2025
REPORT TO CONGRESS

of the

U.S.-CHINA ECONOMIC AND SECURITY REVIEW COMMISSION

ONE HUNDRED NINETEENTH CONGRESS

FIRST SESSION

NOVEMBER 2025

Printed for the use of the
U.S.-China Economic and Security Review Commission
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The Commission, a legislative branch entity, was created on October 30, 2000 by the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001, Pub. L. No. 106–398 (codified at 22 U.S.C. § 7002), as amended by: The Treasury and General Government Appropriations Act, 2002, Pub. L. No. 107–67 (Nov. 12, 2001); The Consolidated Appropriations Resolution, 2003, Pub. L. No. 108–7 (Feb. 20, 2003); The Science, State, Justice, Commerce, and Related Agencies Appropriations Act, 2006, Pub. L. No. 109–108 (Nov. 22, 2005); The Consolidated Appropriations Act, 2008, Pub. L. No. 110–161 (Dec. 26, 2007); The Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015, Pub. L. No. 113–291 (Dec. 19, 2014); and Pub. L. No. 117–286 (Dec. 27, 2022).

The Commission's full charter and statutory mandate are available online at: *www.USCC.gov/charter.*

November 18, 2025

The Honorable Charles E. Grassley
President Pro Tempore of the U.S. Senate, Washington, DC 20510
The Honorable Mike Johnson
Speaker of the U.S. House of Representatives, Washington, DC 20510

Dear Senator Grassley and Speaker Johnson:

On behalf of the U.S.-China Economic and Security Review Commission, we are pleased to transmit the Commission's 2025 Annual Report to Congress. This Report responds to our mandate "to monitor, investigate, and report to Congress on the national security implications of the bilateral trade and economic relationship between the United States and the People's Republic of China." The Commission reached a broad and bipartisan consensus on the contents of this Report, with all 12 members voting unanimously to approve and submit it to Congress.

In accordance with our mandate, this Report, which is current as of October 10, 2025, includes the results and recommendations of our hearings, research, and review of the areas identified by Congress in our mandate, as defined in Public Law No. 106–398 (October 30, 2000) and amended by Public Laws No. 107–67 (November 12, 2001), No. 108–7 (February 20, 2003), 109–108 (November 22, 2005), No. 110–161 (December 26, 2007), No. 113–291 (December 19, 2014), and No. 117–286 (December 27, 2022). The Commission's charter, which includes the 11 directed research areas of our mandate, is included as Appendix I of the Report.

The Commission conducted six public hearings, taking testimony from 50 expert witnesses from government, the private sector, academia, think tanks, research institutions, and other backgrounds. For each of these hearings, the Commission produced a transcript (posted on our website at *www.USCC.gov*). This year's hearings included:

- Made in China 2025—Who is Winning?
- An Axis of Autocracy? China's Relations with Russia, Iran, and North Korea
- Crossroads of Competition: China in Southeast Asia and the Pacific Islands
- The Rocket's Red Glare: China's Ambitions to Dominate Space
- China's Domestic Energy Challenges and Its Growing Influence over International Energy Markets
- Dominance by Design: China Shock 2.0 and the Supply Chain Chokepoints Eroding U.S. Security

The Commission received a number of briefings, both unclassified and classified, by executive branch agencies, the U.S. military, the Intelligence Community, foreign government officials, and U.S. and foreign nongovernmental experts on a range of topics within the Commission's mandate. The Commission includes key insights gained through these briefings either in its unclassified Annual Report or, as appropriate, in a classified annex to that Report.

The Commission conducted official fact-finding travel this year to the Philippines, Indonesia, Vietnam, and Cambodia to hear and discuss perspectives on China's economic, foreign policy, and security activities in the region, U.S.-China relations, and trans-Pacific cooperation. In these visits, the Commission delegation met with U.S. diplomats, foreign government officials, business representatives, academics, journalists, and other experts. The Commission also conducted official fact-finding travel to U.S. technology companies and universities in southern California to enhance its understanding of quantum technologies and better evaluate strategic competition with China in this important sector. Throughout the year, the Commission relied substantially on the work of our excellent professional staff and outside contracted research (see Appendix IV) in accordance with our mandate (see Appendix I).

The Report includes 28 recommendations for congressional consideration. The Commissioners agreed that ten of these recommendations, which appear on page 29, are the most important for congressional action. The complete list of recommendations appears on page 677 at the conclusion of the Report.

We offer this Report to Congress in the hope that it will be useful in helping guide policies to better address the economic and national security implications of the U.S.-China relationship, while advancing American interests and values. Thank you for the opportunity to serve. We look forward to continuing to work with Members of Congress in the upcoming year to address issues of concern in the U.S.-China relationship.

Sincerely,

Reva Price
Chair

Randall Schriver
Vice Chair

Commissioners Approving the 2025 Report

Reva Price, Chair

Randall Schriver, Vice Chair

Hal Brands, Commissioner

Aaron Friedberg, Commissioner

Carte P. Goodwin, Commissioner

Joshua Hodges, Commissioner

Michael Kuiken, Commissioner

Leland R. Miller, Commissioner

Livia Shmavonian, Commissioner

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Chris Slevin, Commissioner

Jonathan N. Stivers, Commissioner

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INTRODUCTION

In 2025, Beijing's diplomats traversed the world claiming that China—and not the United States—is the more responsible steward of international order and the global economy. Yet China's actions show that this rhetoric is far from the reality. Despite facing serious economic strains, over the past year Chinese leaders have continued to funnel state resources into high-tech manufacturing, expand evasive and coercive economic tools, export their problems abroad by flooding global markets with state-subsidized excess supply that distorts global prices and weakens competitors, and weaponize their leverage over supply chain chokepoints. Beijing has intensified its destabilizing gray zone activities, advanced its preparations for potential military conflict, and deepened its coordination with malign actors like Russia and Iran. Beijing has also continued its concerted efforts to establish regional economic and military hegemony in Southeast Asia and the Pacific Islands as stepping stones for projecting power toward its long-term goal of displacing the United States as the dominant power in the Indo-Pacific and, eventually, the world.

Industrial Policy and Imbalances Lead to Two-Speed Economy

In the concluding year of its Made in China 2025 industrial plan, China now possesses a hyper-charged, state-directed manufacturing base without historic parallel. Chinese firms count numerous successes in meeting ambitious market share and localization goals under policies like Made in China 2025. Yet the economy's greatest gains are not in exports or value-added growth but rather in the cumulative and overlapping capabilities of its industrial capacity built through years of state support and other distortive practices. China is now positioned to develop and scale new technologies and attain first-mover advantage in many industries of the future. At the same time, China's broader economy continues to experience malaise and structural weakness due to years of broken promises to rebalance. China's desire to move up the value chain, reduce its dependence on foreign technology, and make the world more dependent on its output means it will continue massive, distortionary policy support for strategic and favored sectors, even if that means slower growth elsewhere in its economy. This dual-speed trajectory of industrial overcapacity amid consumer stagnation poses a direct risk to U.S. competitiveness and the resilience of global markets.

China Shock 2.0

In 2025, China is on track to run the greatest trade surplus with the world, exceeding its own historically unprecedented $992 billion surplus in 2024. While China professes to be a responsible steward of the global economy, in practice it has continued to flout interna-

tional trade rules even as it is the biggest beneficiary of those rules. Its heavily state-distorted economic model has resulted in systemic dumping and massive excess supply, which is now flooding emerging markets—causing major job losses and hurting the manufacturing sectors of developing economies all over the world. Thus far, Southeast Asia has been ground zero for this "second China Shock." China's surging exports of low-cost products like textiles and electronics to Southeast Asia have already led to hundreds of thousands of job losses in Indonesia and contributed to thousands of factory closures in Thailand. These distortions are rippling outward, driving price collapses, political instability, and new dependencies across Africa, Latin America, and Eastern Europe. Without concerted efforts to counter China's unfair trade practices, China's economic model will continue to cause economic harm to countries around the world for years to come. Left unchecked, this wave of predatory overcapacity threatens to hollow out not only developing economies but also key segments of U.S. and allied manufacturing—eroding the industrial base essential to national security.

Leveraging Supply Chain Chokepoints and Security Vulnerabilities

For at least the past five years, China has deliberately pursued a strategy of expanding production and deepening global dependence on Chinese exports while reducing its own reliance on imports. This strategy builds on decades of industrial policy that led to a concentration of supply chains in China and undercut competitors by flooding global markets with subsidized, underpriced goods. It parallels a trend of China sharpening its economic statecraft toolkit and escalating economic coercion against foreign countries, firms, and individuals. In 2025, these trends converged as China leveraged its monopoly over the processing of rare earth elements in trade negotiations with the United States, imposing export restrictions on critical minerals and magnets essential to a range of manufacturing industries and defense technologies. While Beijing has recently relaxed some of these restrictions, it is also tightening its enforcement capabilities for the future—signaling its readiness to weaponize these chokepoints again when politically advantageous.

Beijing's successful use of economic coercion in bilateral trade negotiations highlights an open question for the future of U.S.-China relations: does the United States continue to have escalation dominance in imposing economic restrictions on China? Growing evidence suggests that advantage may be eroding. Critical minerals are only one example of China's leverage over essential supply chains, and the consequences of China weaponizing other chokepoints could be devastating. Chinese producers wield significant control over active pharmaceutical ingredients and key energy infrastructure equipment, and China is investing heavily to gain such leverage over foundational semiconductors. If China cut off access to these items, it could deprive Americans of lifesaving medicines and cause significant harm to the U.S. economy.

The prevalence of Chinese components—especially internet-connected devices with remote access capabilities—in U.S. critical infrastructure provide Beijing with yet another disturbing source

of leverage over the United States. Chinese state-sponsored cyber actors such as Volt Typhoon pre-position assets inside of U.S. critical infrastructure, potentially enabling Beijing to disrupt U.S. power, communications, water, banking, transportation, and other vital systems in the event of a crisis or conflict. These intrusions amount to an operational rehearsal for coercion below the threshold of war.

Undermining Global Stability, Security, and Prosperity

Over the past year, China's external propaganda has accused the United States of undermining international order and attempted to cast Beijing as a force for global stability. In fact, however, China has only intensified its destabilizing gray zone activities in the Indo-Pacific and around the world. China's reckless maneuvers targeting the Philippines in the South China Sea—including one incident that ironically led to a collision of two Chinese vessels in August 2025—have come alarmingly close to killing a Filipino mariner and potentially triggering the U.S.-Philippines Mutual Defense Treaty. China has also globalized its gray zone operations—extending its coercive tactics beyond the first island chain by sabotaging undersea cables, conducting unannounced live-fire military exercises in the Tasman Sea, and launching cyberattacks targeting telecommunications networks across dozens of countries. These actions are designed not only to intimidate neighbors but also to test allied resolve, normalize Chinese coercion, and fragment collective responses. Besides its own malicious activities, Beijing continues to fuel violent conflicts in Ukraine and the Middle East by providing dual-use technologies to Russia and Iran. Beijing's support enables Moscow and Tehran to prolong wars of aggression while refining methods of sanctions evasion and battlefield coordination with direct application to a future Taiwan contingency. In all of these cases, China attempts to cloak its actions beneath a thin veneer of plausible deniability or legal justification, enabling Beijing to present itself a source of stability even as it undermines the very international order it claims to uphold.

Advancing Preparations for a Potential Conflict

China has continued to rapidly advance its capabilities to launch a successful invasion of Taiwan. The People's Liberation Army's (PLA) intensifying military activities near Taiwan—along with its introduction of new platforms designed to support an amphibious attack—have made it so that the PLA could pivot from a routine exercise to an actual blockade or invasion with almost no advance warning. Moreover, a troubling divergence has emerged between China's English-language and Chinese-language propaganda about Taiwan—a split that suggests Beijing may be taking initial steps to prepare its people for the possibility of war. Whereas Chinese statements aimed at international audiences downplay the possibility of an invasion, China's domestic propaganda has stated that Taiwan's "provocations" could justify military action in the near future. While there is no indication that China is planning an imminent invasion—and Beijing still hopes to pressure Taiwan to surrender without a fight—the United States and its allies and partners can

no longer assume that a Taiwan contingency is a distant possibility for which they would have ample time to prepare.

Beyond its specific efforts to enhance capabilities for a Taiwan contingency, Beijing has continued to rapidly modernize its military forces across all domains with the goal of being able to fight and defeat "strong enemies" like the United States. China views space as a crucial warfighting domain, and the PLA is rapidly expanding space and counterspace capabilities that could be used to target U.S. forces in the Indo-Pacific and incapacitate U.S. space-based assets. Beijing's investment in counterspace systems—including direct-ascent anti-satellite weapons and co-orbital interference platforms—illustrates its strategy of blinding and disorienting U.S. forces in the opening phase of a conflict. China also continues to pour significant resources into over-the-horizon technologies such as artificial intelligence and quantum computing that have dual-use purposes and could accelerate China's military and intelligence capabilities.

In addition to modernizing its own capabilities, China's deepening cooperation with Russia, Iran, and North Korea has enabled these pariah economies to withstand multilateral economic restrictions, undermining U.S. statecraft and providing China with a live testbed for sanctions evasion and wartime logistics. These countries cooperate in efforts to supplant the existing world order with one more conducive to their authoritarian, destabilizing regimes. The mutual support between these countries enables each to act more aggressively, providing Beijing with a network of partners capable of supporting it in a military crisis. Even if they chose not to intervene directly, these countries could assist Beijing through military technology transfers, diversionary regional pressures, or economic and energy lifelines, complicating U.S. and allied crisis response planning and stretching deterrence across multiple theaters.

Seeking Hegemony in the Indo-Pacific

While China seeks to undermine existing international institutions, norms, and U.S. global leadership, it has also been working to ensure its own authoritarian hegemony in the Indo-Pacific region. After decades of systematically expanding its economic influence in Southeast Asia and the Pacific Islands, Beijing is now wielding its economic leverage to secure greater military access and security influence. For years, Beijing has pursued access to bases and dual-use facilities in the region. Now, these efforts are converging into an integrated network of logistics hubs, ports, and surveillance outposts designed to support power projection and sustain operations far from China's shores. Beijing has also used regional partnerships with internal security forces throughout Southeast Asia and the Pacific Islands to gain the allegiance of local leaders by helping them maintain power through authoritarian policing practices and high-tech surveillance. Beijing's "inside-out" approach to expanding its security influence aims first to gain a foothold within the internal security apparatuses—which it can then use as a source of leverage to shape their external security behavior. Most recently, China has exploited the growing crisis of scam centers operated by Chinese crime syndicates—many of which spread throughout Southeast Asia with, at a minimum, implicit backing from elements of the Chinese

government—as a pretext to further expand the presence of its internal security forces in the region. This blurring of criminal, commercial, and security activities allows Beijing to embed influence under the guise of law enforcement cooperation, normalizing its extraterritorial reach.

Beijing's ambitions to convert its economic power into greater security influence do not stop in the Indo-Pacific. Rather, Beijing has explicitly referred to regions like Southeast Asia and the Pacific Islands as "pilot zones" for refining strategies it can use to expand its influence on a global scale. These pilot zones serve as laboratories for authoritarian governance exports, technology standards, and coercive finance practices Beijing is already applying in Africa, Latin America, and Central Asia. By perfecting its control model close to home, China is building the architecture for global authoritarian resilience.

Looking Ahead: The Global China Challenge

Countering China's aggression is now a truly global challenge. Beijing's increasing military power projection and technological capabilities—as well as its deepening coordination with Russia, Iran, and North Korea—demand that the United States work closely with allies and partners to address interconnected, cross-regional security threats in multiple geographic areas. Enforcing export controls and securing supply chains by preventing transshipment and reducing exposure to Chinese inputs are likewise global challenges that will require close coordination with allies and partners in every region of the world. Beijing's recent actions demonstrate that a China-dominated world order would be less stable, less secure, less prosperous, and less free. Such an order would be defined by weaponized interdependence, state surveillance, and coercive control over global norms. It will be incumbent upon the United States to counter Beijing's bid for hegemony with a positive vision for the future that promotes prosperity, security, and freedom at home and around the world. Meeting this challenge will require not only defensive measures but also a proactive strategy to rebuild U.S. industrial strength, shape international rules, and lead coalitions that can compete with China's scale and ambition.

EXECUTIVE SUMMARY

Part I: The Year in Review

Chapter 1: U.S.-China Economic and Trade Relations (Year in Review)

China's economic system is under serious strain. High debt levels and eroding fiscal capacity have constrained Chinese officials' means to address the domestic slowdown without more serious structural reform, which remains unlikely for political reasons. The result is increasingly a two-speed economy, whereby broader economic growth remains under substantial pressure while priority areas for the Party such as advanced manufacturing continue to see plentiful policy support and access to capital. Domestic consumption remains tepid amid mounting concerns over stagnant wages, unemployment, high household debt, and a weak social safety net. Amid the deflation of the property bubble, manufacturing remains the government's growth driver of choice, even as the measures China is taking to bolster this sector are having an increasingly adverse impact on its trading partners. Facing a glut of manufactured goods and weak domestic demand, Chinese factories are redirecting much of this excess supply abroad, part of a dynamic that is contributing to a "China Shock 2.0."

China faces additional challenges from new U.S. and other tariffs on Chinese exports, sparking it to engage in retaliatory measures while also exposing the interconnected nature of supply chains for critical technologies. Rising economic tensions have collided with mounting concerns over China's growing technological prowess. U.S. measures to limit China's progress, such as bans on advanced semiconductor exports, have been pulled into broader trade negotiations as bargaining chips. China has also employed its own sources of leverage, targeting individual U.S. companies with punitive measures and ramping up restrictions on critical minerals exports. As economic relations between the United States and China have worsened, Chinese producers are looking for more receptive markets in third countries. China's manufacturing sector is both globally dominant and increasingly a source of concern among its trading partners, even as Beijing shows little intention of changing course on its market-distorting industrial policies. Therein lies the dilemma: China's self-portrayal as a responsible member of the international economic system is directly at odds with its status as perhaps the world's most structurally unbalanced economy.

Key Findings

- Despite over a decade of pledges to rebalance from export- and investment-led growth toward greater domestic consumption—claims repeated throughout 2025—China's economy has deep-

ened its reliance on export-oriented manufacturing in recent years. Especially as its property crisis deepens, China has doubled down on an economic model based on supply-side support to boost production, often resulting in far more products than domestic demand can absorb, with the intent of becoming the dominant global exporter of all types of manufactured goods and materials.

- China has made limited progress, at best, toward rebalancing its economy to promote domestic consumption as a greater driver of growth. Sluggish financial markets, falling property values, and weak wage growth are all significant headwinds, and the recent modest uptick in consumption indicators is primarily due to temporary measures used to pull forward growth.
- If exports falter and efforts to redirect the economy toward greater domestic consumption remain politically non-viable, China has limited other sources of growth to propel its economy forward without backtracking on its progress to deflate the real estate bubble and control rising levels of debt.
- As we approach the 25th anniversary of China's accession to the WTO, China remains a major beneficiary of the global rules-based trading system despite flouting the rules and maintaining an unbalanced, state-led economy fundamentally inconsistent with that system.
- While Chinese officials tout China's openness to foreign investment, the government routinely takes measures adverse to the interests of foreign businesses. Multiple U.S. firms' operations in China have come under threat as a point of leverage in trade negotiations.
- U.S.-China technology competition shapes significant aspects of the U.S.-China economic and security relationship, with global impacts magnified in sectors reliant on advanced semiconductors and artificial intelligence (AI). Chinese companies have made notable progress in these and other key technologies despite U.S. and allied export controls intended to limit China's access to the most advanced technologies.
- China has sought to soften the impact of U.S. tariffs by increasing exports to other countries, while Chinese companies are increasingly offshoring manufacturing capacity, both to avoid tariffs as well as to ensconce themselves deeper in key supply chains. To seek leverage against the United States, China has implemented retaliatory tariffs and export controls on critical minerals and rare earth magnets. China has also targeted retaliation at specific U.S. firms.
- China continues its efforts to position itself as the reliable partner of choice for trade and investment, particularly with emerging markets. At the same time, a variety of countries, including many of those same emerging market countries, have begun to implement their own tariffs and other barriers to safeguard their manufacturing industries from China's massive excess supply.

Chapter 2: U.S.-China Security and Foreign Affairs (Year in Review)

Over the past year, China has sought to present itself as a responsible world leader despite engaging in a range of destabilizing activities that have undermined global peace and security. General Secretary of the Chinese Communist Party (CCP) Xi Jinping has persisted in challenging U.S. global leadership and asserting China's position on the world stage, including by hosting dozens of world leaders for a Shanghai Cooperation Organization (SCO) summit in Tianjin followed by a military parade in Beijing. China has also escalated its use of gray zone tactics—coercive military, economic, and influence operations short of war—against Taiwan, in the South China Sea, and around Japan's Senkaku Islands. Beyond its own borders, Beijing has continued to stoke violence and instability by supplying dual-use goods to Russia and otherwise helping sustain its war against Ukraine, funding Iran and its terrorist proxies in the Middle East, and intensifying cyberattacks on the United States and countries around the world.

China's efforts to undercut U.S. credibility and advance its own interests overseas have also been supported by its approach to domestic governance. Over the past year, China has deepened its anticorruption campaign with the aim of quashing internal dissent, forged ahead with its military modernization efforts, and continued its longstanding efforts to control religious institutions it sees as fueling separatism and undermining Party rule. Considered in the aggregate, these actions reflect Beijing's continued rapid preparations for the possibility of conflict and its systematic efforts to erode U.S. deterrence across the military, economic, technological, cyber, and diplomatic domains.

Key Findings

- China has used the pretext of a "turbulent" external environment to justify its ongoing campaign to quash internal dissent and enforce absolute political loyalty to the CCP. Over the past year, China has sharply increased spending on domestic public security, punished officials for disciplinary infractions at record rates, and continued to purge senior military leaders perceived as insufficiently loyal.
- Despite purges of key military leaders, China's People's Liberation Army (PLA) significantly advanced its military modernization efforts over the past year—increasing its stockpile of nuclear warheads, introducing new amphibious assault ships and stealth fighter jets, expanding its drone deployment capacity, and enhancing its capability to launch an attack on Taiwan with little advance warning. China is increasingly willing to use PLA capabilities to send political messages, as demonstrated by unprecedented naval live-fire exercises conducted in the Tasman Sea off the coast of Australia and New Zealand.
- Beijing has continued its efforts to construct an alternative world order with itself at the center—symbolized most powerfully in 2025 by images of the leaders of Russia, North Korea, Iran, and about 20 other mostly authoritarian countries gath-

ered behind Xi Jinping at a military parade in Beijing commemorating China's victory in World War II.

- In meetings with leaders from Asia, Africa, and Latin America, China has sought to undermine U.S. credibility and bolster its credentials as a leader of the "Global South" by accusing the United States of disrupting international order while professing its own commitment to free trade, development assistance, and international law—despite often failing to follow through on such promises.
- While claiming to be a source of international stability, China has continued to threaten global security by undertaking gray zone activities in the Indo-Pacific and around the world. China routinely engages in provocative military maneuvers near Taiwan and in the South and East China Seas, has sabotaged critical undersea communications cables near Taiwan and in the Baltic Sea, and has escalated cyberattacks on the United States.
- China has also fanned the flames of conflict by supplying dual-use goods to sustain Russia's war in Ukraine, funding Iran and its terrorist proxies through purchases of sanctioned Iranian oil, and providing North Korea with diplomatic cover and material support that advances its cyber and weapons programs, thereby complicating global efforts to constrain these countries' destabilizing activities.
- Taken together, these actions form a coordinated strategy to prepare China for the possibility of potential conflict while steadily seeking to erode U.S. deterrence and the resilience of allied security networks.

Part II: Efforts to Remake the World Order

Chapter 3: Axis of Autocracy: China's Revisionist Ambitions with Russia, Iran, and North Korea

China, Russia, Iran, and North Korea are forging closer strategic, military, and economic ties that increase their ability—individually and collectively—to challenge the interests of the United States and its allies and partners around the world. These states share common objectives in undermining U.S. global leadership and elements of the international system that promote democracy and human rights, while seeking to reshape them to endorse autocratic rule and the use of coercion and military force to advance national interests. Although the relationships among China, Russia, Iran, and North Korea may not constitute an alliance as traditionally conceived, the partnerships allow the countries to consider the use of force, undertake provocative actions, and otherwise act in ways they could not sustain on their own. This cooperation has intensified since Russia's invasion of Ukraine in 2022, as China, Iran, and North Korea have provided Russia with political, economic, and military support to sustain its war of aggression, allowing it to circumvent U.S. and international sanctions and diplomatic pressure. As the alignment is based more on shared interests and expediency than trust and loyalty, each country may decline to assist meaningfully when coun-

terproductive to their larger objectives, as China and Russia did after the United States struck nuclear facilities in Iran in June.

As the most powerful and systemically integrated of these countries, China has been the "decisive enabler" of this group and its destabilizing activities. By cooperating with—and legitimizing—these heavily sanctioned countries, Beijing has developed significant leverage over them, effectively casting them as junior partners in the relationship. While this dynamic has generated some underlying friction, the advantages gained from their collective power have outweighed the disadvantages. To respond to this increasing alignment among China, Russia, Iran, and North Korea, the United States must work in concert with allies and partners to deter destabilizing activities and prepare to respond to multiple potential regional flashpoints. Unfortunately, the necessity to confront this challenge has come at a time when growing divisions within many democratic societies have undermined their willingness and ability to act in a concerted fashion to resist these efforts.

Key Findings

- China, Russia, Iran, and North Korea are forging closer strategic, military, and economic ties that increase their ability—individually and collectively—to challenge the strategic interests of the United States and its allies. This cooperation is rooted in a shared desire to undermine U.S. global leadership and reshape elements of the rules-based international order, including concepts of sovereign equality, peaceful resolution of conflict, and respect for human rights. Instead, the countries seek an order that favors autocratic governance and their capacity to extend their regional spheres of influence.
- While China, Russia, Iran, and North Korea individually pose a significant threat to U.S. interests, their growing cooperation collectively magnifies the challenge. Each is emboldened to undertake actions it could not sustain on its own, and their cooperative efforts make it far more difficult to secure U.S. national security, economic prosperity, and peace and stability around the world.
- Cooperation among the "axis" countries has deepened since Russia's full-scale invasion of Ukraine in 2022, as Russia has drawn on China, Iran, and North Korea to support its war efforts and to help it overcome the subsequent international condemnation and sanctions. For example, China-Russia bilateral trade has increased 66.7 percent since 2021. Each axis country has also benefited in different ways from its support to Moscow.
- China has played the central diplomatic, economic, and financial role in this informal alignment. These relationships have become increasingly asymmetric, with China effectively casting the others as junior partners. While this dynamic has generated some underlying friction, such tensions have largely been mitigated by shared interests and mutual benefits.
- As the alignment is based more on shared interests and expediency than trust and binding obligation, each country has freedom of action and the ability to decline to participate in a

conflict. This flexibility was evident in the failure of China and Russia to provide support to Iran after the United States struck its nuclear facilities in June.

- China's preference for flexible partnerships over formal alliances reflects its opportunistic approach to diplomacy, in which it seeks to take advantage of a relationship that serves its interests while avoiding entanglements that do not benefit it. Beijing seeks to have it both ways—cooperating closely with these partners that defy international norms and institutions while simultaneously trying to promote an image as a responsible stakeholder to the broader international community that values those norms and institutions.
- China's deepening cooperation with Russia, Iran, and North Korea raises significant concerns for Indo-Pacific security. Their coordination increases the risk of opportunistic aggression, a situation in which one regional conflict creates an opening for another actor to take advantage of the United States' diverted attention and resources to launch operations elsewhere. In a Taiwan contingency, such dynamics could force the United States to face tough choices on escalation and resource allocation. The collaboration among these powers substantially increases the risk of regional conflicts transforming into broader global crises.
- China is the major trade and investment partner for these countries, helping them mitigate the adverse effects of U.S. and multilateral sanctions. Chinese entities have been instrumental in facilitating circumvention of export controls. China's opaque financial system has been vital in money laundering and sanctions evasion by Russian, Iranian, and North Korean agents. Together, China's policies have provided a lifeline that has allowed these countries access to the resources, technologies, and dual-use equipment needed to stay in power and continue destabilizing activities.
- The sum of China's sanctions and export control evasion activities is greater than the individual components. China's role as a hub for a diverse array of countries' sanctions evasion activities effectively allows for pooling of resources and economies of scale for companies and service providers that facilitate sanctions evasion. The network effect of Chinese and non-Chinese actors creates shared learning opportunities about evasion tactics, presenting new challenges for sanctions strategy and enforcement.

Chapter 4: Crossroads of Competition: China and Southeast Asia

As a region, Southeast Asia constitutes the world's third-largest population center and fifth-largest economy and straddles strategic sea lanes connecting the Indian Ocean to the Western Pacific—making the region a crucial arena for U.S.-China competition. Beijing has long viewed Southeast Asia as its own "backyard" and has sought to establish economic and military dominance in the region as part of its overall strategy for weakening U.S. power in the Indo-Pacific.

China has made large and sustained investments in expanding high-level diplomacy, security relationships, soft power programs,

and influence operations in Southeast Asia. China's goal is to entrench itself as the regional hegemon while undermining the United States' reputation with both policymakers and the publics in Southeast Asian countries. On the military front, China has pursued access to bases and dual-use facilities in Southeast Asia while deploying aggressive gray zone tactics to advance its unfounded territorial claims in the South China Sea—risking embroiling the region in a devastating military conflict. At the same time, China has sought to expand its cooperation with Southeast Asian countries on non-traditional security issues such as transnational crime as a means to export authoritarian policing practices and expand its security influence in the region.

Beijing has also amassed significant economic leverage in the region. China is Southeast Asia's largest trading partner, and countries in the region have been among the top destinations for China's Belt and Road Initiative (BRI) projects. Chinese companies have invested heavily in the region's critical infrastructure, including telecommunications equipment, electrical grids, data centers, and undersea cables, exposing Southeast Asian countries and—potentially—U.S. firms and military assets in the region to data security and sabotage risks. China's efforts in Southeast Asia—alongside its campaign to erode U.S. partnerships and gain access to dual-use infrastructure in the Pacific Islands—threaten the United States' ability to protect its economic and security interests throughout the Indo-Pacific region.

Key Findings

- China views establishing regional economic and military hegemony in Southeast Asia as core to its strategy to undermine U.S. power in the Indo-Pacific. China's overarching goals in the region include full control of the South China Sea, expanding access to basing and dual-use infrastructure for its military, guaranteeing the People's Liberation Army (PLA) Navy's access to crucial sea lanes, providing land access to the Indian Ocean around the chokepoint of the Strait of Malacca, and keeping Southeast Asian markets open to Chinese exports and investment. At the same time, China is working to ensure that Southeast Asian countries do not provide access and logistical support to the United States in the event of conflict in the Indo-Pacific.
- Over the past two decades, China has increased its influence in Southeast Asia relative to the United States by devoting extensive resources to diplomacy and soft power initiatives alongside its growing trade and investment ties with the region. More recently, China has sought to exploit changes in U.S. trade policy and foreign aid to present itself as the more reliable partner for regional countries' development goals.
- China has taken increasingly coercive actions to assert its control over the South China Sea, an area of tremendous strategic significance to the country and one of the busiest maritime trade routes in the world. China's aggressive actions in the South China Sea, especially those targeting the Philippines—a country with which the United States has a mutual defense

treaty—make the region a potential flashpoint for U.S.-China military conflict.

- In addition to pursuing access to military facilities in Southeast Asia, Beijing has adopted an "inside-out" approach to expanding its security influence in the region that aims to gain a foothold inside the internal security apparatuses of regional countries—which it can then use as a source of leverage to constrain their external security behavior. China has deployed its internal security forces in several Southeast Asian countries—including Burma (Myanmar), Cambodia, and Thailand—in an attempt to gain the allegiance of regional leaders by helping them maintain "regime security" through authoritarian policing and surveillance methods.
- Chinese crime syndicates operate industrial-scale "scam centers" across Southeast Asia that generate tens of billions of dollars in annual revenue by employing forced laborers to conduct online scams under conditions observers have likened to modern slavery. Beijing has selectively cracked down on scam centers that target Chinese victims, leading Chinese criminal organizations to conclude that they can make greater profits with lower risk by targeting the United States instead. According to conservative estimates, Americans lost at least $5 billion to such scams in 2024. Scam centers have also provided a pretext for China to expand its security presence in the region by pressuring Southeast Asian countries—including U.S. allies such as Thailand—to allow Chinese security personnel to operate on their territory.
- China has expanded its economic ties with Southeast Asia through trade and is growing its foreign direct investment (FDI) in strategic sectors like manufacturing and technology. China is the leading trade partner with ASEAN as a whole and with almost every ASEAN country individually. These extensive trade and investment ties, combined with ASEAN's continued rapid growth and "the ASEAN way" favoring "neutrality" in geopolitics, indicate that Southeast Asia is likely to be the locus of significant economic competition between the United States and China.
- Southeast Asia's trade relationship with China has become increasingly unbalanced in recent years, with the region's trade deficit almost doubling between 2020 and 2024 amid a surge in exports from China. This trend reflects efforts by Chinese exporters to find markets other than the United States, the shifting of intermediate supply chains to avoid tariffs, and an accelerated flow-over from China's massive and growing domestic excess capacity in many manufacturing industries. Southeast Asia may be ground zero for the second China Shock.
- China's dominance of regional supply chains and control over critical infrastructure provide it considerable leverage to further its strategic aims. Although Southeast Asian countries are cognizant of risks associated with those ties to China, geographic reality and China's position as the largest external trade

partner for the region constrain their ability to respond to this threat.

- Chinese technology firms are competing with U.S. and European firms for dominance in Southeast Asia's digital infrastructure. The presence of Chinese providers and equipment in telecommunications networks, data centers, and undersea cables exposes host countries to data security and potential sabotage risks. These risks may also impact U.S. firms and military assets operating in the region.

Chapter 5: Small Islands, Big Stakes: China's Playbook in the Pacific Islands

As the United States' gateway to the Indo-Pacific region, the Pacific Islands occupy a crucial position in U.S.-China strategic competition. While the United States has relationships with many Pacific Islands dating back more than a century, China's systematic efforts to build influence in the region over the past few decades have heightened the Pacific Islands' strategic significance to the United States and its allies and partners. For Beijing, the Pacific Islands region is crucial to its goals of projecting military power and hindering the United States' ability to flow forces across the Pacific in the event of a conflict in the Taiwan Strait or the broader Indo-Pacific region. In pursuit of these goals, China has sought to enhance its status in the Pacific Islands through diplomacy and strategic investments while also attempting to undermine U.S. relationships through a systematic campaign of malign influence activities, including cyberattacks, economic coercion, and disinformation.

China has become a key trade and investment partner for virtually every Pacific Island country, enabling it to wield economic leverage that helped convince several countries in the region to abandon diplomatic ties with Taiwan and support Beijing's policy preferences in international organizations. Over the past several years, China has also begun to use its economic and political influence in the region to push for new security partnerships and police cooperation agreements with Pacific Island countries, laying the groundwork for Beijing to gain access to dual-use facilities at strategic points throughout the region. If China succeeds at establishing itself as the dominant power in even a small number of the Pacific Islands, it could—alongside China's efforts to project military power in Southeast Asia—hinder the United States' ability to protect its interests in the Indo-Pacific and significantly alter the global balance of power in Beijing's favor.

Key Findings

- Beijing views the Pacific Islands region as essential to its goals of blunting U.S. military power in the Indo-Pacific, projecting its own power beyond the second island chain, and isolating Taiwan diplomatically and militarily. China has invested significant resources into a multifaceted strategy to expand its influence and undermine U.S. relationships across the region to achieve these objectives.
- Over the past two decades, China has systematically expanded high-level diplomacy, propaganda, people-to-people exchanges,

media penetration, and malign influence activities in the Pacific Islands in an attempt to shape the region's information environment in ways favorable to Beijing and harmful to the United States and its allies and partners.

- China has spent decades building economic influence in the Pacific Islands. China is now a major trade partner for almost every Pacific Island country, far outpacing the United States and even overtaking traditional partners like Australia. The dependence of Pacific Island economies on exports to China and Chinese tourism have exposed the region to China's economic leverage and coercion. China has also exploited its investments in the region to engage in elite capture, entrench preferred providers in critical infrastructure, and develop control over critical resources.
- Over the past several years, China has leveraged its political and economic influence to expand security and police cooperation with Pacific Island countries, enabling Beijing to promote authoritarian security norms and potentially lay the groundwork for access to dual-use facilities.
- The United States has deep ties to the Pacific Islands that long predate the more recent efforts by China to build influence and undermine U.S. partnerships in the region. In response to China's growing presence in the region, the United States and like-minded countries such as Australia and Japan have taken significant steps to further enhance ties with Pacific Island countries.
- Nevertheless, China is working to exploit reductions in U.S. diplomatic and development assistance in the region and advance the narrative that China is the more stable long-term partner. The relative weakening of U.S. influence in the Pacific Islands could have severe implications for U.S. power projection in the Indo-Pacific, potentially hindering the United States' ability to deter Chinese military aggression in the South China Sea, the Taiwan Strait, and globally.

Part III: Competition in Contested Frontiers

Chapter 6: Interlocking Innovation Flywheels: China's Manufacturing and Innovation Engine

In the decade since launching Made in China 2025 (MIC2025), the Chinese Communist Party's (CCP) industrial, science, and innovation policies have multiplied and expanded in scope. China deploys an arsenal of tools to execute these policies and affect its capacity to develop and produce advanced technology. The evidence shows that comprehensive strategic planning, massive state funding, and adaptive implementation have allowed China to overcome previous industrial policy failures. As roads and bridges act as public goods benefiting the entire state, China's policies have constructed an "industrial commons"—a collective resource base Chinese firms can exploit to advance technological capabilities. This industrial commons positions China to develop and support firms that will dominate established markets and control emerging sectors.

Numerous industrial policy successes demonstrate the strength of China's industrial commons and how advances in overlapping industries catalyzed innovation in other technologies or products. China's electric vehicle (EV) industry was built on a range of pre-existing capabilities, including lithium batteries for consumer electronics and a large automobile manufacturing sector. In turn, EVs served as a platform that helped drive innovation in directly related sectors, like battery technology, and in related capabilities, like LiDAR used in autonomous systems. Similarly, China's capabilities in industrial robotics are supporting the emergence of artificial intelligence (AI)-enabled factory production models, promising scalable gains across the manufacturing sector. In synthetic biology, China's sophisticated laboratory infrastructure and growing biotech manufacturing base are positioning it to become a leader in commercializing global scientific discoveries from pharmaceutical to non-pharmaceutical applications, with state-backed facilities enabling rapid translation from research to production at scale.

Key Findings

- Chinese industrial policy has established the landscape for becoming an advanced manufacturing and innovation powerhouse. By conducting industrial policy on an unprecedented scale, China now leads global innovation in many targeted sectors and has built a manufacturing base that is integrated into many legacy and advanced technology supply chains.
- China's industrial policy systematically constructs clusters of interconnected manufacturing capabilities while securing control over foundational technologies. Innovation follows manufacturing, and China is leveraging this approach to generate "interlocking innovation flywheels"—technical advances in one sector rapidly catalyze breakthroughs in adjacent sectors, creating compounding technological advantages that accelerate with each cycle.
- Through MIC2025 and related policies, China has secured dominance in much of the legacy and advanced componentry for today's most prevalent consumer and enterprise technology products. Given that key innovations often happen on the factory floor, China's current dominance gives it a significant leg up in terms of future cycles of iteration and innovation as well as a source of essential components for new technologies.
- China's industrial policy and Party-state control have also positioned it to attain first-mover advantage in technologies of the future, like synthetic biology, quantum technologies, and automation (including humanoid robots). Where the key sectors in MIC2025 mostly reflect mature markets in which China seeks to displace incumbents, becoming the first mover in emerging and nascent technologies would position China to set the future rules of the road.
- Rapid growth in targeted industries has not offset weakness in the broader economy, producing a two-speed economy in which prioritized high-tech sectors contrast with lagging sectors beset by structural economic challenges. All indications suggest

General Secretary of the CCP Xi Jinping will prioritize China's technology ambitions over other policy goals. He believes developing and moving into new technologies can strengthen China's competitiveness vis-à-vis the United States and other prospective competitors. China's expenditure on industrial policy has had a cumulative impact that will continue to drive advances in research and development (R&D) and manufacturing capabilities, meaning that momentum in the high-speed economy will likely continue to grow.

- Overinvestment and overcapacity resulting from China's industrial policies have consistently led to large economic distortions across the value chain for targeted sectors. These distortions often threaten U.S. producers and developing economies attempting to move up the value chain. They also create an environment of intense competition within China as firms compete for market share in artificially expanded markets, forcing firms to increase efficiency, reduce production costs, and repeatedly cut sales prices to stay ahead of rivals. The firms that survive this process, like EV maker BYD, are then typically highly competitive in global markets.
- In the early stages of these product cycles, and often beyond, China's approach is divorced from market principles, and its success largely stems from using subsidies, state coordination, and other nonmarket practices to undercut competitors in foreign markets.

Chapter 7: The Final Frontier: China's Ambitions to Dominate Space

China has embarked on a whole-of-government strategy to become the world's preeminent space power. Beijing views space as a warfighting domain and it seeks to achieve space superiority as a cornerstone of its broader effort to establish information dominance—a prerequisite to controlling the battlespace and gaining operational advantage in future conflicts. To this end, China has rapidly developed, deployed, and operationalized advanced capabilities in space launch, satellites, and ground-based infrastructure spanning its civil, military, and commercial sectors. These advancements are closing the gap in the strategic competition between the United States and China in space.

The People's Liberation Army (PLA) is rapidly expanding its space- and ground-based assets to enhance its battlespace awareness, operational coordination, and capacity for force projection. These capabilities improve China's ability to monitor, target, and challenge U.S. and allied forces across the Indo-Pacific. Over the past decade, China has launched more than 1,000 satellites, dramatically increasing its capacity for persistent surveillance, communications, and precision targeting in support of long-range strike systems. The PLA has also fielded both ground- and space-based counterspace capabilities designed to deter U.S. military action or, in the event of a conflict, degrade U.S. space-enabled operations and power projection. However, as Beijing has expanded its military space capabilities, it has also deepened its own dependency on space assets, potentially creating vulnerabilities of its own. Like any spacefaring nation, this

dependency exposes China to counterspace threats that could disrupt its command and control (C2), precision strike, and situational awareness capabilities in a conflict.

Globally, China has harnessed its ambitious space program to deepen relations with developing countries and expand its space architecture in support of military, commercial, and broader strategic gains. China's rapid progress in establishing a private, though state-directed, commercial space ecosystem in just a decade poses a formidable technological, economic, and geostrategic challenge to the United States. Employing state-led industrial policy and drawing on its vast network of state-owned enterprises in aerospace and defense, China has quickly cultivated a dynamic startup sector focused on seeking to rival U.S. firms in commercial launch and satellite networks. With a growing list of civil space achievements, China is aggressively positioning itself as a global leader in space technology and exploration. It is now seeking to reshape international space governance, influence the development of technical standards, and displace the United States as the world's premier space power.

Key Findings

- China is pursuing an aggressive long-term, whole-of-government campaign to expand its space capabilities across military, commercial, and civil domains with the explicit intent of surpassing the United States. These rapid advances in space pose an escalating threat to U.S. national security, intensify U.S.-China strategic competition for international partnerships, and undermine the ability of U.S. commercial firms to compete internationally.
- China views space as a warfighting domain and has invested heavily in weapons and technologies that can degrade, damage, or destroy the U.S. satellites that provide the backbone of the U.S. military's C2 network as well as its targeting system. By seeking to deprive the U.S. military of the use of space-based assets, the PLA aims to deny the United States the ability to employ its advanced military systems, eroding the foundations of U.S. power projection and joint operations.
- Over the past ten years, China has launched a wide variety of satellites on an aggressive schedule, fielding a growing array of space-based capabilities that has strengthened its ability to coordinate its own operations as well as to conduct the persistent surveillance and targeting of U.S. forces. This effort is part of China's broader strategy to achieve space superiority and strengthen its ability to use long-range precision weaponry to target and disrupt the flow of U.S. forces in the Indo-Pacific.
- China is actively leveraging its space capabilities as strategic tools to expand its geopolitical influence. Through offering other countries the use of its satellite networks, launch services, and space infrastructure, China enhances the resilience and global coverage of its space architecture. At the same time, it draws partner nations more deeply into its technological ecosystem, creating long term strategic and economic dependencies on Chinese technology.

- China's military-civil fusion strategy erases the line between military and civilian space activities, enabling systems and technologies such as satellites, robotic arms, and launch systems to serve both commercial ends and PLA objectives. The dual-use nature of these systems—compounded by blurry lines between state-owned enterprises and nominally private firms—makes it difficult to distinguish commercial innovation from military capability.
- In just ten years, China has dramatically transformed an almost non-existent commercial space sector into a thriving, state-orchestrated startup ecosystem. Fueled by strong government backing and industrial prowess, Beijing is now seeking to cultivate national champions that will challenge U.S. space companies on the global stage at a fraction of the cost. This strategy does not just seek innovation and commercial advancement—it seeks to reshape the competitive balance in what will be the most strategic domain of the 21st century.
- China has achieved major civil space milestones, such as the Chang'e-6 mission returning the first samples from the Moon's far side. These "global firsts" are much more than just about science; Beijing uses them to assert technological leadership to reshape global perceptions of power. The competition now extends beyond symbolic milestones to a contest over who will define the rules, infrastructure, and norms governing space. If the United States cedes leadership, China is poised to advance a state-driven, opaque governance model that could embed long-term global reliance on its systems and standards.
- Losing U.S. leadership in space would amount to relinquishing the advantage first secured during the original space race. China seeks to use its rapid advancements in space to position the country as a technological powerhouse and undermine U.S. prestige and economic competitiveness. Falling behind in space would not only diminish U.S. standing, it would threaten U.S. national security, global influence, technological dominance, and commercial competitiveness in the growing space economy.

Part IV: Exposure to China's Distortions and Coercion

Chapter 8: China Shock 2.0

China's economic model continues to generate a major imbalance between weak domestic demand and excess supply of manufactured goods. China uses its excess capacity to manufacture goods like steel and automobiles at a scale it cannot consume on its own, leading to extreme price wars between producers. Rather than attempt to rebalance its economy, China is exporting its economic distortions in the form of low-priced goods, thereby threatening the world with a second "Shock." This China Shock 2.0 is already upending manufacturing sectors in both developing and developed countries, up and down the value chain, as China's flood of exports is no longer limited to low-value-added goods like furniture and clothing. While these industries are more at risk than before, China has also begun

to produce higher-value-added goods at scale, the result of years of technology theft, government subsidies, and aggressive industrial policies.

The glut of Chinese exports is deepening global market dependence on China and exacerbating supply chain vulnerabilities. Regions like Southeast Asia that once benefited from global trade integration are now at risk of deindustrialization as their exports are undercut by Chinese goods. Germany, South Korea, and Japan are also at risk as their basket of exports increasingly resembles China's. Beyond merely carving out a larger share of global profits for Chinese corporations, China's market dominance is translating into control over chokepoints in key global supply chains for goods like pharmaceuticals and electronics. China's investment in manufacturing facilities abroad undercuts efforts by the United States and its allies and partners to diversify production to other emerging markets.

Responses to this new Shock have been fragmented, relying on outdated tools that no longer match the reality of today's global trading system. Additionally, incentives to push back on these export practices are not always aligned with the desire to continue selling commodities to China or benefiting from Chinese outbound foreign direct investment (FDI). At risk are not just today's factories and jobs in manufacturing: as China floods global markets with its goods, it will gain a more dominant share of key markets, gutting foreign competitors and propelling them into a downward spiral of deindustrialization (the focus of this chapter). This in turn will lead to greater control over critical supply chain chokepoints (the focus of the next chapter). Beijing has already shown its willingness to weaponize its control of the critical minerals sector; a new China Shock will further strengthen China's leverage over supply chains and ability to employ economic coercion to advance its interests.

Key Findings

- The world is facing the threat of a China Shock 2.0, whereby overproduction in key industries across China's highly subsidized manufacturing sector floods outward, causing major harm to industries in other countries. China Shock 2.0 is a manifestation of General Secretary of the Chinese Communist Party (CCP) Xi Jinping's economic plan—massive state subsidies and other distortions to boost production, reliance on foreign markets to absorb the excess supply, and minimal attention to addressing continued, structurally weak domestic demand.
- China's export of excess production is undercutting global competitors and winning market share across the value chain, from commodities to intermediate inputs to finished goods. China's economic model increasingly limits other emerging market countries to the lowest-value-added stages of manufacturing.
- Emerging markets have traditionally been welcoming to Chinese FDI in manufacturing, viewing it as an opportunity to facilitate labor upskilling and the development of local industry. However, Chinese FDI poses potential problems for host countries as well. Chinese officials are increasingly reluctant to allow domestic firms to transfer technology abroad, lessening benefits

to host countries. In addition, Chinese FDI may deepen reliance on Chinese inputs and open the host country to concerns that it serves as a base for Chinese transshipment or tariff evasion.

- In emerging markets, China's surging exports have already led to job losses and factory closures. Emerging market countries have begun to wake up to the threat, employing various tools to push back against China's unfair trade practices and preserve local industry and jobs, with varying degrees of success. International trade agreements have proven less durable protection; in many cases they merely constrain the policy responses of China's trading partners, facilitating the harms from China Shock 2.0, even though China's economic model is inconsistent with the foundational assumptions of those trade agreements.
- China's surging exports of higher-end goods are taking market share from producers in other countries, particularly those in developed countries, including the United States. While emerging markets are imperiled by other aspects of China Shock 2.0, they have little incentive to implement barriers to Chinese exports in those industries that do not compete with local manufacturing. Over time, the long-term harm to U.S. and other non-Chinese producers may be significant. Revenue from foreign markets has helped sustain U.S. economic strength and technological leadership by providing opportunities to scale. Losing this revenue will make it harder to invest in next generation technology.

Chapter 9: Chained to China: Beijing's Weaponization of Supply Chains

China has long made clear its willingness to use its economic heft to advance the Chinese Communist Party's (CCP) strategic interests. In the past five years, however, it has intensified this strategy by prioritizing control over key supply chains. China has already deployed export controls on critical minerals as a coercive tool, including to seek policy concessions in trade negotiations with the United States and to punish other countries. However, critical minerals are just one among several key sectors in which the United States is highly dependent on Chinese sources or could become dependent in the near future.

Other key sectors include active pharmaceutical ingredients (APIs), printed circuit boards (PCBs), and foundational semiconductors—all of which are vital to national security and commercial stability, and for which even short-term, partial disruption could cripple critical industries and military readiness. With potentially as much as one-quarter of all APIs sourced from China directly—or indirectly through India—U.S. pharmaceutical supply chains face a vulnerability that could have drastic consequences for the American healthcare system. PCBs are critical to all electronics—from the simplest to the most advanced. Though Beijing faces practical barriers to restricting Chinese PCB content to U.S. end users, China has substantial and growing leverage in this important sector, both via direct sales to the United States and much more significantly via made-in-China PCBs embedded in global electronics products. Foundational semiconductors are a likely future vulnerability. Chi-

na's breakneck expansion in production capacity threatens to flood the market and put competitors out of business if left unaddressed. In that case, the United States may soon depend on access to China's chip industry for producing a wide variety of electronic devices.

As covered in the preceding chapter, an ongoing flood of low-cost Chinese goods is spilling into global markets amid a second China "Shock," threatening to put global competitors out of business in sector after sector and positioning China for dominance over ever more supply chains. Without bold action to strengthen domestic production, de-risk from potential adversaries, and coordinate more closely with allies and partners, the United States will become ever more dependent on Chinese supply chains while Beijing in turn strengthens its ability to exert leverage via those supply chains by imposing either targeted controls or larger-scale embargoes on critical exports to the United States.

Key Findings

- China has held a dominant position in many global supply chains for years, once concentrated in lower-value products and materials but now extending to advanced technologies. In the past few years, the country's economic coercion toolkit has evolved rapidly in sophistication and impact. China now appears poised to accelerate its weaponization of supply chain chokepoints, potentially imposing significant short-term costs on the United States and other trade partners, eroding industrial resilience, and constraining U.S. policy choices.

- China's economic model systematically leads to a concentration of global productive capacity in industries targeted for state support, and establishing such chokepoints has been an explicit CCP policy goal for years. China's supply chain leverage in key sectors will continue to grow over time if unchecked. To date, the United States and other countries have taken only limited measures to mitigate this threat. In the short-term, China has already shown an ability and willingness to weaponize its dominant position in critical minerals supply chains, including export restrictions on gallium, germanium, and rare earth magnets in 2023–2025.

- China dominates the supply of APIs and other key starting materials (KSMs)—all of which are essential for U.S. drug supply chains. If Beijing actively restricts U.S. access to these materials, the consequences could be catastrophic for U.S. health security, the broader economy, and potentially military readiness.

- China controls roughly half of global production of PCBs, the essential building blocks of virtually all electronic devices on which integrated circuits and other components are mounted. The United States has lost much of its domestic capacity to produce PCBs and has become heavily reliant on Chinese imports. Losing access to this supply of Chinese PCBs would likely shut down U.S. electronics manufacturing across multiple sectors, including those related to defense, aviation, and critical infrastructure.

- China's coming production surge in foundational semiconductors will pose a serious economic and security threat to the United States and other major semiconductor-producing economies. Foundational semiconductors are workhorse components that, while less advanced than leading-edge chips, are critical to the functionality of most electronic devices. Overcapacity in this sector could drive other producers out of business and make the world heavily reliant on Chinese producers for components that form the backbone of both the modern economy and a modern military.
- Because supply chain vulnerabilities can take years to unwind, it is critical for the United States to immediately develop a more effective risk-mapping tool that identifies where Chinese leverage currently exists as well as the sectors where Beijing's leverage will likely grow in the future. In order to eliminate such critical dependencies and avoid them in the future, the United States must formulate and commit to a long-term strategy of supply chain de-risking—requiring close cooperation with allies and partners—to achieve the conditions necessary for greater safety and resiliency.

Chapter 10: Power Surge: China's Electrification Drive and Push for Global Energy Dominance

China's "electrification" strategy is increasing its influence in the global energy sector, which carries a number of risks for the United States. China's economy is rapidly electrifying, adding more hydro, nuclear, solar, and wind power generation in 2024 than Germany's annual total power consumption. Through massive state support and other forms of market distortions, China has become a dominant manufacturer of certain types of equipment at each stage of power generation and consumption. Building on decades of energy infrastructure construction abroad, China's role in global energy systems continues to expand through exports of low-carbon energy technologies and electricity grid components and investment in electric vehicle (EV) and battery factories abroad. The appeal of China's energy technology exports and investments is particularly strong in developing countries, where—aside from offering cheap solutions—China's technologies may mitigate developmental challenges like rural electrification in areas with weak grid infrastructure. The massive scale of China's production and investment across all stages of the electric power system has shifted the trajectory of global markets in a direction that benefits Chinese manufacturers.

The risks for the United States arising from China's expanding exports and investments include supply chain vulnerabilities—given high U.S. reliance on certain materials and products sourced from China—and cybersecurity threats to U.S. critical infrastructure. China supplies over half of the United States' imports of battery energy storage systems and low-voltage transformers, and it is a leading refiner of almost all the critical minerals necessary for the energy sector. Beijing began the process of weaponizing U.S. dependence on Chinese critical mineral refiners in July 2023 and could potentially use its manufacturing capacity in other critical products and materials as economic leverage. The extensive use of Chinese components in the U.S. power grid creates risks for cyber espionage and sabotage—which are significant in light

of China's stated strategy and known activities like People's Republic of China (PRC)-sponsored Volt Typhoon's efforts to pre-position assets in U.S. critical infrastructure. Additionally, China's role in international energy systems expands its geostrategic influence, potentially giving it leverage over U.S. allies and partners or third countries that also depend on China for energy imports or even allow Chinese investment in their energy systems.

Key Findings

- China's government-supported dominance in key "new energy" sectors and growing footprint in global energy systems more generally raise numerous national security concerns for the United States and other countries. These risks include dependency on Chinese exports and technology, with associated leverage accruing to Beijing. Chinese components and systems also raise cybersecurity-related risks to critical infrastructure, which are acute in light of PRC malign efforts like Volt Typhoon.
- China's restrictions on critical mineral exports to the United States demonstrate its willingness and ability to leverage control of energy technology supply chains for economic coercion. Beijing could use similar tactics to undermine U.S. diplomatic objectives and negotiations with third countries. In 2025, firms across North America, Europe, and Asia faced mounting delays and demands for sensitive data during China's mineral export license reviews—turning supply chain chokepoints into instruments of coercion and corporate surveillance.
- China's burgeoning role in global energy systems is occurring through multiple channels: its firms are involved in the construction and operation of energy infrastructure globally, their components are embedded in power systems throughout the world, and its manufacturers are increasingly investing in overseas factories to boost market share abroad.
- China's national energy strategy has been focused on using government policy to grow "electrification" as a means of reducing its reliance on fossil fuel imports, boosting energy efficiency, and reducing pollution and carbon emissions. While it is still the world's leading consumer of fossil fuels, China has made significant progress toward its electrification goals, including by continuing to build coal-fired power plants.
- In light of global trends in favor of reduced carbon emissions, Beijing saw electrification as having benefits not only for its energy policy but also for its goals to become a global manufacturing superpower and grow its geostrategic power. China leveraged access to its market and its industrial policy toolset to become a dominant producer of key "new energy" technologies, including EVs, batteries, solar panels, and core wind turbine components. Its policies have already wiped out solar panel makers in the United States and EU, and similar dynamics threaten foreign producers of EVs, wind turbines, and other low-carbon technologies, undermining efforts to de-risk supply chains. China is also a major producer of key equipment used in energy storage, transmission, and distribution.

Part V: Taiwan and Hong Kong

Chapter 11: Taiwan

We have entered a crucial phase in Beijing's longstanding efforts to impose sovereignty over Taiwan. China is rapidly advancing toward its goal of being prepared to take Taiwan by force—while Taiwan and the United States strive to maintain the capacity to deter a Chinese invasion. China's persistent military activities near Taiwan, combined with new capabilities such as large amphibious assault ships and mobile piers, have enhanced China's capacity to blockade or launch an invasion of Taiwan with little advance warning. Beijing has also continued to escalate its multifaceted pressure campaign targeting Taiwan through military threats, economic coercion, and malign influence activities. Over the past year, Beijing has focused much of its information warfare activities on exacerbating domestic political divisions in Taiwan and driving a wedge between Taiwan and the United States. Moreover, China has continued its efforts to isolate Taiwan in the international arena by pressuring other countries to adopt Beijing's preferred positions and language regarding Taiwan.

In response to China's escalating pressure campaign, Taiwan has made progress enhancing its military deterrence and social resilience through larger and more realistic military exercises, efforts to accelerate the acquisition of new asymmetric defense capabilities, and new measures to counter Chinese malign influence. Taiwan has also continued to leverage its crucial role in technology supply chains—particularly its dominant position in advanced semiconductor manufacturing—to hasten economic diversification away from China. The United States has continued to support Taiwan through weapons sales and security assistance while working with Taiwan to enhance economic ties and build secure supply chains.

Key Findings

- Beijing is attempting to exploit domestic divisions in Taiwan by continuing its two-pronged approach to cross-Strait relations. On the one hand, Beijing has issued harsh threats against Taiwan's Democratic Progressive Party (DPP)-led government, which it accuses of promoting Taiwan independence. On the other hand, Beijing has also stepped up efforts to court opposition leaders, business interests, and youth in Taiwan through promises of economic benefits and cross-Strait exchange programs.
- In light of China's near-constant military training activities and maneuvers near Taiwan, as well as the People's Liberation Army's (PLA) improved military hardware and operational readiness, U.S. and Taiwan military officials have warned that the PLA could implement a blockade within "a matter of hours" and would potentially need only "minimal conversion time" prior to an attack on Taiwan.
- In addition to intensifying its military pressure on Taiwan, Beijing has also expanded a multifaceted campaign to weaken Taiwan's will to resist through economic coercion and inducements, espionage, information warfare, and undersea cable sabotage. Chinese propaganda has focused especially on attempting to

sow doubt about the U.S. commitment to Taiwan by fomenting uncertainty surrounding U.S. policies on Ukraine, tariffs, and semiconductors.

- Taiwan has made progress improving military readiness, enhancing societal resilience, and diversifying its economy. Nevertheless, bureaucratic inertia in the military as well as political gridlock between the DPP-controlled executive branch and the Kuomintang (KMT)-controlled legislature have cast uncertainty around efforts to speed up the modernization of Taiwan's defenses.
- Despite rising tensions with China, Taiwan's economy continued to perform strongly, driven by insatiable global demand for semiconductors and electronics. Taiwan's continued leadership in technology manufacturing processes coupled with efforts to diversify its trade and investment partners have begun to shift dependence away from China, limiting the sting of Beijing's economic pressure campaign.
- Taiwan is now among the United States' top ten trading partners, with goods exported to the United States overtaking those to China for the first time in over two decades. Taiwan's chip manufacturers have pledged record levels of foreign direct investment (FDI) to build semiconductor manufacturing facilities in the United States. As China pursues a strategy of technological and manufacturing dominance, Taiwan's companies will be important partners to prevent over-reliance on Chinese supply chains.

Chapter 12: Hong Kong

Beijing has dissolved the final vestiges of Hong Kong's political freedom, eliminating the last opposition party and expanding on the draconian Article 23 Ordinance to tighten its oversight of Hong Kong's legal system under an expansive definition of "national security." Civil society and free speech have followed similar fates, as authorities have largely succeeded in intimidating Hong Kong's citizens to discourage them from engaging in open opposition. The government has increased vigilance against so-called "soft resistance" at home while offering bounties on dissidents abroad. Nonetheless, attempts to assuage foreign businesses operating in Hong Kong appear initially successful, even as it is clear Beijing sees Hong Kong primarily as an extension of the Mainland's development objectives. Although Hong Kong officials maintain a pretense of independence in order to court international investment, the expansion of "national security" into all domains and pressure on private firms to operate in line with Beijing's political objectives make Hong Kong's system increasingly indistinguishable from the Mainland.

Key Findings

- As the Hong Kong government marked the fifth anniversary of the National Security Law, its ongoing crackdown has eliminated a once vibrant civil society and created an atmosphere of repression comparable to mainland China. The Hong Kong government continues to grant the Mainland authority and over-

sight of the city, passing legislation to award Beijing additional powers to intervene in local law enforcement via the Office for Safeguarding National Security (OSNS).

- Hong Kong security forces have expanded a campaign of transnational repression against leaders of the democracy movement who fled abroad, placing bounties on an additional 15 activists—including two Canadian citizens—canceling passports, and blocking access to their pensions. Authorities have also escalated harassment of activists' family members still in Hong Kong.
- After an exodus of foreign firms following China's imposition of the National Security Law in 2020, a concerted charm offensive to retain international business and rehabilitate Hong Kong's pro-commerce image appears to be bearing fruit. Many foreign firms remain in Hong Kong due to its proximity to mainland China.
- Hong Kong has emerged as an export controls and sanctions evasion hub, facilitating international transactions with and flows of restricted goods and advanced technology to Russia, Iran, and North Korea.
- Beijing's intervention to block CK Hutchison from selling its port investments, including in the Panama Canal, makes clear that Hong Kong firms are now subject to Chinese Communist Party (CCP) directives and that the Party will interfere in commercial transactions to advance its geostrategic objectives. For foreign firms and financial institutions operating in Hong Kong, this interference should be seen as an alarming precedent. Beijing could invoke the National Security Law to intervene in Hong Kong's civil proceedings, and the expanding reach of national security legislation could be used to interfere with transactions even with no mainland China or Hong Kong nexus.

THE COMMISSION'S 2025 KEY RECOMMENDATIONS

The Commission highlights 10 of its 28 recommendations to Congress below. The complete list of recommendations appear at the Report's conclusion on page 677.

The Commission recommends:

I. Congress consider legislation establishing a consolidated economic statecraft entity to address the evolving national security challenges posed by China's systematic and persistent evasion of U.S. export controls and sanctions.

This new unified economic statecraft entity, at a minimum, should include: the Bureau of Industry and Security (U.S. Department of Commerce), the Office of Foreign Assets Control (U.S. Department of the Treasury), the Bureau of International Security and Nonproliferation's Office of Export Control Cooperation (U.S. Department of State), the Defense Technology Security Administration (U.S. Department of Defense), and other appropriate organizations across the executive branch.

This entity should be:

- Integrated into the Intelligence Community with enhanced access to real-time intelligence on evasion networks and real-time intelligence-sharing capabilities with industry to identify emerging evasion tactics;
- Equipped with enforcement authorities comparable to those wielded by the Treasury Department in the financial sanctions sphere, including law enforcement authorities to pursue aggressive enforcement against violators;
- Structured as a direct report to a single cabinet official or the President of the United States so as to ensure strategic coordination across government, unencumbered by the interagency processes; and
- Equipped with resources for technology development, analysis, and international coordination and authority to implement robust verification systems and supply chain tracking technologies.

This recommendation addresses the critical gap between export controls and sanctions as written and their actual enforcement, recognizing that China and Russia continue to successfully circumvent existing safeguards while U.S. technological advantages erode. Modernizing export controls and sanctions infrastructure represents an essential evolution of U.S. economic statecraft for the strategic competition era.

The United States urgently requires modernization of its export controls and sanctions regime to counter China's systematic and persistent circumvention tactics. The current fragmented approach across multiple agencies dilutes accountability and prioritization. Consolidating these authorities under a single entity would create clear ownership, institutional incentives to prioritize enforcement, and concentrated resources dedicat-

ed to countering circumvention. Today's dispersed structure does not enable such focused effort. The Commission notes that Congress passed the Foreign Investment Risk Review Modernization Act of 2018 (FIRRMA), which strengthened the Committee on Foreign Investment in the United States. Since the passage of FIRRMA and the Export Control Reform Act of 2018 (ECRA), economic statecraft has evolved dramatically, revealing significant gaps in enforcement of export controls and sanctions. The Commission defers to congressional committees regarding the optimal organizational placement of this consolidated authority, recognizing that the primary objective is ensuring America's key offensive tools of economic statecraft are modernized, adequately resourced, and strategically coordinated to address 21st-century threats.

II. See the Commission's classified recommendation annex for a recommendation and discussion relating to U.S.-China advanced technology competition.

III. Congress build U.S. pharmaceutical supply chain resilience by increasing visibility into the supply chain, as well as tracking and reducing U.S. direct and indirect dependence on Chinese active pharmaceutical ingredients (APIs) and related key starting materials (KSMs), through legislation that:

- Amends section 3112(e) of the Coronavirus Aid, Relief, and Economic Security (CARES) Act to expand the authority of the U.S. Food and Drug Administration (FDA) to require drug manufacturers to report volume and ultimate origin of APIs and KSMs used in drugs consumed in the United States, including sourcing of Chinese content through third countries. Based on this information, the FDA should:
  - Produce a confidential report analyzing U.S. vulnerabilities to Chinese APIs and KSMs. The report should identify the proportion of U.S. drug consumption that is dependent on foreign APIs and KSMs, determine vulnerabilities, and track trends over time, including anonymized aggregates of increases or decreases in U.S. dependency on China.
- Directs the FDA to identify regulatory authorities and deficiencies to support or incentivize the use of APIs and KSMs from sources with no China origin.
- Directs the Centers for Medicare and Medicaid Services (CMS) to explore the use of procurement and reimbursement authorities to protect the U.S. and allies' API and KSM markets, which could include price floor commitments in support of U.S. industry to protect investments against nonmarket practices and price manipulation.

IV. Congress establish as a strategic national objective that the United States build a resilient bioeconomy industrial base and unlock biology as a general-purpose technology before the end of the decade and support this objective through the following actions:

- Resource the National Institute of Standards and Technology (NIST) to establish a Bio-Measurement Laboratory (BML). The BML should develop, support, and promulgate standards for biological measurements, materials, and models; advance measurement science and tools for biotechnology; and ensure U.S. standards are adopted globally as the foundation of the 21st-century bioeconomy.
- Expand the U.S. Department of Energy's Loan Programs Office's (LPO) lending authority and capacity to include biotechnology projects. Recognizing that the biotechnology sector (outside of pharmaceuticals) faces a financing shortage that threatens U.S. competitiveness, Congress should authorize the LPO to provide loan guarantees and direct loans for biotechnology manufacturing, infrastructure, and commercialization projects. All of these efforts should focus on scaling, not on pilot projects. This expansion should include:
  - Explicit authority for the LPO to finance biotechnology projects under its other lending programs;
  - Appropriations to cover the upfront costs of making biotechnology loans; and
  - Faster application timelines and reduced bureaucratic requirements for biotechnology companies to obtain loans.
- Strengthen and expand the U.S. Department of Agriculture's BioPreferred program to establish the Federal Government as an anchor customer for the bioeconomy by:
  - Establishing binding multi-year procurement commitments for biobased products across federal agencies, with priority for replacing defense and infrastructure materials currently sourced from countries of concern;
  - Expanding BioPreferred program eligibility to include state, local, and tribal governments as well as universities, enabling broader adoption of biobased products;
  - Increasing appropriations for the Biorefinery, Renewable Chemical, and Biobased Product Manufacturing Assistance Program (Section 9003) loan guarantees; and
  - Directing federal agencies to set quantified targets for biobased product adoption in their supply chains and report annually on progress toward reducing strategic dependencies.

The United States currently faces a future in which it depends on China for access to the most cutting-edge biotechnology innovations, sophisticated biomanufacturing equipment, and advanced biomaterials. The coordinated investments in standards development, measurement science, and deployment financing outlined above are essential to ensure the United States leads in the transformation of biology into a general-purpose technology capable of producing up to 60 percent of physical goods in the global economy by mid-century while

maintaining national security, supply chain resilience, and economic competitiveness against strategic competitors.

V. To protect the U.S. power grid from the economic and cybersecurity threats posed by Chinese-made components, Congress should:

- Prohibit the import of energy storage systems with remote monitoring capabilities that are manufactured by or made with technology licensed from Chinese entities.
- Allocate additional funds to the U.S. Department of Energy for grid expansion, modernization, and cybersecurity grant and loan programs and prohibit the use of those grants and loans to purchase goods or services or license technology from entities that pose a cybersecurity risk to the U.S. power grid to be designated by the Secretary of Energy, in coordination with the Secretary of Defense, Secretary of Homeland Security, the Director of the National Security Agency, and the heads of other federal departments and agencies, as the Secretary determines appropriate.
- Direct the Department of Energy and Federal Energy Regulatory Commission to strengthen supply chain risk management requirements for interstate electric transmission utilities by:
  - Requiring utilities to identify all Chinese-origin components within their high- and medium-impact bulk electric system and protected cyber assets;
  - Developing requirements to prohibit the installation of or mitigate the cybersecurity risk posed by those components;
  - Requiring that future procurement of such cyber assets come with full software, firmware, and hardware bills of materials;
  - Mandating that interstate transmission utilities report on their use of Chinese-origin components to their distribution utility customers; and
  - Coordinating with the U.S. Department of Homeland Security and other relevant agencies to provide technical assistance to implement these requirements.

VI. Congress strengthen the U.S. Department of Commerce, Bureau of Industry and Security's (BIS) ability to manage strategic competition with China in fast-moving technology sectors, such as leading-edge semiconductors used in artificial intelligence (AI) applications, and increase congressional oversight, including by:

- Directing BIS to use existing authorities to require tracking technology for export-controlled advanced chips to detect and combat diversion to countries of concern;
- Shifting the U.S. export control regime on advanced chips from a "sell" model to a "rent" model by mandating that any advanced chips above a certain threshold that are not des-

ignated as prohibited for export be accessible exclusively via the cloud. To do this, BIS shall create a license exception in the Export Administration Regulations for renting cloud access to export-controlled AI compute infrastructure with performance capabilities above a certain threshold to entities in countries of concern:

  - BIS shall determine the applicable compute threshold, with periodic adjustments as necessary to ensure the threshold adequately mitigates national security risks while keeping pace with technological developments and other trends; and
  - BIS shall require licensees to implement know-your-customer (KYC) identification programs and report suspicious activity proactively to the agency when entities domiciled within or controlled by countries of concern attempt to access the cloud infrastructure outside of approved licensing procedures or when approved entities use rented cloud infrastructure for suspected military or espionage purposes.

- Directing the Administration to establish a systemic, integrated intelligence unit embedded at BIS, including analysts from the Intelligence Community, to formally integrate technical, analytic, financial, and collection expertise to improve enforcement and to report to relevant committees of Congress outlining the additional resources, authorities, capabilities, and subject matter experts needed to anticipate and counter evasion strategies;
- Directing the agency to move all items subject to a "presumption of denial" license application review standard for export to China or a Chinese entity to a "policy of denial." This would ensure the agency's policy prioritizes national security in assessing export license applications for applicable items on the Commerce Control List or for technologies provided to companies on the Entity List; and
- Establishing a whistleblower incentive program for private citizens providing information on export control violations, similar to the program available to the U.S. Department of the Treasury under 31 U.S.C. § 5323.

The recommendation seeks to address important needs in enhancing BIS's capacity to enforce export controls consistent with congressional intent in the Export Control Reform Act of 2018. It complements the Commission's economic statecraft entity recommendation in Chapter 3 for long-term strengthening of economic statecraft functions into a single entity while recognizing that implementation of such a recommendation to Congress is likely a multi-year process and BIS enforcement needs are urgent and ongoing.

VII. Congress establish a "Quantum First" by 2030 national goal with a focus on quantum computational advantage in three mission-critical domains—cryptography, drug discovery, and materials science. To achieve this ambitious national goal, the

Commission recommends Congress should take the following actions:

- Provide significant funding for U.S. quantum development, focused on scalable quantum computing modalities, secure communications, and post-quantum cryptography. To secure U.S. leadership, Congress should pair this funding with quantum workforce development initiatives, including expanded fellowships, talent exchange programs with allies, and dedicated curricula aligned with mission needs.
- Prioritize modernization of enabling infrastructure, including cryogenic laboratories, quantum engineering centers, and next-generation fabrication and metrology facilities. These assets are essential to converting scientific discovery into deployable systems, and many current research environments remain under-resourced or technologically outdated.
- Establish a Quantum Software Engineering Institute (QSEI) focused on developing the software foundations for scalable, secure, and interoperable quantum computing. The QSEI should also coordinate an open source ecosystem to accelerate application development and build a trusted quantum software supply chain. Modeled on the National Artificial Intelligence Research Institutes and National Manufacturing Institutes, the QSEI would ensure that U.S. quantum hardware is matched by world-class software capabilities, enabling early operational advantage across science, industry, and defense.

Whoever leads in quantum (and artificial intelligence) will control the encryption of the digital economy; enable breakthroughs in materials, energy, and medicine; and gain asymmetric and likely persistent advantage in intelligence and targeting. It is imperative that the United States treat quantum not as a research silo but as a mission-critical national capability—and act accordingly.

While the United States retains world-leading research capabilities, China has mobilized state-scale investment and industrial coordination to dominate quantum systems and standards. For the purposes of this recommendation, the Commission presumes that China is actively racing to develop cryptographically relevant quantum computing capabilities and is likely concealing the location and status of its most advanced efforts. This is a domain where first-mover advantage could yield irreversible strategic consequences, particularly given the vulnerability of current global systems that rely on public key cryptography.

The Quantum First 2030 timeline is essential to ensure the United States achieves quantum leadership before any adversary can leverage these capabilities against American interests. Quantum technologies—spanning computing, sensing, and communication—will shape the future of strategic advantage.

VIII. To preserve and strengthen U.S. primacy in the critical space domain as China pursues sweeping advancements across military, commercial, and civil space sectors, Congress should:

- Increase or reallocate appropriations for the U.S. Space Force to levels necessary to achieve space control and establish space superiority against China's rapidly expanding space and counterspace capabilities.
- Direct the U.S. Department of Defense to enhance the U.S. Space Force's capacity to conduct space wargaming and develop realistic modeling and simulation of potential threats from China, including training programs for space operators on warfighting tactics, techniques, and procedures necessary for space control.
- Conduct oversight hearings and other activities to ensure the United States maintains primacy in the space domain by identifying investments in cutting-edge space technologies and assessing China's space capabilities and threats to U.S. space industrial base capacity.
- Direct the U.S. Department of Commerce, in coordination with the U.S. Departments of Defense, State, and the Treasury, to produce an unclassified report to Congress within 180 days identifying China's commercial space capabilities, the dual-use nature of Chinese space technologies, and China's commercial space industry's support to the People's Liberation Army.
- Direct the U.S. National Space Council to increase international outreach on space launch services and ensure the United States remains the partner of choice for both government and commercial space launch.
- Express support for the strategic importance of U.S. leadership in civil space exploration and direct relevant agencies to assess the progress of the Artemis Accords, evaluate risks China poses to U.S. civil space priorities, including National Aeronautics and Space Administration (NASA) programs, and ensure program delays do not undermine U.S. credibility in establishing global norms for lunar and Martian exploration.

IX. Congress direct the President to create an interagency task force to combat scam centers, which are primarily operated by Chinese criminal networks in Southeast Asia and defraud Americans of billions of dollars annually. The task force should:

- Work with the Intelligence Community to:
  - Assess the extent to which China has obtained Americans' sensitive personal data stored on computers and phones confiscated in raids on scam centers and evaluate how Beijing could use that data; and
  - Prepare a report in both classified and, if possible, unclassified form detailing the extent to which the Chinese

government has ties to the individuals and criminal enterprises that run scam centers.

- Foster cooperation with U.S. technology companies and financial intermediaries to detect and stop scams, particularly cryptocurrency investment fraud;
- Create training programs for U.S. law enforcement on sophisticated new cyber scams and implement a national public awareness campaign;
- Enhance law enforcement cooperation and intelligence sharing with allies and partners to dismantle scam centers, recover stolen assets, and protect victims' personal data; and
- Implement sanctions on individuals, corporations, and foreign government officials that perpetrate and enable online scams.

X. Congress direct the U.S. Department of Defense, in coordination with the U.S. Indo-Pacific Command (USINDOPACOM), to produce a report in both classified and unclassified form assessing its compliance with the legal requirement established by Congress in the Taiwan Relations Act "to maintain the capacity of the United States to resist any resort to force or other forms of coercion that would jeopardize the security, or the social or economic system, of the people on Taiwan." The report should include:

- An assessment of U.S. capacity to respond to a Taiwan contingency;
- An assessment of U.S. capacity to respond to other forms of coercion being used by China to threaten the security of Taiwan (e.g., China's gray zone tactics in and around Taiwan); and
- An assessment of U.S. capacity to comply with the Taiwan Relations Act in scenarios where the United States is also engaged in responding to aggression by Russia, Iran, or North Korea in other regions.

In each case, the report should identify any gaps that currently exist or will exist based on likely trajectories of resources and capabilities.

PART I

THE YEAR IN REVIEW

CHAPTER 1: U.S.-CHINA ECONOMIC AND TRADE RELATIONS (YEAR IN REVIEW)

Executive Summary

China's economic system is under serious strain. High debt levels and eroding fiscal capacity have constrained Chinese officials' means to address the domestic slowdown without more serious structural reform, which remains unlikely for political reasons. The result is increasingly a two-speed economy, whereby broader economic growth remains under substantial pressure while priority areas for the Party such as advanced manufacturing continue to see plentiful policy support and access to capital. Domestic consumption remains tepid amid mounting concerns over stagnant wages, unemployment, high household debt, and a weak social safety net. Amid the deflation of the property bubble, manufacturing remains the government's growth driver of choice, even as the measures China is taking to bolster this sector are having an increasingly adverse impact on its trading partners. Facing a glut of manufactured goods and weak domestic demand, Chinese factories are redirecting much of this excess supply abroad, part of a dynamic that is contributing to a "China Shock 2.0."

China faces additional challenges from new U.S. and other tariffs on Chinese exports, sparking it to engage in retaliatory measures while also exposing the interconnected nature of supply chains for critical technologies. Rising economic tensions have collided with mounting concerns over China's growing technological prowess. U.S. measures to limit China's progress, such as bans on advanced semiconductor exports, have been pulled into broader trade negotiations as bargaining chips. China has also employed its own sources of leverage, targeting individual U.S. companies with punitive measures and ramping up restrictions on critical minerals exports. As economic relations between the United States and China have worsened, Chinese producers are looking for more receptive markets in third countries. China's manufacturing sector is both globally dominant and increasingly a source of concern among its trading partners, even as Beijing shows little intention of changing course on its market-distorting industrial policies. Therein lies the dilemma: China's self-portrayal as a responsible member of the international economic system

is directly at odds with its status as perhaps the world's most structurally unbalanced economy.

Key Findings

- Despite over a decade of pledges to rebalance from export- and investment-led growth toward greater domestic consumption—claims repeated throughout 2025—China's economy has deepened its reliance on export-oriented manufacturing in recent years. Especially as its property crisis deepens, China has doubled down on an economic model based on supply-side support to boost production, often resulting in far more products than domestic demand can absorb, with the intent of becoming the dominant global exporter of all types of manufactured goods and materials.
- China has made limited progress, at best, toward rebalancing its economy to promote domestic consumption as a greater driver of growth. Sluggish financial markets, falling property values, and weak wage growth are all significant headwinds, and the recent modest uptick in consumption indicators is primarily due to temporary measures used to pull forward growth.
- If exports falter and efforts to redirect the economy toward greater domestic consumption remain politically non-viable, China has limited other sources of growth to propel its economy forward without backtracking on its progress to deflate the real estate bubble and control rising levels of debt.
- As we approach the 25th anniversary of China's accession to the WTO, China remains a major beneficiary of the global rules-based trading system despite flouting the rules and maintaining an unbalanced, state-led economy fundamentally inconsistent with that system.
- While Chinese officials tout China's openness to foreign investment, the government routinely takes measures adverse to the interests of foreign businesses. Multiple U.S. firms' operations in China have come under threat as a point of leverage in trade negotiations.
- U.S.-China technology competition shapes significant aspects of the U.S.-China economic and security relationship, with global impacts magnified in sectors reliant on advanced semiconductors and artificial intelligence (AI). Chinese companies have made notable progress in these and other key technologies despite U.S. and allied export controls intended to limit China's access to the most advanced technologies.
- China has sought to soften the impact of U.S. tariffs by increasing exports to other countries, while Chinese companies are increasingly offshoring manufacturing capacity, both to avoid tariffs as well as to ensconce themselves deeper in key supply chains. To seek leverage against the United States, China has implemented retaliatory tariffs and export controls on critical minerals and rare earth magnets. China has also targeted retaliation at specific U.S. firms.

- China continues its efforts to position itself as the reliable partner of choice for trade and investment, particularly with emerging markets. At the same time, a variety of countries, including many of those same emerging market countries, have begun to implement their own tariffs and other barriers to safeguard their manufacturing industries from China's massive excess supply.

Introduction

All economic growth is not created equal, and China's current patterns of growth do not suggest a healthy economy. In 2025, China relied on a familiar playbook of vast subsidies, preferential purchasing of domestic goods, and other nonmarket practices to prop up loss-making firms across its manufacturing sector. These unsustainable policies exacerbate underlying structural issues: aside from deflationary pressure in its corporate sector, China faces a rising fiscal deficit and unresolved local debt problems, a property sector still in crisis, and a potential longer-term demographic collapse. As the external economic environment becomes increasingly hostile to China's exports, China has ramped up efforts to find new outlets for its excess supply in emerging markets, launching a charm campaign to promote its exports and keep avenues open for overseas investment. Meanwhile, over the past year, China's AI firms continue to make progress despite U.S. export restrictions on the most advanced semiconductors. Chinese officials have doubled down on support for the sector and other advanced manufacturing in the hopes that these industries will both make up for lost growth from the property sector slump and help China catch up to the United States.*

China's Macroeconomic Outlook

Hitting a gross domestic product (GDP) growth target does not necessarily correlate to a healthy economy, especially in a country with heavy state intervention into markets and production. China's emphasis on manufacturing has come at the cost of weak domestic consumer sentiment and exploding exports as Chinese firms seek less saturated markets abroad. The continued deflation of the property market bubble has left a trail of unfinished and unoccupied apartments across the country, compounding China's problems. Local governments will need to either repay or write off a looming debt bill, both of which would require forcing officials to choose between propping up growth and improving standards of living.† Years of

*This chapter is based on open source research and analysis and consultations with experts.

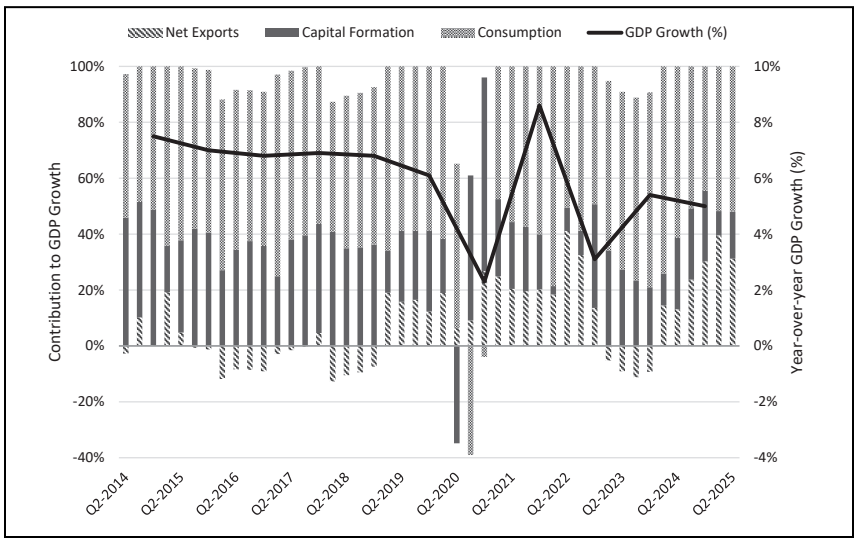
†China's public debt varies by maturity and interest rate. The central government has implemented a program to bring debt back onto local government balance sheets by refinancing debt currently held by off-balance-sheet local government financing vehicles (LGFVs). These refinancings have brought down average interest rates and lengthened maturities. Still, the International Monetary Fund projects that public debt equal to between 10 and 20 percent of China's GDP will come due each year through 2029. 2.3 trillion renminbi (RMB)($321 billion) in onshore LGFV bonds, mostly held by Chinese banks, and $23 billion (RMB 164 billion) in offshore LGFV bonds are maturing in 2025. The low proportion of Chinese debt held by international investors lessens the risks of contagion to global financial markets. Chinese households may ultimately pay the price if the government allows these bonds to default, either through increased taxes to fund bailouts or through the loss of their savings deposited at the local banks that held the bonds. Charles Chang and Chang Li, "China Default Review 2025: Tariffs To Cap Tolerance for Big Hits," *S&P Global*, April 2025, 3; Davis Sun, "China's Accelerated Debt Substitution Eases LGFV Burden; Structural Fiscal Risk Remains," *Fitch Ratings*, October 20, 2024; International Monetary

supply-side policy support emphasizing investment and production have led to thousands of unproductive and often profitless entities that Chinese officials avoid shuttering amid fears of widespread unemployment.[1] To keep the wheel spinning, the Chinese government must provide growing amounts of policy support, which risks exacerbating the cycle until it becomes unsustainable.

Growth Still Driven by Manufacturing and Exports

China's GDP growth drivers, while effective at meeting official targets in the short term, are experiencing headwinds due to structural imbalances in China's economy. China's GDP growth in the first half of 2025 was announced at 5.3 percent, outpacing the annual target of around 5 percent.[2] Yet the components of this GDP growth—consumption, investment, and net exports—reveal a continuing overreliance on the latter two.* Moreover, obstacles to this reliance are proliferating; China's productivity growth has declined and markets overseas are beginning to push back against its surging exports.[3]

Figure 1: Composition of GDP Growth, Q2 2014–Q2 2025



Note: Negative numbers in the figure indicate that the percentage point contribution of the component fell compared to the prior period, although overall growth remained positive. The contribution of China's net exports to GDP growth flipped negative around 2016 as China imported large quantities of raw materials to fuel its manufacturing sector, and again in 2023 as exports fell due to supply chain issues. In the beginning of 2020, stringent pandemic lockdowns led to an almost complete pause in new investment, with consumption also taking a hit due to quarantines.

Source: China National Bureau of Statistics, "*China: Share of GDP Growth Rate*," via Haver Analytics; China National Bureau of Statistics, "*China: GDP Index*," via Haver Analytics; "China's Export Slump Eases as Economy Searches for Stability," *Bloomberg*, September 6, 2023; "China's Economy Returns to Growth amid Global Virus Struggle," *Bloomberg*, July 16, 2020; "China Exports Snap Seven-Month Losing Streak as Imports Surge," *Bloomberg*, December 8, 2016.

Fund, "People's Republic of China: 2024 Article IV Consultation-Press Release; Staff Report; and Statement by the Executive Director for the People's Republic of China," August 2, 2024, 79; Tom Hancock, "China Kicks Off $137 Billion Plan to Tackle LGFV Debt Risk," *Bloomberg*, September 27, 2023.

*China's retail sales figures include purchases by government agencies, schools, and the military, which can obscure weak household consumption when government consumption is rising. Nicholas R. Lardy, "Skeptics of China's GDP Growth Have Not Made Their Case," *Peterson Institute for International Economics*, August 14, 2015.

China Remains Heavily Reliant on State-Driven Manufacturing and Exports

Manufacturing and exports remain outsized drivers of China's GDP growth. In the first half of 2025, industrial value-added growth, which measures the amount the manufacturing sector contributes to GDP growth,* outpaced the same period in 2024.[4] While China's exports have grown almost 6 percent, Chinese imports have fallen over 2 percent year-to-date through August 2025, reflecting a policy push for self-sufficiency in everything from food and basic inputs to critical technologies.[5] As a result, China's trade surplus for year-to-date August 2025 rose 28 percent over the prior year, even after its 2024 trade surplus hit a world record high of nearly $1 trillion, and it is on track to hit $1.3 trillion for the full year 2025 if trends persist.[6] China's trade volume accounted for around 15 percent of the world total in 2024.[7]

Expanding manufacturing activity and a widening trade surplus obscure the fact that China's enterprises are increasingly unprofitable, a telltale sign of overcapacity. In economic terms, overcapacity occurs when a factory's production exceeds the demand for the goods it produces, leading to underutilization and excess supply. Years of vast state support—including direct subsidies, cheap land, and below-market loans—have generated sustained overcapacity for many of China's domestic manufacturers, such as those producing steel, solar cells, and automobiles.[8] Exacerbated by weak domestic demand, excess supply and fierce competition among manufacturers have contributed to downward pressures on prices, while firms have turned to international markets to absorb manufacturing surpluses with help from China's government.†[9] (For more on China's industrial policies and export of excess capacity, see Chapter 6, "Interlocking Innovation Flywheels: China's Manufacturing and Innovation Engine," and Chapter 8, "China Shock 2.0.")

Chinese officials have recently begun to acknowledge the problem of oversupply after years of denial, albeit indirectly, raising hopes from both domestic and foreign producers for supply-side reform. As recently as last year, Chinese officials, commentators, and executives were claiming that China's automobile sector did not suffer from overcapacity and that, regardless, China was helping the rest of the world transition to cleaner sources of energy with its "good value for money" exports.[10] Chinese Communist Party (CCP) officials shifted their messaging in 2025, embarking on an "anti-involution" campaign. The National Development and Reform Commission, China's economic planning agency, describes "involution-style competition"‡ as setting prices below product costs to seize market share, leading to market distortions.[11] Anti-involution is basically a Party-approved concept to raise concerns about overcapacity, since state me-

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*China's National Bureau of Statistics also counts some extractive activities within industrial value added.

†In November 2024, China's Ministry of Commerce introduced new measures to support Chinese exporters, including expanding coverage of export credit insurance and financing, improving cross-border e-commerce development, and facilitating travel visas for business purposes. "China Announces New Measures to Promote Foreign Trade," *Fibre2Fashion*, November 23, 2024; "China's Cabinet Approves Measures to Boost Trade Growth," *Reuters*, November 8, 2024.

‡The anthropological concept "involution" (内卷, *neijuan*) became a Chinese internet slang term to describe cut-throat competition in staying ahead of others and gained popularity as official media and policy documents started using it to characterize price wars in overcapacity sectors.

dia continues to deny the existence of overcapacity and the role of Chinese central government industrial policy in driving it, calling it a "Western" narrative.[12] Per the Party-state, weak demand, wasteful investment, and lack of a unified national market are major causes of involution.[13] General Secretary of the CCP Xi Jinping has criticized local governments for all supporting the same few industries, and officials have issued warnings to electric vehicle producers and online delivery companies over excessive discounts.[14] Officials do appear to be targeting excess supply in their efforts to crack down on price wars, however. Since July, regulators have held two meetings with the solar industry to promote measures that would address overcapacity, such as encouraging an orderly reduction in obsolete production capacity.[15] Regulators are also investigating Chinese coal producers who exceed production quotas.[16]

However, China's overcapacity problem appears poised to get worse before it gets better. The producer price index, a measure of the prices of industrial goods sold by manufacturers, has fallen over 2 percent each month in 2025, pointing to continued supply and demand imbalances.[17] The share of loss-making entities in China has steadily climbed 38 percent since 2021 and now is approaching a quarter of all firms.[18] Despite these trends, growth in fixed asset investment, in particular in the manufacturing sector, remained robust in the first half of 2025.[19] In August 2025, guidance issued by numerous high-level People's Republic of China (PRC) agencies made passing reference to involution while calling on the finance industry to support advanced manufacturing.[20] In other words, China continues to invest in expanding manufacturing capacity despite a record number of loss-making firms—yet more output that foreign countries will be pushed to absorb, to the detriment of producers and employment in those countries.

Consumption Hampered by Structural Issues

Weak domestic demand, reflected by a prolonged slump in consumer spending and confidence, continues to exacerbate China's overcapacity issues. China's share of GDP growth from consumption was 54 percent in the second quarter of 2014, and despite fluctuations over the interim decade, it was 52 percent in the second quarter of 2025.[21] A stronger consumer base would reduce China's reliance on exports to drive growth and could help reduce cyclical volatility from investment and export-driven growth.

China has implemented a series of policies to shore up consumer sentiment and spending, which appear to have achieved some success in the short term. In March 2025, Chinese officials released the Special Action Plan to Boost Consumption, identifying a laundry list of ways to boost consumption with limited clarity on mechanisms for implementation.[22] The list included expanding subsidized trade-in programs for purchases of capital goods and electronics, supporting tourism and other cultural events, promoting training programs for workers, making improvements to the minimum wage system, stabilizing the stock market and cracking down on fraud, and enforcing consumer product safety and vacation policies.[23] The trade-in programs for electronics and household appliances, which have driven the uptick in consumption so far, were so popular that

provincial government funding ran out, causing the programs to be paused temporarily.[24] Retail sales growth has accelerated in 2025 compared to the prior year, and the core consumer price index, which measures the change in prices for consumers—excluding prices for food and fuel—has mostly stayed out of deflationary territory.[25] Other indicators of consumption have also ticked up, including a rise in the number of domestic trips taken by tourists during major holidays.[26]

These short-term measures to boost spending are unlikely to result in sustained rebalancing. Trade-in programs are designed primarily to pull forward consumption that would have occurred anyway; they will not increase demand in the long run, nor do they change the structural disincentives to spend.[27] China has also introduced an annual renminbi (RMB) 3,600 ($500) subsidy for children under three as a way to boost spending and in an attempt to alleviate a looming demographic crisis, but prior efforts to boost the birth rate have mostly failed.[28] The latest consumption policy, an effort to boost spending on services released by China's Ministry of Commerce and eight other ministries in September 2025, purports to ease restrictions on foreign-invested services providers and draw more foreign tourists to boost domestic consumption of services.[29] Without a demand-side boost in financial support, however, the plan is unlikely to spur consumption.[30]

Structural impediments to boosting consumption remain entrenched in China's development model and cast doubt on the efficacy of China's stimulus measures. These impediments include an erosion in household finances, low interest rates that punish savers, and a weak social safety net. Other challenges to stimulating domestic demand include:

- *High household debt leaves consumers wary of spending:* China's household debt to GDP is only slightly below the United States', while average debt to disposable income of Chinese consumers, primarily mortgage debt, hit a record high in 2024.*[31] This upward trend is a major headwind for China's attempts to stimulate consumption through access to cheaper credit as consumers remain focused on paying down existing debt rather than taking out new loans.[32]
- *Difficult investment environment has squeezed savings:* Savers who choose to invest their spare funds in equity markets are overexposed to volatile and typically money-losing domestic securities.[33] Astonishingly, the Shanghai Composite Index has fallen over 35 percent from its peak in October 2007 through August 2025; in comparison, the S&P 500 has risen over 300 percent in that same time frame.[34] Recent defaults by Chinese trust companies (asset managers) after major real estate losses have also wiped out billions of dollars in savings, hurting China's more affluent consumers; by one estimate, at-risk assets

*China lacks a country-wide personal bankruptcy process that could provide relief to the over 100 million individuals struggling with personal debt. The lack of a pathway to personal bankruptcy has spillover effects for the financial sector, which tends to have lower lending standards and balance sheets that are weaker in reality than on paper. Wang Juanjuan, "Interview: Time Is Right for China to Fix Personal Bankruptcy Legal Omission, Expert Says," *Caixin Global*, February 18, 2025.

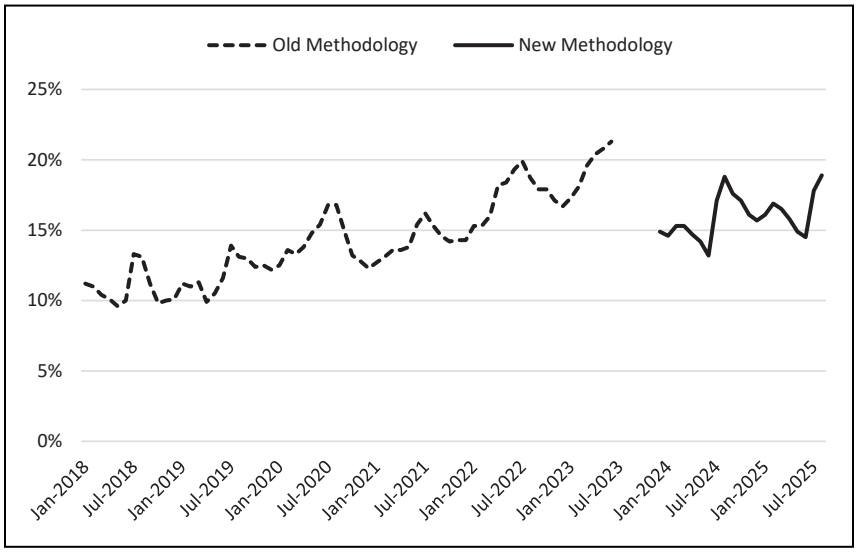
in the industry have reached RMB 600 billion ($84 billion).[35] In part due to lack of good investment opportunities, China's gross household savings rate was 35 percent in 2023, higher than all Organisation for Economic Co-operation and Development (OECD) economies.[36] Most Chinese financial assets are held as bank deposits, which are low risk but yield low interest as well.[37]

- *Weak social safety net contributes to high savings rates:* High savings rates are particularly prevalent among internal migrant workers who are unable to access urban healthcare and education for free due to China's household registration system, an internal passport system that regulates access to social services for these workers.[38] Issues in increasing access to social services will likely persist as long as the measures announced by the central government remain funded by overstretched local governments. (For more on China's fiscal situation, see "Fiscal Position Limits Stimulus Options" later in this chapter.) Estimates that China's state pension fund could run out of money by 2035 have discouraged younger generations from participating, potentially exacerbating future shortfalls.[39]
- *Wage growth has slowed:* Annual wage growth has fallen off dramatically in recent years, from over 9 percent in 2021 to below 3 percent in 2024 in nominal terms as firms cut costs due to downward pressure on profits, including from price wars due to overcapacity.[40] Wages are likely to see further downward pressure, as a slowing economy and fallout from U.S. tariffs have led to factory closures and layoffs.[41] Many manufacturing workers who have managed to remain employed are underemployed or forced to take contract positions, which provide fewer benefits.[42]
- *Workers face a mismatch between their skillsets and opportunities:* As China's older generation of factory workers retire, younger waves of college graduates are seeking white-collar jobs that are increasingly competitive, leading to sustained youth unemployment. Employment opportunities generated by China's science and technology sectors are insufficient to absorb the excess labor from faltering sectors like construction, and youth unemployment has remained elevated through the first half of 2025 (see Figure 2).* Although China's shrinking population may eventually help balance out the labor market as China's oldest generations of workers retire, factories have struggled to find workers in the interim.†[43]

*Average employment by real estate developers has dropped by almost one-third since 2020. China National Bureau of Statistics, "*China: Real Estate Development Employees: Average*," via Haver Analytics.

†According to China's Center for Human Capital and Labor Market Research, the average age of China's workers increased from 32.25 years in 1985 to 39.72 years in 2022. Twenty-six percent of the non-retirement population is over 45 and under retirement age. Haizheng Li, "Human Capital in China 2024," *Center for Human Capital and Labor Market Research*, 2024, 2–3.

Figure 2: China's Youth Unemployment, January 2018–August 2025



Note: In 2023, in the face of wildly high published youth unemployment figures, China revised the calculation methodology to exclude students looking for work—a break with common methodology in OECD economies. Chinese statistical authorities did not release historical data adjusted for the new methodology, making it more difficult to follow the trend over time. For more on China's data weaknesses, see the textbox on "China's Incongruous and Disappearing Data" below. "China Brings Back Youth Jobless Rate, with Rosier Number," *Bloomberg*, January 17, 2024.

Source: China National Bureau of Statistics, "*Urban Unemployment Rate: Age 16–24*," via Haver Analytics.

China's expressed commitment to transitioning to a consumption-led growth model has generated much skepticism, considering repeated past failures by its leaders to do so. In December 2024, the Central Economic Work Conference, China's annual December conference that determines key economic priorities for the coming year, listed support for consumption as the top priority—over industrial policy—moving it up from the number two spot in 2023.[44] However, this is hardly the first time these pledges have been articulated. Over the years, Chinese officials have repeatedly pronounced their intent to elevate the contribution of consumption to growth,* to no avail.[45]

*China has claimed to be addressing weak consumer sentiment for over two decades. The *2001 Work Report* from China's Two Sessions mentioned "adjusting consumption structure" and "improving the consumption environment" as strategies for China to address deflationary trends and improve standards of living. Multiple work reports in the following decade reiterated this policy agenda. For example, the *2005 Work Report* laid out the government's intent to encourage consumption through "fiscal, tax, financial and industrial policies." A 2018 Central Committee and State Council opinion called for increasing consumption in specific industries, including cultural tourism and sports, both repeats from sector-specific opinions released in 2014 and 2015. Many of these policies and guiding opinions repeat prior ideas such as calling out specific sectors or pledging to uphold consumer protection laws without providing commensurate fiscal measures that would support these aims. Central Committee and State Council, 关于完善促进消费体制机进一步激发居民消费潜力的若干意见 [Several Opinions on Improving the System and Mechanism for Promoting Consumption and Further Stimulating Residents' Consumption Potential], September 20, 2018; China State Council, 国务院办公厅关于进一步促进旅游投资和消费的若干意见 [Several Opinions of the General Office of the State Council on Further Promoting Tourism Investment and Consumption], August 11, 2015; China State Council, 国务院关于加快发展体育产业促进体育消费的若干意见 [Several Opinions of the State Council on Accelerating the Development of the Sports Industry and Promoting Sports Consumption], October 20, 2014; Central People's Government of the People's Republic of China, *2007 Report on the Work of the Government*; Central Peo-

Moreover, some analysts regard the failure to shift toward consumption as a reflection of CCP leadership priorities. Xi has continued to emphasize the importance of manufacturing and technology, fearing a focus on consumption could divert economic resources from state policies, and he has criticized policies that encourage "welfarism."[46] Chinese policies emphasize the moral nature of frugality, with recent directives telling officials to refrain from excess work-related spending on items like flowers, alcohol, cigarettes, and banquets; limit travel expenses; and control costs related to meetings.[47] Officials remain wary of stimulus that could lead to "irrational" spending, and China's censors are also concerned about relinquishing control over a large untapped services sector, which could introduce alternative ideologies.*[48]

Some analysts suggest Chinese officials are reluctant to allow consumption to play a greater role in the economy, fearing it could introduce other sources of volatility to CCP rule by putting more wealth and power in the hands of ordinary people.[49] Even if China meaningfully shifts to encouraging consumption now, such a rebalancing would require increasing consumption's share of GDP by ten percentage points to catch up to other economies.[50] It would also divert economic resources from state priorities—a key theme in Xi's criticism of "disorderly expansion of capital" and regulatory tightening against consumer internet firms in the 2021 Common Prosperity Campaign.[51] Such an erosion would affect a key tool for the CCP, which funnels credit to state-owned enterprises (SOEs) and offers business and career advancement opportunities to Party members.[52] From this perspective, Chinese officials may in part be voicing commitment to structural change as a messaging device targeted at foreign and domestic investors, who routinely react with exuberance to China's announcements of major fiscal stimulus programs despite repeated failures to follow through at scale.†[53]

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ple's Government of the People's Republic of China, *2005 Work Report*, March 24, 2005; Central People's Government of the People's Republic of China, *2001 Work Report*.

*China's political concerns can hinder its own efforts to encourage consumption. The official consumption action plan calls for support for domestic intellectual property. The global explosion of popularity in Chinese toy company Pop Mart's Labubu dolls would appear to exemplify Chinese brand power. However, reports of obsessive consumption led officials to crack down on practices that have supported the company's growth, including its practice of packaging items in blind boxes and releasing special collectable editions. The contradiction between the state's desire to promote consumption and retain control over its populace continues to limit China's consumer power. Officials targeted entire thriving industries in prior crackdowns, including banning private after-school tutoring due to concerns of over-intense competition during college admissions and requiring video game companies to limit students' online gaming time. Charlotte Yang, "China's Warning on Blind-Box Toys Sends Pop Mart Shares Sliding," *Bloomberg*, June 20, 2025; Vivian Wang, "China Appears to Backpedal from Video Game Crackdown," *New York Times*, January 23, 2024; "China's $100 Billion Tutoring Ban Backfires, Spawning Black Market," *Bloomberg*, July 20, 2023.

†For example, Chinese leaders announced plans to provide additional support for the economy in September 2024, boosting mainland and Hong Kong equities markets. However, by November, stimulus measures had failed to materialize in a meaningful way. A similar situation played out in 2018 as China introduced moderate stimulus measures in the midst of an escalating trade confrontation with the United States. Despite pledges at the 2018 Economic Work Conference to provide additional support via "significant" tax and fee cuts in 2019, actual measures fell short as China attempted to continue deleveraging at the same time. China again announced an increase in special government bonds to mitigate the economic fallout from strict pandemic lockdowns in late 2022, but execution fell short of planned fiscal spending. An analysis by Bloomberg found that China's final spending lagged budgeted spending by at least 1.4 percent from 2019 to 2024 as local government officials struggled to find worthwhile investments to help boost the economy. "China Should Not Wait to Stimulate Its Economy," *Economist*, November 14, 2024; Samuel Shen and Tom Westbrook, "China's Stocks Rally Fizzles as Stimulus Offer Disappoints," *Reuters*, October 8, 2024; Tianlei Huang, "Lessons from China's Fiscal Policy during the COVID-19 Pandemic," *Peterson Institute for International Economics*, March 2024, 17; Don Weinland, "China Stimulus

Banks Gird Themselves for Consumer Loan Losses

At the end of 2024, the People's Bank of China (PBOC) shifted to a "moderately loose" monetary policy for the first time since the global financial crisis.*[54] Chinese officials have pressured banks to broaden access to consumer credit as a part of the government's stimulus package, and commercial banks initially competed to attract new customers by lowering loan rates.[55] As a result, bank net interest income in the first quarter of 2025 fell 2 percent over the prior year for Mainland-listed banks after China's six largest banks recorded their lowest-ever net interest margins at the end of 2024.[56] The net interest margin for 81 percent of Mainland- and Hong Kong-listed banks declined below a warning threshold set by a Chinese banking industry association, indicating widespread weakness in profitability.[57]

Chinese officials' directive to banks to extend more credit as a stimulus measure has led to declining credit quality.[58] In response to bad debt risks, banks are raising rates on consumer loans, which will likely weigh on spending going forward. In April 2025, banks raised consumer loan rates from 2.5 percent to 3 percent, a move that could substantially reduce consumer demand.[59] Short-term household loans, a proxy for consumer credit, contracted by RMB 274.1 billion ($38.3 billion) in February before rebounding in March and then decreasing again in April.[60] Some of China's largest commercial banks reported increases in bad loans in their consumer divisions at the end of 2024.[61]

Property Market Slide Continues to Weigh Down China's Economy

Four years after Evergrande—once China's largest property developer by sales—defaulted on its debt, the property markets have continued their slow-motion crash.†[62] Property development and real estate were major drivers of growth before Beijing introduced the "three red lines" policy in 2020, which restricted further borrowing by overleveraged developers and led to a wave of defaults, bankruptcies, and eventually state purchases of unsold developments.‡

Feared 'Too Little, Too Late,'" *Financial Times*, September 11, 2019; "China Pledges More Stimulus in 2019 as Economy Seeks Bottom," *Bloomberg*, December 21, 2018; "China Signals More Stimulus Measures Planned," *Bloomberg*, October 31, 2018.

*For the past 14 years, the PBOC's "prudent" monetary policy sought to balance supporting growth and stabilizing inflation with preventing asset bubbles through a mix of tools to control liquidity. The shift to "moderately loose" signals a greater willingness to lower interest rates and boost liquidity in hopes of encouraging borrowing and spending. Kevin Yao, "China Central Bank Is Moving Faster towards Its Policy Limits," *Reuters*, January 10, 2025.

†Evergrande was finally delisted from the Hong Kong Stock Exchange on August 25, 2025 after bankruptcy proceedings revealed that its outstanding debt was larger than previously disclosed. Hong Kong courts have ordered Evergrande and other Chinese developers to liquidate their assets, a complex process considering the number of entities involved and the large number of projects still under development. In Evergrande's case, the assets recovered so far are just a fraction of total claims. Venus Feng, "China's Property Crisis Hits New Low with Evergrande Delisting," *Bloomberg*, August 12, 2025; Clare Jim and Scott Murdoch, "China Evergrande Liquidators Say $255 Million of Assets Have Been Sold," *Reuters*, August 12, 2025.

‡Never officially promulgated, the "three red lines" are a series of prudential measures aimed to contain excess leverage by property developers: (1) a liability-to-asset ratio less than 70 percent, (2) net debt not exceeding equity, and (3) enough cash on hand to cover short-term borrowing. Many developers were not in compliance at the time the policy was implemented, and Chinese officials intended the policy to prevent developers from incurring additional debt until they reduced their liabilities to more sustainable levels. However, the sudden cutoff in access to

Buying and selling activity in tier one cities drove incremental improvement in nationwide property market indicators at the beginning of 2025, but this was quickly stamped out by rising uncertainty over the broader macroeconomic environment.[63] Home sales by floor space and value continued to fall in the first eight months of 2025.[64] Prices of new and existing residential buildings across the country are still below where they were in 2020.[65] Waves of developer defaults and falling prices have repeatedly forced Beijing to step in to stabilize the sector.

A widely cited 2019 survey by the PBOC found that 59.1 percent of Chinese urban* household wealth was held in residential property, over-indexed in the emerging middle class.[66] The PBOC has not released updated survey results, but former chief economist of Evergrande Ren Zeping estimated that housing still accounted for 60.5 percent of household wealth in 2023.[67] As a result, the widespread phenomenon in 2022 of developers failing to deliver prepaid but unfinished apartments led to mortgage boycotts and other soft forms of protest.[68] In response, Beijing has periodically stepped in to prop up prices and passed measures to ensure completion and delivery of prepaid homes.[69] Local governments have been directed to prop up local property markets through lower mortgage and down payment rates, buying back unsold apartments and land from developers, and finishing prepaid projects on a "whitelist" for delivery to homeowners.[70] However, China still faces a glut of housing supply, especially in second- and third-tier cities where growth has slackened due to falling urbanization rates and population decline.†[71] Beijing is also reluctant to provide too much support to the sector for fear it will encourage a return to speculative behavior.

New measures introduced in 2025 are unlikely to provide meaningful support for the struggling sector. Facing softening consumer sentiment, the central government introduced additional guidelines for urban renewal, including renovating older structures, building

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credit led to a liquidity crunch, debt defaults, and the bursting of the property bubble. The crackdown on the property sector also marked the beginning of broader official oversight of China's so-called "grey rhinos": long-simmering issues that threatened the underlying stability of the Chinese economy, including shadow banking, property bubbles, SOE and local government debt, and illegal fundraising. Tianlei Huang, "Why China's Housing Policies Have Failed," *Peterson Institute for International Economics*, June 2023, 5; "China's Three Red Lines: Opportunities in China Real Estate," *UBS Asset Management*, January 11, 2021; Frank Tang, "China Has a Choice between the 'Grey Rhino' Risk of Rising Debt or the 'Black Swan' Threat of an Economic Slowdown," *South China Morning Post*, September 10, 2019.

*Urban land is owned by the government and is leased out to commercial interests and individuals. By contrast, rural land is owned by village collectives. Rural properties cannot legally be transferred outside of the village by the owners, limiting its value as an asset, although local governments have frequently expropriated land from rural residents, providing minimal compensation in return. Mandy Zuo, "China's Rural Land Is Vast, Vacant—and Not for Sale. Would Putting It on the Market Spell Windfall or Woe?" *South China Morning Post*, March 12, 2024; William Sandlund, "China's Retrograde Rural Land Policies," *Council on Foreign Relations*, August 5, 2020.

†The divide between urban and rural property markets continues to weigh on the sector, fueling renewed speculative purchasing in tier one cities while property markets in tier two cities and lower languish. The near default of China's largest privately held property developer Vanke in early 2025 exposed ongoing weaknesses and triggered a flight to safety in state-owned developers for purchases of new apartments, exacerbating private developer liquidity issues. The shift toward state-owned developers, which are much more active in China's largest cities, worsens the divide between property markets in tier one cities and other smaller cities around the country. Logan Wright, Allen Feng, and Endeavour Tian, "Property Market Chartbook, March 2025," *Rhodium Group*, March 28, 2025, 2; Thomas Hale et al., "How the State Is Propping Up China's Housing Market," *Financial Times*, February 25, 2025; Shuli Ren, "China Vanke's Year of Reckoning Has Finally Arrived," *Bloomberg*, January 6, 2025.

new elderly and childcare facilities, and modernizing utility infrastructure.[72] Mortgage rates are also falling after the PBOC cut interest rates by ten basis points in May.[73] Countrywide, accumulated inventory is falling, but most of the remaining inventory is likely concentrated outside of tier one cities, where it will be harder to sell.[74] The primary support measure introduced to date—local government property buybacks—has been unsuccessful.[75] After two years, the total amount of an RMB 300 billion bond quota to fund the program had seen only RMB 16.2 billion tapped through September 2024.[76]

Even as excess supply works its way through the market, the construction slowdown will have long-term impacts on China's economy, fiscal capacity, and financial system. Construction and related activities, which by some estimates contributed 32 percent of annual GDP in 2021, the year the property crisis began, can no longer be counted on as a major growth engine.[77] Employment in the sector has fallen for both construction and property developers.[78] Falling house prices have also contributed to deflation both upstream and downstream as the economy struggles to absorb excess supply in steel, cement, and construction equipment and households feeling the negative effect of the depressed property market on their wealth curtail spending.[79]

Local government budgets have also been negatively impacted. In 2021, at the peak of the property bubble, land sales revenue made up 30 percent of local government revenue, but this figure had dropped to 20 percent by 2023.*[80] Some provincial governments have turned to more strict enforcement of property taxes to try to make up for lost transaction revenue.[81] However, property taxes only apply to commercial and some high-end residential properties, accounting for less than 3 percent of total tax revenue.[82] As long as the property markets remain depressed, local governments' ability to use fiscal stimulus will remain constrained. (For more on China's fiscal capacity, see "Fiscal Position Limits Stimulus Options" later in this chapter.)

Government-directed efforts to bail out industry participants have prolonged the hangover from bad debt in the financial system. As household anger over presold but undelivered apartments grew, the central government rolled out a program directing local banks to lend to a "whitelist" of property projects in an attempt to ensure their completion and delivery to owners.[83] However, it is unclear how successful the program has been; concerned about the repayment capacity of already indebted borrowers, banks continue to resist lending to such projects. In 2024, the total amount of lending committed for these projects far exceeded the total amount actually disbursed to borrowers.[84] As more developers ran into financial trouble, China's SOE regulator, the State-Owned Assets Supervision and Administration Commission, issued a directive in June 2025 requiring state-owned de-

*Land sales revenues declined 23.1 percent in 2022, 13.3 percent in 2023, and 16 percent in 2024. Cumulative lost revenue surpassed RMB 3 trillion (over $400 billion) for those three years. These losses occurred despite local government efforts to prop up prices through LGFV purchases of land. Cheng Siwei and Denise Jia, "China Plans Fiscal Overhaul to Fix Crisis in Local Government Finance," *Caixin Global*, March 10, 2025; "Propping Up Prices? Assessing the Role of Local Governments in China's Real Estate Market," *Stanford University*, 2024.

velopers to avoid defaulting on public debt.[85] However, without providing direct financial support for the developers to pay down public debt, this directive merely shifts the risk of nonpayment to non-public forms of debt, like trade payables, and puts pressure on state-owned banks to roll over loans.[86] In response, China has announced plans to recapitalize major commercial banks to alleviate pressure from waves of property defaults and provide more support by lending to the real economy.* [87] This is hardly the first time officials have been forced to inject capital into the banking system after years of poor risk management. In April 2025, the Chinese Ministry of Finance issued RMB 500 billion in new bonds to support the recapitalization through share purchases, reflecting the importance of these banks in implementing government policy goals.[88] In September, Bloomberg reported that the central government was considering directing state-owned banks to lend money to local governments for overdue payments to the private sector, an amount estimated at over $1 trillion.[89]

Fiscal Position Limits Stimulus Options

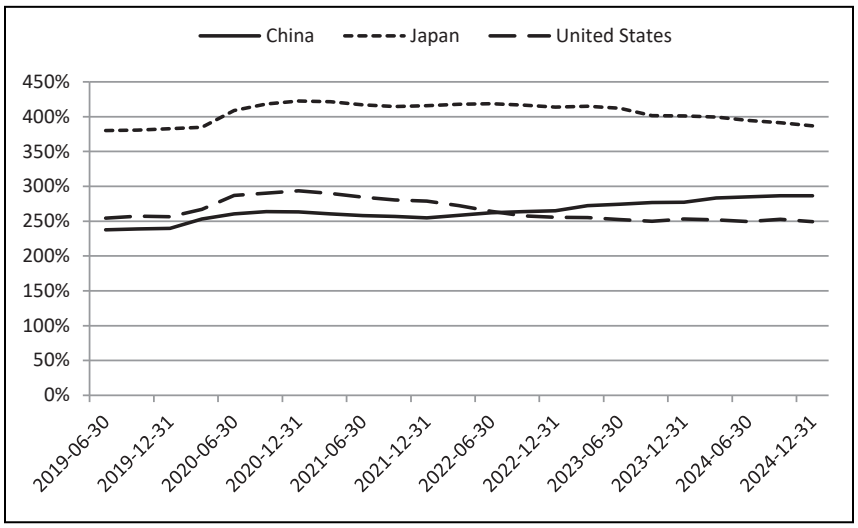
China's fiscal position has worsened, constraining the government's ability to prop up key sectors of the economy with fiscal policy. Most tax revenue in China is routed to the central government, but local governments are still responsible for social services expenditures.[90] The International Monetary Fund estimates that years of debt-fueled investment have left local governments with debt of RMB 66 trillion (approximately $9 trillion).[91] Aggregate fiscal revenue growth has been flat in recent years, and China anticipates only 0.1 percent fiscal revenue growth in 2025.[92] Combined central and local tax revenues declined 3.4 percent in 2024, owing to deflationary pressures and increased tax rebates for exporters, while fiscal revenue from land sales—a substantial traditional source of income for local governments—decreased 16 percent as property markets continued their slide.[93] Fiscal revenues are overly reliant on taxes from manufacturing and have flattened as deflation broadly impacts profitability.[94] China's tax revenues are split roughly evenly between local and central governments, but expenditures are primarily the responsibility of local governments.[95] Transfers from the central government are supposed to make up the difference, but the system suffers from major inefficiencies.[96] Rising interest payments on debt have also limited local government fiscal capacity to support consumption stimulus programs.[97] Prior announcements on reforming the distribution of central and local tax revenues to rebalance the expenditure burden of local governments have led to little change, and tax reform that would give local governments more leeway is unlikely because it would cede central control to local governments.[98]

At the same time as fiscal revenues are stagnating, China's expenditures have increased. In the first half of 2025, the central government budget deficit year-to-date reached a record after im-

*This round of recapitalization echoes China's strategy of moving bad debt around the financial system by creating new asset management entities to hold the debt. China has propped up asset values in the past by moving non-performing loans into segregated asset management companies, which helps banks appear healthy but does not resolve the underlying distressed debt issues. Francois Chimits and Maximilian Karnfelt, "Huarong—A Silent Bail Out That Went Wrong," *Mercator Institute for China Studies*, June 23, 2021.

plementing heavier fiscal stimulus to offset the impact of global tariffs on its exports.[99] Some of the funds raised have been used to pay for wage hikes for civil servants; remaining funds raised will likely go toward consumer and capital goods trade-in programs, additional infrastructure investment, and recapitalizing banks.[100] In prior years, actual fiscal spending has lagged behind Chinese policy pledges for greater stimulus.*[101] However, Chinese policymakers, in the face of rising global pushback on Chinese exports that could inflict significant pain on the economy, have finally been forced to roll out more substantial support. In the first seven months of 2025, China's local governments issued 60 percent more bonds compared with the prior year, with nearly half allocated to major infrastructure projects, adding to a growing debt burden.[102]

Figure 3: Government and Private Non-Financial Sector Borrowing as Percentage of GDP, June 2019–December 2024



Note: The Bank for International Settlements' measurement of total credit to the government and non-financial sector provides an effective cross-country comparison of debt-to-GDP ratios. It encompasses currency and deposits, loans, and debt securities but excludes special drawing rights (SDRs); insurance, pension, and standardized guarantee schemes; and accounts receivable/payable, which are not measured in the same way across countries. Bank for International Settlements, "Introduction to BIS Statistics."

Source: Bank for International Settlements, "BIS Data Portal–*Credit to the Non-Financial Sector*."

*Special local bond issuance has lagged behind its allocated quota as localities have failed to identify infrastructure investment opportunities good enough to justify additional issuance. The consumption multiplier effect from additional special bond issuance is also increasingly diluted as more of the proceeds go toward rolling over off-balance-sheet debt. "These Are All the Different Bonds China Hopes Will Boost Economic Growth," *Bloomberg*, October 15, 2024; Allen Feng, "NPC: No More Disappointments," *Rhodium Group*, March 3, 2025, 4.

China's Incongruous and Disappearing Data

As China's economy has slowed, the government has aimed to obscure weaknesses by manipulating, non-transparently revising, or outright eliminating various data series. Throughout the rapid period of growth in the 2010s, manipulation of official data often sought to smooth volatility and make the economy appear more stable than it actually was—a narrative aimed at both domestic audiences and foreign investors.[103] During this time, poor data quality was exacerbated by the speed and size of China's total growth. Fixed asset investment, which was based on a system of local governments self-reporting spending toward planned investment, was far overstated and only later converged with central government estimates after China's National Bureau of Statistics revised the collection methodology.[104] Since then, the Bureau has taken other steps to bring Chinese data calculations in line with global standards.[105] However, these changes are sometimes made strategically to explain away weaknesses or make it difficult to track changes across periods. For example, China revised its method for calculating the money supply beginning in 2025,* allowing officials to disguise declining figures that would contradict official GDP growth rates and smooth changes over time.[106] Traditional difficulties in parsing data remain, including retail sales data skewed by the inclusion of purchases by government agencies, schools, and the military. To boost purported growth rates, Chinese statistical authorities also routinely revise retail sales data downward to lower the base of comparison for future periods (i.e., make "growth" in the numbers more likely), sometimes by tens of billions of dollars.[107] China's data manipulation also supports its geostrategic aims, which often obscure external imbalances by overstating domestic consumption and outbound investment.[108] While experienced analysts are well aware of these issues, China may still be able to hide the extent of its economic slowdown to other trade partners in an effort to continue encouraging trade and investment.[109]

China's headline macroeconomic figures also generate substantial skepticism because of the CCP's efforts to tighten international access to Chinese data while at the same time silencing the economic community in China. Over the past few years, Chinese officials have stopped publishing data that reflect poorly on the country's economic health, including figures on developer land purchases, foreign investment, and unemployment.[110] Other data considered sensitive, including corporate information and satellite images, are now only available domestically.[111] China's State Council recently amended laws expanding the definition of state secrets to include more expansive corporate data and tightened control over digital information.[112] In 2023, China also launched crackdowns on West-

*Among other changes to M1, or narrow money supply, the PBOC announced it would include balances in virtual wallets like Alipay or Wechat Pay. Ming Ming, "评论 | M1统计口径调整，数据将如何变化?" [Commentary | M1 Statistics Specifications Adjustment: How Will the Data Change?], December 4, 2024.

China's Incongruous and Disappearing Data—*Continued*

ern corporate due diligence firms operating domestically.[113] Greater restrictions on data publication coincide with a broader crackdown on critical discussion of China's macroeconomic health. Whereas the CCP used to tolerate some open debate on the state of the economy (so long as it questioned policy not politics), this no longer appears to be the case. Chinese economists, including Gao Shanwen and Zhu Hengpeng, as well as certain economics publications have been silenced when their statements are seen as too critical of official policy decisions.[114]

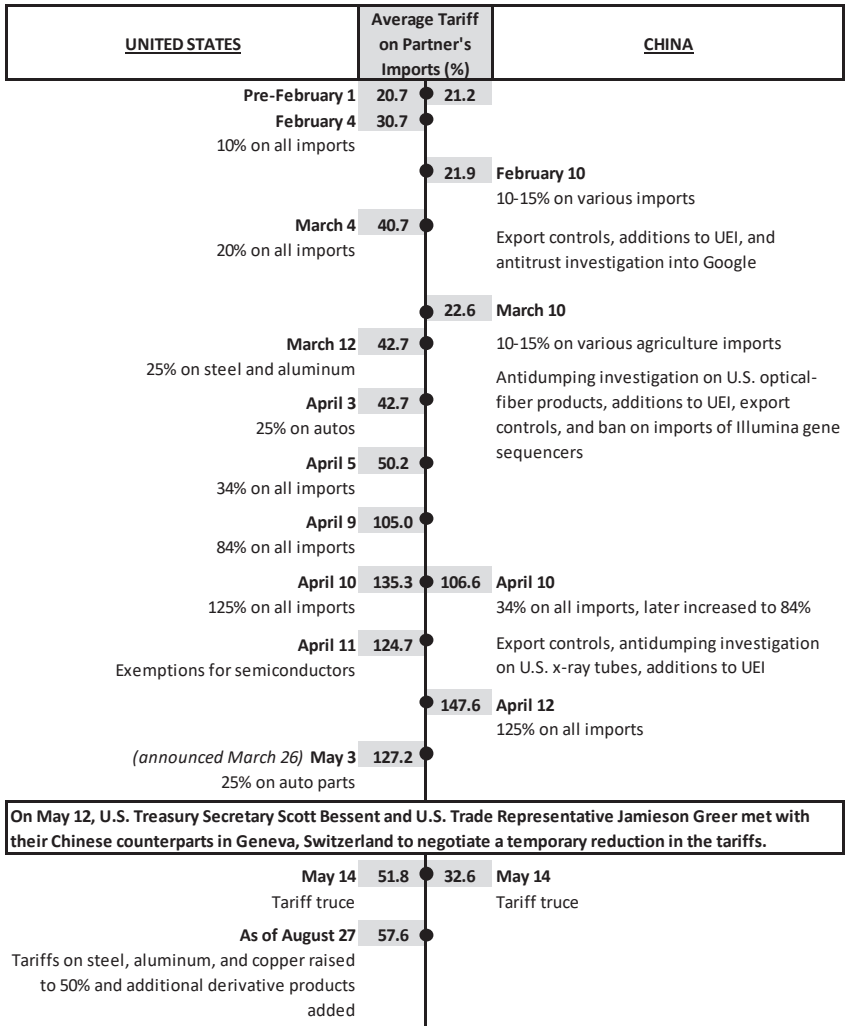
U.S.-China Economic Relations

While years of escalating tariffs, export controls, threats of outbound investment restrictions, and supply chain adjustments have caused turbulence, the United States and China remain close economic partners in terms of overall trade and investment, exhibiting the difficulties in achieving strategic decoupling. China is still the United States' third-largest trade partner, and the United States is China's single-largest export market through the latest available data—despite tariffs having been in place on over half of China's exports to the United States since 2019.[115] From 2023 to 2024, U.S. stock of foreign direct investment (FDI) in China increased 3.4 percent to $123 billion.[116]

China Faces Off with the United States on Trade Measures

In the first half of 2025, the Administration implemented additional tariffs on China, ostensibly in response to China's unfair trade practices and lack of cooperation on cracking down on the shipment of fentanyl precursors to North America. After a series of escalations, U.S. tariffs on China briefly reached 145 percent, before being pulled back to around 57 percent a number of weeks later (see below for a full timeline of events). In September, U.S. and Chinese officials met in Madrid, Spain to negotiate over tariff rates, the fate of Chinese-owned short video app TikTok, and the possibility of a visit by President Trump to Beijing.[117] A return to higher tariff rates remains on the table as the Trump Administration threatened to impose 100 percent tariffs on China in response to Beijing's expansion of export controls on rare earths in October (see more below).[118]

Figure 4: Timeline of U.S. and China Tariff Actions and Non-Tariff Measures in 2025, as of September 30

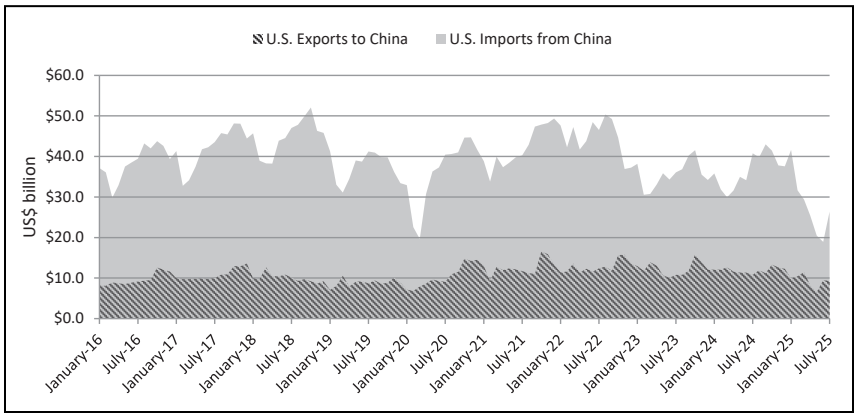


Note: An April 2 executive order revoked the de minimis exemption for Chinese exports, effective May 2. The tariffs applied to de minimis imports have varied since then. Additionally, both sides have exempted certain products from the reciprocal tariffs, including Chinese-made smartphones in the United States and U.S.-made aircraft engines in China. William Burkhart and Keigh Hammond, "Presidential 2025 Tariff Actions: Timeline and Status," *Congressional Research Service* R48549, August 22, 2025; Andrew Silver, "China Creates List of U.S.-Made Goods Exempt from 125% Tariffs," *Reuters*, April 30, 2025; Auzinea Bacon, "Smartphones and Computers Are Now Exempt from Trump's Latest Tariffs," *CNN*, April 12, 2025.
Source: Various.[119]

As of September 30, 2025, tariffs remained in place on most imports from China with an average tariff rate of 57.6 percent.[120] Year-to-date imports of Chinese goods to the United States for the first seven months of 2025 have dropped 18.9 percent and reached their lowest value since 2009.[121] Tariffs are set to continue rising as

the Administration announced new 10 to 25 percent Section 232* import tariffs on timber, wood furniture, and other wood products, effective October 14, 2025.[122]

Figure 5: U.S.-China Monthly Bilateral Trade, January 2016–July 2025



Source: U.S. Census Bureau, "USA Trade Online."

China used a variety of retaliatory tools in response to U.S. tariffs, including implementing counter-tariffs on U.S. exports, imposing export controls on critical minerals, targeting U.S. companies for antimonopoly investigations or import bans, and adding U.S. firms to China's unreliable entity list. While some of the measures had immediate consequences for U.S. production, other measures were softened by China's years-long efforts to reduce its own reliance on the United States:

- *Retaliatory tariffs exacerbate longer-term trend of fewer U.S. exports to China:* China's retaliatory tariffs contributed to a drop in U.S. exports to China of 22 percent year-over-year.[123] Since February, Chinese buyers have reportedly halted new purchases of U.S. soybeans after China imposed retaliatory tariffs of 34 percent on U.S. exports.[124] China typically purchases over half of U.S. annual soybean production.[125] Through July 2025, U.S. exports of soybean and soybean products to China have dropped over 50 percent.[126] However, U.S. exports to China had already been falling, as China has enacted policies to reduce its reliance on U.S. goods.[127] From 2023 to 2024, Chinese purchases of U.S. soybeans fell from $15.1 billion to $12.6 billion.[128] Despite this trend, China remains reliant on imports of specialized semiconductors and medical goods from the United States, a fact highlighted by the exemption of these products from China's retaliatory tariffs.[129]
- *Export controls on critical minerals inflict pain on U.S. producers and target advanced technology:* On April 4, China's Ministry of Commerce announced export controls on the rare earth

*A Section 232 investigation, conducted under the Trade Expansion Act of 1962, assesses whether imports threaten U.S. national security. Within 270 days, the Commerce Secretary reports findings to the President, who may impose remedies if a threat is identified. U.S. Department of Commerce Bureau of Industry and Security, *Section 232 Investigations: The Effect of Imports on the National Security*, July 23, 2025.

elements (REEs) samarium, gadolinium, terbium, dysprosium, lutetium, scandium, and yttrium.[130] These materials are critical for the production of magnets used in industries including automobiles, wind turbines, electronics, and robotics, and controls have led to shortages and production delays outside of China.[131] Exports of these goods now require a license application and approval from China's Bureau for Industrial Security and Import and Export Controls under the Ministry of Commerce, and China has used these licenses as leverage during trade negotiations with the United States.[132] On October 9, China's Ministry of Commerce expanded its licensing requirement to encompass five additional REEs* and REE processing technology, and include exports of goods that either contain Chinese-sourced REEs or were made using related Chinese extraction, processing, and manufacturing technologies.[133] The strengthened controls also require "case-by-case approvals" for such exports destined for use in semiconductors below 14 nanometers, related semiconductor manufacturing equipment, and AI development, in an apparent attempt to counter U.S. restrictions of advanced AI chips.[134] (For more on China's dominance over critical mineral supply chains and its attempts to use this as leverage against the United States and other countries, see Chapter 9, "Chained to China: Beijing's Weaponization of Supply Chains" and Chapter 10, "Power Surge: China's Electrification Drive and Push for Global Energy Dominance.")

- *Unreliable Entity List primarily targets U.S. defense firms, with little incremental impact to date:* In early April, China's Ministry of Commerce added 17 U.S. drone makers and defense firms to its Unreliable Entity List for their sales to or military cooperation with Taiwan, although it later issued a statement on May 14 suspending these additions for 90 days.†[135] China added 17 more entities headquartered in the United States, Canada,‡ and the UK to the list on September 25 and October 9.[136] The additions will likely have little impact on the operations of most of the companies, many of which China had already imposed sanctions on throughout 2024.[137] The exceptions to this were the additions of Illumina and PVH group (the parent of fashion brand Calvin Klein) to the list in February 2025, both of which still have significant revenue-generating operations in China.[138] As China has reformed its export control laws to tighten oversight of exported dual-use items, however, these rules could be used

*The new REEs are holmium, erbium, thulium, europium and ytterbium. Ernest Scheyder et al., "China Expands Rare Earths Restrictions, Targets Defense and Chips Users," *Reuters*, October 9, 2025.

†China's Ministry of Commerce promulgated the Provisions on the Unreliable Entity List in 2020, creating a mechanism to investigate and penalize foreign companies for taking actions perceived as harmful to China's interests. Inclusion on the list can restrict a company's imports and exports from China, prohibit investment in China, and bar senior management from entering China. Lester Ross and Kenneth Zhou, "China, the United States, and the Rivalry over the Imposition of Unilateral Trade Sanctions," *WilmerHale*, September 6, 2024; Cari Stinebower, Jacob Harding, and Kai Zhan, "China Adds Additional Entities to the Unreliable Entity List," *Winston and Strawn LLP*, June 11, 2024.

‡Canada-based semiconductor research firm TechInsights was responsible for uncovering the presence of restricted TSMC, Samsung, and SK Hynix chips and parts in Huawei devices. "China Blacklists Researcher That Exposed Huawei Chip Secrets," *Bloomberg*, October 9, 2025.

to prevent more U.S. end users from accessing Chinese-made components.[139]

- *Targeted actions against U.S. companies to use as leverage:* China's State Administration for Market Regulation (SAMR) announced an antitrust investigation into Google on February 4, although the investigation was later dropped during trade negotiations in September.[140] The company, which does not offer its major products like its search engine and app store in mainland China, nevertheless maintains business relationships with Chinese companies for purposes such as providing the Android operating system and selling advertising space in third country markets.[141] After adding Illumina to the Unreliable Entity List the prior month, in March, China escalated restrictions on the company by banning imports of its gene sequencing machines.[142] China accounts for around 7 percent of Illumina's sales, but the company said it would offset the impact of lost revenues on its profit margins by cutting costs.*[143] (For more on China's ban of Illumina gene sequencers, see Chapter 6, "Interlocking Innovation Flywheels: China's Manufacturing and Innovation Engine.") In September China's Ministry of Commerce announced separate discrimination and antidumping investigations into U.S. chip sales as the two sides geared up for trade negotiations in Madrid.[144] Two days later in the midst of negotiations, SAMR accused Nvidia of anti-trust violations.[145] Chinese officials said the company's acquisition of Israeli firm Mellanox Technologies in 2020 violated China's anti-monopoly law, a deal regulators had approved at the time.[146] The move coincided with SAMR dropping its anti-trust probe into Google, signaling China's willingness to both exert leverage and ease pressure as a negotiating tactic.[147] On October 10, 2025, a day after expanding export controls on REEs, SAMR opened an anti-trust investigation into U.S. chipmaker Qualcomm's June 2025 acquisition of Israeli chip designer Autotalks, claiming the probe would examine whether Qualcomm misreported details of the deal.[148]

As of September 2025, U.S. and Chinese officials appear to have reached a deal that would allow TikTok to continue operating in the United States. In 2024, Congress passed a law that would ban TikTok as of January 2025 unless ByteDance divested control over its U.S. operating entity.[149] Multiple executive orders declined to enforce the law for temporary periods, with the September order lasting through December 2025.[150] Under the terms of the September 2025 agreement, a consortium of U.S. investors including Oracle will have around 80 percent ownership in a new entity with ByteDance's stake reduced to below 20 percent.[151] According to statements from the White House, the app's key algorithms will be recreated by licensing TikTok technology and Oracle will host U.S. user data in the

*This appears to be the first reported instance of China using the Unreliable Entity List to single out a specific product for an import ban. China uses a variety of methods to encourage self-sufficiency among its technology firms, including market entry barriers, financial incentives, forced technology transfer, government investment funds, and discriminatory procurement policies. For more, see "China's Industrial Policy Arsenal" in Chapter 6, "Interlocking Innovation Flywheels: China's Manufacturing and Innovation Engine."

United States.[152] U.S. individuals will also control 6 out of 7 board seats, with ByteDance retaining the last seat.[153]

Cross-Border Financial Flows

Financial flows continue between the United States and China, albeit on a smaller scale and subject to more restrictions. Governments of both sides have taken steps to restrict investment for national security reasons, while companies are proactively hedging their own business risks by canceling previously planned investments. In the second quarter of 2025, investment manager Bridgewater Associates sold its approximately $1.5 billion holdings of U.S.-listed Chinese stocks and China-focused exchange-traded funds.[154] As the largest foreign hedge fund in China with onshore assets under management around RMB 60 billion ($8.8 billion), Bridgewater's divestment indicates a discrepancy between apparently bullish views of the country and the potential exposure of Chinese firms' overseas operations to geopolitical tensions.[155] Despite the slowdown in recent years, cross-border portfolio holdings remain high. Goldman Sachs and Bloomberg estimate that Chinese investors hold $370 billion of U.S. equities.[156] Likewise, U.S. investors hold $800 billion of Chinese equities, primarily through U.S.-listed or Hong Kong-listed mainland Chinese firms.[157]

Listings of Chinese firms on U.S. stock exchanges have declined due to scrutiny from regulators and officials in both the United States and China.* In 2021, Chinese regulators opened an investigation into Didi Chuxing's initial public offering (IPO) on the New York Stock Exchange (NYSE) after the company failed to respond to Chinese regulators' concerns over data privacy. Didi Chuxing ultimately delisted from the NYSE in 2022, and Chinese firms now must receive regulatory approval from China before an overseas IPO.† [158] All of China's SOEs have delisted from U.S. stock exchanges since the Public Company Accounting Oversight Board reached an agreement with Chinese regulators to allow for inspections of audit firms in mainland China and Hong Kong that audit Chinese firms listed in the United States.[159] Small-cap Chinese firms have continued to list on U.S. stock exchanges, and U.S. investors have accused some of these firms of deceiving investors through pump-and-dump schemes. Regulators are investigating a pattern of sudden drops in stock value that appears to be perpetrated by foreign investors.‡ [160]

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*FDI inflows from China have declined broadly since 2016 as the government cracked down on capital outflows in sectors like real estate and entertainment. Thilo Hanemann, Armand Meyer, and Danielle Goh, "Vanishing Act: The Shrinking Footprint of Chinese Companies in the US," *Rhodium Group*, September 7, 2023.

†Chinese regulators have tightened rules for Chinese firms regardless of the listing venue. In 2020, regulators blocked Ant Group's planned Shanghai and Hong Kong IPO after Ant's CEO Jack Ma critiqued financial regulation in a speech. The move sparked a greater tightening of government oversight of China's technology companies, leading to more formalized rules for overseas listings. Yang Yang, Naomi Ng, and K Oanh Ha, "How China Is Bringing Hong Kong's IPO Market Back to Life," *Bloomberg*, August 13, 2025; "In Just One Year, Beijing's Crackdown Has Changed Corporate China Forever," *Bloomberg*, November 2, 2021; Maximilian Karnfelt, "China's Fintech Giant Ant Financial Reined In by Politics," *Mercator Institute for China Studies*, November 12, 2020.

‡Nasdaq has introduced new rules this year that speed up the process of de-listing stocks that fall below $1 in value and requiring certain companies to raise at least $15 million for new IPOs. The U.S. Securities and Exchange Commission has also formed a task force to investigate U.S.-based financial market participants who have facilitated securities law violations. George Steer, "SEC Targets US Firms Tied to Suspected Chinese 'Pump and Dump' Scams," *Financial Times*,

The U.S. government has taken steps to limit investment by U.S. investors in China's high-technology industries to prevent technology transfer. U.S. Department of the Treasury restrictions to prohibit or require notification of transactions involving investment in sensitive technologies in China came into effect in January 2025.*[161] The Administration has since proposed expanding the restrictions to additional sectors.[162] Survey results from the American Chamber of Commerce in China indicate that China's attractiveness as an investment destination has declined due to both U.S.-China tensions and China's declining macroeconomic environment.[163] However, broad portfolio investment in China remains relatively unrestricted, and U.S. portfolio holdings in mainland-China listed securities rose an estimated $16 billion† in the first half of 2025 as Chinese markets saw record global inflows attributed to developments surrounding Chinese AI company DeepSeek.‡[164]

Since government scrutiny of deals in both the United States and China brought Chinese FDI into the United States down from its 2016 peak, Chinese FDI in the United States has remained muted.[165] In 2023, flows of direct investment from China to the United States were $6.9 billion, a decrease of 5 percent over the prior year.[166] The U.S. government announced its intent to prevent Chinese purchases of U.S. farmland after previous proposed transactions that would have granted Chinese owners access to land near U.S. military sites raised alarms.§[167] In addition, China's regulators have stalled approvals for new investments in the United States.[168] China's sovereign wealth fund is also reducing its less liquid U.S. holdings, while state-backed Chinese firms have limited their investments in U.S. private equity funds under pressure from the Chinese government.[169]

China's Technological Outlook—Progress, Obstacles, and Results

U.S.-China Tech Competition and Policy

Technological competition between the United States and China continues to be a major factor reshaping their economic and security relationships. Both sides now realize critical technologies—from advanced semiconductors to AI—are strategic assets tied to national resilience and geopolitical competition. This shift has seen the United States often trying to slow China's progress, while China

September 10, 2025; Dave Michaels, "Obscure Chinese Stock Scams Dupe American Investors by the Thousands," *Wall Street Journal*, June 16, 2025; George Steer, "Surge in Chinese Listings Drives Boom for US Small-Cap IPO Market," *Financial Times*, May 13, 2025.

*These technologies, named in a 2023 executive order, include semiconductors and microelectronics, quantum information technologies, and AI. To date, Congress has not succeeded in enacting legislation restricting outbound investment to China. Cathleen Cimino-Isaacs and Karen Sutter, "Regulation of U.S. Outbound Investment to China," *Congressional Research Service* CRS IF12629, December 10, 2024; "Final US Outbound Investment Rules to Be Effective January 2, 2025: Key Questions Answered," *Latham & Watkins*, November 8, 2024.

†These estimates do not account for portfolio investment that flows through offshore tax havens such as the Cayman Islands and Bermuda.

‡Chinese government stimulus in September 2024 led to a resurgence in domestic equity valuations as individual Chinese investors rushed to take advantage of the rally. However, China's stock markets do not reflect underlying economic realities, and many investors view stock trading as a "casino" rather than one grounded in fundamentals. Li Yuan, "Why Chinese Are Rushing into a 'Casino' Stock Market," *New York Times*, October 21, 2024.

§It is not clear what steps have been taken or what authority has been used since the announcement to implement such a ban.

attempts to use industrial policy to keep up, using as leverage the desire of U.S. tech firms to access China's market and consumers.

The United States has tightened export controls on advanced semiconductors to stall China's progress in AI. In response, Chinese companies have sought ways to circumvent these obstacles and develop workarounds through both homegrown solutions and black market purchases.[170] The United States has also worked with allies to deter the smuggling of AI chips, with Malaysia announcing in July that it would closely track and require permits for any chips shipped into or out of the country.[171] China has responded to U.S. efforts by redoubling efforts to develop competitive domestic alternatives. Huawei's Ascend 910C chip*—touted as rivaling Nvidia's H100 in inference workloads for running AI models like DeepSeek—is now entering mass production via China's Semiconductor Manufacturing International Corporation's (SMIC) 7 nm process, with early shipments and usage already underway by Chinese AI firms.†[172] Meanwhile, SMIC is pursuing deeper integration with Huawei to boost production yields on chips (an estimated 20–40 percent for SMIC compared to 60–90 percent for Taiwan Semiconductor Manufacturing Company [TSMC], dependent on the chip) and achieve full domestic supply chain independence.‡[173] In the long term, yields this low are unsustainable for the profitable operations of SMIC and must be subsidized at great cost by China's central and local governments.[174] While Chinese AI companies wait for Huawei and SMIC to meet local demand, they are buying less advanced chips that do not violate U.S. export controls, illicitly acquiring export-controlled semiconductors, or training their models at overseas data centers.§[175]

Chinese regulators have also moved to restrict foreign companies' access to the Chinese market and push Chinese companies to buy local.[176] In August, Chinese authorities discouraged companies from purchasing Nvidia H20 chips (more on H20s below); then in September, the Cyberspace Administration of China effectively banned Nvidia's RTX Pro 6000D chips—another less advanced product the company had designed to be compliant with U.S. export control performance restrictions.[177]

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*Huawei designs chips through its internal "HiSilicon" fabless chip design firm. These chip designs are then shared with and produced by SMIC. However, Huawei is also now currently constructing at least five semiconductor fabs, meaning future chips may be designed by HiSilicon and then directly produced by Huawei with no third-party involvement. Antonia Hmaidi, "Huawei Is Quietly Dominating China's Semiconductor Supply Chain," *Mercator Institute for China Studies*, April 9, 2024.

†The 910C is being used in systems like Huawei's CloudMatrix 384 rack-scale systems (multiple servers working together), which deliver lesser performance than comparable Nvidia products but are reportedly increasingly serviceable for AI workloads like training or inference. Dylan Patel et al., "Huawei AI CloudMatrix 384—China's Answer to Nvidia GB200 NVL72," *SemiAnalysis*, April 16, 2025.

‡"Yield" is the share of usable chips from a wafer. High yields lower costs, while low yields raise them. Maximizing high-quality, defect-free yields is one of the hardest but most important goals in chipmaking. The Integrated Circuit Engineering Corporation identifies chip yield as "the single most important factor in overall wafer processing costs," since even modest gains in output can sharply reduce overall manufacturing expenses. Gregory Hale, "Hidden Costs and Tradeoffs in IC Quality," *Semiconductor Engineering*, February 8, 2024; Koen de Backer et al., "Taking the Next Leap Forward in Semiconductor Yield Improvement," *McKinsey and Company*, April 2018; "Yield," *Samsung. https://semiconductor.samsung.com/support/tools-resources/dictionary/semiconductor-glossary-yield/*.

§A *Financial Times* investigation published in July 2025 estimated that advanced Nvidia chips worth more than $1 billion were smuggled into China's thriving black market after the Trump Administration tightened controls on exports of advanced AI processors in April. Eleanor Olcott and Zijing Wu, "Nvidia AI Chips Worth $1bn Smuggled to China after Trump Export Controls," *Financial Times*, July 25, 2025.

To strengthen the effectiveness of export controls, the U.S. government is considering more aggressive ways to slow down Chinese firms' race to advanced capabilities. On May 13, the Commerce Department issued guidance that any firms—in the United States or globally—using Huawei's advanced AI chips could be subject to future enforcement actions, though it has yet to provide any follow-up on this issue.[178] Navigating between geopolitical strife and increasingly complex legal regimes, U.S. companies operating in China are often forced to choose between maintaining ties, losing market access, or facing even more severe retaliatory actions.

U.S. firms have begun to engineer products at or just below the legal threshold of export controls, though some production of these bespoke products has been paused after China's move to restrict imports.[179] U.S. export controls have prompted chipmakers like Nvidia and AMD to design chips that, while less capable than their most advanced products, are still more attractive to Chinese AI firms than domestically produced alternatives.[180] In April, Nvidia revealed that the U.S. Department of Commerce had blocked sales of its H20 chips after the company reported $17 billion in revenue from China in 2024; reports indicated Nvidia promptly planned a new, slightly less advanced version of the chip in order to get around the new limitation.[181] On July 14, Nvidia and AMD announced that the Commerce Department would allow the companies to resume sales of the H20 and MI308 (an AMD chip similar in performance to the H20), respectively.[182] Key Administration officials behind this decision believe that allowing lower-compute chips such as the H20 into China promotes U.S. market share dominance, disincentivizes China from exporting Huawei chips to third-party countries, and ensures China's leading AI companies remain "addicted to the American technology stack" two to three iterations behind that which is available to trusted customers.[183] However, leading national security experts* contend that allowing the export of Nvidia's H20 chips undermines the semiconductor export controls by enabling these advanced chips to fuel China's efforts to catch up and surpass the United States in AI, noting that the H20 performs better at certain tasks key to AI models than more advanced chips.†[184]

Given China's ability to access powerful AI chips through legal avenues of cloud compute and illegal avenues of chip smuggling, the U.S. under the previous administration also introduced the AI Diffusion Rule on January 15, 2025.[185] The rule created a three-tier country system: tier one partners had largely unhindered access to advanced graphics processing units (GPUs); tier two countries faced capped access designed to keep them behind the frontier; and tier

*Twenty experts, including Former Deputy National Security Advisor Matt Pottinger, American Compass founder Oren Cass, and senior fellow at Center for New American Security Liza Tobin, signed a letter to Commerce Secretary Howard Lutnick on July 28, 2025, urging the Administration to reverse course and ban the sale of H20 chips to China. Brad Carson et al., "Letter to Secretary Lutnick on H20 restrictions," *Americans for Responsible Innovation*, July 28, 2025.

†A major concern with Nvidia's H20 GPU is its ability to support AI models' inference capabilities. Inference refers to an already trained model's ability to generate outputs such as answering queries, producing content, or analyzing data. Inference, rather than AI model training, is especially critical for Chinese models like DeepSeek's R1. While the H20 is not the most advanced GPU for training large AI models, it is particularly well suited for high-performance inference workloads. Arushi Gupta, Tao Burga, and Tim Fist, "The H20 Problem: Inference, Supercomputers, and US Export Control Gaps," *Institute for Progress*, April 15, 2025; Brad Carson et al., "Letter to Secretary Lutnick on H20 restrictions," *Americans for Responsible Innovation*, July 28, 2025.

three destinations (e.g., China and other arms-embargoed states) were denied leading-edge chips.[186] The framework imposed security and auditing requirements to prevent diversion (including conditions tied to data centers and cloud use) and, for the first time, required licenses for exporting certain unpublished AI model weights, treating them as controlled technology.[187] However, in May 2025, the Commerce Department under the current Administration announced a rescission of the AI Diffusion Rule, raising concerns about the rule's regulatory burden, effect on innovation, and diplomatic impact and indicating it would issue a replacement rule in the future.*[188] At the same time, Commerce issued new guidance intending to strengthen other semiconductor-related export controls.[189] In August 2025, Commerce announced it would end foreign companies' ability to export semiconductor manufacturing equipment to facilities in China without a license under the Validated End-User (VEU) program.[190] The Department's Bureau of Industry and Security (BIS) stipulated that licenses would be granted for existing operations but not for future expansion or upgrades to facilities based in China.[191] Reports indicate that this change will affect numerous foreign firms with operations in China's semiconductor industry, including TSMC, SK Hynix, and Samsung.[192] On September 29, BIS adopted a version of Treasury's "50 percent rule" for sanctioned entities, extending export control restrictions to affiliates owned 50 percent or more by another entity that is already subject to certain controls under BIS and Treasury's Office of Foreign Assets Control.[193] Export control experts have characterized this move as a significant expansion to the coverage of these lists to prevent evasion.[194]

Despite U.S. efforts to restrict China's access to advanced technologies and chips, the results have been uneven. U.S. firms continue to shape China's technology landscape in different ways, with some deepening their cooperation with China even as others pull back. Chinese AI companies have also managed to keep pace with U.S. counterparts, continuing to put out advanced AI models despite barriers to obtaining the most advanced hardware needed for training or inference. Below are related developments summarizing this complex picture:

- *U.S. corporate investment into China's tech ecosystem:* On May 16, Nvidia announced it was investing in a new Shanghai research center, exemplifying a longstanding trend of U.S. tech companies directly bolstering Chinese research and development (R&D) into advanced technologies.[195] While Nvidia's facility will not handle core chip design work, it will focus on adapting existing technologies for local clients, navigating around the most sensitive areas restricted by export controls.[196] Nvidia's actions follow those of Apple, which in 2024 announced that Shenzhen would host its largest R&D lab outside the United States.[197]

*In place of the AI Diffusion Rule, experts at RAND and the Carnegie Endowment for International Peace have argued for a range of potential alternatives—from renting cloud compute (rather than exporting chips) to tier three countries like China or tying the export of chips into trade-based concessions. Alasdair Phillips-Robins and Sam Winter-Levy, "The Trump Administration May Be About to Repeal the AI Diffusion Rule. Here's What It Should Do Next," *Carnegie Endowment for International Peace*, May 8, 2025; Janet Egan and Lennart Heim, "America Should Rent, Not Sell, AI Chips to China," *RAND*, August 15, 2025.

- *Commercial pullback from China:* Nvidia and Apple's actions run in stark contrast to other major U.S. tech companies that are choosing to decouple or decommission Chinese research facilities dedicated to advanced technology. In July, Amazon announced it was shutting down its Shanghai-based AI lab.[198] This pullback mirrors similar actions from IBM and Microsoft, which in recent years have also closed R&D centers throughout China.[199] These actions show that leading U.S. technology companies are choosing different paths for engagement with China depending on their perceptions and the risks versus benefits of market access.
- *China's AI progress:* China has proven it can still produce world-class AI models with less computing power. In December 2024, DeepSeek released its V3 open source large language model, followed by its R1 reasoning model in January.[200] DeepSeek models had comparable performance to leading U.S. AI firms despite using far less compute for training and at the same time achieving far lower costs for running inference.[201] Since DeepSeek's release of V3 and R1, other groundbreaking Chinese AI models—all of them open source, trained on less compute, and typically less expensive than U.S. counterparts—have continued to emerge from both established and upstart Chinese commercial firms, showing that China's innovative capabilities and competitiveness with U.S. AI companies will continue for the foreseeable future.[202] In August 2025, the State Council released the "AI Plus" strategy outlining goals to promote widespread adoption of AI throughout the economy and society in the coming years. Modeled on the "Internet Plus" strategy in 2015 that aimed to connect real-world activity to users and customers online, the AI Plus policy sets out to "empower" people with AI agents and applications across six key industries, with goals of 70 percent adoption by 2027 and 90 percent by 2030.[203]

China's Tech Competition Challenges

In February, General Secretary Xi hosted a meeting with Chinese technology leaders as part of a broader effort to support investment, regulatory stability, and domestic innovation. The firms in attendance included longstanding national champions involved in mature technologies like BYD and Huawei, dynamic startups in emerging technologies like DeepSeek and Unitree Robotics, and the return of previously shunned tech titan Jack Ma, founder of Alibaba.*[204] To outside observers, Xi's presence at the February meeting signaled that China's "tech crackdown" has passed, with some analysts anticipating looser restrictions on private tech firms but many others noting policy would still guide entrepreneurs toward contributing to Beijing's long-term goal of technological self-sufficiency.[205]

*Ma's return was symbolic, as he had previously been punished and had seemingly fled China after challenging local regulations and policies related to his technology companies (notably Alibaba and Ant Group). His reappearance with Xi at the February meeting was intended to be a signal of the Party's support for the technology sector and of renewed regulatory leeway for private tech firms. John Liu, "In from the Cold? Alibaba Co-founder Jack Ma Spotted among Top Tech Bosses Who Met China's Xi," *CNN,* February 17, 2025, "China Invites Jack Ma, DeepSeek Founder to Meet Top Leaders," *Bloomberg*, February 14, 2025.

In April, several ministries jointly issued a directive to the financial industry to support domestic tech firms involved in AI, quantum, biotech, and other strategic sectors by expanding bank credit and extending loans.[206] In May, China unveiled a national venture capital fund to encourage investment in technology firms.[207] Other notable measures of support have focused on applying AI to legacy industries like manufacturing, using AI to identify patentable technology, and building pools of intellectual property to encourage research commercialization.[208] While these efforts are still nascent, China's ability to more quickly identify and patent technology via AI could further contribute to problems of "patent thickets" that strategically block U.S. technology firms from accessing or commercializing intellectual property without facing litigation and other legal complications.[209]

Alongside policy support for critical technologies, China uses Party-led "lawfare" to pressure U.S companies, using their desire for market access as a point of leverage to punish them for compliance with U.S. export controls.[210] Last December, China launched an antitrust investigation that threatens to unwind Nvidia's 2019 acquisition of computer networking firm Mellanox, potentially denying Nvidia access to innovative technology critical for GPUs and networking equipment.*[211] In February, China's market regulator launched an investigation into anticompetitive practices related to Google's Android operating system, which runs on roughly two-thirds of the smartphone market in China and competes with Huawei's domestically developed Harmony OS.[212] Regulators dropped the case in September as they shifted scrutiny to Nvidia during trade talks with U.S. officials in Madrid.[213] Chinese regulators also delayed approval of U.S. electronic design automation (EDA) firm Synopsys's merger with U.S. software developer Ansys after the Trump Administration tightened controls on the sale of advanced chip design software to China, though the deal was subsequently approved.†[214]

Alongside legal weapons to retaliate against the United States, China also seeks to unravel the international partnerships underpinning U.S. export controls by pressuring foreign companies and governments. In May, China's Foreign Minister Wang Yi directly lobbied his Dutch counterpart to loosen the Netherlands' export controls surrounding ASML's photolithography machines, though this effort was unsuccessful.[215] China is now using its own export controls to retaliate against countries partnering with the United States. In July, Japanese Foreign Minister Takeshi Iwaya requested that Foreign Minister Wang Yi ease rare earth element and magnet export licenses to Japan.[216]

Future of U.S.-China Tech Competition

Ultimately, the technological competition between the United States and China may lead to a bifurcated ecosystem for advanced

*Nvidia's acquisition of Mellanox was originally approved by China's regulators in April 2020. "NVIDIA Receives Approval to Proceed with Mellanox Acquisition from China's Antitrust Authority," *Nvidia*, April 16, 2020.

†China's State Administration for Market Regulation conditional approval requires the merged entity to honor current customer relationships and continue supplying EDA software to China. "China Gives Conditional Nod to Synopsys-Ansys deal, Removing Last Major Hurdle," *Reuters*, July 14, 2025.

semiconductors and AI, along with other emerging technologies. For advanced semiconductors, the split is at the company level, with Huawei and SMIC poised to overtake Nvidia's spot as the top supplier of AI chips in China after the Chinese government pressured domestic firms not to buy Nvidia chips during the summer of 2025.[217] According to reporting from the *Financial Times*, the Cyberspace Administration of China instructed Chinese firms to cancel orders of Nvidia chips designed for the Chinese market in September.[218] For AI, the split is more pronounced, with the United States heavily tilting toward closed-weight and proprietary models like those of OpenAI, xAI, DeepMind, or Anthropic, while China's most advanced models by DeepSeek, Alibaba, and others are explicitly open-weight, less expensive, and freely downloadable for users.[219]

Since the intelligence community highlighted to U.S. lawmakers the cybersecurity risks posed by using Huawei and ZTE equipment in telecommunications networks, there has been growing awareness surrounding the security risks linked to Chinese-connected products.[220] This awareness has led to a series of import restrictions and heightened scrutiny across multiple sectors. From Chinese electric vehicles (EVs) and drones to energy infrastructure and defense systems, U.S. officials have raised concerns about embedded hardware, remote access capabilities, and the potential for espionage. These measures have created increased uncertainty for Chinese firms seeking to operate in U.S. markets tied to critical infrastructure, transportation, and national defense.

- *Chinese EVs:* Over the past four years, U.S. policymakers effectively blocked the import and domestic production of Chinese-made EVs through steep tariffs and the denial of federal tax credits. More recently, based on national security concerns, BIS's Office of Information and Communications Technology Services (OICTS) effectively restricted imports of "connected vehicles" produced in or including key systems from various countries, including China.[221] The moves are in part intended to address concerns that China could gather information and even disrupt U.S. transportation networks through these technologies.[222]
- *Chinese drones and other connected technology:* In December 2023, the American Security Drone Act was passed as part of the 2024 National Defense Authorization Act, prohibiting federal government purchases of drones from entities domiciled in China or entities subject to China's influence or control.[223] In July 2025, the Commerce Department opened a Section 232 national security investigation into imported drones.[224] The executive action follow an advanced notice of proposed rulemaking by OICTS in January 2025 seeking comment on risks associated with the use of drones or key drone systems produced in various countries, including China.[225] With Chinese firms like DJI dominating U.S. commercial drone imports, these investigations could become a major point of tension between the United States and China.[226] The Commerce Department also opened a Section 232 investigation into imported robotics and industrial machinery in September, citing concerns over the security of

supply chains for components as well as the ability of foreign persons to weaponize these technologies.*[227]

- *Chinese IT equipment and digital platforms:* In December 2024, the *Wall Street Journal* reported that Commerce Department investigators subpoenaed TP-Link for details on its corporate structure, following concerns raised by the House CCP Select Committee on TP-Link's corporate location in China, cybersecurity vulnerabilities, and TP-Link's obligation to share U.S. user data with China's government upon request by CCP officials.[228] The investigation has continued under the Trump Administration, with Bloomberg reporting in April 2025 that the U.S. Department of Justice's antitrust division was probing the company for potential predatory pricing and related practices.[229] Adding to the pressure, in May, 17 lawmakers led by Senate Intelligence Committee Chair Tom Cotton raised national security concerns about TP-Link's role in U.S. supply chains in a letter to Commerce Secretary Howard Lutnik.[230] Moving forward, Federal Government actions and congressional legislation suggest continuing scrutiny of—and likely further tightening of restrictions against—Chinese IT equipment makers, Chinese digital platforms, and Chinese-origin products that are internet connected.[231]
- *U.S. Department of Defense (DOD) bans on Chinese companies:* In its 2025 update of the Section 1260H List, DOD added 66 companies as well as several affiliates of companies already on the list and expanded prohibitions on procurements containing Chinese-origin components, restricting them from entering into or renewing DOD contracts.†[232] These actions continue a longer trend of identifying and removing Chinese suppliers from U.S. defense supply chains.

China's External Economic Relations

China has sought to capitalize on recent concern on the part of many countries about the direction of U.S. trade policies, offering itself as a stable and reliable alternative to the United States while threatening retaliatory measures against countries that negotiate deals with Washington it finds "unfavorable." Chinese outbound direct investment has begun to recover from pandemic lows, though it is marked by major shifts in composition and geographic destination. Merger and acquisition activity continues to decline, offset by greenfield investment by established companies looking to expand overseas manufacturing capacity. In 2025, Beijing has also contin-

*In April 2025, BIS also initiated Section 232 investigations into imports of semiconductors and pharmaceuticals. As of October 10, the reports have not been published; the 270-day statutory deadline for the investigations to close is December 27, 2025. U.S. Department of Commerce, Bureau of Industry and Security, *Section 232 Investigations: The Effect of Imports on the National Security*.

†Section 1260H of the Fiscal Year 2021 National Defense Authorization Act requires the Secretary of Defense to publish an annual list of "Chinese military companies," including entities working as agents of the People's Liberation Army or Central Military Commission or contributing to China's military-civil fusion program and operating directly or indirectly in the United States or its territories. DOD first published the Section 1260H List in June 2021. "US Department of Defense Issues Updated Section 1260H Chinese Military Companies List," *Hogan Lovells*, January 17, 2025.

ued its multiyear push to promote the use of the RMB internationally, making marginal gains.

China Touts Itself as a Reliable Trade Partner despite Distortive Practices

China has presented itself as a "responsible great power" and partner of choice for U.S. friends and foes alike.[233] In response to the Administration's reciprocal tariff announcement on April 2, 2025, Chinese officials said the proposed tariff policy "severely infringes upon the legitimate rights and interests of all countries, severely violates WTO rules, severely undermines the rules-based multilateral trading system, and severely disrupts the global economic order."[234] Despite China espousing itself as a champion of free and open international trade, numerous countries have continued to enact their own measures to protect their markets in recognition of the potentially harmful distortions that China's mercantilist system poses to their domestic industries. In 2024, 149 countries registered a goods trade deficit with China—deficits poised to deepen as China continues to prioritize goods exports as its principal growth strategy.[235]

China Uses Both Charm and Threats against Countries Engaged in U.S. Trade Talks

China has threatened "resolute countermeasures" against countries that negotiate deals with the United States it determines go against its national interests while also trying to appeal to countries unhappy with current U.S. trade policies.[236] Chinese officials prioritized high-profile meetings with Asian neighbors and promoted Beijing's narrative farther afield.

- Japan, China, and South Korea held their first trilateral economic dialogue in five years on March 30, 2025. The three East Asian countries began talks on a trilateral free trade agreement in 2012, but negotiations stalled in recent years amid heightened tension between China and its two East Asian neighbors.[237] While the three countries agreed to restart trilateral free trade agreement talks in their March meeting, the prospects of achieving such an agreement remain highly unlikely.
- In the weeks after President Trump's "Liberation Day" reciprocal tariff announcements, General Secretary Xi visited three Southeast Asian countries: Vietnam, Malaysia, and Cambodia. Though the trip had been planned months in advance, visiting these countries against the backdrop of the proposed tariff rates from the United States provided an opportunity for Xi to reiterate China's intentions to support neighboring countries in resisting "unilateral bullying."[238]
- In May, Chinese officials touted growing trade and investment relations with key Latin American countries during a regional forum, with Xi promising in a keynote address to boost development and promote multipolarity in the face of "bullying" and "unilateralism."[239]
- In June, Xi announced that the 53 African countries with which China has formal diplomatic relations would be afforded duty-free access to the Chinese market, lowering tariffs across the

board to zero just before many countries in Africa lost duty-free access to U.S. markets under the African Growth and Opportunity Act (AGOA), which expired on September 30, 2025.[240] China has spent years situating its firms on the continent to benefit from expanding trade, including under preferential tariff rates to the U.S. market.[241] Textile exporters in AGOA beneficiary countries tended to expand their use of the third country fabric (3CF) provision after investment by Chinese firms.[242] Benefiting from years of Belt and Road Initiative(BRI) investment, Chinese companies pervade mining and construction industries in many African countries, accruing much of the benefit of related trade.[243] Through September, total two-way goods trade between China and Africa is up 18.2 percent from the first nine months of 2024, reaching $254.9 billion, though the trade is becoming more unbalanced—Chinese exports are up 27.9 percent, while its imports from Africa have risen only 4 percent.[244]

Despite Beijing's charm offensive, developing countries—even those trending toward warmer relations with China—have stepped up their use of trade measures to shield their economies from China's export tidal wave. In January, Turkey increased its tariff rate on Chinese gas and hybrid car imports from 40 to 50 percent while keeping the 40 percent rate for EVs set in 2024 constant.[245] Brazil is reportedly considering accelerating tariff hikes on Chinese EV imports flooding its market, currently set to reach 35 percent by 2026.[246] Even Russia, one of China's closest allies, imposed a significant tax on imported vehicles that came into effect at the start of 2025.[247] Lastly, the Gulf Cooperation Council independent trade investigation body imposed antidumping duties on Chinese aluminum products and electrical components after multiyear investigations.[248] In sum, 28 of China's trade partners initiated a combined 160 trade investigations against China in 2024, a stark increase from 69 total cases brought by 18 countries in 2023.[249]

Trade tensions between China and the EU have also intensified in 2025. European Commission President Ursula von der Leyen told Xi at a July summit in Beijing that China-EU relations had reached an "inflection point" and that relations would further deteriorate unless the CCP takes concrete steps toward addressing European concerns regarding overcapacity and market access.[250] China extended an antidumping probe into EU pork imports, an action seen largely as a retaliatory measure for the EU's 2024 imposition of tariffs up to 45 percent on EVs.[251] The move is part of an escalating tit-for-tat between Brussels and Beijing, where in June 2025 the EU placed restrictions on Chinese medical device equipment in public contracts, citing market barriers for similar European-manufactured products.[252]

In late 2023, the EU's Anti-Coercion Instrument entered into force after passage by the European Parliament.[253] This new legal framework empowers the European Commission to implement a range of economic countermeasures to be taken collectively by the EU against another country using economic coercion against an EU member state.[254] The Anti-Coercion Instrument was first

proposed in 2021 after China used punitive trade measures to punish Lithuania for strengthening ties with Taiwan.[255] The Anti-Coercion Instrument has yet to be used, and though its primary function is as a deterrent, it can be viewed as part of Europe's strategy to create new and more flexible trade remedy tools to better counter China.[256]

In digital services trade, EU regulators have taken steps to enact stricter penalties on Chinese technology companies. On May 2, 2025, an Irish regulatory body tasked with overseeing data protection of foreign companies in the European Economic Area (EEA) levied a 530 million euro ($600 million) fine against TikTok for failing to secure EEA user data by allowing China-based employees to access it remotely.[257] The regulator stated that during the course of the investigation, TikTok provided false information to regulators.[258] In July, the same regulatory body opened another probe into the company's transfer of EU user data to Chinese servers.[259]

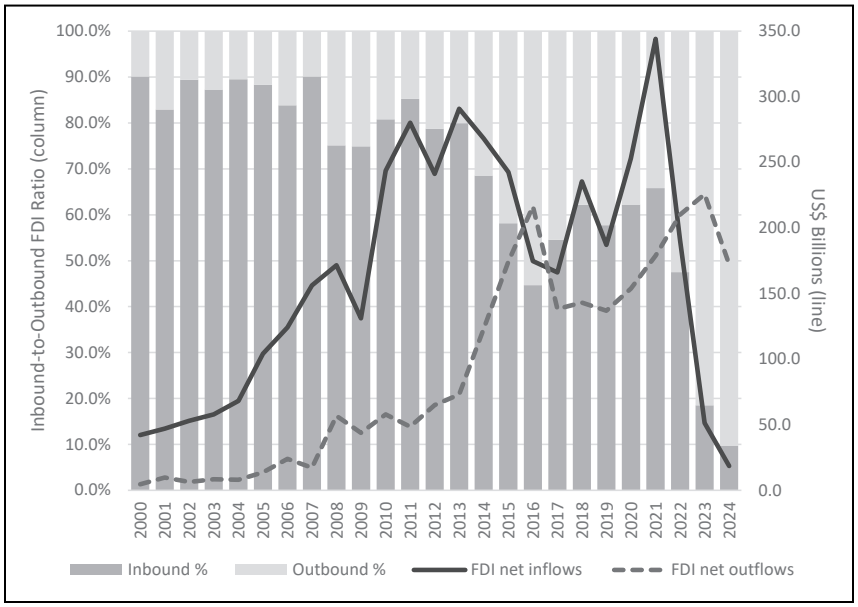
Outbound Direct Investment Shifts to Greenfield in Concentrated Sectors

As Chinese companies face domestic competition and intensifying trade tensions with the United States and the EU, they are seeking to expand operations into new third country markets, a trend apparent in overseas investment patterns. After slowing during the height of the pandemic, China's outbound FDI has seen a resurgence, while inbound investment has dropped off dramatically. This has moved China from a net recipient of investment to a net provider (see Figure 6).[260]

In 2024, Chinese investors made $143.9 billion worth of non-financial direct investments in over 151 countries, up 10.5 percent year-over-year.[261] Non-financial enterprise investment in BRI member countries rose 5.9 percent to $33.7 billion in 2024 and is up 28.2 percent through the first eight months of 2025 compared to the same period the year before.[262] Chinese investment in both the Middle East and Africa reached record levels in 2024, while China's FDI into Europe and the United States combined was the lowest level since 2010.[263] Unlike the 2014–2017 wave of Chinese outbound investment that was primarily focused on high-profile acquisitions for prestige and advancing strategic policy objectives—such as those in Made in China 2025 and BRI—the current wave has been fueled by manufacturers investing in greenfield facilities.* Greenfield investment has accounted for over 80 percent of China's announced outbound FDI every year since 2022.[264]

*This subsection primarily discusses Chinese FDI in countries other than the United States. A discussion of U.S.-Chinese investment trends is found under the "Cross-Border Financial Flows" section. Should China increase greenfield investment in the United States, many such investments may not be subject to Committee on Foreign Investment in the United States (CFIUS) review. Most transactions subject to review by CFIUS pertain to acquisitions in the United States by foreign persons, while greenfield investments typically are not considered covered transactions unless they involve purchase of real estate close to sensitive government and military installations. The Commission previously recommended that Congress consider expanding CFIUS review to cover Chinese investment in U.S.-based greenfield investment. For more, see U.S.-China Economic and Security Review Commission, Chapter 1, Section 2, "Chinese Investments in the United States" in *2017 Annual Report*, November 2017, 72. Brian J. Egan et al., "'America First Investment Policy' Aims to Reshape CFIUS and 'Reverse CFIUS,'" *Skadden, Arps, Slate, Meagher & Flom LLP and Affiliates*, February 24, 2025.

Figure 6: China's Flows of Inbound and Outbound FDI, 2000–2024



Note: Chinese official statistics on FDI net outflows are likely overrepresented due to inclusion of retained earnings, debt, and intra-company transfers in the balance of payments calculations. According to Rhodium Group, this "phantom FDI" could be responsible for over two-thirds of official outbound FDI flows from 2018 to 2023. Thilo Hanemann, Armand Meyer, and Danielle Goh, "The Next Generation of China's Outbound Investment," *Rhodium Group*, September 16, 2024.
Source: World Bank.

Announced FDI projects by Chinese companies since 2021 have been highly concentrated in three industries: automotive, energy, and basic materials. Together, these three sectors accounted for 77 percent of total outbound FDI in 2024.[265] Investment in renewable energy equipment manufacturing rose 45 percent year-on-year between 2023 and 2024.[266] (For more on China's efforts to build supply chains through "connector countries," see Chapter 8, "China Shock 2.0".)

China's Incremental Progress on RMB Internationalization

Chinese policymakers in 2025 sought to capitalize on worries over the U.S. dollar by more aggressively promoting RMB use internationally. China has sought to promote the RMB's use in cross-border payments and settlements as well as a store of value with expanded issuance of RMB-denominated assets. While the volume of RMB used in cross-border payments and in foreign exchange reserve vaults around the world increased in 2025, uptake of the RMB remains muted given China's strict currency controls. For now, Chinese policymakers have shown little desire to repeal restrictions on free-flowing capital that would be a precondition for any widespread adoption of the RMB as a reserve currency. Instead, Beijing sees strategic benefits to segmenting a portion of trade outside the dollar-based financial system, which increases leverage vis-à-vis developing countries, degrades the efficacy of U.S. sanctions, and over time mitigates China's exposure to a main lever of U.S. economic power.

China Considers RMB-Linked Stablecoin

Cryptocurrency trading has flourished in China through unofficial gray markets despite strict regulations banning most cryptocurrency activity. By 2021, China had banned cryptocurrency mining, exchanges, and trading on the Mainland.[267] Official justification for the regulations cited crypto's lack of national backing, the heightened risks of money laundering, the potential for speculation and asset bubbles, and the intense energy requirements associated with mining, although regulators' motivations most likely included the desire to maintain control over the financial and business sectors and prevent capital flight.[268] However, China's efforts to prevent access to cryptocurrency within its borders have failed to stem its popularity as both an alternative investment and a pathway for moving capital out of China.[269] Individuals use virtual private networks and other indirect methods to exchange RMB for cryptocurrencies, which can then be converted into foreign currencies or other assets in excess of the $50,000 annual foreign exchange limit set by the State Administration of Foreign Exchange.[270]

Unlike the Mainland, China has allowed a global cryptocurrency hub to emerge in Hong Kong.[271] New regulations in Hong Kong over the past few years have standardized processes for registering crypto exchanges and issuing stablecoins—a type of cryptocurrency that derives its value from a peg to an external asset—in the city.[272] At the Tenth Belt and Road Summit in Hong Kong in September, a Central Asia-based issuer became the first to launch a licensed offshore-yuan-backed stablecoin.*[273] The stablecoin is designed to help facilitate payments between offshore Chinese organizations and partners in BRI countries, and usage is currently limited to professional organizations.[274] Mainland Chinese tech firms are also reportedly among those that plan to apply for a stablecoin license in Hong Kong.[275] Regulations require exchanges registered in Hong Kong to prevent mainland Chinese users from accessing them, but some of the most popular exchanges globally have failed to register in Hong Kong or have withdrawn their applications while continuing to provide workarounds that allow Mainlanders to access the platforms.[276] It is notable, however, that the volume of illegal digital asset trading in mainland China for the 12 months to July 2023 reached $86 billion, surpassing Hong Kong's $64 billion in legal activity.[277]

Despite stringent restrictions on cryptocurrencies on the Mainland to prevent capital flight, China appears eager to embrace blockchain technologies and became the first major economy to implement a central bank digital currency (CBDC). China's efforts to promote its CBDC at home have encountered issues, including technical challenges and low uptake compared with other popular digital payment systems.[278] Officials are reportedly considering the possibility of an RMB-linked stablecoin. However, it is not

*Approval to issue the coins was granted by Kazakhstan's financial regulator. Hong Kong itself has yet to issue stablecoin licenses, with the first licenses anticipated in early 2026. Wang Xiaoqing, "Hong Kong on Track to Issue First Stablecoin Licenses in Early 2026," *Caixin Global*, September 30, 2025; "China's Yuan Stablecoin Debut in Kazakhstan Signals Blockchain Ambition," *Reuters*, September 29, 2025.

China Considers RMB-Linked Stablecoin—*Continued*

clear how such a stablecoin pegged to the onshore yuan could work in practice, considering China's closed capital account and nonconvertible currency. As U.S. dollar-linked stablecoins grow in popularity, China could consider shifting tack from CBDC to an RMB-pegged stablecoin to better compete abroad, although mainland regulators recently sought to curb speculation and discussion of this possibility, according to reporting from Bloomberg.[279] Such a stablecoin would require notable departures from China's current treatment of domestic currency assets held outside China as well as a serious rethinking of the centralized nature of China's current CBDC.[280]

China has expanded its efforts to promote RMB use internationally, including via alternative cross-border payment systems, currency swap agreements, and payment platforms. In May 2025, the PBOC raised the floor ratio—a tool to incentivize banks to promote cross-border RMB settlement—from 25 percent to 40 percent.[281] In 2024, 30 percent of China's trade was settled in RMB, though globally the RMB comprised a mere 3.8 percent of cross-border payments conducted using the SWIFT messaging system.[282] The RMB's use in cross-border trade is still dwarfed by the dollar's 49.1 percent share, but is trending up from only 2.2 percent of SWIFT payments made in RMB at the end of 2022.[283] UnionPay, China's main card payment network, continues to expand outside the Mainland, with Vietnam and Cambodia establishing QR payment systems that allow tourists and small businesses to carry out cross-border transactions without dollars.[284] As a store of value, 2.2 percent of foreign exchange reserves were held in RMB-denominated assets, compared to 57.8 percent in dollar assets (for more background on China's efforts to internationalize the RMB, see U.S.-China Economic and Security Review Commission, Chapter 7, "China's New Measures for Control, Mobilization, and Resilience," in *2024 Annual Report to Congress*, November 2024, 468–513).[285] The Central Bank of Russia has built up large RMB reserves to dull the impact of sanctions; as of 2023, it held more RMB than dollars.[286]

China's expanded use of currency swap lines raises transparency concerns about predatory lending practices toward heavily indebted countries. As of early 2025, the PBOC had established currency swap agreements with 40 countries.[287] The currency agreements allow partner countries to convert a portion of their local currency to RMB, up to an agreed-upon limit. China states that swap agreements are intended to promote bilateral trade in one another's currency. However, RMB swap agreements have been used by more than three-quarters of partner countries to address short-term liquidity issues related to debt solvency.[288] Developing countries are increasingly relying on swap agreements as a revolving line of credit, with a growing volume of outstanding balances that remain open. This diverges from U.S. Federal Reserve swap agreements that are intended primarily to smooth transactions between large financial institutions and are quickly settled.[289]

ENDNOTES FOR CHAPTER 1

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CHAPTER 2: U.S.-CHINA SECURITY AND FOREIGN AFFAIRS (YEAR IN REVIEW)

Executive Summary

Over the past year, China has sought to present itself as a responsible world leader despite engaging in a range of destabilizing activities that have undermined global peace and security. General Secretary of the Chinese Communist Party (CCP) Xi Jinping has persisted in challenging U.S. global leadership and asserting China's position on the world stage, including by hosting dozens of world leaders for a Shanghai Cooperation Organization (SCO) summit in Tianjin followed by a military parade in Beijing. China has also escalated its use of gray zone tactics—coercive military, economic, and influence operations short of war—against Taiwan, in the South China Sea, and around Japan's Senkaku Islands. Beyond its own borders, Beijing has continued to stoke violence and instability by supplying dual-use goods to Russia and otherwise helping sustain its war against Ukraine, funding Iran and its terrorist proxies in the Middle East, and intensifying cyberattacks on the United States and countries around the world.

China's efforts to undercut U.S. credibility and advance its own interests overseas have also been supported by its approach to domestic governance. Over the past year, China has deepened its anticorruption campaign with the aim of quashing internal dissent, forged ahead with its military modernization efforts, and continued its longstanding efforts to control religious institutions it sees as fueling separatism and undermining Party rule. Considered in the aggregate, these actions reflect Beijing's continued rapid preparations for the possibility of conflict and its systematic efforts to erode U.S. deterrence across the military, economic, technological, cyber, and diplomatic domains.

Key Findings

- China has used the pretext of a "turbulent" external environment to justify its ongoing campaign to quash internal dissent and enforce absolute political loyalty to the CCP. Over the past year, China has sharply increased spending on domestic public security, punished officials for disciplinary infractions at record rates, and continued to purge senior military leaders perceived as insufficiently loyal.
- Despite purges of key military leaders, China's People's Liberation Army (PLA) significantly advanced its military modernization efforts over the past year—increasing its stockpile of nuclear warheads, introducing new amphibious assault ships and stealth fighter jets, expanding its drone

deployment capacity, and enhancing its capability to launch an attack on Taiwan with little advance warning. China is increasingly willing to use PLA capabilities to send political messages, as demonstrated by unprecedented naval live-fire exercises conducted in the Tasman Sea off the coast of Australia and New Zealand.

- Beijing has continued its efforts to construct an alternative world order with itself at the center—symbolized most powerfully in 2025 by images of the leaders of Russia, North Korea, Iran, and about 20 other mostly authoritarian countries gathered behind Xi Jinping at a military parade in Beijing commemorating China's victory in World War Two.
- In meetings with leaders from Asia, Africa, and Latin America, China has sought to undermine U.S. credibility and bolster its credentials as a leader of the "Global South" by accusing the United States of disrupting international order while professing its own commitment to free trade, development assistance, and international law—despite often failing to follow through on such promises.
- While claiming to be a source of international stability, China has continued to threaten global security by undertaking gray zone activities in the Indo-Pacific and around the world. China routinely engages in provocative military maneuvers near Taiwan and in the South and East China Seas, has sabotaged critical undersea communications cables near Taiwan and in the Baltic Sea, and has escalated cyberattacks on the United States.
- China has also fanned the flames of conflict by supplying dual-use goods to sustain Russia's war in Ukraine, funding Iran and its terrorist proxies through purchases of sanctioned Iranian oil, and providing North Korea with diplomatic cover and material support that advances its cyber and weapons programs, thereby complicating global efforts to constrain these countries' destabilizing activities.
- Taken together, these actions form a coordinated strategy to prepare China for the possibility of potential conflict while steadily seeking to erode U.S. deterrence and the resilience of allied security networks.

Introduction

On May 13, 2025, Xi Jinping delivered a keynote speech in Beijing to an audience of leaders from 33 Latin American and Caribbean countries. In a series of thinly veiled criticisms of the United States, Xi denounced "tariff and trade wars," "bullying," and "protectionism."[1] In contrast, he presented China as a champion of "economic globalization," a responsible world power committed to providing humanitarian aid, and a principled advocate for upholding "international order."[2] Similar scenes have played out over the past year in meetings with representatives from virtually every world region.[3] Chinese leaders have sought to undermine the credibility of U.S.

international leadership and portray Beijing as the "adult in the room," claiming to restore global stability.[4]

Yet a review of Beijing's domestic policies, military modernization efforts, gray zone activities, and support for malign actors over the past year reveals that Beijing has continued to engage in dangerous and destabilizing activities that have undermined peace and stability worldwide. Beijing often uses lawfare or outright denials in an attempt to mask its malicious activities, presenting itself as a source of global stability even as it undermines the very international order it claims to uphold.

China's Leaders Prioritized Domestic Social Stability in the Face of a "Turbulent" External Environment

In his annual New Year address for 2025, Xi Jinping called on the Chinese public to be confident in the face of challenges presented by uncertainties in the external environment and pressure from economic transformation, saying, "We grow in the wind and rain, and we get stronger through hard times."[5] As the 14th Five-Year Plan entered its final year in 2025, the Party signaled it would stay its course while laying the groundwork for the future. During a symposium launching the planning process, Xi called on Party cadres to "promote beneficial interaction between high-level development and high-quality security through highly efficient governance."[6] The National Security White Paper released in May reinforced this point, stating that "high-quality development" requires "high-level security" and that "development problems can become security risks," justifying the necessity of the Party's "absolute leadership" over economic development."[7]

China Warned Its Citizens to Prepare for the Impact of an "Increasingly Complex and Severe International Environment"

Chinese Premier Li Qiang's address to delegates of the National People's Congress at the annual Two Sessions meetings in March warned that "an increasingly complex and severe external environment may exert a greater impact on China in areas such as trade, science, and technology," acknowledging the potential impact of trade disputes and supply chain decoupling.*[8] Although Premier Li's speech did not directly address the United States as a challenge, Foreign Minister Wang Yi took a strong tone at a press conference on the sidelines, saying, "No country should fantasize that it can suppress China and maintain good relations with China at the same time" and that China will withstand "any extreme pressure, threats and blackmail."[9]

No major new stimulus measures or policy shifts emerged from the 2025 Two Sessions, but the government signaled it was doubling down on building self-sufficiency by strengthening domestic industry and ensuring adequate stockpiles of fuel and food, continuing a

*The "Two Sessions" refers to concurrent meetings held every spring of the National People's Congress, China's unicameral legislature, and the Chinese People's Political Consultative Conference, a united front advisory body made up of deputies representing stakeholders from a cross-section of Chinese society.

notable trend from the past several years.[10] The government has appeared increasingly concerned about public perceptions of quality of life and the potential for public dissatisfaction to result in social instability. Persistent weaknesses in youth employment, protests over unpaid wages, and high-profile incidents of mass violence—amplified by social media—are seen as potential flashpoints for unrest.[11] The Two Sessions Work Report stated that the government needs to strengthen "social conflict resolution and risk prevention efforts," reflecting the authorities' determination to maintain grassroots surveillance and control.[12] In November 2024, Xi ordered local governments to "strictly prevent extreme cases" following a car ramming attack that killed 35 people.[13] The Budget Report announced a sharp 7.3 percent increase of the public security budget—up from 1.4 percent the previous year—underscoring the priority placed on strengthening the domestic security apparatus.[14]

The 2025 White Paper, China's first on national security, promoted Xi's comprehensive national security concept to both domestic and international audiences. The concept has grown to encompass 20 traditional and non-traditional security fields that support "political security," defined as the unchallenged rule of the CCP. The White Paper repeated the CCP's position that this comprehensive national security approach forms the basis for domestic stability and prosperity, which would enable China to act as a stabilizing force in an increasingly turbulent world.[15] Mathieu Duchâtel, Director of International Studies at the Institut Montaigne, suggested this White Paper may be the public-facing counterpart to an update of China's confidential 2021–2025 National Security Strategy.[16] The White Paper, projecting a righteous and confident tone, justified a higher level of security as necessary for advancing China's development, condemning the United States for violating its "right to develop" with tariffs and sanctions as well as the U.S. alliance system for "interference in China's internal affairs."[17] Throughout the document, China pointed to both its domestic security needs and the turbulent international environment as justifications for its efforts to export its repressive security practices to other countries.

The Party Launches an Austerity Campaign to Discipline Cadres and Civil Servants

In an effort to curb government waste and improve the Party's image amid China's economic downturn, the Central Committee and State Council issued revised austerity regulations in May, ordering officials to control spending on official activities and "lead by example in living frugally."[18] In January, Xi delivered a speech to the Central Commission for Discipline Inspection (CCDI), the Party's anticorruption arm, calling for "constant purification of the cadre ranks," and it launched a campaign in March to investigate local officials for violations of the Party's code of conduct, requiring self-criticism sessions on their spending on meals and travel.[19] Christine Wong, Visiting Research Professor at the National University of Singapore, described the campaign as "an admission that money is tight" that intended to demonstrate "that the public sector is sharing the pain" of China's economic

The Party Launches an Austerity Campaign to Discipline Cadres and Civil Servants—*Continued*

downturn.[20] However, the government soon backtracked, sending signals that reduced spending could have a negative impact on local businesses.[21] Nevertheless, during the first half of 2025, the CCDI handed down a higher number of punishments for Party discipline violations for CCP officials and members than it had at a similar time last year; the number had already increased by nearly half from 2023 to 2024.[22] Although a record number of senior officials were investigated in 2024, the majority of the CCDI's investigations targeted ordinary Party members, most of whom received light punishments.[23] Professor of Government at Claremont McKenna College Minxin Pei suggested that recent campaigns to enforce Party discipline regulations are intended primarily to enforce loyalty within the Party's rank and file rather than purging enemies or fighting corruption.[24] Viewed alongside Xi's broader domestic security measures, the austerity drive also reinforces the Party's ability to maintain political cohesion and discipline over money in the event of future external crises.

China Remained Focused on Ensuring Military Loyalty and Modernization

While projecting an image of Chinese military strength on the world stage, Xi Jinping emphasized two priorities for the PLA during the 2025 Two Sessions: rooting out corruption and deploying advanced technology to improve combat effectiveness. This reflected his intent to build a force that is both politically loyal and operationally capable, consistent with his goal of having a military with the capability to "conduct a successful invasion" of Taiwan.[25] Experts assessed that the ongoing purges and corruption investigations targeting senior PLA leadership are likely to hinder weapons modernization efforts, create instability within command structures, and erode troop morale—factors that could collectively undermine the PLA's combat effectiveness in the short term.[26] Some analysts, however, suggest Xi views the shorter-term instability caused by installing more "reliable" commanders as a necessary trade-off to "ensure compliance with his political agenda, set an example, [and] ensure the PLA develops in the direction he intends."[27] While the anticorruption drive continues to reshape military leadership, it is unlikely to be the decisive factor in determining when Xi might pursue military action against Taiwan.[28] Experts note that the CCP may prioritize broader political objectives over whether the military is fully prepared or domestic conditions are optimal when making that decision.[29]

The Party Purged More PLA Senior Leaders

The PLA's anticorruption campaign has widened in scope, reaching new branches of the PLA and deepening in intensity. Recent investigations and the removal of officers from the PLA's Political Work Department, which oversees the force's political discipline, signal that Xi views the issue not merely as financial misconduct

but also as a deeper crisis of political loyalty within the ranks.[30] In June 2024, Xi convened a rare Central Military Commission (CMC) Political Work Conference—the first in a decade—at the historically significant base of Yan'an and stressed the imperative of maintaining Party leadership.* Xi urged senior officers to "introspect, engage in soul-searching reflections, and make earnest rectifications."[31]

Between July and December 2023, at least 15 senior military officers and defense industry executives were removed from their posts as part of sweeping corruption investigations, many of them tied to the PLA's Rocket Force and the Equipment Development Department—branches long seen as vulnerable to graft due to their central role in defense procurement.[32] The campaign continued into 2025 with several high-profile figures coming under scrutiny. In 2025, then-CMC Vice Chairman General He Weidong—touted for his extensive operational experience focused on Taiwan—and the then-director of the CMC's Political Work Department Admiral Miao Hua—who served as a political commissar between 2014 and 2017—were both placed under investigation.[33] In March 2025, Lieutenant General Tang Yong, then-deputy secretary of the Military Discipline Commission, a key unit in the PLA's anticorruption apparatus, was dismissed under suspicion of corruption.[34] Meanwhile, Admiral Dong Jun, China's defense minister who was placed under investigation in late 2024, reappeared at public events in December 2024 and at the SCO meeting in July 2025, suggesting he may have weathered the political storm.[35] In the defense industry, Liu Weidong, deputy general manager of China South Industries Group Corporation—the leading producer of PLA armaments—was also placed under investigation for suspected violations of discipline and law.[36] The breadth of these investigations underscores Xi's determination to enforce political loyalty at every level of the military hierarchy—an effort that, while disruptive in the short term, strengthens the CCP's control over the armed forces given increased risks of potential external conflict.

The PLA Military Advanced Its Military Capabilities

While the PLA has endured instability among its senior leaders, rapid advancements in military capabilities and modernization across domains have continued. The PLA has remained focused on building its capability to fight and win wars against a "strong enemy" like the United States and to enhance its capacity to credibly threaten an invasion of Taiwan. Collectively, these capability gains—paired with political loyalty enforcement—are positioning the PLA to act quickly and decisively in a crisis, shortening warning timelines for U.S. and allied militaries.

- *Nuclear:* China's nuclear weapons and advanced delivery systems pose a direct threat to the U.S. homeland as well as to deployed U.S. and allied forces.[37] The PLA continued to modernize, diversify, and expand its nuclear posture, enhancing its

*Yan'an is a historically significant symbol, serving as the CCP's revolutionary base from 1936 to 1948 following the Long March. It was also the site of the Yan'an Rectification Movement (1942–1944), where Mao Zedong consolidated his authority as Party leader and emphasized loyalty and ideological unity within the military. Gao Hua, Stacy Mosher, and Guo Jian, *How the Red Sun Rose: The Origins and Development of the Yan'an Rectification Movement, 1930–1945* (Chinese University of Hong Kong Press, 2018).

nuclear deterrent and second-strike capabilities.[38] China has constructed around 350 new missile silo fields for its intercontinental ballistic missiles and increased its stockpile of warheads by 20 percent in the past year, significantly expanding its nuclear strike capacity.[39] At the September 2025 parade commemorating China's WWII victory, Beijing for the first time unveiled a "triad" of nuclear-capable missiles that can be launched from land, air, and sea.[40]

- *Space:* China has implemented a long-term, whole-of-government strategy to expand its space capabilities across military, commercial, and civil domains, leveraging state-directed resources to enhance its comprehensive national strength and attempt to surpass the capabilities of the United States. China has continued to rapidly develop space capabilities to support its military operations, expanding its ability to persistently monitor and target U.S. forces globally as well as to enhance its counterspace capacity to degrade, damage, or destroy U.S. space assets. (For more information on Chinese space capabilities, see Chapter 7, "The Final Frontier: China's Ambitions to Dominate Space.")
- *Electronic warfare:* The PLA's electronic warfare (EW) strategy focuses on suppressing, degrading, disrupting, or deceiving adversary systems before and during conflict.[41] In a Taiwan contingency, the PLA would likely target U.S. aircraft carrier groups and space assets to disrupt long-range precision strike capabilities.[42] Recent developments reflect the PLA's push toward "intelligentized" warfare, including the unveiling of a 6G-based EW platform in June 2025 and an artificial intelligence (AI)-powered EW system in July capable of detecting and suppressing U.S. radar signals as far as Guam, the Marshall Islands, and Alaska.[43]
- *Emerging technology:* Echoing Xi's calls to develop and deploy advanced technologies to improve combat effectiveness, PLA authors have stressed the need to maximize combat capabilities by adopting autonomous systems and AI. All PLA services and theater commands now employ unmanned aerial systems for a wide range of missions, including electronic intelligence; intelligence, surveillance, and reconnaissance; ground and naval strike; and air-to-air attack.[44] Additionally, in May 2025, the PLA Navy held a simulated drill marking its first operational deployment of an AI-assisted decision-making system. During that drill, the PLA Navy relied on an AI system to ultimately improve the stealth capacity of a guided-missile frigate.[45] Additionally, the PLA expects competitors to rely on AI systems and is developing tactics to counter AI usage, including targeting algorithms, data, and computing capacity.[46]
- *PLA Navy:* The PLA Navy's overall battle force in 2024 included over 370 ships and is projected to increase to 395 ships by 2025 and 435 ships by 2030.[47] In July 2025, the PLA Navy unveiled a new amphibious assault ship that will be a drone carrier.[48] China's new warship, the Type 076 *Sichuan*, is designed to carry troops, helicopters, and drones for missions at sea or near coast-

lines. Unlike traditional amphibious assault ships, the Type 076 has an advanced launch system, which allows it to operate with fixed-wing aircraft and larger drones.[49]

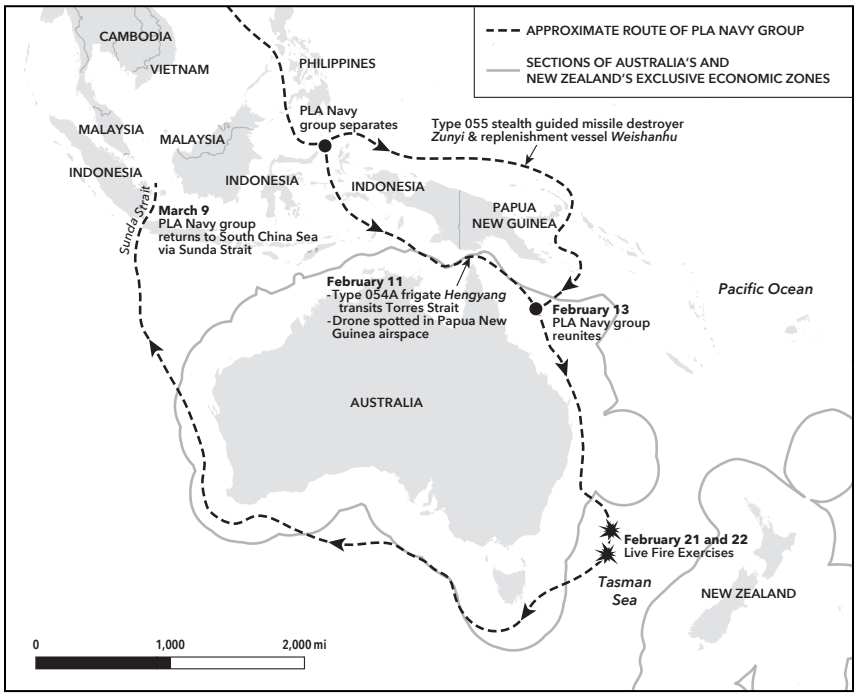
- *PLA Air Force:* The PLA Air Force is rapidly modernizing its capabilities, with plans to deploy the Chengdu J-36, a next-generation stealth fighter that bears some resemblance to the U.S. F-35, and the Jiu Tian, a so-called "drone mothership" that can launch and control large swarms of drones.[50] In addition, the PLA's fighter jets and air-to-air missiles received their first combat use as Pakistani forces successfully flew Chinese-made fighters during a four-day conflict with India.[51] This marks the first known instance of these systems being tested in actual combat, providing the PLA valuable data and potentially boosting the credibility of China's defense exports.[52]

PLA Exercises Demonstrated Increased Integration and Aimed to Intimidate

The PLA's Taiwan-related exercises focused on integrated drills and demonstrated increased capacity to effectively blockade the Taiwan Strait. For the first time, the PLA Navy conducted live-fire exercises near Australia and New Zealand, a not-so-subtle threat indicating its ability to project power beyond the second island chain.[53]

- *Strait Thunder exercise:* The PLA's large-scale exercise around Taiwan in April 2025 practiced naval blockade maneuvers and conducted simulated strikes against Taiwan's energy and port facilities.[54] The drills focused on conducting joint force operations—integrating the PLA Ground Force, Air Force, Rocket Force, and Navy capabilities—and encroached further into Taiwan waters than previous exercises, coming within 24 nautical miles of Taiwan's coast, near the edge of its contiguous zone.[55]
- *PLA Navy live-fire exercises in the Tasman Sea:* The PLA Navy conducted unannounced live-fire exercises in the Tasman Sea near Australia and New Zealand to demonstrate naval power and intimidate Australia.[56] The exercise occurred after an unsafe and unprofessional encounter between an Australian maritime patrol plane and a Chinese fighter jet over the South China Sea a week prior.[57] This marked the first live-fire drill the PLA has conducted in the Tasman Sea and showcased its power projection capability beyond the second island chain.[58]

Figure 1: Operational Details of the PLA Navy Tasman Sea Live-Fire Exercise



Note: EEZs are depicted using the standard 200 nautical mile baseline from countries' coastlines.
Source: Various.[59]

- *PLA Navy and Air Force exercises in the East China Sea/Miyako Strait:* During the October 2024 Joint Sword exercise and again during the April 2025 Strait Thunder exercise, the PLA Navy and Air Force conducted large-scale joint operations transiting the Miyako Strait—the narrow international waterway between Japan's Okinawa and Miyako Islands.[60] These drills tested the ability to quickly project naval and air power through critical chokepoints near Taiwan and Okinawa.
- *PLA Rocket Force combat exercises:* In February 2025, the PLA Rocket Force conducted intensive, realistic combat exercises designed to enhance the adaptability and interoperability of units.[61] These exercises reflect a growing emphasis on preparing missile units for high-pressure, multi-domain threats and modernizing training methods to simulate real combat situations.[62]

China Sought to Expand Its Influence around the World

Over the past year, China framed itself as the country best able to promote peace and development globally and has sought to cast the United States as an instigator of global instability while tightening relationships with Russia, Iran, and North Korea—a group that has

been called the "Axis of Autocracy."[63] (For an expanded discussion of these relationships, see Chapter 3, "Axis of Autocracy: China's Revisionist Ambitions with Russia, Iran, and North Korea.") China has also sought to take advantage of friction between the United States and Europe and other U.S. allies and partners in the wake of tariff negotiations. Building on its Belt and Road Initiative, Beijing has increasingly attempted to leverage its Global Security Initiative (GSI) to move beyond infrastructure diplomacy and increase its security relationships with low- and middle-income countries, frequently offering leaders advanced surveillance and policing systems and enabling authoritarian leaders to strengthen their domestic control. These systems generally rely on technology from providers such as Huawei, which often embed it in critical infrastructure of the host, potentially allowing the Chinese government to access data or disrupt services during geopolitical conflicts.[64]

China Persisted in Destabilizing Gray Zone Activities

In addition to reshaping norms of internationally accepted internal security behavior, China has repeatedly resorted to coercive military, economic, and influence operations short of war—a range of activities often referred to as being in the "gray zone."[65] According to the U.S. National Intelligence Council, the gray zone is "a realm of international relations between peaceful interstate diplomacy, economic activity, and people-to-people contact on one end of the spectrum and armed conflict on the other."[66] Gray zone activities are "coercive or subversive actions to achieve objectives at the expense of others in contravention or in the absence of international norms."[67] Falling below the perceived threshold for military action, China's gray zone activities have taken place across a range of domains, including military and security, cyber, economic, information, legal, and space.[68]

Table 1: Examples of Recent Chinese Gray Zone Activities

Domain	Examples of Gray Zone Activities
Military and Security	• The PLA Air Force conducted aggressive intercepts of aircraft in 2025, including setting off flares in front of an Australian surveillance aircraft over the Yellow Sea in February and maneuvers in front of a Japanese surveillance aircraft in July.[69] • The PLA entered Taiwan's air defense identification zone (ADIZ) a staggering 3,075 times in 2024 (an average of nearly three times per day).[70] • Chinese Coast Guard (CCG) and other China-affiliated vessels have engaged in relentless aggressive actions targeting Philippine Coast Guard activities near the contested Second Thomas Shoal and Sabina Shoal in the South China Sea, including an incident in 2024 where a CCG vessel deliberately rammed a Philippine vessel attempting to resupply the *Sierra Madre.*[71] • In 2024, Chinese government vessels spent a record 355 days out of 366 in the contiguous zone of the Senkaku Islands, with the CCG entering Japanese territorial waters on 42 days.[72] • In July 2025, China used one of its warships to point lasers at a German reconnaissance aircraft performing a mission to protect Red Sea shipping.[73]

Table 1: Examples of Recent Chinese Gray Zone Activities—*Continued*

Domain	Examples of Gray Zone Activities
Cyber	• Throughout 2025, Chinese cyber actors repeatedly used advanced persistent threats (APTs)—including Volt Typhoon and Salt Typhoon—to infiltrate U.S. critical infrastructure information and operational technology networks, possibly to pre-position for disruptive attacks.[74] • In 2024, Taiwan's National Security Bureau reported that Taiwan's Government Service Network received a daily average of 2.4 million attacks—attributing most to China's cyber forces.[75] • In 2024, China conducted a cyberattack on Palau's government.[76]
Economic	• China strategically timed trade investigations and tariffs during Taiwan's elections, targeting products from provinces with high Democratic Progressive Party (DPP) support, with the implicit threat of greater punitive action.[77] • Chinese authorities opened an investigation into Foxconn shortly after founder Terry Gou announced his candidacy for president, trying to pressure him to drop out to consolidate the Kuomintang (KMT) vote ahead of the 2024 presidency.[78] • China threatened to block the sale of Panama ports by CK Hutchison to U.S. investments and directed other Chinese firms to avoid doing any business with related entities until the matter is resolved.[79] • Since December 2023, China has restricted export of numerous critical minerals, several battery and mineral processing technologies, and other critical materials.[80] • China removed tariffs on all African countries except for Eswatini, which is the only African country that still recognizes Taiwan.[81]
Information	• Following the May 2025 India-Pakistan border crisis, China initiated a disinformation campaign to hinder sales of French Rafale aircraft in favor of its own J-35s, using fake social media accounts to propagate AI images of supposed "debris" from the planes that China's weaponry destroyed.[82] • In 2024, pro-China online actors used AI-generated news anchors and fake social media accounts with AI-generated profile pictures to sow divisions in the United States on issues such as drug use, immigration, and abortion.[83]
Legal	• China authorized its coast guard to detain vessels and persons in the waters it claims, seeking to provide a legal basis for the destabilizing activities of its coast guard in the South China Sea.[84] • In early 2025, China launched antimonopoly reviews into U.S. companies including Google and Nvidia and added PVH and Illumina to the unreliable entity list in retaliation for U.S. tariffs and export controls.[85] • In 2023, when several undersea cables to Vietnam sustained damage, China's demand that cable repair ships apply for permits to operate in the South China Sea prolonged repairs and resulted in internet slowdowns for eight months.[86] • In late 2024, China secretly detained a Vietnamese civilian fishing vessel and crew operating within Vietnam's exclusive economic zone (EEZ) near the contested Spratly Islands.[87] • Following the Philippines' arrests of Chinese citizens for surveilling U.S.-Philippine military facilities, China's Ministry of State Security arrested three Filipino nationals in April 2025 and accused them of espionage.[88]
Space	• In 2024, China conducted a series of rendezvous and proximity operations in space, highlighting China's capabilities to disrupt or disable other space assets.[89] • In April 2025, a Chinese space satellite company with links to the PLA reportedly provided satellite imagery to the Iranian-backed Houthis to assist in targeting vessels in the Red Sea.[90]

China's Gray Zone Activities Threaten Global Communications by Cutting Undersea Cables

China has increasingly engaged in undersea cable-cutting activities as a gray zone pressure tactic, and there is mounting evidence that Beijing is developing new cable-cutting technologies for potential wartime use. Undersea cables constitute the backbone of modern global communications infrastructure, carrying an estimated 95 percent of global internet traffic and underpinning financial transactions, government services, commercial activities, and military communications.[91] For over a decade, Chinese scientists at research institutions affiliated with the PLA have actively researched strategies for severing undersea cables, acquiring numerous patents for technologies designed to cut deep-sea cables more cheaply and efficiently.[92]

In February 2025, Chinese scientists affiliated with the China Ship Scientific Research Center—under U.S. sanctions for acquiring U.S.-origin components to support the PLA—unveiled a new design for an "electric cutting device for deep-sea cables" reportedly capable of severing armored cables at depths of more than 13,000 feet.[93] Analysts have predicted that China would attempt to sever Taiwan's undersea cables to cripple its communications in an invasion scenario, and in 2021 researchers gained access to a Chinese database of strategic "points of interest" in Taiwan that included numerous undersea cable landing stations.[94]

Chinese vessels have sabotaged critical undersea cables near Taiwan and in the Baltic Sea. Since the beginning of 2025, there have already been two incidents in which Chinese-owned "shadow fleet" vessels cut cables near Taiwan while engaging in highly irregular movement patterns and disguising their identities and locations.[95] In November 2024, a Chinese vessel severed two undersea cables in the Baltic Sea—one connecting Sweden and Lithuania, the other connecting Germany and Finland—after dragging its anchor for more than 100 miles.[96] A Russian sailor was part of the ship's crew, and European investigators have indicated they believe Russian intelligence agencies instructed the vessel's Chinese captain to cut the cables.[97] The incident closely resembled a case in October 2023 in which a Chinese vessel with Russian sailors aboard severed the Baltic connector gas pipeline and an undersea cable connecting Finland and Estonia by dragging its anchor.[98]

China has also interfered with the process of repairing undersea cables in the South China Sea, and U.S. officials have warned that China could use its cable repair ships to engage in espionage targeting the United States and its allies and partners. On the basis of its unsubstantiated maritime territorial claims, China has demanded that cable repair ships apply for permits to operate in the South China Sea, often causing months-long delays in fixing damaged cables.[99] After several undersea cables serving Vietnam were damaged in 2023, it took eight months to finish repairs due to China's long delay in granting permits, leading to prolonged internet slowdowns in much of Vietnam.[100] U.S. officials have also expressed concern that Chinese cable repair ships could compro-

China's Gray Zone Activities Threaten Global Communications by Cutting Undersea Cables—*Continued*

mise the security of U.S. cables in the Pacific by placing taps on undersea cables and conducting reconnaissance on U.S. military communication links under the pretext of conducting repairs.[101] Yet, due to a shortage of cable repair ships, cable owners have few alternatives for fixing cables in the Asia Pacific region.[102]

Taken together, these activities illustrate that China is developing both the tools and the operational experience to target global communications infrastructure in a future conflict—posing a direct threat to U.S., allied, and partner connectivity in a crisis.

The United States and China Remain Locked in Strategic Competition

Over the past year, the U.S.-China relationship has remained locked in strategic competition based not only on a direct rivalry but also on a clash of opposing systems. According to the U.S. Office of the Director of National Intelligence's 2025 *Annual Threat Assessment*, Beijing remains deeply suspicious of U.S. intentions and views Washington's measures against China as part of a concerted effort—working across the U.S. government and with U.S. allies and partners—to contain China's development and rise, undermine CCP rule, and prevent the People's Republic of China (PRC) from achieving its aims.[103] Part of China's strategy to resist that effort entails amassing, harnessing, and improving all elements of national power to put Beijing in a "leading position" in the competition between systems. This has meant building a military that is capable of challenging the United States in a regional contingency, projecting power, and securing territory. China has continued to attempt to leverage its state-directed and nationally resourced economy to dominate markets and supply chains, compete with the United States, and position itself as the world's leading economy. (For additional information, see Chapter 9, "Chained to China: Grave Risks from Beijing's Weaponization of Supply Chains.") China also seeks to surpass the United States and become the world leader in advanced technologies, including AI and biotechnology.

There has been inconsistent high-level dialogue between Chinese and U.S. military leadership as China has sought to use its willingness to engage in these discussions to achieve leverage on broader negotiations with the United States. U.S. Defense Secretary Pete Hegseth first met his Chinese counterpart, Defense Minister Admiral Dong Jun, in September 2025, but General John Caine, the chairman of the Joint Chiefs of Staff, and the 11 U.S. combatant commanders have yet to meet with their Chinese interlocutors.[104] While the United States and China held an intergovernmental meeting focused on AI in May 2024, neither senior- nor working-level military dialogues have addressed AI. Nor has there been dialogue between the two militaries focused on other increasingly significant matters, such as nuclear weapons or space issues. In September 2025, a bipartisan U.S. congressional delegation led by House Armed Services

Committee Ranking Member Adam Smith—the first U.S. House congressional delegation to visit China since 2019—met with China's Minister of National Admiral Defense Dong Jun in Beijing and emphasized the need for more open military-to-military communications.[105] The absence of substantive military-to-military engagement increases the risk of miscalculation, especially as China advances capabilities designed to contest U.S. power in multiple domains.

China Leverages a Range of Actors to Pose Cyber Threats to the United States

China's ongoing cyber activities, from both state and non-state actors, against the United States have contributed to the distrust in the relationship. In its 2025 *Annual Threat Assessment*, the Office of the Director of National Intelligence stated that China "remains the most active and persistent cyber threat to U.S. government, private-sector, and critical infrastructure networks."[106] A September 2025 *Joint Cybersecurity Advisory*, authored and released by cyber and intelligence agencies from 13 countries, also called out Chinese state-sponsored cyber threat actors that are targeting telecommunications, governments, transportation, lodging, and military infrastructure networks.[107]

Chinese state-sponsored hacker groups like Volt Typhoon, Salt Typhoon, and Silk Typhoon have long targeted U.S. cyber infrastructure and have been linked to different Chinese government entities that have different missions.*[108] Volt Typhoon has pre-positioned itself on U.S. critical infrastructure to enable the disruption or destruction of critical services in the event of increased geopolitical tension or military conflict with the United States and its allies.[109] In the event China were to invade or blockade the Taiwan Strait, Beijing might use these pre-located assets to attack U.S. power grids, transportation nodes, and water facilities to induce panic and undermine the United States' ability to both mobilize its military and rally public support for Taiwan.[110] As opposed to targeting U.S infrastructure, Salt Typhoon was a surveillance operation that gained access to information through almost all U.S. telecommunications companies. China reportedly used this information to acquire access to high-value targets such as then–Senate Majority Leader Chuck Schumer, then–President-elect Donald Trump, and then–Vice President-elect JD Vance's cell phones.[111] As of 2024, Silk Typhoon was focused on using stolen credentials to gain access to networks operated by state and local governments.[112] In July 2025, Microsoft announced that Chinese hackers exploited vulnerabilities in its SharePoint platform, a serious security threat as the platform is used by numerous U.S. government agencies and many companies worldwide.[113] Microsoft identified the perpetrators as two Chinese-based hacking groups linked to the Chinese government: Linen Typhoon and Violet Typhoon, who targeted internet-facing SharePoint servers, and another likely China-based actor, Storm-2603, who deployed ransomware.[114]

*Microsoft gives names to groups engaged in cybersecurity activities based on the country from which the activity originated and the type of activity undertaken. "Typhoon" is used for activities originating in China. The other term—volt, salt, silk, etc.—is used to denote the type of hacking. Devlin Barrett, "What to Know about the Chinese Hackers Who Targeted the 2024 Campaigns," *New York Times*, October 26, 2024.

China is not only relying on government-linked entities to conduct cyber activities but also has developed a new approach in which an office or agency might now employ a private company or companies.[115] By doing so, multiple private companies simultaneously search for vulnerabilities and then sell access to their government customers.[116] This approach creates hundreds of victims as opposed to just a few and makes it difficult to block and definitively ascertain the intended target.[117] In March 2025, for example, the U.S. Department of Justice charged 12 Chinese nationals, including two officers who worked for China's Ministry of Public Security (MPS) and numerous employees of a private company in China, in a wide-ranging international hacking scheme to obtain data at the direction of both the MPS and China's Ministry of State Security.[118] These hackers were allegedly focused on stealing data related to dissidents and critics of China, foreign ministries of governments located in Asia, U.S. federal and state government agencies, and a large religious organization in the United States.[119] These blended state-private cyber operations have expanded China's targeting capacity, have increased operational deniability, and will pose a persistent risk to U.S. security, privacy, and critical infrastructure in a crisis.

China and Russia Deepened Their Relationship

Over the past year, China and Russia have deepened their strategic alignment to present a united front against the United States. China and Russia used Xi's visit to Moscow for the 80th anniversary of the end of World War Two to signal the futility of U.S. efforts to drive a wedge between them. Xi referred to Russia as "friends of steel," and the two sides released a joint statement declaring that their partnership is "not constrained by any third party."[120] The statement also reaffirmed mutual support for the other's core interests: Russia endorsed Beijing's claim that Taiwan is an "inseparable part" of China, while China echoed Russia's preferred framing that a resolution to the war in Ukraine must "eliminate the root causes of the crisis."[121]

Military cooperation between the two countries has expanded notably in scope and substance, especially since the start of the Russia-Ukraine war. China continues to be a key source of dual-use technology for Russia's war effort, particularly in advanced electronics and components used in Russian military systems. In June 2025, Ukrainian intelligence reported that Chinese components, including motors, servos, solid-state drives, and computing hardware, were found in downed Russian drones.[122] Ukraine's military intelligence also showcased that, in early 2025, approximately 80 percent of critical electronics in Russian drones were traced back to China.[123] Russia has also reportedly deployed the Chinese-made Silent Hunter laser system against Ukrainian targets.[124] In return, Russia has provided China with advanced systems such as Su-35 fighter jets and S-400 air defenses, and it may be sharing submarine technologies to support the development of China's next-generation nuclear-powered Type 096 ballistic missile submarine (SSBN).[125] Ukrainian Intelligence reports further indicate that around 600 Chinese troops will train at Russian military installations in 2025, gaining exposure to combat tactics used against NATO-equipped

forces.[126] This deepening military cooperation poses significant challenges for the United States and its allies, with China acting as a decisive enabler of Russia's war effort while gaining technology and operational insights relevant to a Taiwan conflict.

Recent joint exercises also highlight the growing geographic scope and ambition of China-Russia cooperation. In November 2024, Chinese and Russian aircraft conducted joint patrols from the Sea of Japan to the East China Sea, entering South Korea's ADIZ without notice, an act seen as testing the readiness of the United States, South Korea, and Japan.[127] These patrols were both symbolically and strategically significant, taking place near disputed areas and sensitive sea lanes.[128] Moreover, in March 2025, China and Russia held a more complex iteration of their Maritime Security Belt naval drill with Iran near Chabahar, involving simulated maritime attacks, antipiracy operations, and possible EW.[129] The British military reported likely intentional Global Positioning System (GPS) jamming in the Strait of Hormuz during the exercise, highlighting the growing sophistication in electronic operations and a coordinated effort to contest the United States and allied presence in key maritime and airspaces.[130] In September 2024, the CCG and Russia's Border Service conducted a joint patrol in the Bering Sea, reflecting expanded Arctic cooperation as Russia, preoccupied with the war in Ukraine, grows more willing to cede space to China in the region.[131]

Many experts assess that true interoperability between Russian and Chinese forces remains limited, but the sophistication of the bilateral exercises should not be underestimated because they signal growing coordination and pose evolving challenges to regional security.[132] If these trends continue, the increasing scale and complexity of training for combined military operations could raise the likelihood that Russian and Chinese forces are able to operate together more effectively in a future crisis.[133] (For more information on China-Russia bilateral cooperation, see Chapter 3, "Axis of Autocracy: China's Revisionist Ambitions with Russia, Iran, and North Korea.")

China Focused on Expanding Influence in the Indo-Pacific Region

China has attempted to present itself as a more reliable economic and security partner for countries in the Indo-Pacific while blaming the United States for creating economic uncertainty and inflaming geopolitical tensions in the region. Nevertheless, China has intensified destabilizing activities throughout the Indo-Pacific, including escalating its military pressure on Taiwan, sustaining strong-arm tactics in the South and East China Seas, increasing gray zone military activities near Japan's Senkaku Islands, and providing diplomatic cover for and support to North Korea's provocative activities. These actions collectively aim to weaken allied cohesion, constrain U.S. access, and normalize PLA presence in contested areas.

China Increased Military Pressure and Attempted to Sow Divisions in Taiwan's Society

China has further escalated its military pressure campaign against Taiwan with each passing year. PLA aircraft have entered Taiwan's ADIZ with increasing frequency over the past year, and on

April 1–2, 2025, the PLA conducted the Strait Thunder-2025A military exercises encircling Taiwan.[134] While these exercises were similar in scope to previous Chinese military drills around Taiwan, they placed greater emphasis on occupying key maritime chokepoints.[135] Moreover, the PLA has stepped up unannounced large-scale military drills near Taiwan, including exercises in December 2024 that involved 90 ships across an area stretching from the East China Sea to the South China Sea—China's largest military drills near Taiwan in almost 30 years.[136] In light of China's near-constant training activities and military maneuvers near Taiwan, U.S. and Taiwan military officials have warned that the PLA could now implement a blockade "in a matter of hours" and would potentially need only "minimal conversion time" prior to an attack on Taiwan.[137]

China has also sought to exacerbate political divisions in Taiwan by intensifying its violent rhetoric targeting Taiwan's Democratic Progressive Party (DPP)-led government while simultaneously stepping up efforts to co-opt opposition leaders, business interests, and youth groups in Taiwan with promises of material benefits. Chinese officials and state-run media outlets have used increasingly urgent language implying that Taiwan President Lai Ching-te's supposed support for "Taiwan independence" could justify a Chinese invasion. An April 2025 commentary in the *People's Daily* accused President Lai of promoting "Taiwan independence" and stated that "Taiwan independence means war," articulating a potential justification for invading Taiwan and blaming it on President Lai.[138] Other Chinese official statements and media reports have declared that Taiwan separatists would have their "bodies smashed to pieces and their bones ground to powder" and accused President Lai of treating the people of Taiwan like "cannon fodder."[139] At the same time, Beijing has also made a more concerted effort over the past year to co-opt elements of Taiwan's society that it perceives as friendly to its agenda. In February 2025, Beijing introduced the new concept of "shaping the inevitable reunification of the motherland," which calls for allowing "Taiwan compatriots" to share the "fruits of Chinese-style modernization and development" by supporting Taiwan businesspeople in China and creating opportunities for youth from Taiwan to develop careers in China.[140] Beijing has also supported visits to China by Taiwan opposition leaders and youth groups, which often include visits to historical and cultural sites designed to inculcate a sense of Chinese identity.[141] (For more on China's relations with Taiwan, see Chapter 11, "Taiwan.")

China Persisted in Illegal and Aggressive Activities in the South China Sea

Over the past year, Chinese vessels have undertaken aggressive and illegal behaviors intended to assert Beijing's unsubstantiated claims over virtually the entire South China Sea. After a CCG vessel deliberately rammed a Philippine vessel in June 2024 that had been attempting to resupply the *Sierra Madre* outpost on Second Thomas Shoal—which is inside the Philippines' EEZ—and severely injured a Filipino sailor, China took some limited steps to de-escalate tensions at the shoal, possibly to avoid triggering a potential U.S. intervention under the U.S.-Philippines Mutual Defense Trea-

ty.[142] While Philippine forces were able to conduct eight consecutive successful resupply missions to Second Thomas Shoal as of May 2025, China persisted with aggressive and destabilizing actions in the South China Sea.[143] These included a near miss in February when a Chinese helicopter performing dangerous maneuvers nearly collided with a Philippine government-owned plane, an April incident where the CCG planted a Chinese flag on Sandy Cay to assert sovereignty over the unoccupied sandbar, and a series of intrusions into the Philippines' EEZ by Chinese research vessels.[144]

China also ramped up the scale and aggression of its forces around Scarborough Shoal as the Philippines began a program to assert the rights of its fishermen within its EEZ.[145] Chinese aggressive actions reached a new level on August 11, 2025, when a CCG ship collided at high speed with a PLA Navy destroyer while pursuing a Philippine Coast Guard ship near the shoal.[146] The Philippines believes the CCG was attempting to ram its ship and released footage from the incident, which appeared to show significant damage to the CCG ship.[147] Beijing did not officially acknowledge the crash or disclose casualties, instead only making a statement that blamed the Philippines for China's ships colliding with each other.[148] China broadened its efforts in the following months, including by declaring Scarborough Shoal a nature preserve, a new gray zone tactic intended to justify intensified control of the area.[149] China's aggressive tactics to assert its control over the South China Sea create unpredictable risks, highlighting the need for a collective code of conduct among ASEAN nations, which China has continued to thwart.[150]

China Presented Itself as a More Reliable Partner than the United States in Southeast Asia

Beijing views Southeast Asia as a central battleground in its strategic competition with the United States that could help determine the regional and global balance of power between the two countries. Since the beginning of 2025, China's outreach to Southeast Asian countries has focused on exploiting changes to U.S. trade policy and foreign aid to present itself as the more reliable partner for regional countries' development ambitions. Xi highlighted the high diplomatic priority he places on Southeast Asia by making his first overseas trip of 2025 to Vietnam, Malaysia, and Cambodia on April 14–18.[151] The CCP's official English-language newspaper, *China Daily*, described Xi's trip as an attempt to "provid[e] more certainty for regional economic development amid the chaos brought by the United States' launch of a tariff war."[152] Drawing an implicit contrast with the United States, Xi placed particular emphasis on China's continued commitment to development aid during his trip to the region, promising "high-quality development cooperation" in Malaysia, "projects to improve people's livelihood" in Vietnam, and greater "development assistance" in Cambodia.[153] While Beijing has not significantly increased the overall amount of aid it provides to Southeast Asia, it has selectively backfilled a small number of programs affected by U.S. foreign aid reforms where it calculates that it can gain maximum political benefit at minimal cost—such as funding demining activities in Cambodia and providing greater quantities of aid than the United States to support emergency relief efforts

after the March 2025 earthquake in Burma (Myanmar).[154] China has also sought to exploit cuts to U.S. international media programs in Southeast Asia by flooding shortwave radio frequencies previously used by Radio Free Asia with content from Chinese state-run radio programs.[155] (For more on China's expansion of influence in Southeast Asia, see Chapter 4, "Crossroads of Competition: China and Southeast Asia.")

China Viewed the Pacific Island Nations as Critical to Its Goals

In 2025, China continued to extend its influence across the Pacific Islands, recognizing the critical role they play in the balance of power in the Indo-Pacific. China held the Third China-Pacific Island Countries Foreign Ministers' Meeting in person in Xiamen in May, hosting representatives from 11 countries.[156] The joint statement acknowledged the Pacific Island countries' strategic priorities, such as development assistance and management of Pacific Ocean resources and nuclear nonproliferation, and offered China's support for the region's climate response to the extent of its capabilities.[157] China pledged $2 million toward cooperation on climate change and announced a maritime initiative designed to strengthen regional maritime safety governance, train maritime officials and seafarers, and modernize Pacific Island countries' maritime law enforcement equipment.[158] Pacific Island officials were given a tour of an advanced CCG ship on the sidelines of the Foreign Ministers' Meeting.[159] China is prepared to send its first coast guard ships to the region, having registered ships with the regional fisheries inspection commission allowing it to board and conduct inspections of fishing vessels.[160]

The United States, Australia, and New Zealand have become increasingly concerned about China's growing presence and influence, including suspicions over China's construction of potential dual-use facilities in countries like the Solomon Islands, Papua New Guinea, and Vanuatu that could serve the PLA's power projection goals. Pacific Island countries are determined to maintain a neutral stance; in July, Fiji's president stated that the country would oppose a Chinese base anywhere in the region.[161] While denying it intends to establish any military facilities, China continued to make inroads in the region in 2025. It signed a comprehensive strategic partnership agreement with the Cook Islands that included deep-sea mining exploration provisions, causing concern in New Zealand due to its free association relationship with the country.[162] Australia has pushed back on China's expansion of security partnerships in the region, signing its own deals across the region in late 2024 designed to counter Chinese influence.[163] (For more on the expansion of Chinese influence in the Pacific Island countries, see Chapter 5, "Small Islands, Big Stakes: China's Playbook the Pacific Islands.")

China Supported, but Remained Wary of, North Korea's Activities

North Korean leader Kim Jong Un and Xi Jinping held a rare meeting on the sidelines of China's September 2025 military parade, their first encounter since 2019, where they pledged closer coop-

eration between the two countries.[164] This show of unity occurred as North Korea and Russia deepened their military relations amid the ongoing Russia-Ukraine war.[165] Although Beijing has officially distanced itself from North Korea's reported troop deployment to Russia, with Chinese Foreign Ministry spokesperson Lin Jian calling it a matter between two sovereign states and saying China had no knowledge of the specifics of Russian-North Korean military cooperation, signs of unease have surfaced.[166] Experts warn that deeper military alignment between Pyongyang and Moscow could undermine Beijing's longstanding influence over North Korea.[167] This concern was further compounded in March 2025, when China met with South Korea and Japan for the first trilateral economic dialogue between the three countries in five years.[168] Topics discussed included regional trade, North Korea's nuclear proliferation, the Ukraine war, and growing North Korea-Russia military ties, heightening Pyongyang's suspicions toward China.[169]

In spite of China's frustration with North Korea, it continues to provide diplomatic cover for Pyongyang's missile tests and acts of aggression, often downplaying or dismissing international evidence implicating North Korea. Following North Korea's intercontinental ballistic missile (ICBM) test in October 2024, which set a record for distance flown, China refused to condemn Pyongyang's actions, instead siding with Russia in opposing a U.S.-led statement at the UN Security Council.[170] In addition, Chinese-based networks have helped Pyongyang circumvent international sanctions by facilitating access to restricted revenue streams, materials, and technology for its ballistic missile and cyber programs. In December 2024, the U.S. Department of the Treasury sanctioned several Democratic People's Republic of Korea (DPRK) financial entities found operating in China, including Korea Mandal Credit Bank and Korea Daesong Bank.[171] Moreover, in January 2025, Chinese company Liaoning China Trade Industry Co., Ltd. was sanctioned for supplying Department 53, a North Korean weapons-trading entity under the Ministry of National Defense, with equipment such as computers, graphics cards, and network gear used to support the regime's overseas information technology (IT) operations.[172] Further investigation uncovered a shadow network of 35 PRC-based companies affiliated with Liaoning China Trade that appear to provide material support to Department 53's operations and facilitate revenue generation.[173] Together, these actions illustrate how China's tacit and sometimes direct support enables North Korea to advance its weapons programs and evade international accountability, complicating global efforts to curb the regime's destabilizing behavior. (For more information on China-North Korea cooperation, see Chapter 3, "Axis of Autocracy: China's Revisionist Ambitions with Russia, Iran, and North Korea.")

China Endeavored to Draw Japan and South Korea Closer

China has attempted to use trade tensions to drive a wedge between the United States and its two East Asian allies, Japan and South Korea, seeking to draw both closer to Beijing.[174] (For more information on China's trade relations with Japan and South Korea, see Chapter 1, "U.S.-China Economic and Trade Relations (Year in Review).")

Even after the initial April 2025 announcement of tariffs and the July 2025 tariff threat, Japan remained focused on reaching a deal with the United States instead of developing a comprehensive trilateral response with China and South Korea, eventually reaching a trade framework before the end of July.[175] Aside from avoiding the political and security risk that a trilateral response might carry, Japan is wary of siding too closely with China, given its history of economic coercion.[176] While Japan's prime minister resigned in September 2025, analysts believe Japan will continue to view China as a strategic competitor regardless of who is appointed next prime minister.[177]

Even as China has attempted to draw Japan closer, it has simultaneously undertaken antagonistic activities around Japan's Senkaku Islands to further its claims to the islands.[178] In 2024, 1,351 Chinese government vessels spent a record 355 days—out of a possible 366—in the contiguous zone of the Senkakus.[179] Even more provocatively, the CCG entered Japanese territorial waters on 42 days over the course of 2024 (the same number as in 2023).[180] As noted above, in March 2025, four CCG vessels entered the territorial waters and—in a first—a helicopter took off from one of the ships, entering Japanese airspace.[181] While experts have debated China's intentions in taking these aggressive actions, it is clear China is building operational capabilities to more forcefully assert its expansive regional claims and signal a threat to its neighbors.[182]

South Korea is interested in reaching a deal with the United States rather than forming a trilateral response to the U.S. tariffs, and it is wary of the risks such a response might carry.[183] Additionally, South Korea's domestic population does not view China favorably after Beijing leveled economic measures against South Korea following the deployment of a Terminal High Altitude Area Defense (THAAD) system on the peninsula in 2017.[184] Still, South Korea's new president, Lee Jae-myung, is pursuing a pragmatic approach to foreign policy and stated that he seeks to improve ties with China and pursue greater economic, security, and cultural cooperation.[185] A closer relationship is especially important to China to reduce exposure to the U.S. technological decoupling.[186]

China Advanced Strategic Influence across South and Central Asia

India and China De-escalate Tensions at the Border and Beyond

Throughout 2025, high-level meetings took place between China and India as both sought to de-escalate tensions.[187] The contested Line of Actual Control (LAC) between China and India has been a point of bilateral tension since the Galwan Valley clash in June 2020.[188] When Indian Prime Minister Narendra Modi and General Secretary Xi met in October 2024, they agreed to establish a patrolling schedule at the Depsang and Demchok passes along the LAC, advancing Indian Foreign Minister Subrahmanyam Jaishankar's vision for "disengagement" of both countries' frontier forces.[189] However, despite years of bilateral crisis communication mechanisms, this agreement was only established after high-level talks and did not address other hotly disputed border areas such

as Arunachal Pradesh, which China calls "South Tibet."[190] While the October 2024 China-India border patrolling agreement yielded a short-term thaw in tensions, both sides continued militarizing the border in early 2025, building new airbases and shoring up positions along the LAC and near Arunachal Pradesh.[191] Chinese and Indian government readouts of foreign ministry and leader-level meetings took slightly different tones, with China appearing more optimistic, which was not the first time the two walked away from a bilateral engagement with divergent interpretations.[192]

Prime Minister Modi's attendance at the 2025 SCO summit held in Tianjin, China—his first time in China since the 2020 clash—drew attention amid tensions in India's tariff negotiations with the United States.[193] Xi and Modi held a private side meeting during which the two committed to build upon the agreement that China's Foreign Minister Wang and his Indian counterpart Foreign Minister Jaishankar had made earlier in August.[194] India and China agreed to conduct more high-level dialogue, work toward a border de-escalation agreement, expand economic cooperation, reopen flights between countries, and extend allowances for Indian citizens to go on pilgrimage into Tibetan regions into 2026, demonstrating both leaders' interest in taking steps away from decoupling and toward rapprochement.[195] As of September 2025, though, the terms of economic cooperation or border resolution agreements were largely conceptual, with few specifics or follow-ups announced by either side.

Fundamentally, there has been an asymmetry in the degrees to which China and India prioritize establishing a long-term solution to the border dispute. China leverages high-level, well-publicized dialogues to reach partial resolutions—hoping to open the door for bilateral cooperation on trade and other areas by compartmentalizing the border issue without sacrificing its core interests.[196] In recent years, the Indian government has increasingly recognized the seriousness of the threat posed by China at the border—and that it is not merely "acne on the face," especially as China's military has strengthened.[197] India wants a sustainable solution to the border issues that is not seen as a concession and that assuages domestic political pressure to stand up to China, which it views as key to moving forward with China across a range of potential arenas for cooperation, including trade.[198] It remains to be seen whether China's and India's 2025 commitments are a short-term function of India's desire to hedge against tumult in trade negotiations with the United States or are a long-term shift toward normalization in bilateral relations.[199]

China Opportunistically Used Pakistan's Military Crisis to Test and Promote Its Own Defense Capabilities

China's role in the May 7–10, 2025, clash between Pakistan's and India's militaries drew global attention as Pakistan's military relied upon Chinese weaponry and reportedly leveraged Chinese intelligence.[200] During the clash, triggered by India's response to a deadly insurgent attack that killed 26 civilians in its contested Jammu and Kashmir region, both countries attacked targets farther into one another's territories than at any time in 50 years.[201] The Indian Army claimed China helped Pakistan with "live inputs" on Indian military

positions throughout the crisis and effectively used the conflict as a testing ground for its own military capabilities; Pakistan denied these allegations, and China neither confirmed nor denied its degree of involvement.[202]

China expanded its military cooperation with Pakistan in 2025, compounding its own security tensions with India. In November and December 2024, China and Pakistan held the three-week Warrior-VIII counterterrorism drills, and in February 2025, China's navy participated in Pakistan's multinational AMAN drills, highlighting China's and Pakistan's growing defense cooperation. India's commentators viewed the drills as losses in their relationship with China and as direct security threats to its territorial positions.[203]

Pakistan's military success over India in its four-day clash showcased Chinese weaponry. While characterization of this conflict as a "proxy war" may overstate China's role as an instigator, Beijing opportunistically leveraged the conflict to test and advertise the sophistication of its weapons, useful in the contexts of its ongoing border tensions with India and its expanding defense industry goals. As Pakistan's largest defense supplier, China provided approximately 82 percent of the country's arms imports from 2019 to 2023.[204] This clash was the first time China's modern weapons systems, including the HQ-9 air defense system, PL-15 air-to-air missiles, and J-10 fighter aircraft were used in active combat, serving as a real-world field experiment.[205] China reportedly offered to sell 40 J-35 fifth-generation fighter jets, KJ-500 aircraft, and ballistic missile defense systems to Pakistan in June 2025.[206] That same month, Pakistan announced a 20 percent increase in its 2025–2026 defense budget, raising planned expenditures to $9 billion despite an overall budget decrease.[207]

In the weeks after the conflict, Chinese embassies hailed the successes of its systems in the India-Pakistan clash, seeking to bolster weapons sales. Pakistan's use of Chinese weapons to down French Rafale fighter jets used by India also became a particular selling point for Chinese Embassy defense sales efforts despite the fact that only three jets flown by India's military were reportedly downed and all may not have been Rafales.[208] According to French intelligence, China initiated a disinformation campaign to hinder sales of French Rafales in favor of its own J-35s, and it used fake social media accounts to propagate AI and video game images of supposed "debris" from the planes China's weaponry destroyed.[209] Chinese Embassy officials convinced Indonesia to halt a purchase of Rafale jets already in process, furthering China's inroads into other regional actors' military procurements.[210]

China Deepened Relationships in Central Asia

With Russia preoccupied with its war in Ukraine, China has deepened links with Central Asia to advance its interests through economic integration, infrastructure, and security cooperation.[211] Although Russia has long dominated the region, formerly part of the Soviet Union, China has surpassed Russia as Central Asia's primary economic partner. As tariffs and conflicts destabilize China's other supply chains, Central Asian countries remain valuable partners for China due to their strategic location and increasing willingness to

partner for trade and transshipment.[212] In the first five months of 2025, China's trade with the five Central Asian countries increased by 10.4 percent year-over-year.[213] At the second China-Central Asia Summit in June 2025—held in Kazakhstan and attended by Xi—the leaders agreed to build on existing agricultural partnerships, such as further development of end-to-end cotton production that could aid China in evading U.S. forced labor export bans on the Xinjiang region.[214] All five countries attended the SCO meeting held in Tianjin, China, in late August–early September 2025. While larger partners like India and Russia dominated the agenda, key areas of common interest to Central Asia, like counterterrorism (see below), were in the final declaration.[215]

China is also using infrastructure projects and security partnerships to expand its market access and deepen its influence across the region. The "Middle Corridor" trade route through Central Asia is a strategic priority for China, since the "Northern Corridor" through Russia and sea routes through the Suez Canal pose security challenges.[216] To expand access, China has both initiated new infrastructure projects during the June 2025 China-Central Asia Summit and doubled down on existing agreements.[217]

China also sought to deepen its security relationships in the region under the banner of the GSI as both sides strive to counter the "three evils": terrorism, separatism, and extremism.[218] Central Asia has been an increasing target of Beijing's military partnerships and diplomatic dialogue, which have been welcomed by Central Asian countries.[219] The PLA is building military installations and developing its regional presence in the name of counterterrorism.[220] Existing installations like the counterterrorism military facility in Tajikistan, near the Afghan border, also serve as key hubs for the PLA to monitor the region and gather intelligence.[221] More such installations are already planned: Xi promised to continue support to Central Asia's military and law enforcement modernization at the 2025 China-Central Asia Summit.[222]

China Continued Building Relationships in the Middle East

China Sought to Balance Ties to Iran with Other Regional Partners

China and Iran continue to forge a strategic, though nuanced, partnership as part of the broader "Axis of Autocracy." (See Chapter 3, "Axis of Autocracy: China's Revisionist Ambitions with Russia, Iran, and North Korea" for a more extensive analysis of the China-Iran relationship.) Underscoring this alignment, Iranian President Masoud Pezeshkian attended both the SCO summit hosted by China in late August 2025 and Beijing's subsequent military parade in early September, signaling Tehran's desire to strengthen its ties with Beijing.[223] Evidence of the limits in the relationship, however, were evident after the June 2025 U.S. strikes on Iran's nuclear facility.[224] China's Foreign Ministry stated that the actions taken by the United States "violate the purposes and principles of the U.N. Charter and international law, and have exacerbated tensions in the Middle East."[225] China also joined Russia and Pakistan in proposing that the UN Security Council adopt a resolution calling for a ceasefire in the Middle East.[226] Still, beyond these rhetorical efforts,

China did not take any additional concrete steps to assist Iran, such as sending materiel support following the strike.[227]

This response is emblematic of the limits of this partnership. China maintains ties to Iran and supports it through economic and military means in large part due to Beijing's energy needs. However, actions taken by China are tempered, frequently holding Iran at arm's length so as not to jeopardize other interests.[228]

Even though Iran is one of the most heavily sanctioned countries in the world, China maintains a robust trade and investment relationship with Tehran, which provided crucial revenue that enables Iran's destabilizing regional activity. Tehran estimated that about 45 percent of the government budget for 2025–2026 would come from oil and gas sales and would be the single biggest source of government revenue.[229] China purchases approximately 90 percent of Iran's exported oil, often at discounted rate, making it a significant contributor to Tehran's total government revenue.[230] However, China also imports crude oil from Saudi Arabia and Iraq and conducts far more trade with Saudi Arabia and the United Arab Emirates (UAE) than with Iran.[231] As such, China has little incentive to prioritize relations with Iran over Gulf state partners. Perhaps informed by this dynamic, in a dispute over three islands in the Persian Gulf based on historic claims by both Iran and the UAE, China sided with the UAE.[232] In June 2024, the Iranian foreign minister summoned China's ambassador to Iran and protested Beijing's support. Rather than revising its position, China called for the UAE and Iran to resolve their dispute peacefully.[233]

Due to sanctions imposed on Iran, China provides Tehran with military support through discreet cooperation. In January 2025, Iranian vessels docked in China were loaded with an estimated 1,000 tons of sodium perchlorate, a precursor used in missile propellant—enough to fuel approximately 260 missiles.[234] In June 2025, it was reported that Iran ordered from China thousands of tons of ammonium perchlorate, a critical component for ballistic missiles. While China's Foreign Ministry claimed it was unaware of the transaction, the reoccurrence and scale of these activities indicate enforcement gaps, limited oversight, or tacit approval.[235] China also supports Iran by providing access to BeiDou, China's global navigation satellite system, for Iranian military purposes.[236] Along similar lines, in May 2025, a Chinese space satellite company with links to the PLA reportedly provided satellite imagery to the Iranian-backed Houthis to assist in targeting vessels in the Red Sea.[237]

Gulf Countries Served as Investors and Markets for Chinese Technology

China's relations with Gulf countries remain highly focused on bilateral investment, particularly in high-technology and new energy industries.[238] The United States has become increasingly concerned about potential technology transfer to Beijing, given the increased collaboration between U.S. and Gulf countries on AI and continued expansion of bilateral investment and the entrance of Chinese companies into the region.[239] China has been courting investment from Gulf Cooperation Council (GCC) states into its high-tech industries, with the region's sovereign wealth funds playing a major role. While

acknowledging U.S. concerns, players like Qatar's sovereign wealth fund have stated they cannot overlook investment into Chinese AI.[240]Chinese firms have been making joint venture deals across the region, with Huawei continuing to make inroads into cloud computing and smart city sectors and additional deals signed by new energy, automobile, and petrochemical companies.[241] Multiple Chinese robotaxi companies have signed agreements to operate in Gulf states, as has Meituan's delivery drone service Keeta.[242] These agreements not only make the region the first place where Chinese and U.S. driverless taxis will directly compete but also further embeds Chinese technology into the region's logistics sector.[243]

China Aimed to Expand Security, Trade, Economic, and Diplomatic Influence across the African Continent

The PLA Conducted Its Largest Military Exercises on the Continent to Date

China expanded its security cooperation efforts and influence across Africa through joint exercises, military training sponsorships, and other activities under the GSI framework. Going into 2025, Beijing had already signaled its desire to be a major regional security actor through the Forum for China-Africa Cooperation (FOCAC) Beijing Action Plan (2025–2027), which promised more security commitments than prior plans for the region.[244] In August 2024, China sent its largest army and navy deployments to the region to date for military exercises with Tanzania and Mozambique.[245] In spring 2025, China held its Eagles of Civilization air force drill with Egyptian counterparts, marking China's largest air force deployment on the continent.[246] China is already Africa's biggest arms supplier and provides foreign military assistance to countries throughout the continent.[247] It trains approximately 2,000 African soldiers each year via its professional military education programs and has promised to continue these through 2027.[248] These programs include in-country training as well as courses in China, and they play an integral part in Beijing's strategy to shore up regional party-to-party political support among African leaders and militaries.[249]

Beijing Opportunistically Leveraged Its Investments to Capitalize on U.S. Aid Reductions

At the 2025 FOCAC, China promised to backfill areas where U.S. foreign aid or tariffs left gaps for African leaders.[250] Though positive perceptions of both Chinese and the U.S. economic and political influence have generally outweighed negative perceptions in the region, China has leveraged changes in U.S. policy toward the region as a tool of influence operations and competition.[251] In the months leading up to the June 2025 FOCAC meeting, Chinese diplomats in numerous African countries used social media and the press to share their plans to offset the impact of U.S. aid withdrawals and new tariffs. They claimed China would expand access to its markets and lower its own duties and launched a "charm offensive" to boost China's favorability across the continent.[252] At a ministerial meeting in Beijing alongside the FOCAC, China officially announced it would remove all tariffs for the 53 African countries with whom it

holds diplomatic relations, excluding Eswatini for its continued recognition of Taiwan.*[253]

China may not actually have the political will or capacity to replace gaps in aid funding. Foreign Minister Wang's remarks surrounding the 2025 FOCAC reiterated China's messaging that it is a fellow developing country that seeks mutual partnerships while avoiding promises for substantive increases in aid spending.[254] Against the backdrop of China's enduring domestic economic challenges and its own interests in building out critical industries across the African continent, China is unlikely to pursue a policy that creates long-term backfills of foreign aid.[255]

China's Critical Mineral Mines Have Negatively Impacted Local Populations

Over the past year, China has sought to maintain its dominant position in critical mineral supply chains in Africa. Chinese companies and state-owned enterprises (SOEs) are heavily invested across Africa's critical minerals mining operations, which largely export the minerals back to China for processing and use in its production of various manufactured products.[256] Since higher-value processing and manufacturing happens in China, these mining operations yield little benefit for local economies.[257] In addition, the low environmental and safety standards of many Chinese mining companies can threaten the health and safety of local residents.[258] For example, on February 18, 2025, a dam containing waste from a mine owned by a subsidiary of SOE China Nonferrous Metals Industry Group collapsed.[259] Chemicals from the mine poured into the Kafue River, Zambia's most important waterway, contaminating it with a cocktail of cyanide, arsenic, copper, zinc, lead, chromium, and cadmium, immediately necessitating the shutoff of water supply to 700,000 people and polluting the water source used by 60 percent of the area's 20 million residents.[260] As of September, the Chinese SOE had not finished paying out damages to the local population or addressed the long-term impacts of its contamination. The Zambian government pressed China for aid in cleaning up the disaster and for additional, external assessments to fully understand the extent of impact.[261]

China is also investing in infrastructure to connect critical mineral mining sites to ports. Mining is one of the most energy-intensive industries and involves transporting bulk commodities.[262] Many mineral-rich African countries are energy poor and have sparse, poorly maintained railways and roads, so developing mines requires investments in energy and transportation infrastructure.[263] China's mining strategy has often involved building critical infrastructure in mineral-rich parts of Africa.[264] In September 2025, China's state-owned China Civil Engineering Construction Corporation signed a $1.4 billion agreement with Tanzania and Zambia to revive the Tazara corridor, a railway that will traverse Tanzania and Zambia

*Eswatini is the only African country to maintain recognition for Taiwan. China excludes Eswatini from benefits like the zero-tariff status but has been deepening its economic ties with the country. Chinese nationals are increasingly moving to Eswatini, seeking to undermine Taiwan's position in the long term. The only other African territory to recognize Taiwan is Somaliland. For more, see Cebelihle Mbuyisa, "Chinese Roots Deepen in Africa's Last Taiwan Holdout," *Semafor*, September 10, 2024 and Moustafa Ahmad, "A Tale of Two Recognized and Unrecognized Republics," *China-Global South Project*, January 29, 2025.

to connect copper mining areas with the eastern port in Dar es Salaam.[265] This effort comes on the heels of a U.S.-EU partnership agreement with Angola, the Democratic Republic of Congo, and Zambia to launch the Lobito Corridor project, a multi-billion-dollar initiative to connect the copper-rich mining region of those countries to the Lobito Port in Angola on the Atlantic Ocean.[266]

China Leveraged Space Diplomacy to Further Its Critical Interests in African Partnerships

China is also pursuing African space partnerships with an eye toward bolstering support for its long-term security interests and space development goals.[267] Beijing leverages collaborations through its International Lunar Research Station, satellite infrastructure investments, and people-to-people exchanges as incentives for African countries to become technologically dependent and diplomatically aligned with itself.[268] China has developed partnerships and projects with at least 23 African countries.[269] This year, the African Union established the Africa Space Agency near the Chinese-funded satellite manufacturing facility in Egypt, creating a strategic hub likely to enhance China-Africa space collaboration.[270] China also maintains ground stations in Ethiopia and Namibia capable of global surveillance and has partnered with several African countries to utilize its own launch infrastructure to send satellites into orbit.[271] (For more information on Chinese global space activities, see Chapter 7, "The Final Frontier: China's Ambitions to Dominate Space.")

Transnational Crime Syndicates Linked to China Expanded Illicit Activities in Africa

While Beijing has touted itself as an economic and security partner for African countries, it has done little to stem the continued expansion of Chinese crime syndicates throughout the region—which have increasingly used African countries as bases for illicit activities ranging from online scamming to illegal mining and logging. According to an April 2025 UN report, over the past two years, some of the transnational crime syndicates behind scam centers in Southeast Asia have begun expanding into Africa.[272] (For more information on China's connections to scam centers, see text and Appendix of Chapter 4, "Crossroads of Competition: China and Southeast Asia.") Since the beginning of 2024, authorities have uncovered scam operations linked to Chinese nationals in Zambia, Angola, Namibia, and Nigeria.[273] For example, in December 2024 and January 2025, Nigeria's Economic and Financial Crimes Commission arrested 177 Chinese nationals who were allegedly operating scam compounds in which they had trained local Nigerians to carry out so-called "pig butchering" scams.[274] In addition to the spread of online scamming, China's voracious appetite for gold—part of its broader efforts to insulate its economy against potential U.S. sanctions—has also driven Chinese transnational criminal groups to expand involvement in illicit gold mining in at least ten African countries.[275] In Ghana, the top exporter of gold in Africa, dozens of Chinese nationals have been arrested for illegal gold mining thus far in 2025, and Ghanaian lawmakers have accused the Chinese government of being "complicit" in the problem.[276] Due to high Chinese demand for rosewood furniture

and China's lax monitoring of imported timber, Chinese crime syndicates have also increased their illegal logging of rosewood trees in countries such as Ghana and Nigeria—a multi-billion-dollar criminal industry that has caused environmental degradation, fueled corruption, and helped finance militia groups and violent insurgencies.[277]

China Stymied Taiwan and U.S. Influence in Africa

Beijing successfully pressured two African governments into taking new measures to hinder Taiwan's access to the region. Amid renewed calls in Taiwan and the United States for Somaliland's independence, China backed Somalia's sovereignty claims to counter the emergence of a democratic foothold with proximity to the Gulf of Aden and its Djibouti base.[278] Somaliland declared its independence in 1991 and has a stronger economy than neighboring Somalia.[279] While it has not been recognized by the UN and most governments, it has official relations with Taiwan. Despite efforts from China to deter their relationship, Taiwan and Somaliland signed a landmark deal in July 2025 that included a coast guard cooperation agreement.[280] Reporting has speculated that the Trump Administration might officially recognize Somaliland, and Senator Ted Cruz has called on the Administration to recognize the region as a country.[281] China, on the other hand, sent Special Envoy to the Horn of Africa Xue Bing to Mogadishu to reaffirm Somalia's claims over the territory and convinced Mogadishu to refuse visas or border access to Taiwan's citizens.[282] In August 2025, China's Embassy in Somalia condemned Senator Cruz's Somaliland recognition proposal and the analogies drawn to Taiwan, reiterating the importance of sovereignty in international law and calling Taiwan "an inalienable part of China's territory.[283]

In October 2024, the South African government announced that, to avoid "mischaracterization" of its relationship with Taiwan, it would downgrade the "Taiwan Liaison Office" in the capital, Pretoria, to a "Taipei Commercial Office" in Johannesburg.[284] Pretoria claimed the change reflected "the non-political and non-diplomatic nature of the relationship between the Republic of South Africa and Taiwan."[285] Taiwan's government blamed Chinese pressure and claimed that Taiwan is "an inalienable part of China" in a joint statement with their CCP counterparts.[286] In July 2025, Pretoria solidified the Taipei Commercial Office name change with an official statement, which Taiwan's Ministry of Foreign Affairs condemned, saying it would respond with countermeasures.[287] In September, Taiwan officially announced restrictions on semiconductor exports to South Africa, which is the first time Taiwan has used export controls to counter China's coercion to date.[288] While Pretoria and Taipei will likely continue to engage on areas of mutual interests, the significant downgrade demonstrated Beijing's continued pressure campaign to isolate Taiwan in Africa.[289]

China Sought to Undermine the United States throughout Latin America and the Caribbean

China has continued its efforts to undermine U.S. credibility and build Beijing's influence in Latin America and the Caribbean by

sowing doubt about U.S. intentions toward the region and presenting itself as a champion of the "Global South." Chinese leaders continue to place high priority on cultivating ties with Latin American countries. After Foreign Minister Wang visited the region in January 2024, Xi conducted state visits to Peru and Brazil in November 2024.[290]

Chinese officials have also been increasingly vocal in presenting China as a more reliable partner than the United States for the region's development aspirations. In March 2025, Foreign Minister Wang stated, "The people of Latin America want to build their own homes—not someone else's backyard."[291] Drawing an implied contrast with the United States, Wang added that China "respects the wishes of Latin American people" and provides a "reliable choice" for the region's "rejuvenation."[292] In April 2025, China's Foreign Ministry Spokesperson Lin Jian accused the United States of "engaging in extortion and coercion" in the region and called on Washington to "do more to make tangible contributions to the development of Latin American and Caribbean countries instead of spending time sowing divisions."[293]

Beijing has also asserted that China and the countries of Latin America and the Caribbean are all part of the "Global South" to legitimize its presence in the region.[294] In particular, China has cultivated closer ties with Brazil by claiming that the two countries can jointly represent the "voice of the Global South" on issues such as Russia's war in Ukraine.[295] During Xi's state visit to Brazil in November 2024, the two sides agreed to elevate their relationship to a "community with a shared future" and vowed to "defend the common interests of Global South countries" by opposing "confrontation" and "hegemony"—a thinly veiled criticism of the United States.[296]

China Used the Community of Latin American and Caribbean States Forum to Expand Relationships

China used the occasion of the triennial China-Community of Latin American and Caribbean States (CELAC) Forum, held in Beijing in May 2025, to expand its economic and security influence in the region. Delegates approved a China-CELAC Action Plan for 2025–2027 in which Beijing committed to provide $9 billion in credit to CELAC countries over the next three years and to launch 300 "small and beautiful" aid projects focused on improving "people's livelihood."[297] Building on the same playbook Beijing has used to expand its security footprint in other regions, China used this year's China-CELAC Forum to secure agreements to increase non-traditional security cooperation through joint counterterrorism activities, a cybersecurity liaison, and joint efforts to combat transnational crime. The China-CELAC Action Plan also included agreements to expand use of China's BeiDou satellite navigation system in the region.[298] Beijing further promised to invite 500 scholars and journalists to attend training programs in China and provide 3,500 government scholarships for Latin American students to study in China.[299] Analysts have argued that the Action Plan was "designed to embed China across the entire spectrum of governance, economics, and society in the Western Hemisphere."[300]

Beijing Pursued Control of Strategic Ports in Latin America

China has 37 port projects in Latin America and the Caribbean, providing China with the potential capability "to disrupt U.S. trade, monitor naval activity, or enable coercive or covert operations in a future crisis."[301] During his November 2024 trip to Peru, Xi participated in the inauguration of Chancay Port, a deep-water Peruvian port constructed with $1.3 billion in Chinese investment.[302] General Laura Richardson, then–Commander of the U.S. Southern Command, warned that Chancay Port was a potential dual-use facility that could "absolutely" be used by the PLA Navy.[303]

Beijing has also objected to a proposed deal for Hong Kong firm CK Hutchison to sell its controlling stake in two ports near the Panama Canal to the U.S. investment company BlackRock.[304] In response to Beijing's complaints, the Chinese state-owned shipping conglomerate COSCO is reportedly seeking a 20–30 percent stake in the deal, which CK Hutchison has indicated is unlikely to be finalized this year.[305] Analysts have argued that if China blocked or fundamentally reshaped the deal, it would confirm U.S. suspicions about the geostrategic priority Beijing places on these ports.[306] (For more information on the Chinese government blocking CK Hutchison's sale of the Panama ports, see Chapter 12, "Hong Kong.")

China's Relations with Europe Remained Tense

China did not make serious efforts to use the U.S.-Europe trade dispute to improve relations with the EU and attempt to split it from the United States. Instead it took advantage of European supply chain dependencies to adopt a hardline stance in trade negotiations with EU countries.[307] While China made some friendly gestures early in the year, such as lifting sanctions on EU Parliament members who criticized the human rights crisis in Xinjiang, relations with the EU deteriorated throughout 2025, largely over China's support for Russia's war in Ukraine.[308] In a statement to the G7 in June, EU President Ursula von der Leyen described China as engaging in "a pattern of dominance, dependency and blackmail."[309]

China's role as a decisive enabler of Russia's war against Ukraine remains a major obstacle to rapprochement with Europe. At the Shangri-La Dialogue in May 2025, French President Emmanuel Macron stated that the war in Ukraine was a warning for what could happen to Taiwan and the Philippines. He suggested NATO increase engagement with countries in Asia if China did not prevent North Korean troops from entering the war, prompting the Chinese Foreign Ministry to condemn the statements.*[310] In July, Foreign Minister Wang reportedly told senior EU officials that China could not afford a Russian loss in Ukraine because it would allow the United States to turn its attention to China.[311] Soon after, the EU sanctioned Chinese banks for facilitating sales to the Russian military for the first time despite Chinese threats of retaliation.[312] In a symbolic move, China sanctioned two Lithuanian banks in response,

*Some individual countries have increased their engagement with Asia in response to Chinese actions, with Lithuania and the Philippines signing an agreement on defense cooperation to deter Chinese and Russian aggression. Jim Gomez, "Lithuania and Philippines Sign a Pact to Build an Alliance against Aggression," *Associated Press*, June 30, 2025.

targeting a small EU country with which it has a history of strained relations due to its support for Taiwan.[313] Amid these sanctions, China enacted rare earth export controls and retaliatory import restrictions on certain EU products, compounding concerns as Chinese products surged into European markets.[314]

Several diplomatic, economic, and security incidents have also heightened concerns over Chinese activities. The Czech Republic accused the Chinese Embassy in Prague of plotting to cause a collision involving the Taiwan vice president's car during her 2024 visit and cyberattacks against the Czech Foreign Ministry, which resulted in condemnations from the EU.[315] In March, Belgian prosecutors raided Huawei's Brussels headquarters as part of an investigation into a bribery and influence campaign conducted in the European Parliament.[316] In July, Germany accused China of targeting one of its reconnaissance aircraft with a laser during an EU mission to protect shipping in the Red Sea, an allegation Beijing denied.[317] In August, China cut off communication with Czech Prime Minister Petr Pavel after he met with the Dalai Lama.[318]

These events led to low expectations for the July 2025 EU-China Summit that, despite marking 50 years of EU-China relations, was scaled back to one day instead of the originally planned two at China's request.[319] As expected, the two sides did not achieve any breakthroughs at the summit; they issued a joint statement on climate change with no new commitments, and the EU announced it had made an agreement with China to create a mechanism to ease bottlenecks in rare earth exports.[320]

China Pursued Wide-Ranging Activities in the Arctic

China is pursuing a multifaceted approach in the Arctic to advance its economic, energy, technological, scientific, and security interests. China's relationship with Russia is central to advancing these objectives. In the past, cooperation between China and Russia in the Arctic was limited to the development of oil and gas projects.[321] This was due, in part, to Russia believing that a larger Chinese presence in the region would weaken what Moscow perceives as its preeminent position. However, as Russia has become increasingly isolated from the West due to the war in Ukraine, Moscow has acquiesced to increased regional cooperation with China in recent years, hoping to unlock the Arctic's economic potential and relieve some of the pressure imposed by sanctions.

As part of its Polar Silk Road initiative, China is focused on developing the Northern Sea Route (NSR) to advance its economic and energy interests. The NSR—a shipping route along the Arctic coast of Russia—cuts the distance required to travel between Europe and northwestern Asia by 40 percent.[322] As ice in the region continues to melt, the NSR is increasingly navigable. In 2024, China provided Russia with a range of goods via the NSR, including chemical products, construction equipment and materials, passenger cars, auto parts, clothing, and footwear while importing commodities such as iron ore and fertilizer.[323] However, the vast majority of shipments along the NSR move from Russia to

China, carrying energy exports, including crude oil and liquified natural gas (LNG).

In late 2024, China and Russia established the bilateral Subcommittee on Cooperation on the Northern Sea Route to foster greater collaboration in developing the NSR through a range of objectives, including construction in the Arctic and vessel technology, both of which advance China's energy and technological interests.[324] For China, construction in the Arctic is closely linked to supporting its energy interests. In the past, China's National Petroleum Corporation, its Silk Road Fund, and other state-owned oil corporations have assisted Russia in constructing oil and LNG projects, sometimes taking a financial stake.[325] Presently, China and Russia are discussing China's involvement in other LNG projects, though the exact location or locations have not been disclosed.[326]

Although Russia has been reluctant to share sensitive polar technologies with China, during a 2024 state visit, the two countries vowed to strengthen cooperation in polar shipbuilding and ship technology; Russia will likely need China's assistance to construct up to 70 icebreakers as it seeks to quadruple cargo volume on the NSR by 2030.[327] Simultaneously, China continues to improve its ability to produce a range of ships that can navigate the Arctic, and Chinese shipping companies are currently in talks with Russian companies to develop five container ships capable of year-round operations in the Arctic.[328]

China is also pursuing scientific research in the Arctic, which advances its ambition to become a science superpower.[329] China relies on a number of research vessels to explore the Arctic, and in late 2024 the Institute of Deep-Sea Science and Engineering of the Chinese Academy of Sciences launched the multifunctional ship, *Tan Suo San Hao*.[330] The ship can launch submersibles to deep-sea areas, and China plans to use the ship to conduct crew dives to the seafloor of the Arctic.[331] This ship will contribute to the ongoing research, including climate research and data collection related to local marine and meteorological conditions.[332] As part of the Polar Silk Road, China has partnered with several Nordic countries and pursued scientifically focused projects, such as the proposal by China's Polar Research Institute to purchase or lease an airport in Finland for Arctic research flights.[333]

Experts, however, including those in the U.S. Department of Defense, have expressed concerns about the "dual-use" risks posed by China's scientific Arctic activities. During its Arctic research expeditions, China has tested polar-capable fixed-wing aircraft and unmanned underwater vehicles.[334] Additionally, the PLA could use the information collected on Arctic environments and the deployed sensors to spy on NATO assets in the region.[335] In March 2025, the head of Iceland's National Police Commissioner declared that China's Iceland Arctic Research Observatory, a project launched in 2012, has dual-use purposes and might be used for espionage.[336]

China Attempted to Leverage International Institutions to Assert Its National Security Agenda

China Saw International Organizations as Arenas to Advance Its Own Interests

China extended its influence within the UN and affiliated international organizations.* In April 2025, China convened an informal Security Council meeting on "the impact of unilateralism and bullying practices on international relations" aimed at condemning the United States, saying it "gravely violated international trade rules… and triggered severe shocks and turbulence in the world economy."[337] As the UN faces funding challenges and undergoes reorganization, China is leveraging shifts to increase its influence over decision-making and expand its staff footprint across the UN system. China has used its dues to exercise leverage over the organization, such as when it refused to release funds to the International Atomic Energy Agency (IAEA) over its approval of Japan's release of nuclear wastewater in 2023.[338] As it seeks to make undersea mining commercially viable, China is advancing its influence in the International Seabed Authority (ISA); China wishes to have the ISA set rules for mining in international waters while preventing it from gaining an ability to enforce regulations.[339] China also targets standards-setting bodies like the International Telecommunication Union (ITU), placing a large number of Chinese nationals on the technical committees that set standards and regulatory frameworks for global communications networks. (For more on China's efforts to influence the ITU, see Chapter 7, "The Final Frontier: China's Ambitions to Dominate Space.")

Following the United States' withdrawal from the World Health Organization (WHO), China announced an additional $500 million donation to the WHO in May 2025, becoming its new top donor, raising its profile on global health policy, and creating potential for additional staff appointments for Chinese nationals.[340] Beijing has also become the top donor for the UN Educational, Scientific, and Cultural Organization, using it both to advance its preferred cultural narratives and to influence the development of guidelines on AI.[341]

China and Russia Cooperated in BRICS

China and Russia have leveraged the BRICS platform to strengthen diplomatic alignment and advance alternative international norms. At the October 2024 BRICS summit hosted by Russia, Beijing and the Kremlin emphasized their shared interest in circumventing sanctions and reducing dependence on the U.S. dollar, including pursuing an alternative payment system to SWIFT.[342] Russia framed the summit as demonstrating that it was not internationally isolat-

*In addition to its principle and subsidiary organs, the UN is part of a broader system made up of the UN itself as well as various funds, programs, and specialized agencies such as the Food and Agriculture Organization; World Health Organization; World Bank; and UN Educational, Scientific, and Cultural Organization, among others. The Commission tracks Chinese officials appointed to senior positions within the UN system. "The United Nations System," *United Nations. https://www.un.org/sites/un2.un.org/files/un_system_chart.pdf*; U.S.-China Economic and Security Review Commission, *PRC in International Organizations*, May 16, 2025.

ed. China echoed diplomatic support for Russia during the meeting, with General Secretary Xi stating that the world is undergoing "profound changes unseen in a century" and emphasizing deepening "comprehensive strategic coordination" with Russia.[343]

The summit provided a platform for China and Russia to project unity and advocate for expanding the bloc to amplify their influence, particularly among developing countries. They claimed the bloc's January 2024 expansion to include Iran, Egypt, Ethiopia, and the UAE signaled a strategic shift toward amplifying the voices of countries seeking to challenge the dominance of Western powers in global governance, aligning with China and Russia's broader efforts to reshape international norms and governance structures.[344]

This year, at the July 2025 BRICS meeting held in Brazil, neither Xi nor Russian President Vladimir Putin attended in person, with Xi sending Premier Li while Putin avoided travel due to the International Criminal Court arrest warrant.[345] (For more information on China, Russia, and Iran's collaboration in multilateral institutions, see Chapter 3, "Axis of Autocracy: China's Revisionist Ambitions with Russia, Iran, and North Korea.")

China Used the SCO to Collaborate on Advanced Technologies

On August 31, 2025, Xi hosted more than 20 world leaders, including Russian President Putin and Indian Prime Minister Modi, at the SCO summit in Tianjin, using the occasion to outline his vision of transforming the bloc into a platform to bypass Western economic and technological institutions.[346] During the summit, Xi positioned himself as a champion of multilateralism and sovereign equality, highlighting technology, economic cooperation, and development as the SCO's new priorities.[347]

The summit also showcased China's, Russia's, and India's increased willingness to compromise and present a unified front.[348] The three countries signed on to a declaration condemning the U.S. and Israeli bombing of Iran and the "actions that have led to… a catastrophic humanitarian situation in the Gaza Strip," marking the first time India criticized U.S. support for Israel.[349] The declaration also condemned the 2025 Pahalgam terrorist attack that India attributes to Pakistan, a symbolically important gesture for India, which had refused to sign a June 2025 SCO statement because it omitted reference to the attacks.[350]

Xi also introduced the Global Governance Initiative during the SCO summit, aimed at positioning China as a leading voice for developing countries and as an alternative to U.S.-backed governance frameworks.[351] Though still nascent, Beijing's concept paper indicates ambitions to shape global norms and standards—particularly in emerging technologies such as AI, cyberspace, and outer space—where rules remain under development.[352]

Earlier in May 2025, China hosted the China-SCO AI Cooperation Forum in Tianjin, aimed at deepening collaboration on AI applications and governance among member states.[353] Beijing framed the forum as an effort to "promote inclusive global growth and help bridge the global digital divide."[354] A key outcome was the announcement of the Construction Plan for the China-SCO AI Application Cooperation Center, which invites SCO member states to jointly establish

a platform for AI development.[355] The plan outlined objectives such as talent cultivation, enhanced industrial cooperation, and expanded access to open source AI services.[356] By promoting technical cooperation under the SCO framework, China seeks to position itself as a global leader in emerging technologies and to strengthen its appeal to developing countries—particularly those looking for alternatives to U.S. and Western technology ecosystems.

China Continued to Interfere in Religious Institutions to Advance Its Agenda

In 2025, China persisted in interfering in religious institutions to further its domestic and international political agenda: China intends to counter what its 2025 National Security White Paper characterizes as "external security pressure" from "Western anti-China forces" on Tibet, Xinjiang, Taiwan, and other issues China regards as its "internal affairs." In addition, China's interference in religious institutions shows its domestic audience that the CCP will maintain total domestic control under the banner of security.[357]

China Poised for Dispute over Tibet and the Dalai Lama's Succession

The 14th Dalai Lama celebrated his 90th birthday on July 6, 2025, and announced plans for his eventual succession: the institution of the Dalai Lama will continue and the Dalai Lama's office, the Gaden Phodrang Trust in Dharamshala, India, will have "sole authority to recognize the future reincarnation" without interference.[358] The Dalai Lama's succession is poised to become a dispute between China and actors who have committed to back the Tibetan-selected successor, including the United States; China has already declared its own measures to appoint a "Dalai Lama" within mainland China's borders.[359] There will likely be two "successors"—one selected by the Tibetan Buddhist Gaden Phodrang Trust and one by the Chinese government.*[360] China is already seeking to counter support for the Tibetan selection of the Dalai Lama's successor, calling on foreign governments not to support or participate in the what it deems "anti-China" activities.[361] Following U.S. Secretary of State Marco Rubio's statement supporting Tibetans' "ability to freely choose and venerate religious leaders without interference," China's Foreign Ministry stated that the United States is in "no position" to point fingers at China on matters regarding Tibet.[362] When India's Prime Minister Modi wished the 14th Dalai Lama a happy birthday and a senior Indian minister affirmed that the Dalai Lama's trust has

*The CCP-controlled Panchen Lama will be a key player in China's attempts to validate their Dalai Lama succession appointee. In May 1995, the current Dalai Lama recognized six-year-old Gedhun Choekyi Nyima as the reincarnation of the 10th Panchen Lama, the highest Tibetan religious and political figure who stayed in Tibet after the CCP took over in the 1950s. Days after his selection, the CCP arrested the young 11th Panchen Lama and his family, and they have not been seen since. The Party proceeded to install a different Tibetan child, Gyaltsen Norbu, to be its Panchen Lama and has kept him under close guard outside of Tibet ever since, only parading him around Tibetan regions for official events and meetings. The Panchen Lama traditionally plays a significant role in Dalai Lama succession processes, so Beijing will seek to use Norbu to select a Dalai Lama that the CCP controls. Protecting Tibetan Religious Rights: Addressing China's Reincarnation Policies, *International Tibet Network*, *August 2025*, 8–9; Laurie Chen and Krishna N. Das, "The two Panchen Lamas: China's role in Tibet and the clash with the Dalai Lama," *Reuters*, July 4, 2025; "China/Tibet: Panchen Lama Forcibly Disappeared for 30 Years," *Human Rights Watch*, May 15, 2025; Tenzin Dickyi and Tenzin Pema, "The story of one of Buddhism's most revered figures, long missing, explained," *Radio Free Asia*, April 4, 2025.

sole authority to identify the 15th Dalai Lama, China made official complaints to the Indian government, urging it to avoid support for the 14th Dalai Lama's "anti-China separatist activities under the guise of religion."[363]

The search for and selection of the 15th Dalai Lama will have implications on the international stage. China has already taken coercive economic and diplomatic measures to stop support for Tibetan Buddhist succession processes and Tibetan activities in neighboring countries like Mongolia and Nepal.[364] Against the backdrop of existing tensions, the reincarnation of the 15th Dalai Lama, which will be decided near China and India's contested border by the exile community living in India's borders, will likely be a point of contention between the two neighbors.[365] Both China and U.S. partners and allies will have to grapple with the issue as it continues to emerge in international forums.

China Tried to Undermine the Vatican's Relations with Taiwan and Authority over the Chinese Catholic Church

The Vatican has long maintained diplomatic relations with Taiwan, and China has long tried to convince the Vatican to switch recognition to China. Pope Leo XIV's May 2025 inauguration gave rise to speculation on whether his papacy will shift the Vatican further toward China and away from Taiwan.[366] The Vatican did not welcome Taiwan's President to the May 2025 inaugural Mass, instead only inviting former Vice President Chen Chien-jen to attend Pope Leo XIV's inauguration; Chen had also represented Taiwan at Pope Francis' funeral earlier in the spring.[367] President Lai's absence was notable; Taiwan's sitting presidents have attended former papal events, and the Holy See and Taiwan have maintained bilateral relations and reciprocal representative offices since the Republic of China established its government in Taipei.[368] Though neither Taipei nor the Vatican confirmed whether Lai received an invitation, Taiwan's demonstrated interest in presidential attendance implies that Beijing's pressure impacted the Holy See's decision.[369]

In 2025, China used the occasion of a newly inaugurated Pope to pursue two initiatives with the Vatican: to extend its interference over the selection of Catholic bishops in China and to pressure the Vatican to switch diplomatic recognition from Taiwan to China. Though China and the Vatican do not have diplomatic relations, they have a 2018 agreement establishing a tenuous process of collaboration over the selection of Catholic bishops in China.* Over the years, China has pushed the limits of the agreement or entirely ignored it. In spring 2025, China exploited the death of Pope Francis to violate the agreement again, appointing two bishops without Vatican approval in the period between the funeral of Pope Francis and the inauguration of Pope Leo XIV.[370] On June 11, 2025, however, Beijing agreed to recognize Pope Leo XIV's selection of a formerly

*Typically, the Vatican selects Catholic bishops through a complex and discreet process centered around religious tradition and papal authority without interference from any foreign government. For more context on the history of Vatican-China relations and how the two came to terms of cooperation on bishop appointments, see Chad de Guzman, "What to Know about the Vatican's Relationship with China—and What the Next Pope Means for It," *Time*, April 25, 2025; Bing X, "China, Vatican Extend Controversial Deal on Appointment of Bishops," *Radio Free Asia*, October 10, 2023; Collin Vogt, "Faith Fact: How does the Vatican appoint a bishop?" *Catholic Echo*, May 1, 2025.

"clandestine" bishop in a reversal of the typical structure where the Vatican approves Beijing's proposed candidates.[371] The challenge of balancing unity and religious freedom for China's Catholic population was clearly front of mind for Pope Leo XIV as he used his first public speech to express his hope that Catholics in China would persist in "the midst of trials," signaling his commitment to keeping Chinese Catholic churches in the Vatican's fold.[372]

In seeking to undermine and control the leadership of both the Dalai Lama and the Pope, Beijing is sending a clear signal to its domestic audience that it will take proactive measures to interfere in religious institutions well beyond its borders. China's actions underscore that it views the Sinicization of religion as a core internal affair and will continue to aggressively interfere in these institutions at home and abroad. These efforts aim to preempt external influence, reinforce Party dominance, and ensure that all religious and political activity within its territory remains firmly under CCP authority.

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PART II

EFFORTS TO REMAKE THE WORLD ORDER

CHAPTER 3: AXIS OF AUTOCRACY: CHINA'S REVISIONIST AMBITIONS WITH RUSSIA, IRAN, AND NORTH KOREA

Executive Summary

China, Russia, Iran, and North Korea are forging closer strategic, military, and economic ties that increase their ability—individually and collectively—to challenge the interests of the United States and its allies and partners around the world. These states share common objectives in undermining U.S. global leadership and elements of the international system that promote democracy and human rights, while seeking to reshape them to endorse autocratic rule and the use of coercion and military force to advance national interests. Although the relationships among China, Russia, Iran, and North Korea may not constitute an alliance as traditionally conceived, the partnerships allow the countries to consider the use of force, undertake provocative actions, and otherwise act in ways they could not sustain on their own. This cooperation has intensified since Russia's invasion of Ukraine in 2022, as China, Iran, and North Korea have provided Russia with political, economic, and military support to sustain its war of aggression, allowing it to circumvent U.S. and international sanctions and diplomatic pressure. As the alignment is based more on shared interests and expediency than trust and loyalty, each country may decline to assist meaningfully when counterproductive to their larger objectives, as China and Russia did after the United States struck nuclear facilities in Iran in June.

As the most powerful and systemically integrated of these countries, China has been the "decisive enabler" of this group and its destabilizing activities. By cooperating with—and legitimizing—these heavily sanctioned countries, Beijing has developed significant leverage over them, effectively casting them as junior partners in the relationship. While this dynamic has generated some underlying friction, the advantages gained from their collective power have outweighed the disadvantages. To respond to this increasing alignment among China, Russia, Iran, and North Korea, the United States must work in concert with allies and partners to deter destabilizing activities and prepare to respond to multiple potential regional flashpoints. Unfortunately, the ne-

cessity to confront this challenge has come at a time when growing divisions within many democratic societies have undermined their willingness and ability to act in a concerted fashion to resist these efforts.

Key Findings

- China, Russia, Iran, and North Korea are forging closer strategic, military, and economic ties that increase their ability—individually and collectively—to challenge the strategic interests of the United States and its allies. This cooperation is rooted in a shared desire to undermine U.S. global leadership and reshape elements of the rules-based international order, including concepts of sovereign equality, peaceful resolution of conflict, and respect for human rights. Instead, the countries seek an order that favors autocratic governance and their capacity to extend their regional spheres of influence.
- While China, Russia, Iran, and North Korea individually pose a significant threat to U.S. interests, their growing cooperation collectively magnifies the challenge. Each is emboldened to undertake actions it could not sustain on its own, and their cooperative efforts make it far more difficult to secure U.S. national security, economic prosperity, and peace and stability around the world.
- Cooperation among the "axis" countries has deepened since Russia's full-scale invasion of Ukraine in 2022, as Russia has drawn on China, Iran, and North Korea to support its war efforts and to help it overcome the subsequent international condemnation and sanctions. For example, China-Russia bilateral trade has increased 66.7 percent since 2021. Each axis country has also benefited in different ways from its support to Moscow.
- China has played the central diplomatic, economic, and financial role in this informal alignment. These relationships have become increasingly asymmetric, with China effectively casting the others as junior partners. While this dynamic has generated some underlying friction, such tensions have largely been mitigated by shared interests and mutual benefits.
- As the alignment is based more on shared interests and expediency than trust and binding obligation, each country has freedom of action and the ability to decline to participate in a conflict. This flexibility was evident in the failure of China and Russia to provide support to Iran after the United States struck its nuclear facilities in June.
- China's preference for flexible partnerships over formal alliances reflects its opportunistic approach to diplomacy, in which it seeks to take advantage of a relationship that serves its interests while avoiding entanglements that do not benefit it. Beijing seeks to have it both ways—cooperating closely with these partners that defy international norms and insti-

tutions while simultaneously trying to promote an image as a responsible stakeholder to the broader international community that values those norms and institutions.

- China's deepening cooperation with Russia, Iran, and North Korea raises significant concerns for Indo-Pacific security. Their coordination increases the risk of opportunistic aggression, a situation in which one regional conflict creates an opening for another actor to take advantage of the United States' diverted attention and resources to launch operations elsewhere. In a Taiwan contingency, such dynamics could force the United States to face tough choices on escalation and resource allocation. The collaboration among these powers substantially increases the risk of regional conflicts transforming into broader global crises.
- China is the major trade and investment partner for these countries, helping them mitigate the adverse effects of U.S. and multilateral sanctions. Chinese entities have been instrumental in facilitating circumvention of export controls. China's opaque financial system has been vital in money laundering and sanctions evasion by Russian, Iranian, and North Korean agents. Together, China's policies have provided a lifeline that has allowed these countries access to the resources, technologies, and dual-use equipment needed to stay in power and continue destabilizing activities.
- The sum of China's sanctions and export control evasion activities is greater than the individual components. China's role as a hub for a diverse array of countries' sanctions evasion activities effectively allows for pooling of resources and economies of scale for companies and service providers that facilitate sanctions evasion. The network effect of Chinese and non-Chinese actors creates shared learning opportunities about evasion tactics, presenting new challenges for sanctions strategy and enforcement.

Introduction

The image was striking: General Secretary of the Chinese Communist Party (CCP) Xi Jinping, flanked by Russian President Vladimir Putin and North Korean leader Kim Jong Un, striding together down the red carpet at China's September 2025 military parade, followed by Iranian President Masoud Pezeshkian and other national leaders just behind them. The moment was a carefully choreographed display intended to send a message that countries are lining up behind Beijing in solidarity with its efforts to push back against the United States and the U.S.-led world order.[1] Although this was the first time the leaders of China, Russia, North Korea, and Iran appeared together in public, the alignment among the countries has been growing over recent years. The expanding cooperation raises serious concerns about the strategic challenges these countries pose—not only individually but also collectively—to the national security interests of the United States and its allies and partners.[2] As the most powerful actor among them, China plays

a central enabling role, fostering coordinated strategic alignment aimed at undermining the United States and the post-World War II international order founded on the concepts of sovereign equality, peaceful conflict resolution, and universal human rights.* Even prior to the beginning of the Russia-Ukraine war, the convergence of these countries sparked debate over whether to characterize their relationships as an "axis" or a looser "partnership of convenience."† [3] Advocates of the "axis" perspective point to trends of growing strategic coordination among these countries and their increasingly shared perception of the United States as a threat, while skeptics argue that most interactions remain bilateral and lack a formal alliance framework.

Regardless of the characterization of these relationships, the strengthening of ties among China, Russia, Iran, and North Korea represents a significant challenge to the strategic interests of the United States and its allies. These states share common objectives: to challenge U.S. global leadership, to reshape elements of the international system to be more conducive to authoritarian forms of government, and to normalize the use of coercion, military force, and the abuse of human rights. Experts argue that this partnership emboldens each actor to engage in provocative actions, believing that mutual support will help them withstand consequences. The interconnectedness among these countries can act as a force multiplier against the United States and its allies, potentially destabilizing key regions while lowering the perceived costs of confrontation for these revisionist‡ regimes. This dynamic also opens the door to opportunistic aggression, in which one actor exploits a conflict elsewhere—such as tensions over Taiwan or in Ukraine—to advance its own regional objectives while U.S. attention and resources are diverted, increasing the likelihood that a single regional conflict could escalate into simultaneous crises across multiple theaters.§

The Relationships Were Built over Decades but Deepened by the Conflict in Ukraine

China's relationships with Russia, Iran, and North Korea are rooted in decades of engagement, although it has pursued a more coordinated and assertive alignment with these countries in recent years.

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*In this chapter, the rules-based international order refers to the global system that began to emerge after 1944 out of a desire to prevent a third catastrophic war in light of the devastation wrought by two world wars in the preceding 30 years. The goal was to establish a set of rules and legal norms that, if followed, would maintain peace and security among all states. Some of these rules, including principles of non-intervention in the internal affairs of other states, territorial integrity, and the peaceful settlement of disputes, were enshrined in the UN Charter. Other rules and institutions aimed to promote free trade and economic interdependence as a means of sustaining peace, such as the Bretton Woods system, which created the International Monetary Fund, the World Bank, and the General Agreement on Tariffs and Trade, which later evolved into the WTO. Additional agreements and norms sought to articulate universal human rights, promote multilateral cooperation, and advance democracy.

†The term Axis originally referred to the World War II alliance of Germany, Italy, and Japan against the Allies. In modern geopolitics, some analysts use it to describe the informal alignment of China, Russia, Iran, and North Korea due to their shared revisionist goals; relatively high levels of cooperation, including military-related cooperation; and potential threat to the U.S.-led international order.

‡Revisionism, a concept rooted in power transition theory, refers to the strategic posture of states that are dissatisfied with the existing international order and seek to reshape its norms, institutions, and power structures, often through assertive or coercive means.

§This chapter draws upon the Commission's February 2025 hearing on "Axis of Autocracy? China's Relations with Russia, Iran, and North Korea," consultations with experts, and open source research and analysis.

The China-Russia relationship grew rapidly after the Communist takeover of mainland China in 1949, followed by the Sino-Soviet split in the 1960s over border disputes and competing visions for global communism.[4] The two countries have slowly rebuilt ties since the late 1980s, evolving into what both now describe as a "no-limits" partnership.[5] China's engagement with Iran accelerated during the Iran-Iraq War in the 1980s, when Beijing emerged as a key arms supplier to Tehran.[6] Over the past decade, China has become Iran's largest trading partner, helping Iran circumvent international sanctions aimed at isolating the country while providing crucial support to the development of Iran's drone and ballistic missile programs.[7] (For more on China's support for Iran's destabilizing activities, see U.S.-China Economic and Security Review Commission, Chapter 5, "China and the Middle East," in *2024 Annual Report to Congress*, November 2024, 333–402.) Meanwhile, after coming to its aid during the Korean War, China formalized an alliance with North Korea in 1961 through the Treaty of Friendship, Cooperation, and Mutual Assistance, the only defense pact China maintains with any country.[8] Despite ongoing tensions, particularly over Pyongyang's nuclear weapons program, China has remained North Korea's top trade partner for more than two decades.[9]

Russia's Illegal Invasion of Ukraine Dramatically Accelerated Cooperation

Since Russia's invasion of Ukraine in 2022, China, Russia, Iran, and North Korea have rapidly deepened their cooperation. Facing geopolitical isolation from the United States and Europe, Russia has been compelled to seek economic, military, and strategic partnerships with these countries, each of which has benefited from supporting Moscow in different ways. China has emerged as Russia's most critical partner, playing a central role by purchasing sanctioned oil, maintaining trade and investment ties that bolster Russia's economy, and providing dual-use technologies that enable Russia's military aggression.*[10] This support helps sustain Russia as a key actor in China's broader strategy to challenge U.S. leadership. A Russian collapse would significantly alter the global balance of power, weakening China's influence and strategic position.[11] Reflecting this concern, remarks made by China's Foreign Minister Wang Yi to the EU foreign affairs chief during a July 2025 meeting suggest that Beijing may prefer a protracted conflict in Ukraine to keep the United States distracted from the Indo-Pacific—remarks that contradict China's public neutrality.[12]

Iran has also seized the opportunity to strengthen ties with Russia. Notably, Iran was among the few countries that refused to condemn Moscow at the outset of the invasion.[13] Ukrainian officials

*Analysis indicates that while the U.S. government has publicized China's provision of dual-use components to Russia's military, such as semiconductors, recent reporting suggests more direct military support. This includes critical minerals and chemical precursors for explosives and gunpowder, tooling machines and drone components for defense industries, and the presence of over 150 Chinese nationals fighting alongside Russian forces. Two of those Chinese nationals were captured by Ukrainian officials in April 2025 but were not officially tied to the Chinese government, although Ukraine reports that Chinese authorities are aware of mercenaries being recruited by Russia. Maria Tril, "China Provides 80% of Critical Electronics for Russian Drones, Intelligence Agency Says," *Euromaiden Press*, May 5, 2025; Samya Kullab, "Ukraine Says More than 150 Chinese Mercenaries Are Fighting for Russia in Ukraine," *AP News*, April 9, 2025.

have reported the use of Iranian-made Shahed drones by Russian forces, providing Iran with an opportunity to test and refine its drone and missile technologies in an high-intensity conflict against Western-equipped defenses.[14] In April 2023, Ukraine shot down a Shahed-136 drone deployed by Russia and found it contained a voltage converter manufactured in China.[15] Since then, Moscow has localized nearly 90 percent of its Shahed production—baseline Iranian models initially imported under a deal with Tehran—and investigators have identified more Chinese components, including transceivers, signal generators, signal converters, microchips, and antennas in Russia's domestically produced variants.[16] Maria Berlinska, head of Ukraine's Air Intelligence Support Center and a top drone expert, cautioned that Russian-Iranian-Chinese engineering teams are carrying out "systematic, monumental scientific projects" that could significantly affect the war.[17] She warned that Russia could soon deploy over 1,000 Shahed-type drones per day—exceeding the 805 used in September's largest strike.[18] This underscores the complex supply chains fueling Russia's war effort, with Chinese technology and expertise flowing between Iran and Russia.

Meanwhile, North Korea has leveraged the war to deepen its security relationship with Russia by sending ammunition and troops while reducing its own global isolation.[19] In return for military support, North Korea has received important military benefits. Not only has it been able to refine its tactics, test military equipment, and obtain experience in the contemporary battlefield environment, but it has also reportedly received advanced Russian military technologies such as short-range air defense systems and advanced electronic warfare systems as well as core modules for building a nuclear-powered submarine.[20] The significance of the Russia-Ukraine war is profound, marking the first time these four countries have fully converged in their strategic interests and actions in a real-time conflict. This alignment could serve as a catalyst for more coordinated cooperation in future conflicts involving any of them.

Overlapping Goals Undergird Strategic Alignment

These Revisionist Countries Share Antipathy toward the United States, Seek to Alter the World Order

Although China, Russia, Iran, and North Korea do not share a unified vision of a future world order, they are united in their dissatisfaction with the current one and see it as impeding their ability to achieve their national security goals. In their official rhetoric, these states consistently promote narratives that seek to frame the United States and its allies as hostile forces determined to contain and suppress their rise. Xi Jinping has repeatedly asserted that the United States and its allies seek "all-round containment, encirclement, and suppression," posing unprecedented challenges to China's development.[21] Similarly, President Putin has accused the United States and its allies of "trying to weaken, divide, and ultimately destroy our country."[22]

This framing is used to justify efforts to undermine existing international norms and reshape them in ways that protect and promote their own governance models, which are characterized by centralized governments that lack accountability to the people, disregard

human rights, and rule by law rather than by the rule of law. In doing so, these four countries seek to legitimize their own political models and to export tools of control to create a "world safer for autocracies."

Within this alignment, China acts as a key enabler, providing crucial diplomatic, economic, and political support that empowers these states to sustain military aggression, circumvent Western sanctions, and expand their global influence operations. Given China's deep integration with and reliance on the global economic system, it tends to portray its efforts as reshaping existing global norms and institutions, whereas Russia, Iran, and North Korea rely more heavily on disruptive tactics—including military aggression, sanctions evasion, and nuclear proliferation—to challenge the status quo.[23]

These Countries View Regime Security as a Core Interest

China, Russia, Iran, and North Korea share the fundamental necessity of ensuring the security of their regimes internally, guaranteeing the survival of their ruling elite, and safeguarding the regimes from foreign influence, domestic unrest, and ideological subversion.[24] These shared imperatives shape both their domestic policies and their international alignments. In China, regime security is institutionalized through the dominance of the CCP and has been bolstered in recent years by Xi's comprehensive national security concept, which has consistently expanded the range of private and public activities treated as essential to national security and strengthened China's internal security apparatus.*[25] Similarly, Russia, Iran, and North Korea regard the spread of Western democratic norms—including civil society activism and international advocacy for political freedoms—as forms of external interference that endanger their regimes' hold on power and, by extension, their national security. This collective concern was explicitly stated in a Russia-China Joint Statement from February 2022, weeks before the invasion of Ukraine, which declared opposition to "attempts by external forces to undermine security and stability in their common adjacent regions" and pledged to "counter interference by outside forces in the internal affairs of sovereign countries under any pretext."[26] The statement reflects China and Russia's shared commitment to resisting so-called "color revolutions" and regime change influenced by values aligned with the existing international order and efforts that promote democratic values.† Through military support, diplomatic coordination, and surveillance technology sharing, China, Russia, Iran, and North Korea actively reinforce one another's internal control mechanisms, making regime security the bedrock of their cooperation.

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*For more on Chinese leaders' increasing concerns about internal and external security, see U.S.-China Economic and Security Review Commission, Chapter 7, "China's New Measures for Control, Mobilization, and Resilience," in *2024 Annual Report to Congress*, November 2024, 461–462.

†"Color revolutions" refers to a series of largely nonviolent, prodemocracy movements that emerged in the post-Soviet countries and parts of the Middle East and Asia during the late 1990s and early 2000s. China and Russia use the term to describe what they claim are foreign-backed efforts to promote regime change or democratic reforms in other states, which they perceive as a challenge to sovereignty and to the existing international order. Ieva Bērziņa, "The Russian 'Colour Counterrevolution' Model for Containing Geopolitical Expansion by the West," *Journal of Military Operations* 3, no. 1 (Spring 2015): 23–26; Lincoln Mitchell, "Putin's Orange Obsession," *Foreign Affairs*, May 6, 2022; "China's Xi Says 'Color Revolutions' Must Be Prevented," *Voice of America*, September 16, 2022.

These Countries Seek to Assert Control and Influence over Regional Spheres

China, Russia, Iran, and North Korea all seek to establish regional spheres of influence, viewing U.S. alliances and partnerships as major obstacles to their ambitions. Each country aspires to dominate its immediate neighborhood and rectify perceived historical injustices. China aims to assert primacy in the Indo-Pacific while Russia endeavors to reassert control over Eastern Europe and Central Asia and revive its Soviet-era level of global influence. Iran seeks to expand its influence across the Middle East, and North Korea aims to reshape the security dynamics on the Korean Peninsula in its favor.[27]

China seeks to become the preeminent power in the Indo-Pacific and eventually the world. China perceives the United States' military alliances and forward-deployed forces in Japan, South Korea, Guam, and Australia as a direct threat to its ability to assert authority in the Indo-Pacific region, including its broad and unsubstantiated maritime claims and claims over Taiwan.[28] In the South and East China Seas, China has built artificial islands, militarized disputed features, and rejected international legal rulings in an effort to solidify control over vital maritime routes and counter U.S.-led security cooperation with countries like the Philippines and Japan.[29]

President Putin has a neo-imperial vision of Russian power, viewing the areas controlled by the former Soviet Union as properly within Russia's sphere of influence. Accordingly, he has bristled at the westward orientation of Russia's former satellites—especially their integration with NATO and the EU. Moscow has repeatedly used military aggression to enforce its vision of its sphere of influence, as seen in Georgia in 2008, Crimea in 2014, and the war in Ukraine since 2022.[30] These actions reflect a broader goal of reversing what Russia views as the strategic losses of the post-Cold War order.

Iran similarly views itself as a major Middle East power. The U.S. alliance with Israel and the U.S. role as the architect and enforcer of Iran's international isolation are obstacles to its ability to reassert itself throughout the Middle East. Tehran views its support for terrorist organizations and violent actors—such as Hezbollah in Lebanon, various militias in Iraq, the Houthis in Yemen, Hamas in Gaza, and the former Assad regime in Syria—as essential tools for projecting power and countering rival states, particularly Saudi Arabia and Israel.[31]

North Korea seeks to undermine the U.S.-South Korea alliance and establish itself as the dominant power on the Korean Peninsula. It uses nuclear weapons development, ballistic missile testing, and periodic military provocations to pressure regional actors, enhance deterrence, and consolidate the Kim Jong Un regime's internal legitimacy.[32]

In sum, these revisionist countries view U.S. security guarantees, military presence, and diplomatic networks as significantly constraining their ability to reshape their respective regions on their own terms. China, Russia, Iran, and North Korea's cooperation is underpinned by the overarching goal of safeguarding their authoritarian regimes from perceived external and internal threats. These regimes seek to weaken U.S. alliances and challenge global norms such as free elections, human

rights, and freedom of expression that threaten their political models. By framing external criticism as foreign interference, they invoke nationalism to justify repression and consolidate control at home under the guise of defending national sovereignty.

China Sees Geopolitical and Strategic Benefits from Cooperation with Authoritarian States

Through its support for Russia, Iran, and North Korea—and other authoritarian states around the world—China extends its geopolitical influence, secures strategic footholds in critical regions, and strengthens a shared resistance against U.S.-led political and security structures.

China's backing of Moscow in the Russia-Ukraine war is driven, at least in part, by the concern that a weakened or collapsed Russia would not only generate regional instability but also undermine China's vision of a multipolar world and eliminate a key strategic partner in opposing U.S. dominance.[33] This calculus shapes China's continued support for Putin's regime—through facilitating sanctions evasion, providing economic lifelines, supplying dual-use goods that fuel Russian military aggression, and amplifying anti-Western narratives across international platforms. China also derives significant strategic advantage from the prolonged U.S. engagement in the Russia-Ukraine war as it diverts U.S. attention away from the Indo-Pacific and stretches U.S. military, financial, and diplomatic resources across multiple major geopolitical fronts.

Since the 1979 Islamic Revolution, China has had an interest in supporting the regime in Iran, which has seen the United States as a persistent threat to its internal stability, citing U.S. support for opposition groups, economic sanctions, and "maximum pressure" campaigns as attempts to destabilize the regime.[34] China views the Iranian regime as strategically advantageous for its continued access to Iranian energy resources and as a partner to balance against U.S. influence in the Middle East.[35] China uses the narrative of U.S. overreach and instability in the Middle East (e.g., the wars in Iraq and Afghanistan and U.S. support for Israel) to burnish its image as a responsible non-interventionist, stabilizing power and to appeal to developing countries in the region.

China's support for the Kim regime aligns with a longstanding strategic objective dating back to the Korean War: to maintain North Korea as a buffer state between China and U.S.-aligned South Korea, preventing hostile forces and U.S. weapons from being deployed on its border.[36] Despite ongoing tensions over Pyongyang's nuclear program, Beijing has consistently prioritized regime stability in North Korea to safeguard this strategic barrier.

China, Russia, Iran, and North Korea Cooperate Multilaterally in Various Ways

Cooperation to Counter Global Economic and Financial Sanctions

As countries subject to various economic and financial sanctions imposed by the international community, Russia, Iran, and North Korea have a shared desire to establish financial linkages and trad-

ing networks beyond the reach of U.S.-led sanctions. To this end, they have sought to build economic networks that, over time, could serve as viable alternative trade and payment channels.* Though not currently subject to such broad-based sanctions, China has previously been sanctioned, currently hosts numerous entities subject to financial sanctions, and more generally has an interest in weakening the effectiveness of sanctions. In supporting countries subject to such sanctions, China advances multiple objectives, including undermining U.S. foreign policy, enhancing the capacity of its own sanctions evasion systems in light of its substantial future sanctions risk, and promoting alternative global economic systems that are less reliant on the dollar and increase the prominence of China's currency.

China's facilitation and coordination of alternative trade and payment channels have enabled a growing network of actors engaged in evasion schemes to achieve economies of scale by more efficiently accessing financial services and buyers.[37] For example, China facilitates networks consisting of middlemen commodity buyers and small independent oil refineries that purchase sanctioned items or oil transported by a shadow fleet of vessels that purposefully hide their movements.[38] Small regional Chinese banks largely siloed from the dollar-based financial system most often facilitate payments on behalf of buyers, while large Chinese financial institutions connect to these small regional banks, thereby providing a conduit to international currency markets via Hong Kong or other financial hubs.[39] Finally, front companies controlled by—or acting on behalf of—sanctioned regimes tap into this expansive system of evasion by conducting business with Chinese entities, whether witting and unwitting.[40] (For more on China's facilitation of sanctions and export control evasion, see Graham Ayres and Lyndi Tsering, "China's Facilitation of Sanctions and Export Control Evasion," *U.S.-China Economic and Security Review Commission*, November 2025.)

Many front companies acting on behalf of Iran, Russia, and North Korea operate out of Hong Kong, given the city's emergence in recent years as a major hub for sanctions evasion. The official stance of Hong Kong authorities is that they will not enforce sanctions other than those implemented by the UN Security Council, and they have become increasingly uncooperative with U.S. authorities in light of growing pressure and influence from Beijing.[41]

The network effects, resource sharing, and level of coordination among actors in China, Russia, Iran, and North Korea, as well as in third-party countries like the United Arab Emirates (UAE), present added layers of complexity in targeting the nodes of these networks. According to testimony before the Commission by Kimberly Donovan, director of the Atlantic Council's Economic Statecraft Initiative, disrupting these complex transnational money laundering schemes requires substantial resources and information sharing across government and with partner countries.[42] She argued that while this can create a "whack-a-mole"

*For more on China's alternative cross-border payment systems, see U.S.-China Economic and Security Review Commission, Chapter 7, "China's New Measures for Control, Mobilization, and Resilience," in *2024 Annual Report to Congress*, November 2024, 482–487.

solution, these efforts are nonetheless effective in imposing costs and inefficiencies on the intended target.[43]

At a strategic level, the involvement of Chinese financial institutions with significant global interdependencies in sanctions evasion activities makes it more difficult for the United States and allies to ratchet up enforcement through escalatory actions like secondary sanctions.[44] Secondary sanctions restrict non-U.S. persons from transacting with a primary designated entity through the threat of being denied access to the U.S. financial system.[45] Broadening the use of this powerful extraterritorial mechanism could potentially ensnare Chinese financial institutions with significant international business, exposing foreign and U.S. clients to risk.[46]

China Has Broadened Its Military Cooperation

Since Russia's invasion of Ukraine, military cooperation among China, Russia, Iran, and North Korea has intensified significantly in both scale and scope. While China's military support to these revisionist countries remains primarily bilateral, these states have increasingly sought to expand their cooperation to trilateral and multilateral levels. One of the most notable examples of this growing alignment is the series of trilateral naval exercises—referred to as the Maritime Security Belt—conducted in the Gulf of Oman and the Indian Ocean by China, Russia, and Iran. These exercises began in 2019 and have continued annually, though China did not participate in 2020 and 2021.*[47] In mid-March 2025, the three countries held their joint naval exercise near Chabahar, Iran.[48] This year's drills marked a notable upgrade in scale and complexity—including simulated attacks on maritime targets, antipiracy operations, inspections and detentions, and possible joint electronic warfare operations. During the exercises, the British military reported Global Positioning System (GPS) interference in the Strait of Hormuz, likely caused by intentional jamming by one or more of the participating countries.[49] This disruption, while not definitively linked to joint electronic warfare, suggests growing sophistication in their capabilities and highlights the potential for coordinated electronic operations aimed at undermining adversary systems. Such disruptions are especially concerning in a congested chokepoint like the Strait of Hormuz, where even a temporary loss of navigational reliability can endanger civilian shipping.[50] Although North Korea does not regularly participate in multinational military exercises, South Korean officials reported that former Russian Defense Minister Sergei Shoigu proposed trilateral naval drills with North Korea and China in 2023.[51] While analysts generally assess that interoperability among these militaries remains low, the increasing frequency and sophistication of trilateral exercises—particularly among China, Russia, and Iran—should not be underestimated.[52] These developments reflect a deepening alignment and a shared intent to challenge U.S. maritime dominance and that of its partners in strategically vital regions.

*China did not participate in the exercises in 2020 and 2021, likely due to pandemic-related disruptions, although the drills continued with Russia and Iran.

Continued Cooperation on Weapons Sales, Export Control Evasion, and Space Issues

Beyond multilateral exercises, these countries have strengthened their cooperation over the years in other critical military domains, such as weapons and materiel support. China, Russia, Iran, and North Korea are all subject to export controls on both weapons and dual-use items necessary for modern military systems. These revisionist countries rely on one another to varying degrees to supply weapons and gain access to dual-use goods. For example, China has played a key role in supporting Iran's military modernization—despite international sanctions—by transferring military technology and indirectly supplying small arms and cruise missiles through third-party channels, including countries like North Korea.[53] In April 2024, Britain's Royal United Services Institute reported satellite imagery showing a U.S.-sanctioned Russian cargo ship, *Angara*, docked at Zhoushan Xinya Shipyard in China.[54] *Angara* was transporting thousands of containers believed to contain North Korean weapons and ammunition.[55]

In addition to direct weapons sales, these revisionist countries support one another through the provision of dual-use goods and export control evasion. Jake Rinaldi, a defense analyst at the U.S. Army War College, testified to the Commission that as China has become more sensitive to reputational risks of direct arms sales to Iran and North Korea, it has shifted its military cooperation toward technology sharing and sales of dual-use products.[56] In addition, Dr. Rinaldi's testimony cited China's role in more clandestine or covert export networks operating through third-party countries and intermediaries.[57] This indirect support was illustrated in 2023 when Chinese-manufactured dual-use components were found in Iranian Shahed-136 drones, which were subsequently used in Russia's attacks against Ukraine.[58] Chinese dual-use parts, including components used in Russian guidance systems, various kinds of microelectronics, and engine components, have flowed through third-party countries or been routed via Russian payments processed through intermediaries in Hong Kong, Kyrgyzstan, Kazakhstan, and the UAE.[59] These channels help obscure the origin and destination of sanctioned goods, enabling China to support Russia's war efforts while avoiding detection and giving it the ability to claim plausible deniability. A significant amount of the trade between China and Russia involves militarily sensitive dual-use items identified on the Common High Priority List (CHPL), a designation used by the United States, the EU, Japan, and the UK.*[60] The CHPL includes items such as microchips for weapons guidance, ball bearings for tank production, and other critical components.[61] Russia's reliance on China

*As of February 23, 2024—the most recent publicly available update—the U.S. Department of Commerce's Bureau of Industry and Security lists 50 items on the CHPL. Tier 1 items of highest concern include a broad range of electronic integrated circuits used in precision-guided weapons systems for which Russia has no domestic production capacity; Tier 2 items include electronic components Russia can produce but prefers to source from the United States and partners and allies; Tier 3.A includes electronic components with a broad range of suppliers; Tier 3.B includes mechanical and other components such as ball and roller bearings, airplane and helicopter parts, optics, navigation equipment, etc.; Tier 4.A includes manufacturing equipment for electronic components; and Tier 4.B includes Computer Numerically Controlled (CNC) machines and components used in mechanical and metal manufacturing. U.S. Department of Commerce, Bureau of Industry and Security, *Common High Priority List*, February 23, 2024.

for these high-priority goods rose sharply from 32 percent in 2021 to 89 percent in 2023, indicating the dramatic growth in defense industrial cooperation.[62]

These countries also cooperate in the space domain. In 2022, Putin and Xi signed agreements to promote interoperability of China's BeiDou and Russia's GLONASS satellite navigation systems and to jointly construct, operate, and maintain BeiDou and GLONASS ground stations, calling for mutual compatibility and data sharing between the two systems.[63] The previous year, Iran and China had signed an agreement granting Iran access to the BeiDou system, which could be used for military applications.[64] Iran could use the BeiDou system to improve targeting accuracy, select launch locations, and carry out more sophisticated ballistic and cruise missile strikes as well as enhance the precision and coordination of unmanned aerial vehicles.[65] Experts have also assessed that North Korea has adopted the GLONASS system for its missile tests.[66] According to testimony from Jemima Baar, an independent China analyst, given the shared use of BeiDou and its increasing interoperability with GLONASS, China, Russia, Iran, and North Korea could enhance real-time intelligence sharing, secure communications, and battlefield awareness in the event of a conflict.[67] This interoperability could enable these countries to conduct operations with greater speed, precision, and strategic depth across multiple theaters and domains, making it more difficult for the United States and its allies to intervene and contain conflicts.

Advancing Autocratic Governance through Coordinated Action in International Institutions

China, Russia, Iran, and North Korea have coordinated actions in a systematic campaign in the UN and other international institutions to reshape global norms to legitimize and promote authoritarian governance and preferred international norms relating to human rights, territorial sovereignty, economic development, and the governance of critical technologies.[68] Their strategies have included building blocs within these bodies to obstruct activity, creating parallel power structures, and selectively reinterpreting key documents to serve authoritarian ends. In the UN Human Rights Council, for example, China and Russia have played leading roles in the Like-Minded Group, a coalition of states that has worked to weaken international human rights protections and shield members from criticism over domestic crackdowns.[69] Similarly, in 2021, China, Russia, Iran, and North Korea joined other authoritarian-leaning states in launching the Group of Friends in Defense of the UN Charter, an 18-member bloc that uses the language of international law to subvert it—using concepts like unilateralism and noninterference to provide a façade of multilateral legitimacy to justify destabilizing activities and repression.[70]

China and Russia have also leveraged their permanent seats on the UN Security Council to shield partners from accountability. Following North Korea's 2022 intercontinental ballistic missile launch, both countries vetoed a resolution to impose additional sanctions, breaking a 16-year precedent of sanctions for North Korea's missile tests and preventing the Council from responding to Pyongyang's

destabilizing activities.[71] Moreover, they have systematically undermined UN monitoring capabilities—Russian representatives succeeded in dismantling the panel of experts charged with monitoring sanctions enforcement on North Korea in 2024 after continual years of efforts by Chinese and Russian appointees to undermine the panel's credibility.[72]

A similar pattern is evident in their support for Iran. Both China and Russia were original supporters of the Joint Comprehensive Plan of Action (JCPOA), the 2015 multilateral agreement aimed at limiting Iran's nuclear capabilities in exchange for sanctions relief. However, following the U.S. withdrawal from the deal in 2018 and Iran's violations of its commitments, China and Russia consistently blocked accountability measures, framing such measures as illegitimate or politically motivated while providing diplomatic cover for Tehran's nuclear escalation.[73] In June 2025, the International Atomic Energy Agency's 35-nation Board of Governors again called on Iran to fulfill its legal obligations and comply with its nuclear commitments, citing five previous resolutions to the effect between 2020 to 2024.[74] Collectively, these efforts pose a significant challenge to the integrity and credibility of the international system. By undermining institutions intended to promote transparency and accountability, prevent conflict, and protect human rights, China, Russia, Iran, and North Korea are working to reshape multilateral norms to protect authoritarian interests. If left unchecked, their cooperation risks normalizing impunity for aggression, proliferation, and human rights abuses, which represents one of the gravest long-term threats to international stability.

Creating Alternative International Institutions: BRICS and the Shanghai Cooperation Organization

Beyond undermining existing institutions like the UN that it regards as favorable to the U.S.-aligned world order, China has led the effort to establish alternative international power structures more conducive to authoritarian governance and its preferred international norms, including BRICS and the Shanghai Cooperation Organization (SCO). (For analysis of developments over the last year in BRICS and the SCO, see Chapter 2, "U.S.-China Security and Foreign Affairs (Year in Review).")

China played a leading role in establishing what became known as BRICS in 2009, envisioning it as a counterweight to the G7 and a key forum to broaden its influence among nations of the "Global South." The ten countries* now in BRICS represent roughly half of the global population and 27.2 percent of global gross domestic product (GDP).†[75] The organizational structure of BRICS remains largely informal, with no shared charter or common funds. The group operates on a consensus-based approach, with each member country hosting and serving as chair to set priorities on an annual rotating basis.[76] With the admission of Iran in 2024, BRICS provides an avenue to offset Iran's isolation in other international organizations.

*BRICS is an intergovernmental organization founded by five major emerging economies—Brazil, Russia, India, China, and South Africa—formed to promote mutual economic, political, and development interests of developing countries. The group has since expanded to include Egypt, Ethiopia, Iran, Saudi Arabia, and the UAE.

†China accounted for 61.8 percent of the combined GDP of the ten BRICS members.

BRICS has been used to oppose UN condemnation of Russia's war in Ukraine, develop a common position on Iran's nuclear program, and explore an alternative international financial system to reduce reliance on the U.S. dollar.[77] During the Commission's February 2025 hearing, witnesses concurred that BRICS thus far has had limited effectiveness as a multilateral bloc.[78] However, they noted it may provide a forum for leading revisionist members China, Russia, and now Iran to seek to promulgate international norms, and it could facilitate the incremental construction of alternative international systems, such as payment channels that, while not likely to fully replace incumbents in the short run, do warrant continued monitoring.[79]

The SCO, established in 2001 by China and Russia with three Central Asian states, now has nine members, including India, Pakistan, and Iran.[80] Although its institutional structure is weak and members have divergent interests that limit its ability to enforce collective action, recent developments suggest that member states are beginning to align more closely.[81] What began as a regional security bloc in Central Asia has since evolved into a broad political, economic, and technological organization aimed at counterbalancing U.S.- and Europe-led institutions. In September 2025, the SCO summit provided a high-profile platform for a unified anti-American gathering among the axis counties. At the summit, Xi introduced the Global Governance Initiative (GGI), seeking to position China as a leading voice and provider of an alternative governance framework for developing countries in regional and global institutions. While still nascent, Beijing's concept paper indicates that the GGI is intended to shape global norms and establish standards aligned with China's preferences.[82] Out of that summit also came a commitment to establish an SCO development bank to function as another multilateral lending instrument, but one serving otherwise isolated axis states and outside the reach of U.S. sanctions.[83]

The SCO also conducts recurring drills like Peace Mission and the Interaction-2024 exercise in Xinjiang, which provide a platform for China, Russia, and Central Asian countries to deepen military coordination and gain training experience in areas such as air-ground combat operations, long-distance mobilization, stability maintenance operations, conventional warfare, and drone testing.[84] Moreover, mechanisms like the SCO's Regional Anti-Terrorist Structure (RATS) support intelligence sharing and cross-border surveillance but have also been used to suppress dissent and target minorities under the guise of counterterrorism.[85] These activities underscore the SCO's positioning as an alternative security framework aligned with the strategic priorities of China and Russia while also cultivating closer security and political relationships with developing countries.[86]

Drawing on the Authoritarian Toolkit: Building Influence through Technology and Information Control

Exporting Repression: Surveillance Technologies, Digital Control, and Policing Practices

These revisionist countries also seek to reshape international norms through the global export of surveillance technologies and digital control tools that enable repression and strengthen author-

itarian governance. Increasingly, China is extending its reach by promoting domestic control through the export of its surveillance technologies, policing practices, and internal security models—not only to Russia, Iran, and North Korea but also to a wider range of countries across Africa, Southeast Asia, and elsewhere.[87] According to testimony from Christopher Walker, vice president at the Center for European Policy Analysis, these exports include facial recognition systems, AI-driven monitoring platforms, digital ID systems, and centralized data management systems.[88] Mr. Walker highlighted that countries like Pakistan, Venezuela, and Uganda have adopted these technologies, often with Chinese state-backed firms' assistance in building surveillance infrastructure through the Digital Silk Road initiative.[89] China promotes its Digital Silk Road strategy as a model of governance that equates political stability with centralized control over information.[90] Chinese AI surveillance systems have been deployed in over 80 countries, supporting initiatives like urban "safe cities," social credit registries that blacklist individuals, and policing platforms designed to preemptively monitor dissent.*[91]

Other "axis" countries pursue similar efforts. Russia has also played a key role in exporting tools of digital authoritarianism. It has provided "cybersecurity" systems and surveillance software to regimes such as Belarus and Venezuela, enabling these governments to monitor opposition activity, control public discourse, and restrict access to independent information.[92] Iran has also likely supported the development of Venezuela's cyber defense and censorship systems in exchange for financial gains to fund military activities.[93] While North Korea is less involved in the export of such technologies, it is a heavy domestic user of Chinese surveillance tools.[94] These include biometric data collection—such as fingerprints and photographs—used to monitor its population.

China also has used efforts such as its Global Public Security Cooperation Forum (GPSCF), formerly known as the Lianyungang Forum, to deepen international cooperation on law enforcement and public security.[95] The GPSCF is an annual summit organized by China's Ministry of Public Security (MPS) and serves as a platform to "showcase the PRC's [People's Republic of China] vision of global public security cooperation and advanced law enforcement technologies, including facial recognition software and drones."[96] In recent years, the forum has attracted delegates from more than 120 countries, regions, and international organizations.[97]

In addition to these multilateral initiatives, China maintains sustained bilateral internal security dialogues with Russia, Iran, and North Korea. China also uses internal security partnerships to protect its overseas interests by serving as tools for monitoring the diaspora and conducting transnational repression. Moreover, internal security cooperation allows China to build influence within recipient governments and potentially develop leverage for political coercion.† Collectively, these patterns represent a coordinated effort by China, Russia, Iran, and North Korea to develop and sustain authoritarian

*Recent data show that two Chinese firms—Hikvision and Dahua Technology—account for roughly one-third of the global surveillance camera market. "Mapping More of China's Tech Giants: AI and Surveillance," *Australian Strategic Policy Institute*, November 28, 2019.

†See Chapter 4, "Crossroads of Competition: China and Southeast Asia" for a deeper discussion of this issue.

governance in other countries by providing tools and training that promote information control and repression and challenge global standards of privacy, transparency, and human rights.

Shaping the Narrative: Propaganda, Disinformation, and Malign Influence

Additionally, China, Russia, Iran, and North Korea have stepped up coordination on information operations and psychological warfare to control narratives and shape public perceptions about events. These campaigns aim to legitimize authoritarian rule by spreading false or misleading narratives about adversaries, discrediting internal dissent, and glorifying regime achievements.[98] The central goal in the information environment—as in their efforts more broadly—is to reinforce their domestic control and undermine trust in U.S. global leadership while they reshape elements of the international system to legitimize aggression, coercion, and the repression of dissent. A key tactic in these efforts is the mutual amplification of state-sponsored content. For example, since the start of the Russia-Ukraine war in 2022, Russian state media and affiliated actors have actively pushed disinformation, portraying Russia as a victim of NATO aggression, denying war crimes, and framing the invasion as a "liberation" of Russian-speaking populations.[99] These narratives are often echoed by Chinese, Iranian, and North Korean state outlets, which reframe Russian talking points for domestic audiences and sympathetic governments across the developing world. Chinese media frequently reshare Russian narratives or the purported failures of Western democracies.[100] Iranian outlets cite Chinese sources to underscore claims of U.S. economic decline or global instability, while Russian media platforms reinforce North Korean denunciations of U.S. military exercises.[101] This coordinated disinformation effort reinforces anti-Western messaging, lending credibility to otherwise fringe or fabricated claims. Together, these coordinated information campaigns form a non-kinetic front in global strategic competition. By manipulating digital spaces, revisionist regimes seek to spread authoritarian narratives, erode international rules and norms, and reshape global discourse in their favor.

China Has Sought to Balance Strategic Partnerships with the Desire for Global Legitimacy

China has downplayed the existence of a bloc with Russia, Iran, and North Korea and has sought to carefully manage the perception of its relationships to minimize reputational risks and maintain plausible deniability. China has long been skeptical of formal alliances, rooted in concerns about the so-called "entrapment dilemma"—the risk of being drawn into defending another country's security interests at great cost to its own.[102] Historically, Chinese leadership has publicly favored flexible "partnerships" that allow it to maintain autonomy and adapt to shifting global dynamics without being constrained by fixed obligations.[103] This strategy also reduces the risk of entanglement in external conflicts that could jeopardize China's broader strategic interests. China's engagement with countries like Russia, Iran, and North Korea is guided by the caveat that China seeks to ensure support does not interfere with its other priorities,

such as maintaining stable relations with the EU, Gulf states, or East Asian neighbors.

This cautious approach is evident in China's handling of the June 2025 Israel-Iran conflict, which highlights the limits of its strategic partnerships. Despite Iran having signed a new strategic partnership with China in 2021 and one with Russia in early 2025, neither country came to Iran's assistance when its nuclear facilities were bombed by Israel and the United States in June. While both countries publicly condemned the attacks and called for a ceasefire, neither country offered to provide actual support to Iran such as advanced weaponry or the replenishment of its air defense architecture destroyed in the strikes.[104] Although the strategic partnership agreements did not include mutual defense pacts, they did call for increased defense cooperation, and Russia had agreed to provide Iran with advanced weaponry in 2023 and 2024.[105] Analysts have speculated on a variety of reasons for the restraint—for example, Russia being overextended in Ukraine and China not wanting to disrupt ongoing trade talks with the Trump Administration or its broader economic interests. In any event, the failure to act may indicate limits to the robustness of the partnerships among these countries.

China's restraint during the Israel-Iran conflict, as well as its careful positioning in the Russia-Ukraine war, underscores a broader effort to resist being portrayed as the leader of an "axis" of authoritarian states. Beijing deliberately avoids framing its partnerships in opposition to democracies, recognizing that international discourse often portrays such regimes as illegitimate, repressive, and inferior to democratic governments.[106] Another reason China has avoided the "axis" label is that it risks justifying NATO expansion and deepening alignment among its rivals.[107] Chinese leadership's reluctance to be closely entangled with Russia, North Korea, and Iran also reflects a desire to avoid reinforcing the Western narrative that China is forming a Cold War-style bloc. At the 2023 Shangri-La Dialogue security forum, for example, former Defense Minister Li Shangfu condemned efforts to build NATO-like alliances in the Asia Pacific, stating that "in essence, attempts to push for NATO-like [alliances] in the Asia-Pacific is a way of kidnapping regional countries and exaggerating conflicts and confrontations, which will only plunge the Asia-Pacific into a whirlpool of disputes and conflicts."[108] Instead, Beijing has emphasized its opposition to exclusive alliances and "zero-sum thinking" and sought to present itself as a constructive, inclusive leader on the world stage, seeking to build a "community of common destiny" and a "shared future for mankind."[109]

Despite its public commitment to a multipolar international system, China's behavior suggests a clear preference for hierarchical, asymmetric relationships with itself at the center. This tendency is evident in the rollout of major foreign policy initiatives such as the Belt and Road Initiative (BRI), the Global Development Initiative (GDI), the Global Security Initiative (GSI), the Global Civilization Initiative (GCI), and the Global Governance Initiative (GGI). These efforts cast China as the principal architect of a reimagined international order, one in which Beijing defines the rules and sets the terms of engagement. In short, China's vision of multipolarity

serves as a strategic instrument: a means to expand its own influence while reducing the leverage of the United States and its allies on the global stage. These frameworks are not designed to foster genuinely equal partnerships but rather to reinforce China's leadership by extending economic, security, and ideological benefits in a top-down fashion.

China's Bilateral Relations with Russia, Iran, and North Korea

China's Partnership with Russia

China's partnership with Russia has been more robust and institutionalized than those with Iran or North Korea and has deepened in recent years in response to what both governments perceive as escalating geopolitical threats to their regimes. Their relationship has evolved from a bond rooted in communism in the early Cold War years to a more complex relationship driven by shared geopolitical goals and strategic alignment against the United States. Both Xi Jinping and Vladimir Putin view their partnership as a counterweight to the international order favoring the United States, regarding one another as powerful partners capable of offering mutual political, economic, military, and technological support. Even in the absence of a formal military alliance, the two countries continue to cooperate closely through coordinated joint statements, joint military exercises, and sales of weapons and technology. Their relationship has deepened in recent years in response to external pressures: Russia's invasion of Ukraine and China's intensifying trade war with the United States have pushed them to bolster their strategic alignment. While both countries emphasize that they are priority ("no limits") partners rather than formal allies, military and economic cooperation remains a significant aspect of their partnership.[110]

Xi's visit to Moscow in May 2025 for the Victory Day Parade commemorating the 80th anniversary of the end of WWII in Europe marked his 11th visit to Russia since becoming president in 2013. In late August–early September 2025, President Putin reciprocated by traveling to China to attend the SCO summit and the military parade celebrating China's WWII victory, signaling his strong support for China's leadership and deepening China-Russia relations.[111] Xi and Putin have met more than 40 times, the highest number of meetings between Xi and any world leader.[112] Amid rising tensions with the West—ranging from the U.S. imposition of tariffs on Chinese goods to continued pressure on Russia to end its war in Ukraine—Xi and Putin used the occasions to convey the durability of their partnership. Their May 2025 joint statement and press conference emphasized the "unique strategic value" of their relationship and reaffirmed their status as "priority partners" and "friends of steel."[113] The statement also reaffirmed Russian support for the PRC's claim over Taiwan and called for addressing the "root causes" of the Russia-Ukraine war, an endorsement of the Kremlin's preferred rhetoric concerning the conflict.[114] In another joint declaration titled "Joint Statement by the People's Republic of China and the Russian Federation on Global Strategic Stability," China and Russia criticized U.S. military initiatives, including the "Gold-

en Dome" proposed by President Donald Trump in January 2025, that is designed to counter growing missile threats, particularly from adversaries like China and Russia.[115] The statement claimed that the United States was "turning outer space into an environment for placing weapons and an arena for armed confrontation" and creating a "strategic offensive arms [race]."[116] They emphasized that China and Russia were committed to the "peaceful use of outer space."[117] This statement is hypocritical, given that both countries have conducted destructive anti-satellite tests that created significant debris hazards and destabilized space security.[118] China and Russia's joint statements, alongside observable increased military cooperation, underscore how shared grievances toward the United States have strengthened their partnership.

China, Iran, and North Korea Fuel Russia's War Machine

Russia's invasion of Ukraine has accelerated the convergence of materiel and technological support among China, Russia, Iran, and North Korea. Although these countries do not operate under a formal joint command structure or multilateral coordination mechanism, they have increasingly supported each other's strategic interests through bilateral arrangements. Key examples of support to Russia include:

- *China:* Since Russia's illegal 2022 full-scale invasion of Ukraine, Russia has become heavily dependent on China economically, technologically, and diplomatically, which is why NATO labeled China a "decisive enabler" of Russia's war effort.[119] This dependency has provided Beijing greater leverage to shape the terms of cooperation to its advantage, reinforcing its role as the senior partner. Beijing has become a critical economic and technological lifeline for Moscow, particularly through the export of dual-use products. Reports indicate that over 70 percent of Russian imports of semiconductors and 96 percent of secure microchip or "smart" cards—which are used in a variety of civilian and military applications—come from China.[120] Beijing has also provided technical assistance to strengthen Russia's satellite and space-based capabilities and provided satellite imagery to Russia to help it track Ukrainian troop movements.[121] Additionally, as a key supplier to Iran's drone program, China indirectly has bolstered Iran's support for Russia, as discussed below.
- *Iran:* Tehran has delivered offensive Shahed-136 drones, short-range ballistic missiles, and ammunition to Russia, and it reportedly deployed paramilitary personnel to Crimea to train Russian troops in operating these drone systems.[122] In return, Iran has received advanced conventional weapons from Russia, including fighter aircraft and attack helicopters.[123] Iran's own military may benefit from observing the performance of its equipment and associated tactics on Ukrainian battlefields.[124]

China, Iran, and North Korea Fuel Russia's War Machine—*Continued*

- *North Korea:* North Korea's military support to Russia has been ongoing since at least mid-2023 and has continued since then, expanding to include direct military involvement.[125] Pyongyang has supplied Russia with ammunition, equipment, and ground forces, using the war as a testing ground for its military hardware, doctrine, and training.[126] Russia, in turn, has supplied North Korea with short-range air defense systems, sophisticated electronic warfare technology, and key components essential for constructing a nuclear-powered submarine.[127] North Korea has also supplied Russia with ballistic missiles and launchers that have been used in the war against Ukraine. By early 2025, Pyongyang had transferred 148 KN-23 and KN-24 ballistic missiles to Russia, which have struck Ukrainian targets on the battlefield.[128] Moreover, reports indicate that North Korea has sent around 14,000 troops to augment Russian forces fighting in Ukraine, with these forces deployed and fighting in the Kursk border region.[129] Following a meeting between Russian Security Council Secretary Shoigu and Kim Jong Un, North Korea announced in June 2025 that it will send thousands of military construction workers and deminers to carry out reconstruction in Russia's Kursk region.[130]

Looking ahead, the outcome of the war in Ukraine will likely shape the form and intensity of future cooperation among these four countries, though not its strategic direction. Experts argue that an outcome where Russia emerges triumphant would expose the limits of Western resolve, emboldening this network of authoritarian countries to more forcefully challenge U.S.-led norms and institutions.[131] Conversely, if Russia ends the war weakened or isolated, experts assess that China may scale back its overt support to avoid secondary sanctions or reputational damage.[132] However, this would likely shift the relationship into more covert or informal channels rather than dismantle it.[133] In either scenario, the underlying strategic factor uniting Beijing and Moscow—their shared desire to resist perceived U.S. hegemony—is unlikely to be meaningfully altered.

China-Russia Security Cooperation: Extensive and Expanding

The China-Russia military partnership took root in its current form in the 1990s when the People's Liberation Army (PLA) became a major purchaser of Russian military hardware, but it has since evolved into much more extensive and strategic military cooperation, particularly after 2014. China's acquisition of Russian air defense systems, fighter jets, and air-to-air missiles significantly enhanced its military capabilities and served as a basis for its domestic weapons production.[134]

Arms Sales Involve Increasingly Sophisticated Weapons Systems

From the 1990s to 2024, Russia was China's leading foreign arms supplier, accounting for approximately $38.5 billion in known weapons sales—equivalent to 77 percent of China's total arms imports during that period.[135] Although Russia had previously limited the transfer of its most advanced military technologies in order to preserve its military technology edge, since Russia's 2022 invasion of Ukraine, Moscow has become increasingly reliant on China and has acquiesced to sharing some of the crown jewels in its arsenal.[136] In recent years, Moscow has exported more sophisticated systems to Beijing, including the Su-35 multi-role fighters and S-400 surface-to-air missile systems.[137] Russia may also be sharing sensitive submarine technologies with China, including those supporting improvements to the nuclear propulsion plant of its next-generation Type 096 ballistic missile submarine (SSBN).[138] If true, this could pose a major challenge to U.S. naval posture and anti-submarine warfare strategies.

Beyond direct sales, Russia and China have announced cooperation on the joint production of weapons, including heavy-lift helicopters and missile early warning systems.[139] However, according to Elizabeth Wishnick, a senior research scientist at the Center for Naval Analyses, this cooperation generally involves Russia "supplying a particular component or software" to China rather than joint production.[140] At the same time, China has sought to reduce its reliance on foreign military suppliers, including Russia, by investing heavily in its own domestic defense weapons production.[141]

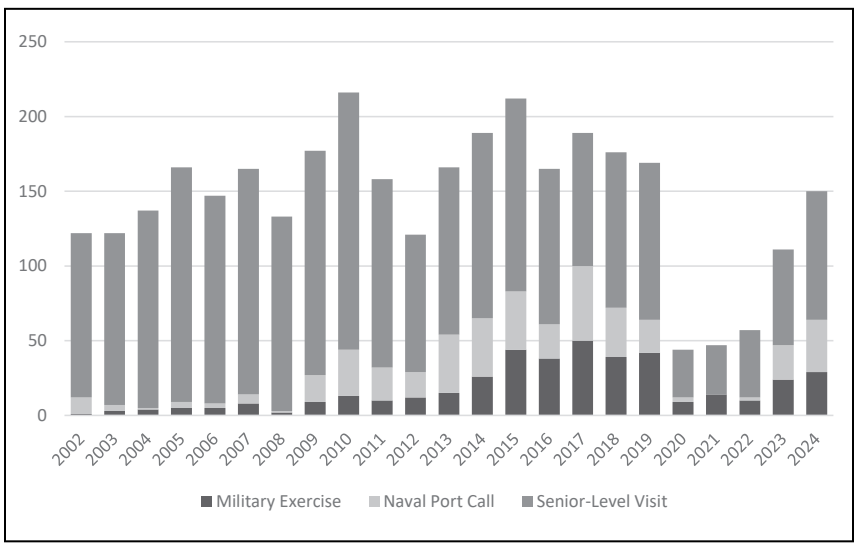
More recently, China's cooperation with Russia has centered on supplying "dual-use" systems and technologies, particularly in the electronics sector, to help Moscow replace key components previously sourced from Ukraine and the West. As noted above, analyses indicate that in 2023, China accounted for 89 percent of the CHPL items needed for Russia's war effort in Ukraine.[142] According to Oleh Ivashchenko, the head of Ukraine's Foreign Intelligence Service, at least 20 Russian defense plants have received machine tools, gunpowder, chemical products, and other components from Chinese suppliers.[143] Mr. Ivashchenko also said that Russia's aviation sector has obtained "equipment, spare parts, and documentation" from China and that 80 percent of the "critical electronics" used in Russian drones came from China.[144] In July 2025, European officials reported that Chinese firms have been covertly shipping engines to Russia's weapons manufacturer IEMZ Kupol under false labels to evade sanctions, enabling the increased production of Garpiya-A1 attack drones used against both military and civilian targets in Ukraine.[145] China has also supplied nitrocellulose, a key ingredient in gunpowder and rocket propellant manufacturing, to support Russia's munitions production, including artillery shells.[146] Russian companies have become more reliant on China as a source of precision machine tools, such as computer numerically controlled (CNC) machines, and often obtain them indirectly through intermediary countries such as Belarus and various Central Asian nations.[147] (For more on China's facilitation of sanctions and export control evasion, see Graham Ayres and Lyndi Tsering, "China's Facilitation

of Sanctions and Export Control Evasion," *U.S.-China Economic and Security Review Commission*, November 2025.)

Military-to-Military Cooperation Expands

Since Russia's 2014 annexation of Crimea and ensuing geopolitical isolation, China-Russia military exercises have increased markedly in frequency, scale, and operational complexity, incorporating a broader range of combat and combat support activities (see Figure 1). According to data from the National Defense University, 63 percent of all recorded China-Russia military interactions over the past 23 years occurred between 2014 and 2024, underscoring a significant intensification of bilateral military engagement.[148] In their 2025 joint statement on the Comprehensive Strategic Partnership of Coordination for a New Era, Beijing and Moscow reaffirmed their commitment to deepening defense ties, expressing their intent to further deepen military mutual trust and cooperation, expand the scale and scope of joint military exercises, regularly organize joint maritime and air patrols, strengthen exchanges and cooperation under bilateral and multilateral frameworks, and promote China-Russia military cooperation to a higher level.[149] For instance, intelligence reports indicate that around 600 Chinese troops will train at Russian military installations in 2025, gaining exposure to combat tactics used against NATO-equipped forces.[150]

Figure 1: Frequency of China-Russia Military Diplomacy Activities, 2002–2024



Note: The decline in China-Russia military diplomacy activities between 2020 and 2022 was primarily due to COVID-19.
Source: Phillip C. Saunders and Melodie Ha, "Chinese Military Diplomacy," *National Defense University*, June 2025.

In September 2025, the Royal United Services Institute, a British think tank, reported documents revealing deals dating back to 2023 in which China supplied dual-use items to Russia in exchange for Russia equipping and training a Chinese airborne battalion and

sharing its battlefield expertise in airdropping armored vehicles.[151] These exchanges indicate that Beijing is moving beyond symbolic joint drills and public statements and deepening military cooperation with Moscow to strengthen its power-projection and air maneuver capabilities, including in ways that would be useful if it chooses to attack Taiwan.

China and Russia have significantly expanded the complexity and geographic scope of their joint air and naval patrols in recent years. In August 2025, they held Joint Sea Exercise 2025 in the Sea of Japan, followed by a 15-day joint naval patrol.[152] According to Chinese state media, the drills included "submarine rescue, joint anti-submarine, air defense and anti-missile operations, and maritime combat."[153] Japan's national defense white paper, published the previous month, warned that the growing tempo of China-Russia military operations near Japan poses a "grave concern" for its national security.[154] These joint patrols are both symbolically and strategically significant, as they usually take place in proximity to disputed areas or sensitive sea lanes and have tested the readiness and response protocols of the United States, South Korea, and Japan. For example, in July 2024, the Russian and PLA navies conducted a joint patrol near the United States for the first time, with their aircraft entering into Alaska's air defense identification zone (ADIZ).[155] Similarly, in November 2024, Chinese and Russian aircraft conducted joint exercises from the Sea of Japan to the East China Sea and entered South Korea's ADIZ without prior notice.[156]

Despite the growing frequency and geographic reach of these joint operations, however, many experts assess that true interoperability between Russian and Chinese forces remains limited.[157] Both militaries face enduring challenges stemming from their respective military cultures, their independently developed command and control (C2) systems,* and their limited experience conducting joint operations with foreign partners.[158] Hence, experts point to the largely scripted nature of drills, suggesting they may be as much about political signaling and confidence building as genuine operational integration.[159] While these limitations currently constrain China-Russia military cooperation, they could ultimately be overcome if Xi and Putin perceive a significant deterioration in the international security environment that compels deeper collaboration in combined military operations.

Additionally, there are indications that China and Russia may be cooperating on gray zone activities, with the disruption of undersea cables frequently raised as a notable potential example. (Gray zone activities, including cable cutting, are discussed in Chapter 2,

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*Command and control (C2) systems are critical for countries seeking to achieve joint interoperability, serving as the backbone for coordination, communication, and decision-making across units, services, and countries. Both Russia and China face ongoing challenges with their respective C2 systems, which have hindered their ability to coordinate effectively even within their own military branches and theater commands. Reports from the Russia-Ukraine war indicate that Russia's Soviet-era C2 structure was overly rigid, outdated, and disorganized, hindering battlefield adaptability and coordination. The PLA has undertaken C2 reforms, especially after 2015, to improve jointness and streamline its theater command structure, but analysts note continued shortcomings in joint operations and real-time decision-making. U.S. Department of Defense, *Summary of the Joint All-Domain Command & Control (JADC2) Strategy*, March 2022, 7; Matthew Loh, "NATO Can't Ignore the Russian Military's Faster, More Dangerous Kill Chain," *Business Insider*, April 28, 2025; Jasmin Alsaied, "The People's Liberation Army's Command and Control Affects the Future of Out-of-Area Operations," *Journal of Indo-Pacific Affairs* (March–April 2023): 148.

"Security and Foreign Affairs Year in Review" and Chapter 11, "Taiwan.") European officials reported that a Chinese-flagged vessel was present near the sites of two undersea cable-cutting incidents in the Baltic Sea and noted possible Russian involvement.[160] In October 2023, Finnish authorities identified a Chinese-flagged vessel, *Newnew Polar Bear*, which had Russian sailors on board, as the ship that severed the Balticconnector gas pipeline and a telecommunications cable linking Finland and Estonia.[161] In another incident in November 2024, the Chinese-owned bulk carrier *Yi Peng 3* cut two critical undersea data cables while dragging its anchor along the Baltic seabed for more than 100 miles—one connecting Sweden and Lithuania and the other linking Germany and Finland.[162] The vessel was carrying Russian fertilizer and was crewed by a Chinese captain and at least one Russian sailor. European authorities from Denmark, Sweden, and Germany who have been investigating the incident suspect the sabotage was orchestrated by Russian intelligence services, not the Chinese government.[163] These incidents have heightened European suspicions that Chinese commercial vessels may be covertly enabling Russian gray zone operations and posing threats to critical European infrastructure.

In a potential Taiwan contingency, Russia may likely mirror China's approach to the Ukraine war by providing indirect military and economic support while avoiding direct involvement. According to then–Director of National Intelligence Avril Haines, China and Russia have conducted joint military exercises related to Taiwan, prompting the U.S. Department of Defense to increase planning for a potential conflict involving both countries.[164] Experts anticipate that Russia's support could take the form of stepped-up energy supplies, dual-use technology, battlefield expertise, cyber capabilities, and missile defense cooperation.[165] Russia's contributions would enhance China's warfighting capacity while allowing Russia to avoid the political and economic consequences of direct engagement.[166] Strategically, Russia would stand to gain from the United States being preoccupied in the Indo-Pacific, a factor that could influence its calculus on taking action to advance its interests elsewhere.

China-Russia Economics and Trade: Symbiotic, though Heavily Asymmetric

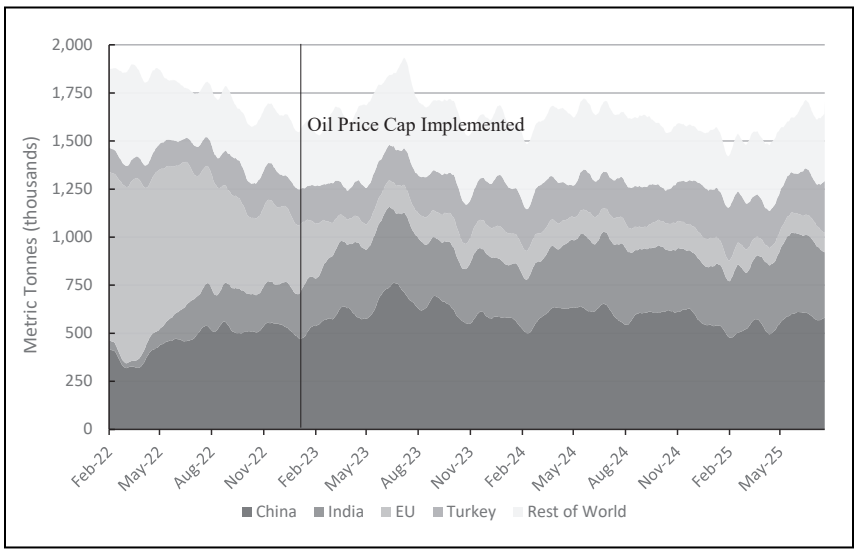
China has played a pivotal role in helping Russia's economy withstand the broad-based economic sanctions and evade export controls that would otherwise limit its ability to manufacture weapons to attack Ukraine.

China's economic support to Russia has increased tremendously since Putin's full-scale invasion of Ukraine in 2022, enabling Russia to sustain its wartime economy despite heavy sanctions from the United States, Europe, and other countries. With vast energy reserves and one of the world's most developed oil and gas sectors, Russia is heavily reliant on revenue from energy exports, which also makes it particularly susceptible to targeted trade sanctions on the energy sector.* While Europe curbed Russian imports and the G7 engineered a sanctions regime to limit Russia's ability to

*Russia's oil and gas sector contributes about 20 percent of its GDP on average and 30 to 50 percent of total federal budget revenues.

sell oil above $60 per barrel, China's purchases of Russian energy have allowed Moscow to replenish its resources and maintain fiscal solvency during the war (see Figure 2). Since the imposition of the oil price cap, China has been the largest purchaser of Russian fossil fuel by price (32 percent) and by volume (36 percent).[167] China imported 2.2 million barrels per day (bpd) from Russia in 2024 (about $62 billion in annual value), up from 1.6 million bpd in 2021.[168] In 2023, Russia surpassed Saudi Arabia as China's largest crude oil supplier, now making up 21.5 percent of total Chinese crude imports compared to 15.5 percent prior to the war.[169]

Figure 2: Export Destinations for Russian Fossil Fuel (21-Day Rolling Average), February 2022–August 2025



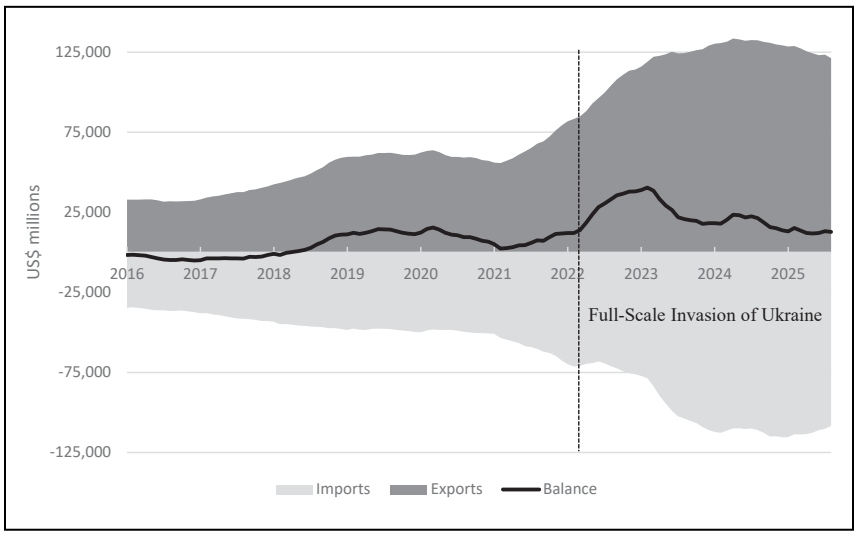
Source: Centre for Research on Energy and Clean Air, "*Russia Fossil Tracker*."

Chinese state firms Sinopec, Zhenhua Oil, and PetroChina accounted for about half of China's purchases of oil from Russia until early 2025, when they began to curb purchases in response to the U.S. Department of the Treasury's expanded application of secondary sanctions on Russia's energy sector.[170] Small independent teapot refineries* purchase the remainder and have stepped up purchases to make up the difference.[171] China has also helped prop up Russian farmers, as imports of Russian grain have increased over 400 percent since 2021 to $428.6 billion, though this still only accounted for 2.9 percent of China's total cereal imports in 2024.[172] Progress continues on a "New Land Grain Corridor," a series of joint investments to build out transportation infrastructure that will enable Russia to further expand trade with China and other parts of Asia, and for China to diversify from seaborne routes for food imports.[173]

*"Teapot" refineries are small independent refineries primarily clustered in Shandong Province that largely conduct transactions outside of the dollar-based financial system. Siyi Liu and Trixie Sher Li Yap, "China Teapot Oil Refiners Improve Run Rates but Demand Woes, Sanctions Weigh," *Reuters*, April 6, 2025; Kimberly Donovan and Maia Nikoladze, "The Axis of Evasion: Behind China's Oil Trade with Iran and Russia," *Atlantic Council*, March 28, 2024.

More generally, China has helped cushion the blow to Russia's economy from broad economic sanctions. Last year, Russia's GDP grew 4.3 percent, a level it would not have been able to achieve without the indispensable support of China.[174] Economic activity between China and Russia has expanded substantially since the start of the war, as China is backfilling both Russia's export sales and its need for imports and investment. Total China-Russia goods trade hit $245 billion in 2024, up 66.7 percent from the pre-war level of $147 billion in 2021 (see Figure 3).[175] Chinese companies have accrued greater market share in Russia in the wake of an exodus of foreign firms. Of the 50 largest foreign companies operating in Russia, 11 are now Chinese, compared to just one (Huawei) before the war.[176] This trend is especially pronounced in the auto industry, where the market share for Chinese automakers increased from 9 percent in 2021 to 61 percent in 2023.[177]

Figure 3: Russia's Bilateral Goods Trade with China (12-Month Rolling Sum), January 2016–August 2025



Source: China's General Administration of Customs, via Haver Analytics.

Yet the trade relationship has become heavily lopsided, as Russia now depends on China for 34 percent of its external trade, while the comparable figure for China is 4 percent.[178] Recent signs point to Moscow's growing discomfort with the increasing level of dependence on Chinese imports. In October 2024, Russia increased a vehicle disposal tax on imported vehicles, a move tantamount to a tariff and regarded as incentivizing Chinese companies to set up manufacturing operations inside Russia.[179]

China-Russia: Potential Points of Friction

As China and Russia's military and economic cooperation deepens, several structural and geopolitical friction points complicate their partnership. One core issue is the increasingly asymmetric power dynamic, with China's rising economic and military strength giving

it greater leverage over an internationally isolated and relatively weaker Russia, which has indisputably become the "junior partner" in the relationship.[180] This asymmetry risks fostering resentment in Russia that could act as an inhibitor on future collaboration, given the reversal of historical roles and Putin's sensitivity to personal and national prestige.[181] A planning document believed to have been written in late 2023 or early 2024 by Russia's domestic intelligence agency, the FSB, referred to Beijing as "the enemy" and accused it of conducting espionage against Russia, including recruiting Russian spies and stealing sensitive military technology.[182] The FSB also warned that China was using academic and commercial fronts to gather intelligence in sensitive regions like Ukraine and the Arctic while potentially laying the groundwork for territorial claims in the latter.[183] Chinese military planners have been trying to acquire Russian expertise in certain technologies, including "submarine operations, aeronautical design (including stealth capabilities), and missile systems."[184] According to Alexander Gabuev, director of the Carnegie Russia Eurasia Center, Russia's growing dependence on dual-use materials and technology from China to sustain its war effort has made it increasingly difficult for Moscow to resist these requests.[185] This dynamic risks creating tensions, as pressure on Russia to relinquish sensitive military technologies could strain the relationship.

From China's perspective, its deepening relationship with Russia presents several points of friction. First, China has incurred diplomatic costs for supporting Russia during the Ukraine war, particularly in European capitals where Beijing's perceived alignment with Moscow has strained key relationships.[186] This concern contributed to China's decision not to provide direct lethal exports to Russia, but it may also limit Beijing's willingness to deepen overt military ties with Moscow.[187]

Second, Beijing clearly had concerns about Moscow's potential willingness to use nuclear weapons early in the Ukraine war.[188] China warned Russia against using nuclear weapons on Ukraine, with Xi issuing a personal warning to Putin during his visit to Moscow in March 2023 that underscored Beijing's discomfort with the potential for nuclear escalation by a close strategic partner.[189] While both China and Russia emphasize nuclear deterrence in their national security strategies, China has historically adopted a "no first use" doctrine, while Russia has shown a greater willingness to invoke its nuclear arsenal for coercive purposes, particularly in the context of conventional conflict.[190] Although Russia has long had a much greater nuclear weapons capability than China, Beijing is rapidly expanding its arsenal. While the Kremlin has publicly said it is not alarmed by China's actions, leaked military training documents reveal deep Russian concerns—particularly about the possibility of China staking claims to its eastern border territories—and show that Russia has rehearsed the use of tactical nuclear weapons in the event of a Chinese invasion.[191]

Third, as noted above, Beijing and Moscow continue to have unresolved border disputes that, despite formal demarcation agreements in 1991 and 2004, continue to stir nationalist sentiment.[192] Chinese officials and netizens periodically refer to the 19th-centu-

ry treaties that ceded territory to Russia as "unequal."[193] Finally, China and Russia both seek influence in regions like Africa, Central Asia, and the Arctic.[194] Beijing's economic interests prioritize regional stability to safeguard infrastructure and investments under BRI, whereas Moscow often benefits from—and exploits—instability, particularly in regions with weak governance. The war in Ukraine has weakened Russia's position in these other regions and forced it to acquiesce to China's growing dominance. In the Arctic, for instance, Russia had long rebuffed China's desire to become more active, fearing Beijing's presence would undermine its dominance in the region. Since its isolation from the West, however, Moscow has embraced greater collaboration, seeking to use China's resources to unlock the Arctic's economic and energy potential.[195] Chinese shipping companies are currently in talks with Russian companies to develop five container ships capable of year-round operations in the Arctic.[196]

These potential friction points highlight the growing power imbalance as well as differing approaches to the international order, whereby China has sought to promote stability and protect its global economic interests and image as a responsible power while Russia has used instability as an opportunity to expand its influence. Ultimately, because China and Russia's growing relationship is driven less by mutual trust than by a shared opposition to the U.S.-led international order, both accrue many more advantages than disadvantages from their ties.

China's Partnership with Iran

China's support has helped enable Iran to circumvent international sanctions and continue to spread instability throughout the Middle East, thereby challenging the U.S.-led order. By deepening its involvement in the Middle East, China advances its strategic goals in a region vital to global energy supplies while complicating U.S. efforts to maintain a dominant position in the region.[197] Beijing and Tehran signed a comprehensive strategic partnership agreement in 2021, wherein China pledged to invest $400 billion in economic and infrastructure projects over a 25-year period as well as enhance cooperation on military, security, intelligence, and cyber issues.[198] Beijing likely views prolonged U.S. entanglement in the region as strategically advantageous because it diverts U.S. attention and resources away from the Indo-Pacific. As Iran has come to rely on revenue from China's purchases of nearly all of its heavily discounted oil, the relationship has become deeply asymmetric. Consequently, China has chosen to keep Iran at arm's length in order to not jeopardize its other—predominantly economic—interests in the region.[199] The asymmetry and restraint in this relationship was evident in China's subdued response to the June 2025 U.S. strikes on Iranian nuclear facilities, when Beijing's support for Tehran proved largely rhetorical in Iran's hour of need.[200] (For more on China's response to the U.S strikes on Iranian nuclear facilities, see "China-Iran: Potential Points of Friction" later in this chapter.) Most analysts assess that while China has a strong interest in the survival of the Iranian regime, it is unlikely to offer direct military support, at least in the near term.[201]

China-Iran Security Cooperation: Generally Discreet and Dual-Use

China was a major supplier of arms to Iran in the 1980s but largely stopped arms transfers in 2015 after the U.N. Security Council passed Resolution 2231 as international sanctions increased scrutiny of overt weapons transfers to Iran.[202] Since then, Russia has emerged as Iran's primary arms supplier, accounting for all imports of major arms between 2019 and 2023.[203]

Despite stepping away from conventional arms sales, China has since shifted toward more discreet forms of cooperation, including the transfer of military technology to Iran and the supply of dual-use materials critical to Iran's ballistic missile program and used in the production of Iranian drones. This includes Beijing's transfer of missile, naval, and aviation technologies, which helped establish Tehran's domestic defense manufacturing capabilities.[204] In January 2025, two Iranian vessels docked in China were loaded with approximately 1,000 tons of sodium perchlorate, a precursor used in missile propellant. This volume is estimated to be enough to fuel 260 missiles.[205] A few months later, part of the shipment, along with other missile fuel chemicals, was linked to an explosion at Shahid Rajaee port in Iran that killed 25 people and injured around 800 others.[206] In June 2025, the *Wall Street Journal* reported that Iran had ordered thousands of tons of ammonium perchlorate, another critical component for ballistic missiles, from China. While a Chinese Foreign Ministry spokesperson claimed Beijing was unaware of the transaction, the scale and recurrence of such transfers indicate that enforcement gaps or limited oversight by Chinese authorities may be enabling these activities.[207] These shipments underscore how, even without direct weapons sales, China remains a key enabler of Iran's missile development, undermining international nonproliferation efforts and reinforcing Iran's regional influence.

Other dual-use components from China include voltage converters, sensor technologies, and engines, all of which have legitimate commercial applications but are also integral to Iran's drone production.[208] Iranian drones, built with Chinese parts, have been used not only by Tehran's regional proxy forces but also by Russia in Ukraine.[209] Beyond hardware, China has also enhanced Iran's drone capabilities through providing access to BeiDou, China's global positioning navigation satellite system. Starting in 2015, Iranian defense companies partnered with Chinese firms to integrate satellite navigation technology into their unmanned aerial vehicles (UAVs), which significantly improved their targeting accuracy. By 2021, China granted Iran full military access to BeiDou, providing greater precision and effectiveness of Iran's unmanned systems.[210] In May 2025, Chang Guang Satellite Technology, a private Chinese space company with close links to the PLA, was reportedly providing satellite imagery to Iranian-backed Houthis to assist in their targeting of vessels in the Red Sea.[211]

Additionally, Chinese nationals have also been found smuggling sensitive U.S.-origin dual-use items to Iranian military entities despite international sanctions. The Treasury Department's Office of Foreign Assets Control (OFAC) and the U.S. Department of Commerce's Bureau of Industry and Security (BIS) have taken action

against multiple entities based in China and Hong Kong that essentially operate as front companies for procuring UAV and other dual-use components for Iran.*[212] Uninhibited operation of these networks highlight persistent enforcement challenges within China's regulatory framework, raising concerns about Beijing's ability or willingness to fully control illicit proliferation activities. These activities not only strengthen Iran's nuclear and missile programs but also risk empowering proxies in the region, including the Houthis in Yemen, which could destabilize an already volatile security environment.

As Iran's top trading partner, China has significant economic leverage over Iran. China has a history of using economic leverage as a foreign policy tool against other countries but has notably refrained from pressuring Iran to cease its destabilizing activities or those of its proxies.[213] For instance, despite China's stated interest in regional stability and securing critical maritime routes, Beijing has evidently not pressured Tehran into curbing Houthi attacks on civilian shipping in the Red Sea corridor, other than for Chinese and Russian ships.[214]

China-Iran Economic Ties: China Exploits an Isolated Iran, Fueling Regional Conflict

Despite Iran being one of the most heavily sanctioned countries in the world, China maintains a robust trade and investment relationship with the country and provides crucial revenue and material support.† With the world's second-largest natural gas reserves and fourth-largest proven oil reserves, Iran is heavily reliant on the sale of hydrocarbons, making it highly susceptible to sanctions on the state-owned energy sector.[215] In 2024, Iran's real GDP was $436.9 billion, and oil export revenue during the Iranian calendar year‡ ending in March 2025 hit $67 billion, amounting to 15 percent of annual GDP.[216] Tehran estimated that about 45 percent of the government budget for 2025–2026 would come from oil and gas sales and would account for the single biggest source of government revenue.[217] The largest share of oil revenues in Iran's budget was earmarked for Iran's military.[218]

China has systematically undermined the sanctions regime and now purchases from 90 percent to nearly all of Iran's exported oil (see Figure 4).[219] Purchases from Iran account for 10 to 15 percent of China's oil imports, compared to roughly 45–50 percent from other Middle Eastern countries.[220] To obscure the scale of trade and help evade U.S. and European sanctions, these purchases are not recorded by Chinese customs data. Instead, they are reported un-

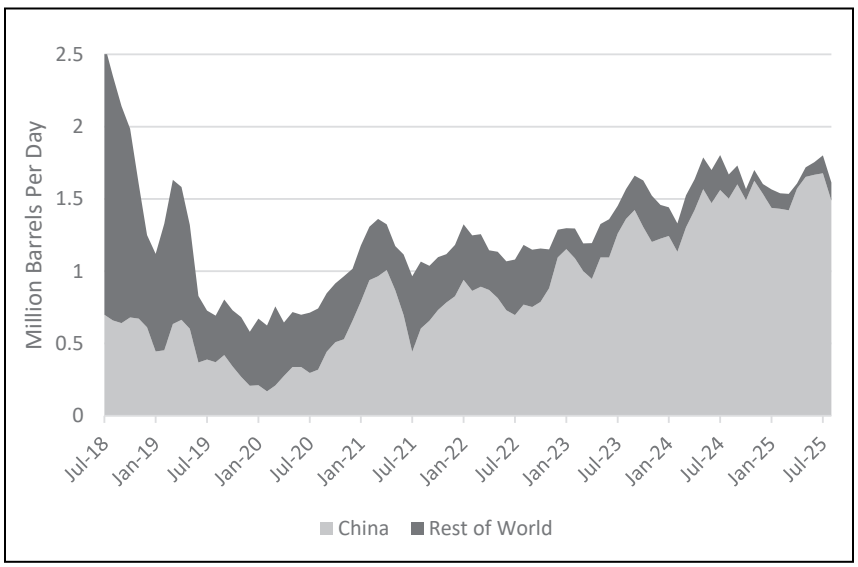
*There are several examples of these cases that can be found in the listed article. Victoria Cheng, "Case Study on Smuggling Sensitive U.S.-Origin Items," *Institute for Science and International Security*, August 12, 2024.

†The U.S. sanctions program against Iran in current form blocks all access to U.S.-based assets, prohibits transactions with U.S. persons, bans nearly all U.S. trade with Iran, prohibits arms trade to or from Iran, and contains a secondary sanctions element putting at risk foreign financial institutions that do business with sanctioned Iranian persons. UN sanctions imposed prior to the 2015 JCPOA were lifted in January 2016 after the International Atomic Energy Agency certified Iran's compliance with the agreement. They were reimposed in Semptember 2025 after France, Germany, and the UK invoked a snapback mechanism due to Iran's "significant non-performance" of its commitments under the agreement. U.S. Department of State, *Completion of UN Sanctions Snapback on Iran*, September 27, 2025.

‡Iran uses a different calendar year than the United States; Iran's calendar year begins in March.

der import figures of other countries, mainly Malaysia, Oman, and the UAE.[221] Through the first quarter of 2025, China's purchases of Iranian oil had been steadily climbing for years, making Iran China's third-largest source of crude oil behind Russia and Saudi Arabia.[222] In October 2024, the *Economist* estimated that Iranian petroleum and petrochemical sales generated as much as $70 billion in 2023.[223] Factoring in costs of production, China's oil purchases from Iran provide a significant overall portion of Tehran's entire government budget and military spending. (For more on China's facilitation of sanctions and export control evasion, see Graham Ayres and Lyndi Tsering, "China's Facilitation of Sanctions and Export Control Evasion," *U.S.-China Economic and Security Review Commission*, November 2025.)

Figure 4: Iranian Crude Oil Export Destination (Three-Month Moving Average), July 2018–August 2025



Source: United Against Nuclear Iran, "*Iran Tanker Tracker*."

As previously mentioned, China and Iran signed a comprehensive strategic partnership agreement in 2021, a much lauded agreement that Iranian officials hailed as a "'complete road map of relations for the next quarter century."[224] Under the agreement, China pledged to invest $400 billion in various sectors, including oil and gas, banking, telecommunications, ports, railways, healthcare, information technology, and tourism.[225] The agreement also outlined joint plans to construct two ports in Iran: one in Chabahar and a new oil terminal near the Jask port, south of the Strait of Hormuz.[226] These ports, along with the Gwadar Port in Pakistan and the Kyaukpyu Port in Burma (Myanmar), form part of China's strategic network of Indian Ocean ports.[227] This is particularly significant given that roughly 80 percent of China's oil imports and 95 percent of its trade with the Middle East pass through the Indian Ocean and the Strait of Malacca.[228] By the start of 2024, China had reportedly only in-

vested $185 million in new projects, well below the expected $32 billion if outlays were dispersed evenly over 25 years.[229]

President Ebrahim Raisi visited China in 2023 to convey Iran's concerns about the lack of progress on implementing the agreement, the first visit by an Iranian president in 20 years.[230] The Iranian Foreign Ministry's readout emphasized Tehran's eagerness to accelerate and deepen the partnership. Beijing, however, responded more cautiously, releasing a vague statement on economic cooperation without citing concrete projects.[231] The underwhelming investment figures likely reflect reluctance on the part of Chinese companies to engage in open transactions with Iran due to fears of violating U.S. sanctions.[232]

China-Iran: Potential Points of Friction

The chief point of friction in the bilateral relationship has stemmed from Iran's nuclear program. In the mid-1990s, China began signaling its opposition to Iran developing nuclear weapons, although it continued to provide open support to Iran's nuclear power industry.*[233] Beijing's response to the June 2025 strikes on three of Iran's nuclear facilities was limited to condemning the attacks and calling for a ceasefire at the UN Security Council alongside Russia and Pakistan, with no indication that China planned to provide material support to Iran.[234] While China has affirmed Iran's right to produce nuclear energy, Foreign Minister Wang Yi confirmed China's stance toward Iran's nuclear program in the days after the strikes, including the point that "Iran should continue to honor its commitment not to develop nuclear weapons."[235] China has advocated that Iran return to the JCPOA—or a similar framework—that limits Iran's nuclear activities and allows for removal of sanctions from the country.[236] China likely sees Iran's continued pursuit of nuclear weapons as having the potential to create regional instability or spark a crisis in the Middle East that would negatively affect China's energy and economic interests.[237] Chinese business interests in the region would also likely be negatively impacted if additional sanctions were imposed on Iran by the United States and like-minded countries, whether as part of a maximum pressure campaign or punishment for developing a weapon.[238]

Leaders in Iran were disappointed in China's restrained response to the June 2025 attacks, viewing it as indicative of a relationship shaped more by China's energy and commercial interests than the deeper strategic partnership they had sought from China.[239] Tino Sanandaji, a Swedish-Iranian researcher with the Stockholm School of Economics, stated that "a common complaint in Iran is that China and Russia, rather than being true friends, exploit Iran's isolation to get cheap natural resources while selling Iran second-rate military hardware at inflated prices, sometimes never even delivering the promised equipment."[240]

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*China's accession to the Nuclear Non-Proliferation Treaty (NPT) in 1992 marked a shift toward the international nonproliferation regime, yet concerns about its role in Iran's nuclear proliferation grew rapidly. After the Iran-Iraq War, Iran emphasized the need to develop non-conventional capabilities, prompting Western media to allege that China was aiding a nuclear weapons program through the export of nuclear technologies. Beijing denied these allegations, asserting that its nuclear assistance to Iran was lawful and intended solely for peaceful purposes. Marybeth Davis et al., "China-Iran: A Limited Partnership," *CENTRA Technology, Inc.* (prepared for the U.S.-China Economic and Security Review Commission), April 2013.

For its part, China has had to balance its activities with Iran against its broader interests in the Middle East. China imports large amounts of crude oil from Saudi Arabia and Iraq and conducts far more trade with Saudi Arabia ($107.5 billion in 2024) and the UAE ($101.8 billion in 2024) than with Iran ($42.4 billion in 2024).*[241] The wealthier Arab Gulf states offer more attractive long-term trade and investment opportunities for China. Chinese firms have large contracts with Qatar, Saudi Arabia, and the UAE for a range of platforms and technologies to support their ambitious buildout of digital infrastructure.[242] Thus, China has little incentive to prioritize relations with Iran over its Gulf state partners. Reflecting these interests, China sided with the UAE in a dispute over three Persian Gulf islands, prompting rare protests from Tehran in June 2025. Iran's foreign minister summoned China's ambassador, urging a policy reversal, but Beijing merely called for a peaceful resolution and upheld its original stance.[243]

Despite these frictions, there is not much evidence that their relationship is fraying.[244] China continues to keep Iran at arm's length while benefiting from both its discounted oil and its efforts to undermine the Western-led order. While Iran would like more from China, it greatly benefits from diplomatic support, dual-use technologies, and access to an all-important export market.

China's Partnership with North Korea

Historically, China has placed considerable strategic value on its relationship with North Korea, dating back to its assistance to Pyongyang during the Korean War in the 1950s.[245] China's only formal alliance is with North Korea: the 1961 Treaty of Friendship, Cooperation, and Mutual Assistance. More recently, China has become virtually the sole trade partner for a North Korean regime isolated by heavy sanctions.[246] In 2021, the two countries renewed the treaty, signaling a continued commitment to strategic alignment.[247] The two countries have often used a metaphor of "lips and teeth" to describe the closeness of their relationship.[248]

In September 2025, Kim Jong Un met with Xi Jinping during a high-profile Chinese military parade, marking the first time in 66 years that a North Korean leader had attended the event.[249] Kim received a warm welcome from Xi, walking side by side with him and President Putin down the red carpet.[250] Xi also hosted Kim for private dinners and a formal bilateral meeting following the parade.[251] Experts have interpreted this highly symbolic display as Beijing's attempt to reset bilateral relations and reassert its influence over Pyongyang.[252] However, readouts from the event did not address underlying tensions between the two countries. Instead, China emphasized strengthening cooperation based on "common interests," signaling to Pyongyang the importance of pursuing a more pragmatic, interest-driven partnership and aligning more closely with China's strategic priorities, particularly amid North Korea's deepening ties with Russia and the prospect of future nuclear talks with the United States.[253]

*The figure for Iran includes an estimated $29 billion of unreported oil exports. Ron Bousso, "China Trade Spat Undermines Trump's 'Max Pressure' Iran Campaign," *Reuters*, April 10, 2025.

The Kim regime's pursuit of nuclear weapons and its erratic actions, coupled with Beijing's desire to be seen as a responsible international power, have led Beijing to temper its support. After North Korea's 2017 Musudan intermediate-range ballistic missile test off its eastern coast, China reinforced the UN sanctions regime on North Korea's missile and nuclear programs.[254] In addition to sanctions, China implemented unilateral measures that suspended coal imports from North Korea, which made up approximately 34 to 40 percent of Pyongyang's export revenue and had a substantial negative impact on the regime's ability to finance its programs.[255] Although relations improved in 2018, tensions persist, particularly over North Korea's repeated missile tests. China has viewed the tests not only as destabilizing but also as inviting a greater U.S. military presence in Northeast Asia and strengthening U.S. relations with Japan and South Korea, reinforcing the strategic encirclement Beijing has sought to avoid.[256] Since the Russian invasion of Ukraine, Beijing has shown signs of unease over Pyongyang's increasingly close ties with Moscow, as a deeper military alignment could undermine China's longstanding influence over North Korea.[257]

China-North Korea Security Cooperation

For China, North Korea holds a critical geopolitical location that serves as a strategic buffer in Northeast Asia, preventing encroachment by the United States or its allies on one of its borders. In the decades following the Korean War, particularly in the 1990s, China offered professional military training and facilitated technological exchanges that contributed significantly to the development of North Korea's ballistic missile and satellite capabilities.[258] However, since North Korea's first nuclear test in 2006, Beijing began to publicly distance itself from Pyongyang's weapons development efforts and reduced its military support, with cooperation largely limited to areas such as cyber operations and diplomatic support.

Despite growing frustration with North Korea, China has continued to shield Pyongyang diplomatically, often downplaying or dismissing international evidence of its provocations against South Korea, Japan, and the United States. Beijing has repeatedly resisted or undermined U.S. efforts to apply sustained diplomatic and economic pressure on North Korea, placing more importance on North Korea's role as a buffer than curtailing its weapons development activities. In October 2024, North Korea conducted an intercontinental ballistic missile test, setting the national record by reaching an altitude of over 4,000 miles.[259] While the United States and other UN Security Council members condemned the launch, China refrained from doing so and aligned with Russia in opposing the U.S.-led statement at the UN. Although China has expressed concern over North Korea's missile and nuclear tests, at the same time it has consistently stressed the importance of "regional stability" and has advocated for dialogue and negotiation rather than escalating sanctions or military responses.[260] China has urged not only North Korea but also the United States, South Korea, and their allies to exercise restraint to avoid heightened tensions.[261] For decades, Beijing has leveraged its role as North Korea's primary economic and diplomatic partner to position itself as an indispensable interlocutor in managing

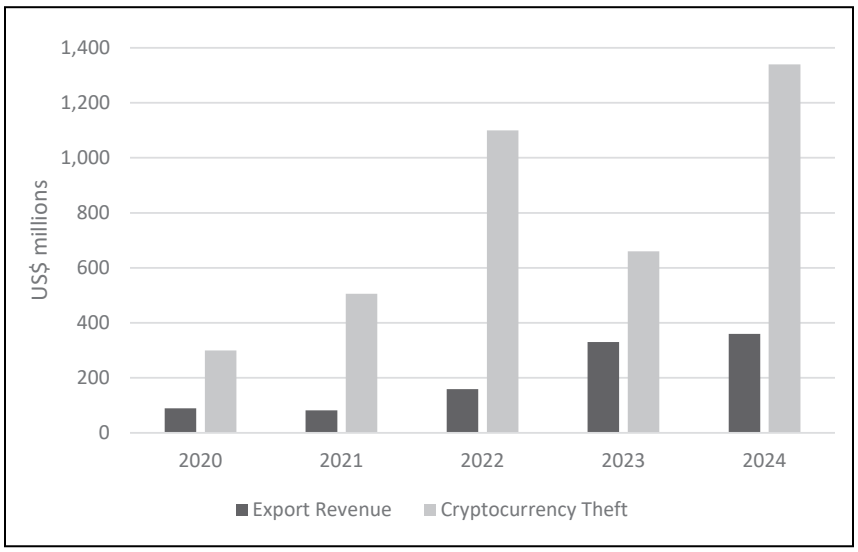
the Korean Peninsula, especially during the Six-Party Talks in the 2000s, and shape U.S. policy in ways that serve its strategic interests.[262] This balancing act underscores China's desire to avoid instability near its borders while maintaining leverage over North Korea.

Since the 2006 nuclear test, the Chinese government has refrained from directly supplying North Korea with nuclear weapons technology or technical expertise and has restricted conventional arms sales. China has continued to support North Korea, however, through dual-use technology transfers that have expanded North Korea's military and, in some cases, strategic capabilities. In 2010, China Aerospace Science and Industry Corporation sold heavy-duty trucks to North Korea.[263] These were later repurposed by North Korea as transporter-erector-launchers for its KN-08 intercontinental ballistic missiles, marking a major advancement in North Korea's road-mobile nuclear capabilities.[264] Clandestinely or covertly, it is likely that China has also supplied dual-use products critical for many of North Korea's weapons systems. According to testimony from Jake Rinaldi, a defense analyst at the U.S. Army War College, China provided technology to Pyongyang's indigenous drone program and training to North Korean engineers working in satellite operations.[265] Over the last several years, U.S. authorities, including the Treasury Department and the Commerce Department's BIS, have taken enforcement actions against numerous entities in Hong Kong, Macau, and mainland China linked to networks that have helped North Korea covertly acquire materials and technology for its ballistic missile and space programs.[266] A key Chinese facilitator, the so-called Shi Qianpei network, was sanctioned by the Treasury Department for its role in concealing the true shipments and destinations of military-grade components.[267]

China also appears to play an important role in supporting North Korea's globally disruptive cyber crime and military-related cyber activities. North Korean military cyber units have operated from Chinese territory and engaged not just in espionage and intelligence gathering but also in cyber crime to generate revenue for the regime and its military and strategic ambitions.[268] For example, in 2022, North Korean hackers carried out a widespread ransomware attack from China that targeted U.S. hospitals, causing widespread disruption to healthcare providers and patients.[269] China has also hosted numerous North Korean IT workers who have hidden their identities and provided remote IT work for clients around the world, sometimes using this work to advance North Korea's malicious hacking operations as well. According to OFAC, the "revenue generated by these DPRK [Democratic People's Republic of Korea] IT workers [is] used by the DPRK to develop its WMD [weapons of mass destruction] and ballistic programs, in violation of U.S. and UN sanctions."[270] Operating in China has allowed North Korea to exploit that country's advanced computing and internet infrastructure while maintaining plausible deniability for its destructive cyber activities.[271] In January 2025, the Treasury Department sanctioned a network involving a Chinese company, Liaoning China Trade Industry Co., Ltd., for supplying electronics equipment to North Korean IT workers operating within or through Chinese territory.[272]

Beyond the direct harm from North Korea's cyber activities, China's role in facilitating these activities has had other implications. First, North Korean cyber crime has been critical for generating hard currency for the regime. Ill-gotten gains from cryptocurrency theft consistently outstrips trade revenue, with North Korean hackers pulling in $1.34 billion from the practice in 2024 alone (see Figure 5).[273] Not only has this revenue enhanced North Korea's capacity to threaten its neighbors, it has also decreased the Kim regime's reliance on external partners like China. Second, the presence of North Korean cyber operatives in China has enhanced North Korea's resilience. At the Commission's 2025 hearing, Dr. Rinaldi testified that the continued presence of North Korean cyber operatives in China would likely ensure the survivability and operational continuity of the regime's cyber forces, even if North Korea's domestic systems were severely disrupted.[274]

Figure 5: Estimated North Korean Export Revenue vs. Stolen Cryptocurrency Proceeds, 2020–2024



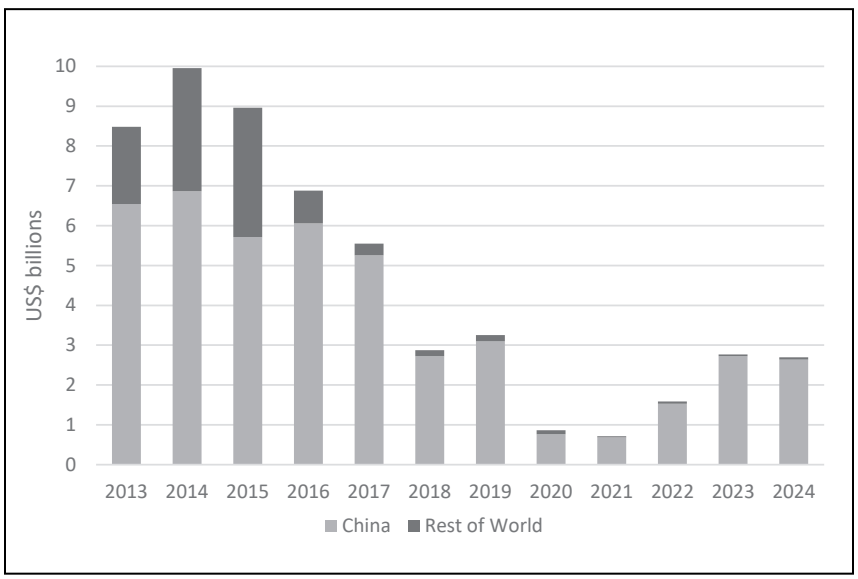
Source: Various.[275]

China-North Korea Economics and Trade: Near-Complete Reliance Has Not Translated Neatly to Influence

China has maintained an official position of adherence to, and enforcement of, all UN sanctions against the Kim regime.[276] In practice, Beijing has facilitated sanctions and export control evasion on behalf of North Korea for nearly two decades.[277] North Korea remains almost exclusively reliant on China for its external economic activity. China is North Korea's largest trading partner, accounting for 98.3 percent of the DPRK's reported trade in 2023 (see Figure

6).*[278] While total two-way trade is relatively small and still recovering from North Korea's extreme COVID-19 lockdown, trade with China amounted to $2.7 billion in 2023 and constituted one of North Korea's few non-illicit lifelines to non-domestically made products and one of its few official sources of revenue.[279] Officially, North Korea imports luxury items, chemical products, and agricultural goods from China while exporting raw materials and energy products. North Korea exports about 3 percent of its electricity to China despite persistent domestic power outages.[280] Curiously, in 2023 North Korea exported $167 million worth of human hair, fake eyelashes, and wigs to China, most of which was relabeled "Made in China" and then sold in global markets.[281] Remittances from North Korean workers in China are another lucrative revenue stream. North Korean workers are present in a variety of industries in China, including in factories in the northeastern border region, on fishing boats, and as previously described as IT support specialists.[282] (For more on China's facilitation of sanctions and export control evasion, see Graham Ayres and Lyndi Tsering, "China's Facilitation of Sanctions and Export Control Evasion," *U.S.-China Economic and Security Review Commission*, November 2025.)

Figure 6: Estimated North Korean Goods Trade with China and Rest of World, 2013–2024



Source: Various.[283]

North Korea's trade has undergone two shocks in recent years: (1) the imposition of more severe international sanctions limiting the country's commercial trade in 2017 in response to its nuclear missile

*North Korean weapons sales are not included in these trade figures, which—according to one estimate—range anywhere between $1.7 billion and $5.5 billion. Olena Guseinova, "Putin's Partner: North Korea's Cooperation with Russia amid the War against Ukraine," *Hanyang University*, October 2024.

testing, and (2) a self-imposed strict border closure due to COVID-19 in 2020 that largely halted all trade until January 2022.[284] Despite the tightening of broad-based sanctions, North Korea's continued provocations and self-inflicted isolation demonstrate both the Kim regime's commitment to nuclearization and high tolerance for economic pain.

Given China's apparent leverage over North Korea, Kim's actions indicate either the limits of China's ability to check behavior it regards as destabilizing or the limited extent to which China genuinely has concerns about those actions.[285] As Dr. Rinaldi testified to the Commission, "While China denies direct involvement in North Korea's black-market activity, its failure to disrupt these operations over decades should be seen as a strategic choice."[286]

China-North Korea: Potential Points of Friction

Despite their longstanding alliance, several points of friction complicate China-North Korea relations. A major concern for Beijing is North Korea's ongoing nuclear weapons development program, which destabilizes East Asia, risks drawing China into a broader regional conflict, and flies in the face of widespread international consensus against nuclear proliferation. Although North Korea increasingly disregards China's counsel and pursues an independent strategic agenda, Beijing has continued to shield Pyongyang from the full impact of international sanctions.[287] This paradox highlights a key element of friction as Beijing seeks to preserve ties with Pyongyang to retain leverage over its foreign policy, even as its unease has grown over Pyongyang's defiance and pursuit of its own strategic agenda.[288] North Korea's erratic behavior also complicates China's efforts to present itself as a responsible global actor, making it harder for Beijing to convince the international community that it supports peace and stability.

More recently, China appears increasingly concerned about Pyongyang's growing military cooperation with Russia amid the war in Ukraine. The June 2024 treaty between North Korea and Russia, which reportedly includes mutual defense commitments, signals a potential return to Cold War-style bloc politics, something China has sought to avoid. China has remained officially neutral in response to deepening Russia-North Korea relations, with a Chinese Foreign Ministry spokesperson stating that both countries are "independent sovereign states" and that how they develop their bilateral ties is "their own matter."[289] However, subtle signs of Beijing's unease have emerged, suggesting China views this deepening partnership with concern.[290] If Russia assumes a significant security guarantor role for North Korea, it would substantially reduce China's leverage over Pyongyang. Moreover, given the complex and sometimes competitive history between China and Russia, Moscow's growing presence in North Korea could strain their relationship by challenging China's traditional influence in a region it considers strategically vital.

These friction points, however, remain secondary to China's overriding strategic interest in maintaining North Korea as a geopolitical buffer on the Korean Peninsula and its broader interests in undermining U.S. global influence and the rules-based international order.

Implications for the United States

No matter the terminology used, the strengthening of relationships among China, Russia, Iran, and North Korea poses a significant national security threat to the United States and its allies and partners around the world. These states share common objectives in weakening U.S. power and influence and in undermining elements of the existing rules-based international system. Although the relationship among the countries does not constitute an alliance as traditionally conceived, in many ways these revisionist countries collaborate more robustly than the Axis powers did prior to World War II. As the alignment is based more on shared interests and expediency than trust and loyalty, each has freedom of action and the ability to decline to participate in a conflict that others may trigger. This arrangement creates advantages that far exceed the disadvantages, which will make it extremely difficult for the United States—or any group of states—to disrupt or quickly drive a wedge between these countries.

The relationships the axis countries have with each other—with China often at the center—present serious strategic challenges for the United States, as they allow each country to consider the use of force, undertake provocative actions, and otherwise act in ways they could not sustain on their own. As evident in the ongoing conflict in Ukraine, China, Iran, and North Korea have provided Russia with political, economic, and military support, decisively enabling its aggression and allowing it to circumvent U.S. and international sanctions and diplomatic pressure. In this context, each individual challenge becomes harder to resolve as the interlinkages between and among these revisionist countries serve as force multipliers, and each challenge has the potential to "set the world on fire."

The presence of nuclear weapons in China, Russia, and North Korea—and Iran's pursuit of them—adds a dangerous and destabilizing dimension to their deepening strategic cooperation, making deterrence more complex and raising the stakes of miscalculation or escalation. As China increasingly transforms the military balance in the Western Pacific in its favor, it may become more emboldened—banking on support from its "axis" partners—to use force against a U.S. treaty ally in the region.

Each of these revisionist countries has sought to establish a sphere of influence in its region, and the United States and its security commitments with partners have often served to thwart those efforts. As these states deepen cooperation, they seek to shift those regional power balances in their favor by undermining the credibility of U.S. commitments to regional partners and to weaken U.S. power and influence in general.

Lacking an overarching strategy or joint military capabilities, these countries are increasingly likely to conduct gray zone activities as they seek to test limits and gauge U.S. and regional reactions. (See Chapter 2, "U.S.-China Security and Foreign Affairs (Year in Review)" for more on this topic.) **If there is no coordinated effort to impose a significant cost on these countries for such gray zone conduct, they are likely to become increasingly brazen in the future.**

The growing ties between the axis countries also increase the likelihood of escalating actions, potentially culminating in "opportunistic aggression" by other members of the group. Each country may be emboldened to take more provocative actions knowing the other countries will provide support to the primary aggressor—from a limited border skirmish or cyberattack to a much more significant crisis, such as a Chinese blockade of Taiwan. Even more significantly, the countries may act "opportunistically" to try to take advantage of diversions of U.S. attention and resources—for example, Russia exploiting a Taiwan contingency by moving military forces into an eastern European country. Such dynamics raise the danger that even small provocations could spiral into broader confrontations with global consequences.

As the most powerful and systemically integrated of these countries, China has been a "decisive enabler" of this group. By cooperating with—and legitimizing—these heavily sanctioned countries, China has helped erode the broader international norms that have at times constrained destabilizing behavior and aggression, and it has undermined the effectiveness of sanctions and export controls by facilitating trade and capital flows outside of the global trading system. As China and its sanctioned partners build this shadow trading system, it chips away at the dollar-based financial system's centrality in global trade and the relative power of the United States in that system.

China's activities have been part of the broader-based effort by this group of authoritarian powers to advance an alternative vision of global order rooted in power, coercion, and hierarchy. They seek to replace the international system that evolved after World War II based on rules, norms, and principles such as sovereign equality, the peaceful resolution of disputes, and the universal protection of human rights. **To respond to this challenge, the United States—and its allies and partners around the world—must develop a clear-eyed understanding of this evolving strategic threat and pursue strategies that enhance preparedness for multiple potential regional flashpoints that each could quickly escalate into a crisis.** Unfortunately, this challenge has come at a time when growing divisions within many democratic societies have undermined their willingness and ability to act in a concerted fashion to resist these efforts.

Recommendations

The Commission recommends:

- Congress consider legislation establishing a consolidated economic statecraft entity to address the evolving national security challenges posed by China's systematic and persistent evasion of U.S. export controls and sanctions.

  This new unified economic statecraft entity, at a minimum, should include: the Bureau of Industry and Security (U.S. Department of Commerce), the Office of Foreign Assets Control (U.S. Department of the Treasury), the Bureau of International Security and Nonproliferation's Office of Export Control Cooperation (U.S. Department of State), the Defense Technology Se-

curity Administration (U.S. Department of Defense), and other appropriate organizations across the executive branch.

This entity should be:

- Integrated into the Intelligence Community with enhanced access to real-time intelligence on evasion networks and real-time intelligence-sharing capabilities with industry to identify emerging evasion tactics;
- Equipped with enforcement authorities comparable to those wielded by the Treasury Department in the financial sanctions sphere, including law enforcement authorities to pursue aggressive enforcement against violators;
- Structured as a direct report to a single cabinet official or the President of the United States so as to ensure strategic coordination across government, unencumbered by the interagency processes; and
- Equipped with resources for technology development, analysis, and international coordination and authority to implement robust verification systems and supply chain tracking technologies.

This recommendation addresses the critical gap between export controls and sanctions as written and their actual enforcement, recognizing that China and Russia continue to successfully circumvent existing safeguards while U.S. technological advantages erode. Modernizing export controls and sanctions infrastructure represents an essential evolution of U.S. economic statecraft for the strategic competition era.

The United States urgently requires modernization of its export controls and sanctions regime to counter China's systematic and persistent circumvention tactics. The current fragmented approach across multiple agencies dilutes accountability and prioritization. Consolidating these authorities under a single entity would create clear ownership, institutional incentives to prioritize enforcement, and concentrated resources dedicated to countering circumvention. Today's dispersed structure does not enable such focused effort. The Commission notes that Congress passed the Foreign Investment Risk Review Modernization Act of 2018 (FIRRMA), which strengthened the Committee on Foreign Investment in the United States. Since the passage of FIRRMA and the Export Control Reform Act of 2018 (ECRA), economic statecraft has evolved dramatically, revealing significant gaps in enforcement of export controls and sanctions. The Commission defers to congressional committees regarding the optimal organizational placement of this consolidated authority, recognizing that the primary objective is ensuring America's key offensive tools of economic statecraft are modernized, adequately resourced, and strategically coordinated to address 21st-century threats.

- Congress direct the Intelligence Community (IC) to produce, within 180 days, an assessment of China's support for Russia's war against Ukraine. This report should examine all the var-

ious forms of Chinese assistance and sanctionable activities, including but not limited to economic, technological, military, intelligence, information, and cyber operations, and assess how such support has affected the conduct of the war. In addition to a classified report to the relevant committees of Congress, the IC should be directed to produce an unclassified version suitable for wider dissemination.

- Congress pass legislation to create an Undersea Cable Security Initiative to counter Chinese and Russian sabotage of undersea cables. The legislation should:
  - Ban Chinese vessels from laying, maintaining, and repairing U.S.-invested cables;
  - Direct the U.S. Department of Homeland Security, in coordination with other relevant agencies, to take measures to monitor and secure critical cables, including through the use of sensors, surveillance satellites, and joint coast guard patrols with allies and partners; and
  - Direct the U.S. Department of State, in coordination with other relevant agencies, to work with allies and partners to support the development of a multinational fleet of cable repair ships to respond rapidly to incidents of sabotage.

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CHAPTER 4: CROSSROADS OF COMPETITION: CHINA AND SOUTHEAST ASIA

Executive Summary

As a region, Southeast Asia constitutes the world's third-largest population center and fifth-largest economy and straddles strategic sea lanes connecting the Indian Ocean to the Western Pacific—making the region a crucial arena for U.S.-China competition. Beijing has long viewed Southeast Asia as its own "backyard" and has sought to establish economic and military dominance in the region as part of its overall strategy for weakening U.S. power in the Indo-Pacific.

China has made large and sustained investments in expanding high-level diplomacy, security relationships, soft power programs, and influence operations in Southeast Asia. China's goal is to entrench itself as the regional hegemon while undermining the United States' reputation with both policymakers and the publics in Southeast Asian countries. On the military front, China has pursued access to bases and dual-use facilities in Southeast Asia while deploying aggressive gray zone tactics to advance its unfounded territorial claims in the South China Sea—risking embroiling the region in a devastating military conflict. At the same time, China has sought to expand its cooperation with Southeast Asian countries on non-traditional security issues such as transnational crime as a means to export authoritarian policing practices and expand its security influence in the region.

Beijing has also amassed significant economic leverage in the region. China is Southeast Asia's largest trading partner, and countries in the region have been among the top destinations for China's Belt and Road Initiative (BRI) projects. Chinese companies have invested heavily in the region's critical infrastructure, including telecommunications equipment, electrical grids, data centers, and undersea cables, exposing Southeast Asian countries and—potentially—U.S. firms and military assets in the region to data security and sabotage risks. China's efforts in Southeast Asia—alongside its campaign to erode U.S. partnerships and gain access to dual-use infrastructure in the Pacific Islands—threaten the United States' ability to protect its economic and security interests throughout the Indo-Pacific region.

Key Findings

- China views establishing regional economic and military hegemony in Southeast Asia as core to its strategy to undermine U.S. power in the Indo-Pacific. China's overarching goals in the region include full control of the South China

Sea, expanding access to basing and dual-use infrastructure for its military, guaranteeing the People's Liberation Army (PLA) Navy's access to crucial sea lanes, providing land access to the Indian Ocean around the chokepoint of the Strait of Malacca, and keeping Southeast Asian markets open to Chinese exports and investment. At the same time, China is working to ensure that Southeast Asian countries do not provide access and logistical support to the United States in the event of conflict in the Indo-Pacific.

- Over the past two decades, China has increased its influence in Southeast Asia relative to the United States by devoting extensive resources to diplomacy and soft power initiatives alongside its growing trade and investment ties with the region. More recently, China has sought to exploit changes in U.S. trade policy and foreign aid to present itself as the more reliable partner for regional countries' development goals.
- China has taken increasingly coercive actions to assert its control over the South China Sea, an area of tremendous strategic significance to the country and one of the busiest maritime trade routes in the world. China's aggressive actions in the South China Sea, especially those targeting the Philippines—a country with which the United States has a mutual defense treaty—make the region a potential flashpoint for U.S.-China military conflict.
- In addition to pursuing access to military facilities in Southeast Asia, Beijing has adopted an "inside-out" approach to expanding its security influence in the region that aims to gain a foothold inside the internal security apparatuses of regional countries—which it can then use as a source of leverage to constrain their external security behavior. China has deployed its internal security forces in several Southeast Asian countries—including Burma (Myanmar), Cambodia, and Thailand—in an attempt to gain the allegiance of regional leaders by helping them maintain "regime security" through authoritarian policing and surveillance methods.
- Chinese crime syndicates operate industrial-scale "scam centers" across Southeast Asia that generate tens of billions of dollars in annual revenue by employing forced laborers to conduct online scams under conditions observers have likened to modern slavery. Beijing has selectively cracked down on scam centers that target Chinese victims, leading Chinese criminal organizations to conclude that they can make greater profits with lower risk by targeting the United States instead. According to conservative estimates, Americans lost at least $5 billion to such scams in 2024. Scam centers have also provided a pretext for China to expand its security presence in the region by pressuring Southeast Asian countries—including U.S. allies such as Thailand—to allow Chinese security personnel to operate on their territory.

- China has expanded its economic ties with Southeast Asia through trade and is growing its foreign direct investment (FDI) in strategic sectors like manufacturing and technology. China is the leading trade partner with ASEAN as a whole and with almost every ASEAN country individually. These extensive trade and investment ties, combined with ASEAN's continued rapid growth and "the ASEAN way" favoring "neutrality" in geopolitics, indicate that Southeast Asia is likely to be the locus of significant economic competition between the United States and China.
- Southeast Asia's trade relationship with China has become increasingly unbalanced in recent years, with the region's trade deficit almost doubling between 2020 and 2024 amid a surge in exports from China. This trend reflects efforts by Chinese exporters to find markets other than the United States, the shifting of intermediate supply chains to avoid tariffs, and an accelerated flow-over from China's massive and growing domestic excess capacity in many manufacturing industries. Southeast Asia may be ground zero for the second China Shock.
- China's dominance of regional supply chains and control over critical infrastructure provide it considerable leverage to further its strategic aims. Although Southeast Asian countries are cognizant of risks associated with those ties to China, geographic reality and China's position as the largest external trade partner for the region constrain their ability to respond to this threat.
- Chinese technology firms are competing with U.S. and European firms for dominance in Southeast Asia's digital infrastructure. The presence of Chinese providers and equipment in telecommunications networks, data centers, and undersea cables exposes host countries to data security and potential sabotage risks. These risks may also impact U.S. firms and military assets operating in the region.

Introduction

On April 17, 2025, General Secretary of the Chinese Communist Party (CCP) Xi Jinping landed in Phnom Penh, Cambodia—his final stop on a three-country trip to Southeast Asia that had first taken him to Vietnam and Malaysia.* In Phnom Penh, where a major road was recently renamed "Xi Jinping Boulevard" in honor of his contributions to Cambodia's development, Xi was greeted by red banners, large portraits of him draping government ministries, and crowds of Cambodians waving Chinese flags.[1] Cambodia's Prime Minister Hun Manet had announced the visit two weeks earlier, when he presided alongside Chinese officials over the opening of a Chinese-funded expansion of Cambodia's Ream Naval Base, where PLA forces appear to have secured access for a permanent presence.[2]

*For the purposes of this chapter, Southeast Asia refers to the 11 countries in the Association of Southeast Asian Nations (ASEAN): Brunei, Burma, Cambodia, Indonesia, Laos, Malaysia, the Philippines, Singapore, Thailand, Timor-Leste, and Vietnam.

Yet tensions lurked beneath the surface of these lavish celebrations. Xi arrived in Cambodia on the 50th anniversary of the Khmer Rouge seizing power in Phnom Penh, upstaging what would have been a solemn day of mourning for the genocide perpetuated by the Khmer Rouge with CCP support.[3] Xi's visit to Cambodia also coincided with the week of Khmer New Year, forcing countless Cambodian officials, police, and soldiers to cancel their holiday plans.[4] Analysts suggested the visit's curious timing might have been a way for Xi to signal his displeasure with the Cambodian government over its failure to stop Chinese criminal groups operating scam centers in Cambodia from targeting Chinese victims.[5] In many ways, Xi's trip to Cambodia was a microcosm for China's relations with Southeast Asia in 2025: Beijing is attempting to capitalize on leverage it has built through decades of expanding trade and investment to increase its geopolitical and security influence in the region. Yet, while most Southeast Asian countries publicly praise China's contributions to the region's development, significant tensions rooted in overlapping territorial claims and divergent interests bubble beneath the surface. Ties to China have helped integrate Southeast Asian countries into global manufacturing supply chains, and China has become a large market for the region's commodities exports, but these ties have also put Southeast Asia in the crosshairs of global pushback on China's rising export wave.*

China Seeks to Establish Regional Hegemony in Southeast Asia

China views establishing regional hegemony in Southeast Asia as an essential component of its strategy to undermine U.S. power in the Indo-Pacific. China's overarching goals in the region include full control of the South China Sea, guaranteeing the PLA Navy access to crucial sea lanes, providing land access to the Indian Ocean around the chokepoint of the Malacca Strait, ensuring that Southeast Asian countries do not provide access and logistical support to the United States in the event of conflict in the Indo-Pacific, and keeping Southeast Asian markets open to Chinese exports and investment. In pursuit of regional hegemony in Southeast Asia, Beijing has devoted extensive resources to formal diplomacy and soft power initiatives in the region. More recently, China has sought to capitalize on perceptions that the United States is pulling back from Southeast Asia to present itself as the more responsible and reliable partner for the development aims of countries in the region.

Southeast Asia Is a Central Battleground in U.S.-China Strategic Competition

The Countries of Southeast Asia Are Highly Diverse but Linked by Proximity to China

Southeast Asia is a region defined by its diversity. The region has a variety of systems of government, ranging from democracies

*This chapter's findings are based on the Commission's March 2025 hearing on "Crossroads of Competition: China in Southeast Asia and the Pacific Islands"; fact-finding trips to the Philippines, Indonesia, Vietnam, and Cambodia; meetings with government officials and business leaders; and open source research.

(including the Philippines, Indonesia, Timor-Leste, and Malaysia) to repressive regimes such as Burma and Cambodia.[6] The region also hosts a range of development levels, encompassing wealthy countries such as Singapore (with a per capita gross domestic product [GDP] of $93,000) and poor countries like Laos (per capita GDP of $2,100).[7] Finally, the region is culturally and religiously varied, including Muslim-majority countries (Brunei, Indonesia, and Malaysia), Catholic-majority countries (the Philippines and Timor-Leste), and Buddhist-majority countries (Burma, Cambodia, Laos, and Thailand).[8] More than 1,000 languages are spoken throughout the region.[9] Yet all countries in Southeast Asia share an important commonality: geographic proximity to China. China's growing economic and military power is a fact of life with which all Southeast Asian countries must contend. Nevertheless, Southeast Asian countries also exhibit considerable variation in their approach to managing relations with China, ranging from the Philippines—which has closely aligned with the United States and forcefully criticized China for its aggressive and illegal behavior in the South China Sea—to Cambodia, which has more closely aligned with China, blocked ASEAN statements on the South China Sea, and recently inaugurated the Chinese-funded and -constructed expansion of its major naval base.[10] Competing with China in this highly diverse region requires a sustainable approach that is tailored for the particularities of each country, their disparate needs and priorities, and their varying ties with China.[11]

The Association of Southeast Asian Nations (ASEAN)

ASEAN is an intergovernmental organization headquartered in Jakarta, Indonesia, that aims to foster economic and security cooperation among the countries of Southeast Asia.[12] ASEAN currently includes 11 countries: Brunei, Burma, Cambodia, Indonesia, Laos, Malaysia, the Philippines, Singapore, Thailand, Timor-Leste, and Vietnam.[13] ASEAN operates according to the guiding principles of consensus decision-making and noninterference in the internal affairs of member countries—collectively known as "the ASEAN way."[14] The ASEAN Charter also includes the principle of "ASEAN centrality," the idea that ASEAN should be the "primary driving force" for the region's external relations.[15] While many observers credit ASEAN for helping facilitate decades of economic development and relative peace in the region, critics have argued that ASEAN's consensual decision-making process has prevented the bloc from playing a constructive role in handling contentious issues like the civil war in Burma and China's aggressive actions in the South China Sea.[16]

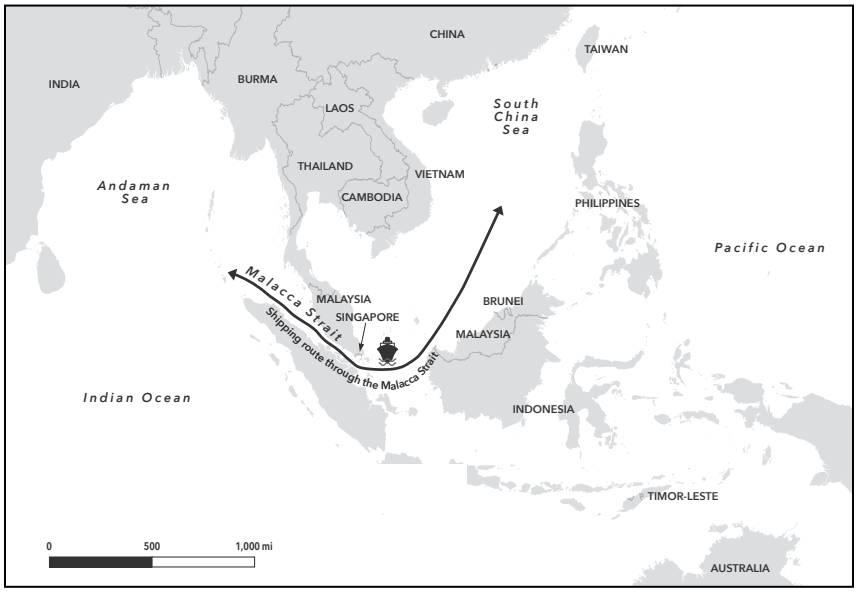
The United States and China Have Critical Economic and Security Interests in Southeast Asia

Both China and the United States have enormous economic interests in Southeast Asia. In the aggregate, Southeast Asia constitutes the world's third-largest population center and fifth-largest economy.[17] Since the 2008 global financial crisis, Southeast

Asia has consistently ranked among the fastest-developing regions in the world, with a combined GDP of around $4.0 trillion as of 2024, approximately equal to the GDP of India.[18] Despite stagnating growth since the COVID-19 pandemic, Southeast Asia is also home to a large and growing middle class of consumers.[19] The region is poised for a significant demographic dividend over the coming decades, with a young population and growing labor force that is not projected to peak until 2050.[20] Southeast Asian countries occupy a crucial position in global supply chains linking China and the United States, and an estimated one-third of all global shipping passes through the South China Sea.[21] China and the ASEAN countries are each other's largest trading partners, and total trade between them reached $984 billion in 2024.[22] Yet collectively, ASEAN countries are also the United States' fourth-largest trading partner, with bilateral trade totaling over $475 billion in 2024.[23] Moreover, the United States far outpaces China in FDI in ASEAN countries.[24] In 2023, the United States provided 32.4 percent of all FDI in ASEAN countries, compared with only 7.5 percent from China.[25] The United States' FDI in ASEAN countries in 2023 exceeded that of China, Hong Kong, Japan, Korea, Taiwan, and India combined.[26]

Southeast Asia is also crucially important to the security of the Indo-Pacific and the overall military balance of power in the region. The region is home to two U.S. treaty allies—the Philippines and Thailand—as well as key U.S. partners such as Singapore, Vietnam, and Indonesia.[27] China's aggressive actions in the South China Sea targeting the Philippines—a country with which the United States has a mutual defense treaty—make the region a potential flashpoint for U.S.-China military conflict. Southeast Asia would also play a crucial role in the event of a military conflict over Taiwan. U.S. access to bases, overflight rights, and logistics support from countries in the region could greatly affect how quickly and effectively the United States could respond to a Chinese provocation.[28] China is likewise concerned with what then–General Secretary of the CCP Hu Jintao termed the "Malacca Dilemma": the possibility that the United States and its allies could respond to a Chinese action against Taiwan by blockading the Strait of Malacca—which runs between Malaysia, Indonesia, and Singapore—cutting off the majority of China's maritime trade and energy imports.[29]

Figure 1: A Significant Portion of Global Maritime Trade Transits Southeast Asia



Note: Southeast Asia is one of the busiest regions for global trade. In 2023, 38 percent of maritime goods trade transited through the Strait of Malacca. "Risks and Resilience in Global Trade," *OECD*, 2024, 37.

China Views Southeast Asia as a Stepping Stone for Its Regional and Global Ambitions

China Sees Southeast Asia as Its Own "Backyard"

China views Southeast Asia as its own "backyard" due to its geographical proximity and historical ties to the region. China shares a land border with Southeast Asian countries that stretches 3,100 miles across Burma, Laos, and Vietnam.[30] Due to Beijing's broad and unsubstantiated sovereignty claims over almost all of the South China Sea, it has maritime territorial disputes with Brunei, Indonesia, Malaysia, the Philippines, and Vietnam.[31] As of 2023, approximately 30 million people of Chinese descent resided in Southeast Asia, nearly 70 percent of all overseas Chinese worldwide, with particularly high concentrations in Indonesia (11.2 million), Thailand (7.0 million), Malaysia (6.9 million), and Singapore (3.1 million).[32]

Beijing's views on Southeast Asia are also shaped by history. China ruled Vietnam—sometimes indirectly as a vassal state, sometimes as a province of the Chinese empire—for approximately 1,000 years, often resorting to brutal military force to suppress Vietnamese resistance.[33] During China's Ming (1368–1644) and Qing (1644–1911) dynasties, China engaged with maritime Southeast Asia through a hierarchical "tribute system" in which foreign states ritually expressed deference to the Chinese emperor as a condition for trade relations.[34] Analysts have argued that China's historical sense of superiority based on that anachronistic system shapes its aggressive approach toward Southeast Asia in the contemporary era.[35]

In a moment that many analysts interpreted as revealing Beijing's sense of entitlement to dominate Southeast Asia, then–Chinese Foreign Minister Yang Jiechi lectured his Southeast Asian counterparts at a 2010 ASEAN Regional Forum Meeting: "China is a big country and other countries are small countries, and that is just a fact."[36]

Southeast Asia Is at the Core of Beijing's "Neighborhood Diplomacy" Strategy to Displace the United States in the Indo-Pacific

Beijing views Southeast Asia as a central battleground in its strategic competition with the United States that could determine the regional and global balance of power between the two countries. Since Xi Jinping came to power in 2012, China's foreign policy has prioritized "neighborhood diplomacy," a strategy that seeks to undermine U.S. power in the Indo-Pacific by first building Chinese influence in nearby countries.[37] Xi and other top Chinese leaders have frequently referred to Southeast Asia as the "priority direction" for China's neighborhood diplomacy strategy.[38] For the past decade, leading Chinese academics have also described Southeast Asia as the center of a high-stakes struggle to prevent the United States from strengthening its position in the Indo-Pacific by countering U.S. initiatives like the "Asia-Pacific rebalance" and "Indo-Pacific strategy."[39] Yan Xuetong, one of China's most influential foreign policy thinkers, has argued that building Chinese influence in Southeast Asia "is related to the core substance of China's rise."[40] Zhao Weihua, director of the Center for China's Relations with Neighboring Countries at Fudan University, has likewise stated that Southeast Asia should be viewed as "the area of China's core interests within the geopolitical sphere of its periphery."[41]

Moreover, Beijing sees Southeast Asia as a proving ground and showcase for the global initiatives it is using to challenge the rules-based international order. Recent Chinese government documents have described Southeast Asia as a "model" and "pilot zone" for the implementation of both BRI and the Global Security Initiative (GSI). In 2023, a State Council Leading Small Group described China-ASEAN efforts to promote China's BRI as a successful "model" for regional cooperation and an "illustrative example for promoting the construction of a community of common human destiny."[42] Beijing's 2023 *Global Security Initiative Concept Paper* likewise described the Mekong region of Southeast Asia as a "pilot zone" for the GSI.[43] Duke University professor and Southeast Asia expert Jonathan Stromseth has concluded that Southeast Asia serves "both as a testing ground for China's development as a great power and as a gateway for its global expansion in the future."[44]

Southeast Asian Elite Sentiment Is Shifting toward China

Most Southeast Asian Countries Prefer Not to "Choose Sides" in U.S.-China Competition

Most countries in Southeast Asia have traditionally pursued a "hedging" strategy that aims to maintain close ties with both China and the United States while avoiding overreliance on either. Numerous recent academic and think tank studies have concluded that the overwhelming preference among policymakers throughout South-

east Asia is to avoid choosing between Beijing and Washington and instead leverage relations with both countries for their own development aspirations.[45] For example, Drew Thompson, an expert on Southeast Asia's international relations at Nanyang Technological University, recently found that the "consistent theme" among different Southeast Asian countries' responses to intensifying U.S.-China competition was "don't make us choose sides."[46] In particular, for countries such as Vietnam (with its long history of resisting both Chinese and Western imperialism) and Indonesia (which played a key role in the non-aligned movement during the Cold War), maintaining an independent foreign policy is a pillar of modern nationalism—a sentiment reflected in Indonesia's "friends to all, enemies to none" policy and Vietnam's "four nos" policy (no military alliances, no siding with one country against another, no foreign military bases, and no threat or use of force).[47] Despite ASEAN's oft-criticized inability to reach consensus on contentious issues like the South China Sea, regional states still place high value on the concept of "ASEAN centrality" as a way to maintain the region's independence in the face of escalating U.S.-China competition.[48]

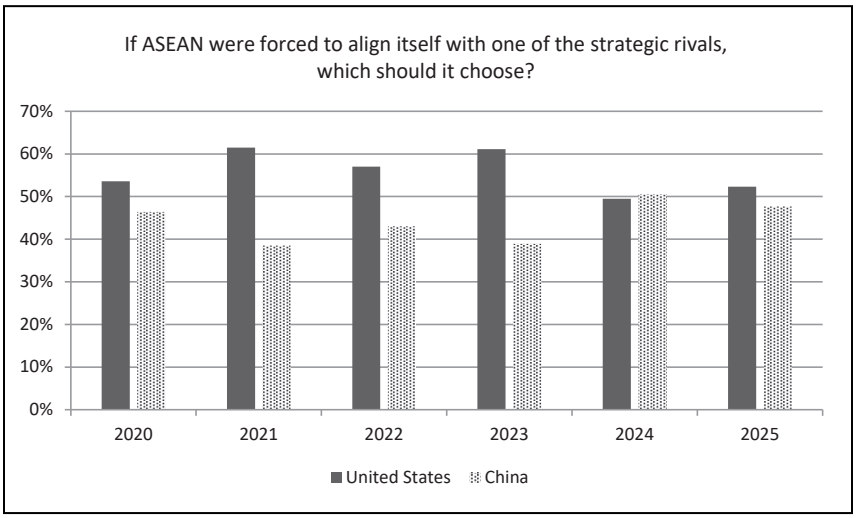
Both China and the United States face considerable challenges in seeking to build greater influence in the region. Prashanth Parameswaran, a fellow with the Wilson Center's Asia Program, has argued that China faces an "influence-trust gap" in Southeast Asia, where many countries see China as the most influential but least trusted power in the region.[49] Recent survey results have shown that while respondents throughout Southeast Asia rank China as the most influential economic and strategic power in the region, only a minority trust China to act "in the wider interests of the global community."[50] In contrast, Dr. Parameswaran noted that the United States faces a "power-commitment gap" in which regional powers question whether the United States' capabilities in the region will translate into sustained commitments that address regional priorities.[51] The survey showed that fewer than half of respondents in the region view the United States as a "reliable strategic partner."[52]

Survey Evidence Shows the United States Losing Ground to China among Southeast Asian Policymakers and Elites

While the majority of Southeast Asian policymakers and elites continue to prefer a balanced approach to navigating U.S.-China tensions, studies of elite Southeast Asian opinion show the United States losing ground to China over the past two years. The region's most prominent opinion survey is the *State of Southeast Asia Survey Report*, an annual study conducted by the ISEAS-Yusof Ishak Institute, a research institution funded by the Singaporean government. Based on a sample of government officials, researchers, and representatives from civil society and the private sector across all ASEAN countries, the survey captures "the prevailing attitudes among those in a position to inform or influence policy on regional issues."[53] Since 2020, the ISEAS survey has asked the question: "If ASEAN were forced to align itself with one of the strategic rivals, which should it choose?" In 2023, 61.1 percent of respondents chose the United States (compared to 38.9 percent that chose China).[54] However, in 2024, a slim majority (50.5 percent) chose China—a

swing of 23 percentage points in a single year.[55] In 2025, the survey showed a slight uptick in the percentage of respondents who would choose alignment with the United States (52.3 percent) over China (47.7 percent).[56] Nevertheless, the number of respondents who chose alignment with the United States remained lower than any year prior to 2024. The 2025 survey was conducted in January and February, so it does not capture reactions to recent changes in U.S. policy.[57]

Figure 2: Survey Results Show Elite Sentiment Tilting toward China, 2020–2025



Source: "ISEAS State of Southeast Asia Survey Reports, 2020–2025," *ISEAS-Yusof Ishak Institute*.

Other large-scale studies conducted over the past two years confirm China is gaining ground relative to the United States. A 2024 Pew Research Center survey that included nationally representative samples of public opinion in Malaysia, Singapore, the Philippines, and Thailand found that a greater portion of the population had a favorable opinion of China than the United States in all but the Philippines.[58] In the same survey, respondents in all four Southeast Asian countries surveyed were more likely to state that China has a positive rather than a negative effect on their country's economy.[59] According to a 2024 Asia Society Policy Institute analysis of more than 3,000 surveys, China had a positive net favorability rating in all Southeast Asian countries except for Burma and the Philippines.[60] A September 2025 study published by the Lowy Institute, a think tank that receives funding from the Australian government, concluded that China was the "leading" external power in Southeast Asia, outranking the United States in terms of overall influence in the region.[61]

Two key factors behind this shift in Southeast Asian public opinion are the negative perception of the U.S. role in the situation in Gaza and the widespread belief that China is a more reliable economic partner.[62] In the 2024 and 2025 ISEAS surveys, the Israel-Hamas

conflict ranked as one of respondents' top geopolitical concerns, on par with issues such as maritime disputes in the South China Sea and the proliferation of scam centers.[63] Reflecting this widespread concern with the humanitarian situation in Gaza, all ASEAN countries voted in favor of a UN General Assembly Resolution in May 2024 expressing "deep regret and concern" that the United States had vetoed a Security Council resolution recommending Palestine's admission to the UN.[64] Lynn Kuok, the Lee Kuan Yew chair in Southeast Asia studies at the Brookings Institution, testified before the Commission that the Israel-Gaza conflict has undercut U.S. messaging in the region by reinforcing "perceptions of Western hypocrisy and double standards in the application of international law."[65] At the same time, China's sustained economic engagement in the region has been helping to win hearts and minds in countries such as Cambodia and Laos.[66] In the 2025 ISEAS survey, 56.4 percent of respondents ranked China as the "most influential economic power in Southeast Asia" (compared to 15.4 percent who chose the United States).[67]

China Is Making Progress Building Influence in Southeast Asia at the Expense of the United States

While China's influence in Southeast Asia is rooted in its large economic presence, Beijing has also devoted considerable resources to diplomacy and soft power to expand and deepen its sway in the region. Dr. Kuok testified to the Commission that China's "vital economic role" in Southeast Asia is the primary source of its influence.[68] China is the largest trading partner for almost every ASEAN country, and although China's BRI has had a mixed impact for the region, most Southeast Asian countries view BRI as positive on balance, and Chinese investments have funded transformative infrastructure improvements in places such as Laos and Cambodia.[69] Moreover, China's economic influence in Southeast Asia is likely even greater than what would be expected based on hard numbers alone.[70] Chinese investments in Southeast Asia have tended to be in highly visible infrastructure megaprojects, whereas U.S. investments in areas like services are much less prominent in daily life.[71] Some analysts have argued that as result, Southeast Asian countries tend to overestimate China's economic importance relative to the United States.[72] Yet Chinese influence in Southeast Asia is not limited to economics. China has sought to convert its economic clout into greater "comprehensive national power" by expanding its levers of influence in the region through diplomacy, soft power initiatives, united front work, and media programs.[73]

China Prioritizes High-Level Diplomacy with Southeast Asia to Present Itself as the More Dependable Partner for the Region's Development and Security Needs

In addition to its large economic role in the region, China devotes greater resources than the United States to diplomacy in Southeast Asia. Top Chinese leaders allocate a large portion of their official diplomatic visits to Southeast Asian countries—22 percent over the 18 months after the end of China's zero-COVID policies.[74] In recent years, China's high-level diplomatic engagements with the region

have outpaced the United States by a ratio of approximately two to one. For example, in 2022, China held 40 meetings with Southeast Asian countries at the leader and foreign minister levels, compared to 19 such engagements for the United States.[75] China has also been highly active in other engagements with ASEAN. As of 2023, China's Foreign Ministry listed 39 separate "cooperation initiatives" with ASEAN on issues including trade, security, and people-to-people exchanges.[76] China has sought to leverage its diplomacy with ASEAN to pressure the organization to side more openly with China over the United States. In an address to the 2024 ASEAN-China Forum in Hong Kong, China's Ambassador to ASEAN, Hou Yanqi, touted China as the "most leading," "most dynamic," and "most fruitful" partner of ASEAN and made thinly veiled criticisms of the United States for "trade bullying," "protectionism," and "decoupling."[77]

Since the beginning of 2025, China has doubled down on both "neighborhood diplomacy" and "head-of-state diplomacy" with Southeast Asian countries in an attempt to capitalize on the perception that the United States is pulling back from the region. On April 8–9, 2025, Xi Jinping participated in a "Central Conference on Work Related to Neighboring Countries" in Beijing that was attended by the CCP's entire Politburo Standing Committee, the highest-level meeting devoted to neighborhood diplomacy in 12 years.[78] In his address to the conference, Xi sought to present China as the more suitable security partner for Southeast Asian countries. He introduced the new concept of an "Asian security model" rooted in "sticking together through thick and thin," "seeking common ground and shelving differences," and "dialogue and consultation."[79] Xi further highlighted the high diplomatic priority he places on Southeast Asia by making his first overseas trip of 2025 to Vietnam, Malaysia, and Cambodia on April 14–18.[80] Chinese propaganda has repeatedly contrasted Xi's high-profile visit to the region with uncertainty surrounding U.S. tariffs, seeking to present China as the more trustworthy and reliable partner to Southeast Asian countries.[81] Some Southeast Asian leaders have echoed Beijing's rhetoric. In a speech welcoming Xi to Malaysia, Prime Minister Anwar Ibrahim criticized "some quarters" of the world for imposing tariffs "without restraint."[82] "Amid this turbulence," he added, "China has been a rational, strong, and reliable partner."[83] High-level officials from seven Southeast Asian countries—Burma, Cambodia, Indonesia, Laos, Malaysia, Singapore, and Vietnam—attended the September 2025 military parade in Beijing, which analysts interpreted as a deliberate signal to Washington that U.S. tariffs could push countries in the region closer to China.[84]

China has wielded its diplomatic influence in Southeast Asia to block actions that undermine Beijing's policy preferences. For example, China has long used its leverage over ASEAN countries such as Cambodia and Laos to block ASEAN from adopting a unified stance in opposition to China's aggression in the South China Sea.[85] China has dragged out negotiations with ASEAN aimed at implementing a "Code of Conduct" for the South China Sea for more than two decades.[86] George Washington University professor David Shambaugh has argued that "Beijing has so successfully co-opted and intimidated the ASEAN states" that it now holds a form of "veto power" in which Southeast Asian countries are "conditioned not to criticize

China publicly or directly."[87] Southeast Asian countries—including Muslim-majority countries like Indonesia and Malaysia—have remained largely silent in the face of China's human rights abuses against Uyghurs in Xinjiang. In February 2025, Thailand deported 48 Uyghurs to China over the objection of the United States and UN human rights experts.[88]

Beijing also wields its diplomatic leverage to attempt to ensure that Southeast Asian countries would not support Taiwan in the event of a conflict. All countries in Southeast Asia recognize Beijing rather than Taipei, and seven ASEAN countries (Brunei, Burma, Cambodia, Indonesia, Laos, Malaysia, and Timor-Leste) have adopted Beijing's preferred language that Taiwan is an "inalienable" part of China.[89] The 2024 ISEAS survey found that only 5.7 percent of respondents thought their country should "facilitate military support for Taiwan" in the event of conflict in the Taiwan Strait.[90]

Nevertheless, the bloody border conflict between Thailand and Cambodia that broke out in July 2025 illustrated the limits of Beijing's diplomatic influence in the region. On July 24, 2025, fighting erupted between Thailand and Cambodia near a long-disputed segment of their shared border, killing at least 38 people and displacing hundreds of thousands more.[91] As part of its broader efforts to project influence in Southeast Asia, Beijing publicly declared its desire to play a leading role in mediating a resolution to the conflict.[92] In a meeting with the Secretary-General of ASEAN Kao Kim Hourn, China's Foreign Minister Wang Yi blamed the conflict on the "legacies of Western colonialists" and stated that as a "friendly neighbor" to both Cambodia and Thailand, China was willing to play a "constructive role" in reducing tensions.[93] Yet, in part due to a widespread perception in Thailand that China was biased in favor of Cambodia, as well as wariness of China's growing influence among other ASEAN countries, Beijing played only a very limited practical role in ceasefire negotiations.[94] Malaysian Prime Minister Anwar Ibrahim hosted the talks in his capacity as the current chair of ASEAN, and the United States helped push the two sides to an agreement by threatening higher tariffs if the fighting continued.[95]

China Attempts to Expand Its Influence in Indonesia

The United States has longstanding economic and security ties with Indonesia and has prioritized strengthening U.S.-Indonesia relations as a key component of broader U.S. efforts to maintain a free and open Indo-Pacific.[96] Indonesia plays a crucial role in Southeast Asia and the broader Indo-Pacific region. In addition to being the largest economy in ASEAN, it is the fourth most populous country in the world, the third most populous democracy, and the most populous Muslim-majority state.[97] In 2023, the United States and Indonesia upgraded their relationship to a "comprehensive strategic partnership" and signed a defense cooperation arrangement aimed at bolstering already strong security ties between the two countries, which include arms sales and joint military exercises.[98] The United States and Indonesia have also engaged in talks regarding a critical minerals partnership, and Indonesia agreed to lift restrictions on critical mineral exports to

China Attempts to Expand Its Influence in Indonesia—*Continued*

the United States as part of a trade deal reached with the Trump Administration on July 22, 2025.[99]

Realizing Indonesia's importance to the region, China has made a concerted effort over recent years to expand its own influence in Indonesia. In November 2024, China agreed to $10 billion worth of investment deals with Indonesia.[100] Chinese companies are major investors in Indonesia's emerging technology firms and are making efforts to expand their market share in the country's undersea cables, data centers, cloud computing, and artificial intelligence (AI) sectors.[101] Chinese companies have also secured dominant positions in some of Indonesia's most strategically important industries. Chinese firms control about 75 percent of Indonesia's nickel refining capacity, and Huawei provides the majority of Indonesia's telecommunications network infrastructure.[102] In line with Beijing's strategy of providing targeted foreign aid where it serves CCP interests, China also announced support for Indonesian President Prabowo Subianto's signature program to provide free meals to poor Indonesian communities and donated anti-narcotics detection equipment to Indonesia's National Narcotics Board.[103]

While Indonesia aims to remain neutral in U.S.-China competition in accordance with its traditional non-aligned foreign policy, China has made concerning inroads toward expanding its security influence in the country.[104] During President Prabowo's November 2024 trip to Beijing—his first overseas trip as president—he appeared to break with Indonesia's longstanding position by implicitly acknowledging China and Indonesia's "overlapping claims" in the South China Sea—although Indonesia later clarified that it does not recognize China's claims and has not altered its stance.[105] In January 2025, Indonesia became the first Southeast Asian country to join BRICS, which some analysts argued could be interpreted as implicit support for China and Russia's efforts to remake the international order.[106] According to a 2025 survey of policymakers and elites, 72.2 percent of respondents in Indonesia would choose strategic alignment with China over the United States—a nearly 20 percent increase over two years earlier.[107] It is likely that China would attempt to exploit any reductions to the United States' economic and security engagement with Indonesia to further expand its influence in one of the region's most important countries.

China Tries to Mobilize Overseas Chinese for United Front Work in Southeast Asia

In addition to formal diplomacy, Beijing has also attempted to use united front work to mobilize China's large diaspora in Southeast Asia in service of the CCP's agenda. The CCP's United Front Work Regulations call for cultivating support for the CCP among overseas Chinese and mobilizing them for tasks such as "constraining 'Taiwan independence' forces" and "creating a favorable international environment."[108] Particularly in Southeast Asian countries with

a high proportion of ethnically Chinese citizens, CCP united front work has taken the form of disseminating propaganda through Chinese-language media, leveraging access to permits to conduct business in China, and pressuring ethnically Chinese businesspeople to lobby for China's interests.[109] While the exact scope of China's success is unclear, there have been notable prominent examples. In March 2024, Singapore invoked its foreign interference law to designate Philip Chan, a Hong Kong-born Singaporean citizen and former president of the Hong Kong Singapore Business Association, as a "politically significant person" subject to special reporting requirements pertaining to his activities. In 2023, Mr. Chan had attended China's "Two Sessions" parliamentary meetings in Beijing as an "overseas Chinese representative" and gave an interview to Chinese media in which he stated, "It is our duty as overseas Chinese to tell China's story well."[110] In the Philippines, a woman named Alice Guo managed to get elected mayor of the town of Bamban and use her position to provide cover to Chinese transnational criminal groups. Philippine authorities have since alleged Guo is a Chinese citizen who moved to the Philippines as a child, later obtained a fraudulent Philippines birth certificate, and is a Chinese spy whose campaign for mayor was "arranged by Chinese state security."[111]

China Seeks to Exploit Recent Cuts to U.S. International Media Programs to Deepen Its Control over Southeast Asia's Information Environment

China has made a concerted push over many years to dominate Southeast Asia's information space by cultivating media influence throughout the region and wielding it to promote Beijing's narratives and suppress negative stories about China. Over the past two decades, the Chinese government has devoted considerable resources to expand the reach of Chinese state-run media outlets—such as Xinhua, China Global Television Network (CGTN), and China Radio International—in Southeast Asia as well as to improve their content by hiring away journalists from respected international and local media outlets.[112] Chinese government bodies also often host all-expenses-paid "training" sessions for Southeast Asian journalists in China designed to encourage reporting that frames China and its relationship to the region in a positive light.[113] (For more on China's extensive efforts to use local media and journalists to spread China's propaganda, see U.S.-China Economic and Security Review Commission, Chapter 2, Section 2, "Battling for Overseas Hearts and Minds: China's United Front and Propaganda Work," in *2023 Annual Report to Congress*, November 2023, 239–244.)

Xinhua has also signed content-sharing deals with independent media outlets throughout Southeast Asia, enabling it to embed non-attributed, state-produced Chinese propaganda into local-language news sources that have trustworthy reputations and large audiences—a strategy that the former head of China Radio International called "borrowing the boat to go out to sea."[114] In 2019, Xinhua signed a content-sharing deal with the popular Thai-language newspaper *Khaosod*, which is well known for its critical coverage of politically sensitive subjects. Almost immediately after inking the agreement, *Khaosod* began running Xinhua-provided pieces portraying protesters in Hong Kong as "tools of Western agitators" and de-

scribing Xinjiang as a haven for "equality, solidarity and harmony among ethnic groups and religions."[115] In Malaysia, the Malay-language newspaper *Sinar Harian* has published Xinhua articles with disinformation about Xinjiang, with the "Xinhua" label included only in small print at the bottom of the article.[116]

Prior to recent cuts to their staff and programming, Voice of America (VOA) and Radio Free Asia (RFA) had been the largest media platforms pushing back against Beijing's narratives in Southeast Asia. VOA programming, which focused on promoting understanding of the United States and delivering unbiased news, had enormous reach throughout the region, broadcasting in many Southeast Asian languages (including Burmese, Indonesian, Khmer, Lao, Thai, and Vietnamese) as well as broadcasts in English, Mandarin, and Cantonese that reached Southeast Asian listeners.[117] The VOA Vietnamese YouTube channel had 1.6 million subscribers and more than 1.2 billion views on its videos.[118] VOA Khmer was the No. 1 Facebook media page and No. 1 X account in all of Cambodia.[119] RFA, which provides uncensored news to countries lacking press freedom, also offered local-language coverage of Burma, Cambodia, Laos, and Vietnam and had a similarly impressive reach in the region, with an estimated total weekly audience of 58.3 million, 38.1 million followers across social media platforms, and 257 million website views in 2024.[120] In Southeast Asian countries with a highly restricted media environment, RFA provided exclusive local-language coverage of topics such as Chinese influence activities in the region, People's Republic of China (PRC) aggression in the South China Sea, and China's atrocities in Xinjiang.[121] Dr. Parameswaran testified before the Commission that RFA had been the only news outlet exposing scandals such as Chinese-owned potash mines causing massive sinkholes and Chinese rubber companies harassing local farmers in Laos.[122] Due to cuts to the United States Agency for Global Media, VOA has stopped broadcasting in all Southeast Asian languages.[123] RFA has eliminated its Burmese and Lao language services and significantly scaled back its content for Cambodia and Vietnam.[124]

China has openly celebrated cuts to RFA and VOA via its state-run propaganda outlets and moved to replace U.S. international media broadcasts with its own propaganda. A *People's Daily* editorial criticized VOA and other U.S. international media outlets as "anti-China institutions" that deepened "prejudice and misunderstanding toward China" and described the United States cutting their funding as "a happy case of karmic retribution."[125] China's state-run *Global Times* mocked VOA for being "discarded by its own government like a dirty rag."[126] According to an analysis prepared for the United States Agency for Global Media, Chinese state radio programs have significantly expanded their broadcasting in Asia in recent months by flooding shortwave radio frequencies previously used by RFA with their own content.[127]

China Exploited Changes to U.S. Foreign Aid for Propaganda Purposes in Southeast Asia

China has also attempted to exploit uncertainty surrounding the future of U.S. foreign aid to present itself as the more reliable partner to Southeast Asian countries. During his April 2025 trip

to Southeast Asia, Xi Jinping emphasized China's continued commitment to development aid, promising "high-quality development cooperation" in Malaysia, "projects to improve people's livelihood" in Vietnam, and greater "development assistance" in Cambodia.[128] While many of these statements are consistent with language Chinese officials have used in the past in similar settings, and because there is not yet evidence of a widespread attempt by China to replace U.S. foreign aid funding, it is likely that Beijing sees added propaganda value in touting its development cooperation initiatives this year.[129]

China has further attempted to exploit U.S. debates around foreign aid cuts to question U.S. motives. The Chinese government has long criticized the U.S. Agency for International Development (USAID) as a political weapon designed to preserve U.S. "hegemony."[130] Xinhua suggested that developing countries should not mourn the loss of U.S. aid, as it was a "tool of geopolitical control" intended to "maintain rather than eradicate global inequalities."[131] The *Global Times*, a notoriously nationalistic Chinese newspaper, contended that criticisms of USAID cuts focused on U.S. competition with China prove that the United States only provided aid to obtain political benefits rather than out of a genuine desire to help developing countries.[132]

Yet, while China has sought to exploit cuts to U.S. development aid for propaganda purposes, it has not—to date—significantly increased its overall development assistance to Southeast Asia or other regions. Unlike the United States, China has not traditionally provided large amounts of foreign aid in the form of grants for humanitarian relief and development projects.[133] Rather, China has offered loans for large-scale infrastructure projects under the umbrella of BRI.[134] In recent years, Beijing has signaled its intention to fund more "small and beautiful" projects under the Global Development Initiative (GDI), but many GDI-labeled projects are still funded through loans, and traditional grants remain a comparatively small portion of China's development assistance.[135]

Moreover, China's overall foreign aid budget has decreased significantly in recent years. According to the China International Development Cooperation Agency (China's closest equivalent to USAID), China provided a total of 270 billion renminbi (RMB) ($37.6 billion) in foreign aid from 2013 to 2018, for an average annual total of approximately $6.27 billion.[136] While China has not published comprehensive data since 2018, analysts have estimated China's 2024 foreign aid budget at $2.85 billion.[137] Xi has also previously faced domestic criticism for spending lavishly abroad in the face of poverty at home.[138] In light of China's recent economic downturn and growing fiscal challenges, it seems unlikely that Beijing would reverse course and dramatically increase aid in the near future.

Rather than significantly increasing foreign aid to Southeast Asia, Beijing appears to have adopted a strategy of selectively backfilling a small handful of programs affected by U.S. cuts where it believes it can achieve maximum soft power benefit at minimal cost. Chinese funding for demining activities in Cambodia illustrates how China has successfully exploited even temporary pauses in U.S. foreign as-

sistance for propaganda purposes. On February 5, the Cambodian Mine Action Center (CMAC), the leading demining organization in Cambodia, announced that the Chinese government had committed to provide it with $4.4 million in grant funding, an announcement framed in Cambodian media as China "step[ping] in" to replace frozen U.S. funds.[139] The United States had previously provided approximately $2 million per year to the CMAC, but after the United States froze foreign assistance on January 24, the CMAC announced it would need to furlough 210 staff members and halt operations in eight provinces.[140] Although the United States quickly exempted the program from its aid freeze, China has continued to reap the lion's share of positive press for its support of the CMAC.[141] During Xi's April 2025 visit to Cambodia, the two countries released a statement in which Cambodia expressed "great appreciation" for China providing resources, training, and equipment for demining activities.[142]

China also sought to exploit cuts to USAID in Southeast Asia for propaganda purposes in the aftermath of the 7.7 magnitude earthquake that struck Burma on March 28, 2025, killing more than 3,700 people and displacing many more.[143] On March 31, the Chinese government announced it would provide $14 million in emergency humanitarian assistance to Burma and that 400 Chinese personnel were already on the ground assisting with rescue and relief efforts.[144] One day earlier, the U.S. Embassy in Burma had announced $2 million in humanitarian assistance.[145] The United States sent a three-person USAID assessment team to Burma to determine how the United States could assist with relief efforts, but all three members of the team received termination emails shortly after arriving.[146] While China is often criticized by social media users in Burma due to its support for the unpopular military government, a Reuters report found that expressions of gratitude for Chinese earthquake relief efforts were common on Burmese social media and that expressions of "anti-China sentiment" had significantly declined.[147] Nevertheless, later investigations found that China provided most of its aid through the military junta while neglecting opposition-held regions—and that at least some of the money went to helping the junta establish administrative control in areas affected by the earthquake rather than directly helping victims.[148]

China Uses Many Tools to Develop Control over the Security Environment in Southeast Asia

China seeks to establish hegemony in Southeast Asia not only because of its proximity and importance as a trade partner but also for its military significance owing to its critical geostrategic location. China regards access to the region's sea lanes as critical to its national security due to the volume of trade that passes through them—as much as 38 percent of global maritime goods trade passes through the Strait of Malacca.[149] Several of the region's countries lie on the island chains Beijing views as essential to what it characterizes as a longstanding U.S. strategy to "contain" China by obstructing the PLA Navy's access to the broader Pacific Ocean. Beijing also views control over the entire

South China Sea as vital to its national security interests, and China's use of aggressive gray zone tactics to assert its illegal maritime territorial claims have heightened the risk of triggering military conflict in the region. China's pursuit of greater access to bases and dual-use facilities throughout Southeast Asia—alongside similar efforts in the Pacific Islands—are part of its broader goal of expanding the PLA's capacity to prevent the United States from intervening effectively in a military conflict in the South China Sea, Taiwan, or the broader Indo-Pacific region.

In addition to expanding the PLA's military presence in the region, Beijing has also adopted a multifaceted approach to expanding its security influence in Southeast Asia while simultaneously undermining that of the United States. Beijing has both expanded its participation in bilateral and multilateral military exercises in the region and engaged in internal security outreach to embed its security personnel inside several Southeast Asian countries. Beijing recognizes that if it can gain leverage over regional countries by helping their leaders maintain power and address non-traditional security concerns like transnational crime, it may be able to convince them to deny access, basing, and overflight rights to the United States in the event of a conflict. Although most countries in the region generally do not see China as an imminent military threat, many are becoming concerned by China's expanding traditional and non-traditional security influence and welcome the presence of the United States to provide a counterbalance to an increasingly assertive China.

China Is Using Increasingly Aggressive Tactics to Assert Its Control over the South China Sea

China has increasingly pressed its expansive and legally unsupported claims to the South China Sea with a near-constant, aggressive maritime presence and related gray zone intimidation activities throughout the region. It has also successfully thwarted the ability of Southeast Asian claimants to coordinate their efforts to assert rights over their exclusive economic zones (EEZs) or to develop a Code of Conduct in ASEAN.[150] However, China has not always succeeded in deterring other claimants from asserting their territorial rights. Instead, China's actions are making the situation in the South China Sea more volatile, increasing the potential of a miscalculation that could disrupt sea lanes or even draw the United States into a violent conflict by triggering the U.S.-Philippines Mutual Defense Treaty.[151]

China has utilized gray zone tactics—broadly defined as coercive military, economic, and influence operations short of war—in the South China Sea since the late 2000s.*[152] (China's gray zone tactics are also discussed in Chapter 2, "U.S.-China Security and Foreign Affairs (Year in Review)" and Chapter 11, "Taiwan.") These include using the Chinese Coast Guard (CCG) to enforce PRC maritime law and regulations outside of its jurisdiction, fre-

*Perhaps learning from the success (from its perspective) of its gray zone activities in the South China Sea, China extended such activities to the East China Sea in the 2010s, and most recently it has been engaged in significantly more aggressive gray zone activities in and around Taiwan. Isaac Kardon, "Combating the Gray Zone: Examining Chinese Threats to the Maritime Domain," *Carnegie Endowment for International Peace*, June 4, 2024.

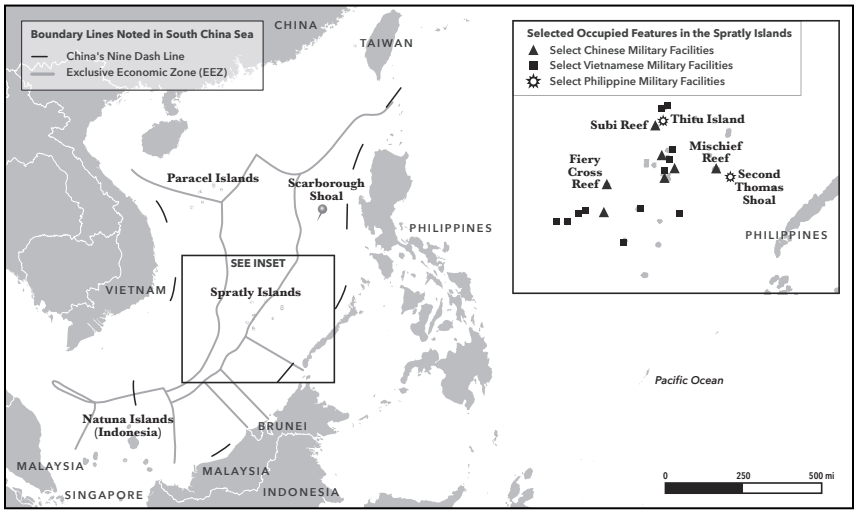
quently in coordination with maritime militia forces, PRC civilian fishing vessels, and marine scientific vessels and often with PLA Navy vessels nearby as a deterrent to an aggressive response.[153] Since 2021, the CCG has increased the size and number of its patrols and engaged in more aggressive actions in the South China Sea, often utilizing a variety of non-lethal coercive tools such as water cannons, lasers, and acoustic weapons. The goals of these actions have included establishing effective control over disputed areas, interfering with legitimate commercial activity by competing claimants, challenging lawful freedom of navigation in the disputed areas, and in some cases undermining the credibility of U.S. alliances.[154]

To justify its coercive gray zone activities, China has sought to use "lawfare" to legitimize its claims to almost all of the South China Sea, often invoking the UN Convention on the Law of the Sea (UNCLOS) to support its claims. Although the Permanent Court of Arbitration ruled in 2016 that China's claims were unlawful and its actions had violated the Philippines' EEZ, China has continued to insist it has the legal right to enforce Chinese law over areas it claims.[155] By using legal arguments and CCG vessels to reinforce its claims, China has sought to create a façade of legality, presenting its activities as legitimate law enforcement actions. For example, under CCG Order #3,* which went into effect on June 15, 2024, China has asserted the CCG's right to use force against "acts that infringe on China's national sovereignty" and to detain foreign vessels and individuals in all the waters China claims in the South China Sea.[156]

In a number of ways, China's gray zone activities in the South China Sea have succeeded. Over time, China has managed to normalize its presence and escalate its activities in other countries' EEZs—and sometimes even their territorial waters—while mostly avoiding actions that would trigger direct conflict or internationalize an incident.[157] Other countries have not been able to stop these activities and have often faced dilemmas in determining appropriate responses and even in how to pursue entirely legal activities within areas rightfully subject to their own jurisdiction. In order to dispel the ambiguity of the term "gray zone," encourage clearer thinking on potential responses, and impose greater reputational costs on China's aggression, the Philippine Armed Forces has coined the term "ICAD"—illegal, coercive, aggressive, and deceptive—to describe China's actions.[158]

*"Provisions on Administrative Enforcement Procedures for Coast Guard Agencies 2024."

Figure 3: Map of the South China Sea



Note: EEZs are depicted using the standard 200 nautical mile baseline from countries' coastlines.
Source: Various.[159]

The Philippines Has Borne the Brunt of Chinese Aggression

China has focused its most intense gray zone activities on the Philippines, likely reflecting that country's geostrategic importance to freedom of navigation in the South China Sea and the strategic value the Philippines could play in a Taiwan contingency. (For more information, see U.S.-China Economic and Security Review Commission, Chapter 8, "China's Evolving Counter-Intervention Capabilities and the Role of Indo-Pacific Allies," in *2024 Annual Report to Congress*, November 2024, 574–580.) Additionally, harassing the Philippines serves China's goal of attempting to undermine U.S. credibility as the Philippines' treaty ally. China may also perceive the Philippine Coast Guard and Armed Forces as an easy target to demonstrate the CCG's capabilities and to deter other claimants from asserting their rights.

In June 2024, China's ICAD activities against the Philippines came to a head over the Philippines' attempts to resupply the *Sierra Madre* outpost on Second Thomas Shoal as China escalated its efforts to block Philippine ships from approaching. Two days after the above-mentioned CCG Order #3 went into effect, CCG ships attacked Philippine Navy boats attempting to resupply the outpost. CCG personnel stormed the vessels using bladed weapons, seriously injured a Filipino sailor, and destroyed communications equipment.*[160] Subsequent negotiations led to an agreement in July 2024 that allowed the *Sierra Madre* to be resupplied, which the Philippines has successfully done approximately every two months as of September 2025.[161]

*China has used force in attempting to prevent the resupply of the *Sierra Madre* ten times since 2021, but it has only succeeded in stopping Philippine forces twice. "Shifting Tactics at Second Thomas Shoal," *Center for Strategic and International Studies*, *Asia Maritime Transparency Initiative*, August 22, 2024.

However, China has continued its ICAD provocations. Chinese forces use a wide variety of aggressive tactics in the South China Sea, including swarming, ramming, boarding, and blocking Philippine vessels as well as utilizing water cannons, military-grade lasers, sonic weapons, and aggressive maneuvers in the air.[162] The CCG has retained or expanded its near-constant presence around features within the Philippines' EEZ, particularly the Scarborough, Sabina, and Second Thomas Shoals.[163] At Sabina Shoal in August 2024, the CCG rammed the Philippine Coast Guard flagship, *Teresa Magbanua*, three times, inflicting damage.[164] In August 2025, this reckless behavior resulted in a collision between ships from the CCG and PLA Navy as they pursued and attempted to ram a Philippine Coast Guard vessel near the Scarborough Shoal.[165] The CCG vessel sustained severe damage, and footage released by the Philippines, and search and rescue operations conducted by the CCG following the incident, suggest at least two casualties among the CCG crew.[166] China did not acknowledge the crash but condemned the Philippine Coast Guard for "dangerous maneuvering."[167] According to experts, the embarrassment suffered by China is likely to result in increased aggression. Soon after the incident, the CCG sent a swarm of small vessels to the Second Thomas Shoal, which made a close approach to the *Sierra Madre*.[168] China also announced it was designating the Scarborough Shoal a nature reserve in what is a new form of lawfare intended to solidify its control over the area.[169]

In April 2025, the CCG grabbed headlines when it sent sailors to pose with a flag on Sandy Cay, claiming to have "enforced maritime management and exercised sovereign jurisdiction," which prompted the Philippine Coast Guard to do likewise in the following days.[170] Sandy Cay is part of the Spratly archipelago, lying 1.5 nautical miles from Thitu Island,* which hosts Philippine Navy and Coast Guard stations and a small Filipino civilian population.[171] Notably, it is also 9.3 miles from Subi Reef, one of China's artificial island bases, described by the Philippine Navy as the anchoring hub for Chinese ships in the area, including PLA Navy, CCG, and maritime militia ships.[172] Some analysts suggest China may be asserting sovereignty over Sandy Cay in order to reinforce its rights over the naturally low-tide Subi Reef—and potentially Thitu Island as well.[173]

Although the Philippines had attempted to take a softer stance on South China Sea issues during then–President Rodrigo Duterte's strategy of leaning toward China and away from the United States, China continued its aggressive behavior in the South China Sea, ultimately forcing him to once again seek U.S. support.[174] Chinese aggression increased markedly in 2022 after the election of President Ferdinand Marcos Jr., who has built a "transparency strategy" as a cornerstone of efforts to counter China's ICAD activity in the South China Sea. The Philippines has released images and video of incidents to underscore their unlawfulness, counter Chinese narratives, rally public opinion, and gain international support. However, the degree to which China can be swayed by reputational costs is limited.[175]

*Known in the Philippines as Pag-asa Island. Jonathan Head, "The Islanders Facing China's Menacing Presence on Their Horizon," *BBC*, May 20, 2025.

Chinese aggression, including preventing Filipino access to traditional fishing grounds, has increased the Philippines' resolve.[176] The Philippines is developing an external orientation for its armed forces through the Comprehensive Archipelagic Defense Concept, has enhanced the legal framework for control of its territorial waters, and has created a National Maritime Council to ensure a unified and coordinated approach to maritime security and domain awareness.[177] It has renewed its partnership with the United States to enhance its deterrence capacity, including by upgrading its military facilities through the Enhanced Defense Cooperation Agreement (EDCA). The United States and the Philippines have also extended EDCA to additional sites selected to bolster the Philippines' ability to defend its rights in the South China Sea, such as Oyster Bay in Palawan.[178] The Philippines is working with the United States and other partners on modernizing its military and enhancing maritime domain awareness, while expanding military exercises with Australia and India.[179] The Philippines is also cognizant of the role it might be called on to play in a Taiwan contingency, with Armed Forces Chief of Staff General Romeo Brawner telling troops that "if something happens to Taiwan, inevitably we will be involved," particularly to ensure the safety of the approximately 250,000 Filipino citizens residing there.[180]

Vietnam Has Quietly Reinforced Its Position in the South China Sea

Vietnam has also long been a target for PRC harassment in its EEZ, but it has not been subjected to the same level of Chinese aggression as the Philippines in recent years. The lower intensity of China's behavior toward Vietnam has been reflected in its response to Vietnam's rapid artificial island construction campaign at its Spratly Island outposts. By 2024, the acreage of Vietnam's artificial islands was already 71 percent of China's, and they now feature at least one 8,000-foot runway in order to enhance Vietnam's logistical capabilities, allowing it to maintain a more persistent presence.[181] Beijing's response has been fairly muted; only a single mild rebuke was issued via the Ministry of Foreign Affairs in February 2025 over the construction of the runway.[182] China has not attempted to halt construction of the islands through deployments of PLA Navy or CCG ships, nor has it retaliated economically.

Vietnam's approach to dealing with Chinese aggression has also been comparatively opaque in contrast to the Philippines' transparency strategy. In general, Vietnam has not sought to publicize incidents of China's aggression, even when the CCG has targeted Vietnamese civilian vessels in Vietnam's EEZ. For example, in June 2024, a fishing boat and its crew disappeared after reporting an encounter with Chinese authorities, but the Vietnamese government did not immediately disclose the incident.[183] However, perhaps because of the brazen and public nature of China's actions, Vietnam did feel the need to respond in October 2024 when the CCG chased and boarded a Vietnamese fishing vessel in the Paracel Islands, severely beating the crew and taking their equipment and catch.[184] Vietnam denounced the attack and a month later demanded the release of all detained Vietnamese ships and crew.[185] Since that inci-

dent, there have not been major public actions or reactions between China and Vietnam in the South China Sea. While Vietnam and the United States both call for freedom of navigation through the South China Sea, Vietnam is likely to maintain a cautious approach.[186]

Other South China Sea Claimants Have Downplayed Conflicts with China

China's gray zone activities occur throughout the South China Sea, but other countries have downplayed the incidents. The CCG regularly patrols Malaysia's EEZ, attempting to deter it from exploring and extracting resources, and China has issued demands for Malaysia to halt such activities.[187] Automatic Identification System (AIS) data analyzed by the Center for Strategic and International Studies' Asia Maritime Transparency Initiative showed the CCG operated vessels in Malaysia's EEZ nearly every day in 2024, mostly around Luconia Shoals, where Malaysia drilled large numbers of new wells in 2023 and 2024.[188] Malaysian Prime Minister Anwar Ibrahim publicly stated that Malaysia will not cease utilizing resources in its EEZ, but he downplayed the severity of the problem.[189]

China, likewise, has attempted to dissuade Indonesia from developing its oil and gas resources in the South China Sea. In October 2024, the CCG shadowed a survey vessel operating in the gas field north of Indonesia's Natuna Islands.[190] The Indonesian Coast Guard released videos of its encounter with the CCG in a move reminiscent of the Philippines' transparency strategy but novel for Indonesia.[191] The encounter took place without the use of water cannons, ramming, or other violent tactics frequently utilized by the CCG against the Philippines, and the Indonesian Coast Guard credited itself with driving off the Chinese vessel, although it repeatedly returned.[192] Indonesian President Prabowo Subianto signed a joint statement with China on the mutual development of maritime areas during his November 2024 state visit to Beijing, which was Indonesia's first formal acknowledgement that it has overlapping claims with China in the South China Sea. Shortly thereafter, however, the Indonesian Ministry of Foreign Affairs released a statement indicating that its position on South China Sea issues had not changed, clarifying that Indonesia does not recognize the nine-dash line, and stating that all negotiations must be based on UNCLOS.[193]

China Is Expanding Bilateral and Multilateral Military Exercises in the Region

Even as it utilizes aggressive tactics against other claimants in the South China Sea, China seeks to build trust with Southeast Asian countries through military exercises. It has been expanding the scale and scope of these exercises in the region in order to showcase the increased capabilities of the PLA and to keep pace with the United States' expanded regional exercises. Engaging with the PLA is one method for Southeast Asian countries to signal non-alignment, including for countries with longstanding military relations with the United States. While China has held record numbers of exercises with Southeast Asian countries in recent years, it still lags behind the United States in the number and size of its military exercises in the region.[194] According to research published by the

Australia-based Lowy Institute, the United States still conducts the largest number of bilateral and multilateral exercises in the region, with seven out of the 11 ASEAN countries engaging in more exercises with the United States than China.[195] U.S. exercises are still favored by most Southeast Asian countries for their focus on interoperability and combat readiness; in contrast, China has framed its bilateral and multilateral exercises in Southeast Asia around humanitarian relief and disaster response and countering non-traditional security threats such as terrorism and piracy.[196] China's regional military exercises are also becoming increasingly multilateral, potentially reflecting a desire to compete with U.S.-led multilateral exercises.[197] This is exemplified by the Aman-Youyi (Peace and Friendship) exercise series, which by 2023 had expanded to include Cambodia, Laos, Malaysia, Thailand, and Vietnam and featured the largest number of personnel for a China-led multilateral exercise in the region to date.[198]

Military exercises may provide an indicator of the state of Southeast Asian countries' relations with the United States and China, respectively. Following the deterioration of Thailand's relations with the United States after its 2014 military coup, China used the opportunity to expand military-to-military relations with Thailand. Their most recent Falcon Strike joint air force drills and Blue Strike naval drills have featured drones and submarines, potentially reflecting Thailand's ongoing acquisition of a Chinese submarine.[199] Indonesia's resumption of the bilateral Peace Garuda exercises with China in 2024 also represents their closer engagement; the exercises had been suspended in 2015 over a South China Sea dispute.*[200] Even Cambodia wishes to retain a hedging strategy in its military exercises. In 2025, it asked the United States to restart the bilateral Angkor Sentinel joint exercise series, last held in 2016, shortly before the China-Cambodia Joint Support and Training Centre at Ream Naval Base was inaugurated with the largest bilateral Golden Dragon exercises ever held.[201]

China Is Making Progress on Strategic Ports and Basing Ambitions

In order to ensure its ability to prevent disruptions to trade and energy flows through the Strait of Malacca and the South China Sea, China requires access to reliable logistical strongpoints in Southeast Asia for PLA forces. The economic and political influence China is cultivating in Southeast Asia is already allowing it to gain access to strategically located bases and dual-use ports in the region, advancing its ability to operate overseas and project power. Such facilities may create opportunities to engage in intelligence collection, pre-position supplies, and launch counter-intervention efforts that could play an important role in a Taiwan contingency or other crisis.[202] The recently inaugurated Ream Naval Base in Cambodia and the Kyaukphyu port under construction in Burma add to China's growing network of security facilities in Southeast Asia, bolstering existing bases in the South China Sea and stretching into the Pacific

*However, China continued to participate in Indonesia's Komodo multilateral exercises throughout this period. Ian Seow Cheng Wei, "What's behind the Resumption of China-Indonesia Military Exercises?" *Diplomat*, August 2024.

Islands region. Chinese entities own stakes in six ports throughout the region that have the capacity to host naval vessels, potentially offering opportunities for espionage and logistical support for the PLA while allowing China to maintain plausible deniability about their strategic utility.[203]

Cambodia's Ream Naval Base Likely Represents China's First Military Facility in the Region

The Ream Naval Base in Cambodia, which entered operation in April 2025 after years of construction, represents China's most significant attempt to develop a military facility in Southeast Asia.[204] While Cambodia and China have both denied that Ream amounts to a new overseas Chinese military base and assert that no Chinese personnel will be permanently stationed there, the United States believes otherwise. In 2019, U.S. officials reported seeing a secret draft deal that would give China exclusive access to a 62-acre portion of the base for 30 years, including military personnel, ship access, and weapons storage—effectively making Ream China's first overseas naval base in Southeast Asia and second worldwide.[205] While its distance from the Strait of Malacca and its shallow waters limit its strategic value to some extent, Ream could prove valuable as an intelligence-gathering outpost and as a way to reinforce Chinese influence in Cambodia.[206] It is of particular concern for Vietnam, as it represents a potential PLA threat on its eastern flank, which could reinforce Chinese bases in the South China Sea to the west.

The Ream base appears to have been divided into two sections, with the northern pier potentially reserved for the exclusive use of Chinese forces. Two Chinese corvettes have maintained a persistent presence at this pier since December 2023.[207] The pier has features suggesting it is intended to benefit China, including its unusual configuration, which resembles a pier at China's Djibouti base.[208] While it is long enough to accommodate aircraft carriers and other vessels larger than any yet operated by the Cambodian Navy, the waters around the base are still not deep enough to accommodate the PLA Navy's largest vessels.[209] In April 2025, Deputy Chief of Staff of the Central Military Commission Cao Qingfeng joined Cambodian Prime Minister Hun Manet for the inauguration ceremony.[210] The new facilities include a China-Cambodia Joint Support and Training Center, a 2,130-foot pier, and a dry dock.[211] A February 2025 visit by the Chinese ambassador to an air defense facility under construction to the north of the base may represent further Chinese involvement in strengthening the base's capabilities.[212]

Cambodia attempted to prove its claims that the base was open to all by inviting Japan, Vietnam, Russia, and the United States for port visits following the base's inauguration. So far this effort has been unconvincing, as it is not yet clear whether Cambodia has allowed another foreign military to enter the northern part of the base.[213] Two Japanese Self Defense Force minesweepers arrived the day after Xi Jinping's departure from the country following his state visit, with Vietnamese and Russian vessels visiting shortly afterward.[214] However, the visiting ships did not dock at the large new pier in the northern part of the base used by PLA Navy vessels, instead docking at the wharf in the southern part of the base.[215]

During its May 2025 trip to Cambodia, the Commission sought permission to visit Ream Naval Base. Ultimately, the day before the visit would have happened, the Government of Cambodia denied access without providing any explanation. The following week, Cambodia and China initiated their largest-ever joint military exercises, called Golden Dragon 2025, based in part at Ream.

Chinese influence extends beyond Ream Naval Base into the adjacent city of Sihanoukville and around Kampong Som Bay, where a Chinese company secured a 99-year lease to a full 20 percent of Cambodia's coastline and recently completed a major airport that could supplement the facilities at Ream.*[216] The Dara Sakor Airport is the only completed portion of the company's plans to develop an industrial park, deep-water port, and luxury resorts in the area. Although the plans were drawn up in 2008, the airport only opened to commercial flights in April 2025 and operates just one flight per week.[217] Despite this apparent lack of commercial viability, the airport is massive, with runways large enough to accommodate military aircraft, which has raised speculation that the facility could provide access to the PLA Air Force, providing an air power complement to the naval facilities at Ream.[218]

China's Expanding Security Footprint in Burma Reopens the Opportunity for a Strategic Port

Burma plays a critical role in China's strategy to secure a land access route to a port on the Bay of Bengal/Indian Ocean to reduce its vulnerability to a potential blockade of the Strait of Malacca.[219] The Burmese civil war has, at least for the time being, created setbacks for China's efforts to connect the Chinese city of Kunming to a deep-sea port at the strategically located Burmese town of Kyaukphyu.[220] China is utilizing its increased leverage over the multiple parties to intervene in the conflict in order to advance its interests, extend its security presence, and work toward restarting its infrastructure projects to connect the city and the port.[221]

In early 2025, China pressured the Burmese military to concede to its request to allow its private military companies (PMCs) to operate in the country, and a joint PMC was established in Kyaukphyu Port in a deal signed with CITIC Group.[222] The PMC is likely to include both Burmese and Chinese personnel and could play a role in making it safe for Chinese workers to resume construction at Kyaukphyu, which was disrupted in late 2024.[223] Chinese PMCs are closely tied to the PLA and are expected to be deployed with an array of intelligence and surveillance capabilities, which may provide targeting data to the Burmese military.[224] China extended further support to the Burmese military by banning exports of dual-use technology to opposition groups in November 2024 and increasing arms sales to the military, including aircraft, drones, and a diesel submarine.[225] China's Ministry of Public Security is also expanding China's security footprint in Burma, working to set up a coordination center with the junta's security forces and provide them equipment.[226] China has thrown its support behind the military govern-

*The company was sanctioned by the United States in 2020 in response to the project illegally displacing Cambodian residents and its potential military use. U.S. Department of the Treasury, *Treasury Sanctions Chinese Entity in Cambodia under Global Magnitsky Authority*, September 15, 2020.

ment and started making efforts to legitimize junta leadership on the global stage.[227] It is also using its longstanding significant influence over many of Burma's most powerful ethnic armed opposition groups to force their withdrawal from some of their captured territories, handing the junta outcomes they could not achieve on the battlefield.[228] Through its interference in Burma, China is gaining experience in an active war zone, making progress toward securing a strategically located dual-use port, and seeking to retain exclusive access to key resources, including rare earth minerals.[229]

China Develops New Methods to Build Security Inroads in Southeast Asia

China is expanding its security footprint in Southeast Asia in ways that go beyond conventional engagement, using cooperation on non-traditional security issues to export authoritarian norms and practices. Under the umbrella of its GSI, China has sought to formalize and expand its non-traditional security cooperation in Southeast Asia. China is also exploiting the rapidly growing problem of scam centers to pressure countries in the region—including U.S. allies such as Thailand—to allow Chinese security personnel greater leeway to operate on their territory. The presence of officers from China's Ministry of Public Security and other internal security forces in the region enhances China's domain awareness, creates opportunities for intelligence gathering, and strengthens its ability to police its own citizens abroad. It also has the potential to become an additional lever of Chinese influence by helping leaders in the region maintain regime security.[230]

China Leverages Non-Traditional Security Issues to Expand Its Security Presence in Southeast Asia

For over two decades, China has promoted non-traditional security cooperation with Southeast Asia to expand its security influence in the region. As early as 2002, China signed a joint declaration with ASEAN to increase cooperation on non-traditional security issues such as the illicit drug trade, human trafficking, and terrorism.[231] As part of the agreement, China also agreed to hold training courses for security personnel from ASEAN countries, enabling it to begin promoting its authoritarian policing practices among countries in the region.[232] In the 2010s, China began working to establish new multilateral and bilateral security mechanisms that enable it to dispatch its security personnel to conduct patrols and participate in raids on transnational criminal activity in Southeast Asia. Since 2011, China has coordinated joint patrols of the Mekong River together with Laos, Burma, and Thailand. In 2017, it further institutionalized parallel regional security cooperation by establishing the Lancang-Mekong Integrated Law Enforcement and Security Cooperation Center in the border province of Yunnan, which brought in Cambodia and Vietnam and serves to share intelligence, conduct training, and organize joint operations.*[233] China has likewise set up bilateral law enforcement coordination centers with countries in

*Under the framework of the Lancang-Mekong Cooperation mechanism. Lu Guangsheng, "China Seeks to Improve Mekong Sub-Regional Cooperation: Causes and Policies," *S. Rajaratnam School of International Studies*, February 2016, 12.

the region, establishing one with Cambodia in 2019, followed by one with Laos in 2022. The operation centers provide Chinese security personnel wide latitude to operate in these countries.[234] As part of these efforts, China has trained security personnel in Cambodia and Laos on issues such as "anti-interference," "anti-secession," and "resistance to color revolutions"—effectively exporting its own draconian policing practices to countries with which it is closely aligned in Southeast Asia.[235]

China Uses the Global Security Initiative to Formalize and Deepen Its Security Presence in Southeast Asia

Since its launch in 2022, China's GSI has served as a framework for further formalizing and expanding China's non-traditional security cooperation with Southeast Asia. Intended as an alternative to the U.S.-led international security architecture, China's GSI has emphasized promoting internal regime security (which China refers to as "political security") and eschewing formal military alliances in favor of greater cooperation on non-traditional security issues.[236] China has actively courted the participation of Southeast Asian countries in the GSI, and since 2022 Indonesia, Laos, Vietnam, Cambodia, Thailand, and the Philippines have all issued statements expressing varying levels of support for China's GSI.[237]

The case of Vietnam provides a clear illustration of how China has used non-traditional security cooperation branded under the GSI to enhance its security presence, even in a country with which it has long had a contentious security relationship. After Vietnam endorsed the GSI in 2023, Xi Jinping traveled to the country and declared that Vietnam and China should enhance their mutual trust by collaborating on "government security and regime security," including sharing intelligence on how to prevent "external infiltration" and strengthening cooperation on monitoring religious groups and foreign non-governmental organizations.[238] The increased interaction between the two countries' internal security services has created an avenue for China to influence the Vietnamese government despite their diverging interests in the South China Sea.[239]

China Exploits the Growing Problem of Scam Centers to Deepen Its Security Influence in Southeast Asia

Over the past several years, China has exploited the growing crisis of scam centers operated by Chinese crime syndicates—many of which spread throughout Southeast Asia with, at a minimum, implicit backing from elements of the Chinese government—as a pretext to further entrench its security presence in the region. (For more on scam centers, see Appendix: "China's Exploitation of Scam Centers in Southeast Asia.") Since the outbreak of the COVID-19 pandemic, scam centers operated by Chinese criminal networks based in Southeast Asia have exploded into a massive criminal industry that has begun to rival the global drug trade in scale and sophistication.[240] In 2023, scam centers in Burma, Cambodia, and Laos generated an estimated $43.8 billion in revenue—equivalent to about 40 percent of their combined official GDP.[241] The explosive growth of scam centers in Southeast Asia has also fueled large-scale human trafficking. In August 2023, the Office of the UN Commis-

sioner for Human Rights estimated that 220,000 people from dozens of countries were being held as forced laborers in scam centers in Cambodia and Burma alone.[242]

Beijing has used the scourge of scam centers to pressure regional countries to grant Chinese security personnel even greater leeway to operate within their territory to conduct raids on scam centers that target Chinese victims. In January 2025, China hosted a meeting of the Lancang-Mekong Law Enforcement Cooperation mechanism with representatives from Burma, Cambodia, Laos, Thailand, and Vietnam in which those countries agreed to strengthen intelligence sharing and joint operations with China to crack down on scam centers.[243] In particular, China has exploited the problem of scam centers to pressure Thailand—a U.S. treaty ally that has long resisted allowing Chinese police to operate on its territory—to permit Chinese security forces to work within its borders. After a Chinese actor named Wang Xing was abducted in Thailand and trafficked into a scam center in Burma in January 2025, Chinese tourist arrivals in Thailand reportedly dropped by 33 percent, causing significant harm to Thailand's economy.[244] Under pressure to reassure Chinese tourists, Thailand acceded to China's request to establish police coordination centers, and Thailand's then-Prime Minister Paetongtarn Shinawatra vowed to "strengthen law enforcement cooperation with China" during a meeting with Xi Jinping in February.[245] Later that month, Thailand allowed high-level Chinese officials and Chinese security forces to participate in cross-border raids on scam centers in Burma that resulted in thousands of Chinese citizens being turned over to Chinese personnel in Thailand and repatriated to China on Chinese charter flights.[246] However, numerous Thai academics and opposition Members of Parliament have since argued that granting China such access violated Thailand's sovereignty and sections of Thailand's Penal Code prohibiting actions that undermine the independence of the state.[247]

Perhaps most concerning from the perspective of the United States, Chinese security personnel in Southeast Asia have selectively cracked down on scam centers that target Chinese victims, leading Chinese criminal groups to assess that they can make greater profits with less risk by targeting American victims instead. In 2024, China reported a 30 percent decrease in money lost to online scams. In the same year, the United States witnessed a 40 percent increase in losses from online scamming.[248] According to very conservative estimates, Americans lost at least $5 billion to such scams in 2024.[249]

China Increases Its Leverage in Southeast Asia through Expanding Trade and Investment

Collectively, Southeast Asian countries constitute a large and rapidly growing economic region, with a regional population of nearly 380 million people under the age of 35 and economies projected to grow by an average of over 4 percent over the next five years.*[250] There is not a single "ASEAN" economy, however, as there is significant economic diversity across the ASEAN countries. China is the

*Unless stated otherwise, figures in this section are based on the ten countries that formed ASEAN prior to Timor-Leste's accession in October 2025.

region's largest external trading partner and has strong economic ties to Southeast Asia through intertwined supply chains for manufactured goods.[251] This two-way trade has created opportunities for Southeast Asian countries, particularly as multinationals seek to diversify supply chains, but it also has increasingly created risks. Indonesia, Malaysia, Vietnam, and Thailand are already experiencing China Shock 2.0—a surge in Chinese imports that compete with local manufacturers and put downward pressure on wages and employment.

China's investment ties in the region have also had mixed impacts. As two-way trade links between China and the region grew, China invested heavily in regional transport infrastructure under BRI, building ports, roads, and railways to serve its expanding export-oriented economy.[252] This investment, at times, fueled instances of elite capture and involved white elephant projects that provided little benefit for the local population. In recent years, China began investing more heavily in digital infrastructure, including telecommunications networks and undersea cables as well as emerging technologies like AI-enabled data centers that could pose security risks to host countries.

China's Economic Relationship with Southeast Asia Has Become Increasingly Unbalanced

Southeast Asia seeks to maintain ties with its two largest trade partners through the lens of the "ASEAN Way," which emphasizes avoiding alignment with external stakeholders. China and the United States are ASEAN's largest external trade partners, and both have a substantial impact on development in the region.[253] China is the largest source of visitors to the region, while accumulated FDI from U.S. firms has spurred global value chain participation and exports.[254] Because of these linkages, Southeast Asia is deeply concerned about the potential impact to its economy from U.S.-China decoupling, generating pressure to choose sides.[255] The ASEAN Community Vision 2045 called out the need to navigate the impact and potential opportunities of key trends, including major power rivalries, rising barriers to trade and investment, and supply chain resilience.[256] ASEAN's statement envisioned "strong and mutually beneficial economic relations with external partners… that maintain ASEAN Centrality."[257] The ASEAN region's commitment to avoiding alignment is reflected in the choice by multiple members to seek membership in both the Organisation for Economic Co-operation and Development and BRICS.[258]

China's extensive trade and investment links with Southeast Asia are driven by integrated global supply chains. ASEAN countries conducted $3.8 trillion in total goods trade in 2024, with intra-ASEAN trade accounting for the largest share, at 21.4 percent.[259] China, however, represents the largest external trade partner for combined ASEAN countries, at 20 percent of ASEAN trade.[260] The significance of the trade relationship between China and ASEAN is mutual—ASEAN as a bloc is China's largest trade partner.[261] In 2024, China was also the largest bilateral trade partner for every individual ASEAN country except for two: Thailand and Brunei.[262] Chinese manufacturers' need for raw materials has provided a market

for exports of natural resources from Southeast Asia.[263] Conversely, ASEAN countries depend on China for imports of intermediate goods.[264]

China's trade with ASEAN benefits from several trade agreements. ASEAN and China have had a free trade area—the ASEAN-China Free Trade Area (ACFTA)—since 2010, though a relatively weak one.*[265] China and ASEAN recently concluded negotiations on a second upgrade to ACFTA (the first upgrade was completed in 2015) that would deepen economic cooperation in areas including digital and green economies.[266] The Regional Comprehensive Economic Partnership (RCEP), which links ASEAN with other bilateral free trade agreement partners, was intended to boost regional trade by strengthening supply chains. However, the wide diversity among RCEP's participants led to significant loopholes being built into the agreement, including a very limited dispute settlement mechanism.[267] China is also seeking to join the Comprehensive and Progressive Agreement for Trans-Pacific Partnership, a significantly more extensive trade agreement that includes Brunei, Malaysia, Singapore, and Vietnam among its members.†[268]

In recent years, the China-ASEAN trade relationship has become increasingly unbalanced, and ASEAN countries are already at the forefront of the second China Shock. The ASEAN trade deficit with China nearly doubled between 2020 and 2024.[269] Monthly ASEAN exports to China peaked in December 2021, while ASEAN imports from China have only continued to grow, hitting a new monthly peak in April 2025.[270] While many of these imports from China are intermediate goods—some of which are incorporated into ASEAN's exports to third countries—increasing amounts of Chinese exports are final goods, potentially displacing domestic production and intra-ASEAN trade, resulting in economic harm to ASEAN countries.[271] Many Southeast Asian countries have implemented measures to protect local industries and push back on the flood of excess capacity from China.[272] However, given the scale of China's market distortions and the size of its manufacturing sector, it is likely that China's economic model will hinder Southeast Asia's efforts to move up the value chain. (For more on the impact of China's unfair trade practices, see the case study on Southeast Asia in Chapter 8, "China Shock 2.0.")

Although China is Southeast Asia's largest single trade partner, trade and investment with the United States is also very important to the region. The United States is the largest export market for ASEAN countries, and—collectively—ASEAN is the fourth-largest

*The desire to forge new and improved deals stems from weaknesses in existing trade agreements. Notably, ACFTA has a low utilization rate. Inkyo Cheong and Yeri Ryu, "Issues on the ASEAN-China Free Trade Area," in *Further ASEAN-China Cooperation for Joint Prosperity: Envisioning ACFTA 3.0 in the Digital Era* (Economic Research Institute for ASEAN and East Asia, 2024), 74; Xirui Li, "ASEAN's Trade-Off between Economic Nationalism and Development," *East Asia Forum*, February 24, 2024.

†The Comprehensive and Progressive Agreement for Trans-Pacific Partnership, formed by the remaining members of the Trans-Pacific Partnership after the United States withdrew, is a comprehensive agreement including relatively high environmental, labor, intellectual property, and investment standards; market access provisions for both goods and services; and a dispute settlement mechanism. The combined GDP of its 12 members is around 13 percent of the world total. New Zealand Foreign Affairs and Trade, *Comprehensive and Progressive Agreement for Trans-Pacific Partnership Overview*, accessed August 22, 2025; Cathleen D. Cimino-Isaacs, "CPTPP: Overview and Issues for Congress," *Congressional Research Service* (Report No. IF 12078), June 16, 2023.

trading partner of the United States, accounting for over $120 billion in U.S. exports.[273] ASEAN is also the top destination for U.S. FDI in the Indo-Pacific, with estimates of FDI stock ranging from $346 billion to over $500 billion.[274] As a result, the United States remains the largest source of inbound FDI to ASEAN countries.* In 2023, the United States invested $74.4 billion, over 30 percent of total FDI flows, while China only made up 7.5 percent of the total.[275] Many U.S. and other foreign companies have made one or more ASEAN countries the centerpiece of their efforts to diversify supply chains away from China.[276]

Given the "ASEAN way" of avoiding alignment in geopolitics, both the United States and China are likely to see further growth in trade and investment ties with ASEAN, suggesting the region will continue to be a key area for U.S.-China economic competition in the coming years.

Chinese Investment Has a Mixed Record

U.S. investment in ASEAN economies has been driven by multinational corporations investing in electronics, other manufacturing industries, and services that have helped Southeast Asian countries integrate into global value chains. By contrast, China's investment in the region is heavily driven by BRI,† which has provided extensive infrastructure investment and loans primarily through state-owned entities, creating issues of lingering debt burdens and underperforming assets. More recently, China's investment in the region has shifted from large-scale physical infrastructure projects like roads, railways, and ports to focus on "small and beautiful" projects.[277] China's private technology firms are beginning to invest in industries including semiconductors, AI, and data centers under BRI's Digital Silk Road (DSR) initiative, creating security risks for host countries and competing with U.S. firms for market share. Chinese manufacturers are also setting up factories in Southeast Asia to avoid being subject to tariffs on made-in-China goods. Goods produced in these factories compete with local suppliers for market share, and their further export into global markets could expose ASEAN to retaliatory tariffs. (For more on China's manufacturing investment in Southeast Asia, see Chapter 8, "China Shock 2.0.") Furthermore, the dominance of Chinese firms in industries like critical minerals and

*The US-ASEAN Business Council estimates that ASEAN has received more FDI from the United States than China, India, Japan, South Korea, and Taiwan combined. Singapore receives by far the most inbound investment ($141 billion out of $226 billion total in 2022) due to its strong supporting financial and regulatory infrastructure. Singapore then serves as a jumping-off point for investment into ASEAN countries, where Singapore is the largest investor. This phenomenon obfuscates flows and stock of investment and heightens the difficulty in determining which foreign countries are the largest source of investment to Southeast Asian countries. "China's Investments in Southeast Asia Snarl US Plans on Supply Chains," *Bloomberg*, April 24, 2025; Vikram Nehru, written testimony for U.S.-China Economic and Security Review Commission, *Hearing on Crossroads of Competition: China in Southeast Asia and the Pacific Islands*, March 20, 2025, 7; ASEAN Secretariat, *ASEAN Key Figures*, 2023, 46; "ASEAN Matters for America Matters for ASEAN," *US-ASEAN Business Council*, 2023, 26.

†The BRI label encompasses both state-led initiatives and private corporate actions. Although Chinese private firms often initiate investment without a directive from the state, the Chinese government coopts private Chinese investments and reframes them under the umbrella of BRI messaging to advance its own strategic and political aims abroad. Likewise, because of the advantages in terms of government support and access, Chinese companies are incentivized to welcome taking on the label of BRI. Yuen Yuen Ang, "Demystifying Belt and Road," *Foreign Affairs*, May 22, 2019; Jonathan Hillman, written testimony for U.S.-China Economic and Security Review Commission, *Hearing on China's Belt and Road Initiative: Five Years Later*, January 25, 2018, 3.

batteries reduces opportunities for the United States to work with its allies and partners in the region on de-risking supply chains. (For more on the risks from China's dominance over supply chains, see Chapter 9, "Chained to China: Beijing's Weaponization of Supply Chains.")

China's Physical Infrastructure Investment Has Helped Entrench Chinese Commercial Interests while Bringing Questionable Benefits

In the decade since it was launched, China's BRI has failed to live up to its promises for global development, leaving countries around the world facing higher debt loads while imbedding Chinese firms and equipment in local economies and infrastructure. After hitting a peak around 2016, China's volume of international lending began to fall as poor risk management practices, implementation difficulties, and China's own flagging domestic conditions forced a reevaluation of its overseas commitments.[278] China is now the single-largest creditor for a vast portfolio of loans to developing countries, many of which will likely face repayment difficulties for projects that failed to deliver the promised benefits.[279] For example, in 2023, China accounted for 37 percent of Cambodia's external debt load.[280] Although Cambodia's risk of debt distress is considered low, China extended no new loans to the country in 2024 after a string of unsuccessful projects.[281] Laos, which the International Monetary Fund labels as in debt distress, owed 32 percent of its public debt to China at the end of 2023.[282] Cambodia and Laos, two of Southeast Asia's countries that most embraced China's promise of infrastructure assistance, are also probably least well positioned to negotiate for better terms on future projects.[283]

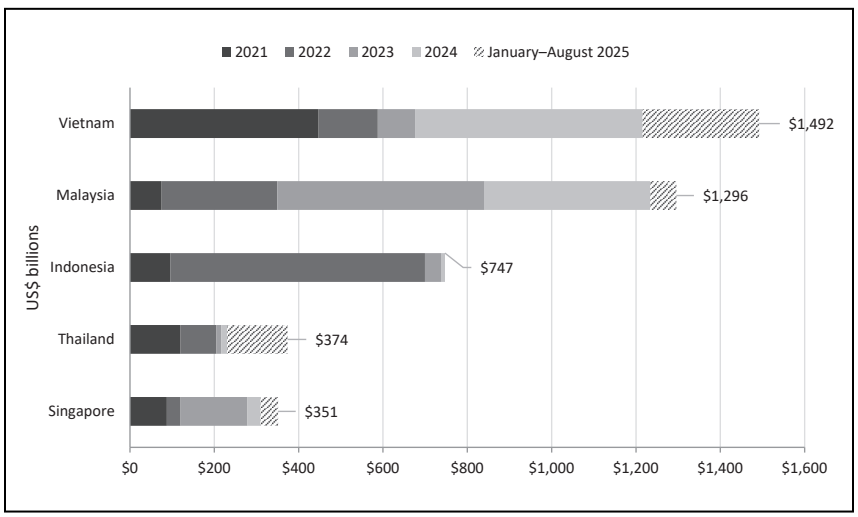
Local elites have sought to leverage Chinese infrastructure projects for political gain, and a lack of governance and opaque bidding processes have led to poor project outcomes. Chinese firms often made unrealistic promises on speed of execution and pricing in order to win contracts but reneged on their promises once the projects started, leaving governments on the hook for unanticipated expenses.[284] For example, in the case of a project to build a high-speed rail connection between Jakarta and Bandung in Indonesia, Chinese contractors outbid their Japanese competitors by promising faster completion and lower interest costs, neither of which they were ultimately able to deliver on.[285] The railway as it currently exists seems likely to generate a negative rate of return for the near term, and some analysts argue it needs further expansion to other cities before the economic case becomes viable.[286]

Although citizens from Southeast Asian countries, on the whole, have a positive impression of BRI as it has brought some tangible improvements in transportation and other infrastructure, it has also brought detrimental side effects for local development.[287] Communities hosting BRI investment projects have leveled criticism at Chinese construction firms for bringing in Chinese laborers and intensifying ethnic tensions.[288] Both Chinese and host country laborers have become victims of human trafficking as Chinese officials have insufficient oversight of the actions of firms using the BRI label.[289]

Chinese Investment in Critical Infrastructure in Southeast Asia Is Raising Security Concerns

Chinese companies are investing in key critical infrastructure systems throughout Southeast Asia, sometimes competing with U.S. firms and creating vulnerabilities that could impact U.S. national security interests in the region. China's DSR investments are clustered in telecommunications, 5G, data centers, fintech, and e-commerce.[290] Laos and Thailand were the first Southeast Asian countries to explicitly sign DSR cooperation agreements, but since then, all ASEAN countries have received some DSR investment, with Indonesia, Singapore, and Malaysia receiving the most projects through 2020.[291] Since then, according to data from Rhodium Group's China Cross-Border Monitor, China's investment into the region's information and communications technology sector has exceeded $12 billion, with major investments in Indonesia, Malaysia, and Vietnam (see Figure 4). Southeast Asian countries generally welcome these investments for their potential to stimulate domestic growth, a consideration that sometimes outweighs competing security concerns for host countries.

Figure 4: Value of Completed Chinese FDI Transactions in Information and Communications Technology Sector, 2021–August 2025



Source: Rhodium Group, "China Cross-Border Monitor–Information and Communications Technology, 2021–2025."

Chinese DSR investment represents a shift from the state-driven approach that previously dominated BRI to investments led by private Chinese firms. Huawei, ZTE, and Alibaba were major Chinese players in DSR projects through the latest publicly available comprehensive datasets as of 2021, and more recent analysis indicates that these firms remain the leading Chinese investors in emerging technology in Southeast Asia.[292] U.S. and Chinese investment has led to fierce competition in areas like cloud computing and data centers, where China has established itself as a leader in Thailand, the

Philippines, and Malaysia.[293] Alibaba and Huawei have contributed to AI-enabled smart city initiatives in Malaysia and Singapore and have made or are planning investments in data centers in Malaysia, Indonesia, Singapore, Thailand, Vietnam, and the Philippines.[294] Additionally, almost every Southeast Asian country has used Huawei as a core network equipment provider in their telecommunications infrastructure.[295]

China's DSR and private sector tech investments can raise national security concerns for host countries and, in some cases, even for the United States. Chinese investments in information and communications technology are often welcomed based on relatively low cost and quick execution, and host countries did not consider them a security threat until recently.[296] Huawei has supplied 70 percent of Indonesia's network equipment and has offered to take over the remaining percentage with a free rip-and-replace program.[297] All Chinese firms, including Huawei, are required to cooperate with requests from the Chinese government for data and to cooperate with the CCP on "matters of national security," raising concerns over data collection and surveillance abroad.[298] State-owned State Grid Corporation of China owns 40 percent of the National Grid Corporation of the Philippines, the company that operates the Philippines' national electricity grid.[299] This ownership stake has raised concerns among Philippine lawmakers that China could remotely access and disable the grid.[300] To the extent that U.S. defense sites in the Philippines rely upon that critical infrastructure, the United States could be exposed to many of the same security concerns.[301] (For more on risks posed by China's investments in energy grids around the world, see Chapter 10, "Power Surge: China's Electrification Drive and Push for Global Energy Dominance.")

Singapore Seeks to Balance Trade, Investment, and Security Relationships

As a regional finance and trade hub, Singapore plays a key role in connecting ASEAN to the rest of the world. Singapore is attempting to maintain this role against the backdrop of amplified U.S.-China competition in the region. The Singaporean government believes the need for regional stability and its role as an economic middleman necessitates a position of strategic neutrality toward China. According to a 2025 survey, elites in Singapore view "intensifying economic tensions between major powers" as one of the top three challenges facing the region.[302] While China is Singapore's largest trade partner, the United States and Singapore have had a free trade agreement since 2004, and the United States is the largest source of FDI for the country.[303] During a visit to China this year, Prime Minister Lawrence Wong emphasized Singapore's commitment to working with the country to maintain free trade.[304]

Singapore's importance as a trade and investment hub is augmented by a vibrant and growing technology sector, and Chinese and U.S. firms are both taking advantage of its pro-business environment. Startups in "deep tech"—autonomous vehicles, semiconductors, robots, and other cutting-edge technologies—are flourish-

Singapore Seeks to Balance Trade, Investment, and Security Relationships—*Continued*

ing due to Singapore's talent base, location, and policy support.[305] The country produces 10 percent of the world's semiconductors and 20 percent of its semiconductor manufacturing equipment, and in recent years it has attracted investment for new semiconductor manufacturing facilities from Taiwan and U.S. companies looking to diversify production.[306] At the same time, Chinese firms have invested in Singapore's AI industry, including a cloud services partnership between Huawei and the country's major financial institutions.[307] Other Chinese AI startups have moved to Singapore because it offers better access to capital and a more open regulatory environment—and also because operating out of Singapore can help alleviate the concerns of overseas customers wary of working with companies based in China.[308]

Singapore recognizes the security risks from China and has taken steps to harden its infrastructure. In 2024, China-linked cyber threat actor Volt Typhoon attacked Singapore's largest telecom company in what experts believe was a test run for attacks on U.S. telecommunications infrastructure.[309] In July 2025, Coordinating Minister for National Security and Minister for Home Affairs K Shanmugam described a China-linked hacking effort on strategic targets in Singapore as posing a risk for espionage and disruption to vital services.[310] Japan and Singapore are reportedly collaborating on upgrading the resiliency of shared undersea cables and cyber systems.[311]

Despite its small size, Singapore is proactive in establishing national security relationships, maintaining longstanding close ties to the United States that include access, basing, and overflight privileges and significant purchases of U.S. armaments.[312] However, Singapore also has carefully cultivated security ties with China, including participating in high-level military exchanges and joint exercises.[313] Furthermore, Singapore also maintains discreet defense ties with Taiwan, engaging in military training at facilities in Taiwan despite Chinese pressure.[314]

China is also seeking to provide and service undersea cables that enable global connectivity for the region. Southeast Asia is a hub for undersea cable connections, and demand for connectivity is growing both to link smaller islands to modern internet infrastructure and to serve the needs of population centers aiming to become hubs for digital services.[315] Japan dominates cable laying in Southeast Asia (41 percent), with the United States (20 percent) and China (19 percent) ranked second and third in terms of total subsea cables supplied in the region.[316] For now, China remains a distant fourth place in the global undersea cable industry, which has been dominated by French, U.S., and Japanese firms.[317] However, China is making efforts to promote domestic cable-laying companies on the world stage, and the China Academy of Information and Communications Technology projects that Chinese companies will be involved in the installation of 45 percent of cables globally between 2023 and 2028.[318] Additionally,

China maintains a significant presence in the undersea cable repair industry—primarily in the northwest Pacific Ocean—and launched several new cable-laying ships in 2024.[319]

Technology investment in Southeast Asia has also become another avenue for Chinese firms to work around U.S. export controls on advanced semiconductors. Chinese firms are at least partially driven by commercial motivations to access new markets, talent, data, and information, and their investments overlap with those pursued by U.S. firms.[320] Countries in Southeast Asia have at times been receptive to this investment. In May 2025, Malaysia announced it had reached an agreement to incorporate Chinese technology, including Huawei's Ascend AI chips and DeepSeek's AI models, into a large domestic computing project.[321] After the announcement drew scrutiny from the United States over security concerns, the Malaysian government removed references to Huawei and distanced itself from the project, but the incident exemplifies the ongoing competition for dominance in Southeast Asia's developing AI industry.[322] Chinese and U.S. firms have occasionally invested in the same AI firms in Southeast Asia, raising the possibility of unintentional tech transfer to China.[323] Operations in Southeast Asia may also provide a way around U.S. export controls for Chinese companies. For example, Singapore has become a major destination for investment by Chinese AI companies seeking to avoid U.S. restrictions on exports of chips and other high-tech equipment to China.[324] Chinese firms have also been able to access advanced Nvidia chips by flying physical hard drives to Malaysia and renting data center servers there to train AI models.[325] Although Malaysian officials announced they were launching an investigation into the incident, they reiterated that the country maintains a "neutral stance on unilateral sanctions" and only advised companies to comply to avoid secondary sanctions.[326] The incident highlights the difficulty of securing technology amid ASEAN's desire to maintain access to both U.S. and Chinese technology.

Implications for the United States

If Beijing's bid for regional hegemony in Southeast Asia succeeds, it would significantly alter the global balance of power in China's favor, with serious implications for the United States' ability to protect its economic and security interests in the region. China's growing influence and leverage in Southeast Asia could threaten the United States' ability to rely on regional partners for access, basing, and overflight—undermining U.S. capacity to support Taiwan and other Indo-Pacific allies and partners. It would also undercut the United States' capability to ensure a free and open Indo-Pacific and free passage in some of the world's most crucial sea lanes.

Beijing has adopted a long-term, multifaceted approach toward building influence in Southeast Asia at the expense of the United States. China has spent many years amassing economic leverage over Southeast Asian countries through expanding trade and large-scale infrastructure investments. Beijing has also devoted significant resources to reshaping the information environment in the region with the aim of promoting Beijing's influence and undercutting

U.S. credibility. More recently, Beijing has sought to capitalize on its economic and political clout to increase its military access and security footprint throughout the region. **If Southeast Asian countries perceive that the United States is pulling back economically and diplomatically, it will be increasingly difficult for the United States to retain its position as the security partner of choice in the region.**

China's persistent and aggressive actions in the South China Sea targeting the Philippines also make the region a potential flashpoint for U.S.-China military conflict. Gregory B. Poling, director of the Southeast Asia Program and Maritime Transparency Initiative at the Center for Strategic and International Studies, testified before the Commission that if China continues with its current pace of operations in the South China Sea, "It is a mathematical certainty that a Southeast Asian mariner—most likely a Filipino—will be killed with unpredictable escalation risks."[327] Such an event could trigger the U.S.-Philippines Mutual Defense Treaty and potentially lead to direct confrontation between the United States and China. The Philippines is an important and longstanding U.S. ally that would play a crucial role in enabling U.S. military support for Taiwan or other regional contingencies. **In order to maintain the credibility of U.S. deterrence in the Indo-Pacific, it is essential that the United States continues to signal strong support for the Philippines and help it enhance its capacity to resist and deter China's illegal, coercive, aggressive, and deceptive activities in the South China Sea.**

China's expanding police cooperation with Southeast Asian countries should also be concerning to U.S. policymakers. Beijing has adopted an "inside-out" approach to building its security influence with several countries in the region. **Beijing is using cooperation with internal security forces in various Southeast Asian countries in an attempt to gain the allegiance of regional governments by helping them maintain power through authoritarian policing practices and high-tech surveillance methods.** Beijing can then use these arrangements as leverage to obtain support for China's positions—and, potentially, to pressure them to deny access, basing, and overflight to the United States during a military conflict.

Beijing is exploiting the growing problem of scam centers to pressure Southeast Asian countries (including Thailand, a U.S. treaty ally) to grant Chinese security forces even greater leeway to operate on their territories. **If the United States does not strengthen law enforcement cooperation with Southeast Asian countries to help them build the capacity to tackle scam centers, they are more likely to accept the further expansion of China's police presence in the region.**

China's raids on scam centers targeting Chinese victims have only incentivized Chinese criminal groups to focus on scamming Americans instead. **If the United States does not act to raise public awareness domestically and better equip U.S. law enforcement to handle sophisticated new cyber scams, the Chinese crime syndicates behind scam centers in Southeast Asia are likely to continue targeting Americans.**

China's growing investment in critical infrastructure in Southeast Asia and its surging exports to the region also pose concerning security risks. Chinese technology companies have invested heavily in telecommunications equipment, electrical grids, data centers, and undersea cables in Southeast Asia—potentially exposing U.S. firms and military assets in the region to data security and sabotage risks. China's growing trade and technology links with the region could also deepen supply chain dependencies on China. At the same time, the reality of China Shock 2.0's negative impact on Southeast Asia may make regional countries more receptive to efforts to respond to China's heavily distorted economic model. **It is essential for the United States to continue engaging the region economically.**

Southeast Asia is a highly dynamic, economically significant, and geostrategically crucial region that will continue to play a pivotal role in U.S.-China competition. **If the United States does not step up its economic and security engagement with the region, China's dominance will likely continue to expand, threatening the ability of the United States to protect its economic and security interests throughout the Indo-Pacific.**

Recommendations

The Commission recommends:

- Congress direct the President to create an interagency task force to combat scam centers, which are primarily operated by Chinese criminal networks in Southeast Asia and defraud Americans of billions of dollars annually. The task force should:
  - Work with the Intelligence Community to:
    - Assess the extent to which China has obtained Americans' sensitive personal data stored on computers and phones confiscated in raids on scam centers and evaluate how Beijing could use that data; and
    - Prepare a report in both classified and, if possible, unclassified form detailing the extent to which the Chinese government has ties to the individuals and criminal enterprises that run scam centers.
  - Foster cooperation with U.S. technology companies and financial intermediaries to detect and stop scams, particularly cryptocurrency investment fraud;
  - Create training programs for U.S. law enforcement on sophisticated new cyber scams and implement a national public awareness campaign;
  - Enhance law enforcement cooperation and intelligence sharing with allies and partners to dismantle scam centers, recover stolen assets, and protect victims' personal data; and
  - Implement sanctions on individuals, corporations, and foreign government officials that perpetrate and enable online scams.
- Congress pass legislation to equip the Philippines to more effectively counter China's military aggression and malign influence and support U.S. national security goals in the region. The legislation should:

- Support the Philippines Coast Guard (PCG) on the front lines of deterring Chinese aggression by:
  - Providing the necessary resources to the U.S. Departments of State, Defense, and Homeland Security to maintain PCG capacity-building programs funded by the Bureau of International Narcotics and Law Enforcement Affairs (INL); and
  - Ensuring the PCG is prioritized in Foreign Military Financing (FMF).
- Enhance Philippines engagement with the Quadrilateral Security Dialogue (Quad) by directing the State Department to develop a Quad Plus dialogue and/or working group on gray zone or ICAD (illegal, coercive, aggressive, and deceptive) activities.
- Provide the necessary resources and direct the State Department and other implementing agencies to prioritize initiatives related to:
  - Cybersecurity, to counter attacks on the Philippines' government and critical infrastructure;
  - Energy security and digital infrastructure, to support economic development, including near U.S. military installations, and to secure connectivity in the Indo-Pacific;
  - The Luzon Economic Corridor (LEC) initiative with the United States, Japan, and the Philippines, to develop infrastructure, connectivity, and supply chains across the Luzon Island region;
  - Emergency preparedness, to support disaster response and joint U.S.-Philippines defense infrastructure development; and
  - Public health, in part to maintain and build goodwill with the Filipino public.
- Utilize the Quad Critical Minerals Initiative to support the Philippines' development of alternative critical minerals supply chains, including in coordination with Indonesia and other relevant ASEAN states. In coordination with partners, funding from the U.S. International Development Finance Corporation and Export-Import Bank of the United States should prioritize the development of the Philippines' domestic refining and processing capabilities and provide export credit insurance and supply chain finance solutions.
- Strengthen defense and commercial shipbuilding in the Philippines in coordination with broader efforts among Indo-Pacific allies, including South Korea and Japan, and support mechanisms to enhance maintenance, repair, and overhaul services in the Philippines.

- Congress pass legislation to restore Radio Free Asia's (RFA) full funding and operations by providing a direct appropriation to RFA or providing funding through a grant agreement with another entity, such as the National Endowment for Democracy. The legislation should:

- Preserve RFA's ability to report on events and issues in China that are censored or unreported by Chinese state-controlled media;
- Enhance RFA's unique capacity to break through Beijing's "Great Firewall" and connect to people in China through its Mandarin, Cantonese, Tibetan, and Uyghur language services; and
- Endorse and strengthen RFA's capability to counter Chinese influence and propaganda throughout Asia by providing local-language information about China's repressive, coercive, and aggressive actions—such as incursions in the South China Sea, threats against Taiwan, and the harmful effects of Belt and Road Initiative projects.

Appendix: China's Exploitation of Scam Centers in Southeast Asia*

Key Findings

- Chinese criminal networks operate industrial-scale scam centers across Southeast Asia that steal tens of billions of dollars annually from people around the world—a massive criminal enterprise that rivals the global drug trade in scale and sophistication.
- The Chinese criminals behind scam centers have built ties—some overt, some deniable—to the Chinese government by embracing patriotic rhetoric, supporting China's Belt and Road Initiative (BRI), and promoting pro-Beijing propaganda overseas. As a result, Chinese crime syndicates have expanded across Southeast Asia with, at a minimum, implicit backing from elements of the Chinese government.
- The spread of China-linked scam compounds in Southeast Asia is fueling corruption and violence, undermining the ability of governments in the region to control what happens in their territory, and promoting human trafficking.
- China is exploiting the problem of scam compounds to increase its leverage over Southeast Asian governments, conduct intelligence and influence operations, and expand its security footprint in the region.
- Beijing has selectively cracked down on scam centers that target Chinese victims, leading Chinese criminal organizations to conclude that they can make greater profits with lower risk by targeting citizens of wealthy countries such as the United States.
- Americans are now among the top global targets of China-linked scam centers, with an estimated $5 billion lost to online scams in 2024 alone—a 42 percent increase over the previous year.

Introduction

In March 2024, an 82-year-old Virginia man named Dennis committed suicide after losing his life savings in an online scam.[1] Dennis had connected with a woman named "Jessie" on Facebook, and the two built a close relationship over months of chatting. Jessie told Dennis she earned money by investing in cryptocurrency and gradually persuaded Dennis to invest his savings too. Then one day, all of Dennis's money—and Jessie—disappeared.[2] Dennis was one of tens of thousands of Americans who have collectively lost billions of dollars to online "pig butchering" scams, in which scammers build personal relationships with victims over months ("fattening the pig") before stealing their money by convincing them to invest in fraudulent financial schemes ("slaughtering the pig").[3] According to very conservative estimates, Americans lost at least $5 billion to

*This appendix was previously published as a Commission Spotlight. U.S.-China Economic and Security Review Commission, *China's Exploitation of Scam Centers in Southeast Asia*, July 18, 2025.

such scams in 2024—an increase of 42 percent over the previous year.[4] Unbeknownst to most victims, these pig butchering scams are perpetrated primarily by sophisticated Chinese criminal networks that operate large-scale scam compounds in Southeast Asia.[5]

This Commission Spotlight examines how China-linked scam centers are fueling corruption and violence in Southeast Asia, paving the way for greater Chinese influence in the region, and directly harming Americans in the process. Its findings are based on the Commission's March 2025 hearing on "Crossroads of Competition: China in Southeast Asia and the Pacific Islands"; fact-finding trips to the Philippines, Indonesia, Vietnam, and Cambodia; and open source research.

The Rise of China-Linked Scam Centers in Southeast Asia

During the early 2000s, Chinese criminal groups made enormous profits through illicit casinos and online gambling facilities before pivoting to scamming.[6] After General Secretary of the Chinese Communist Party (CCP) Xi Jinping launched his anticorruption campaign in 2012, many Chinese criminal organizations relocated their illicit gambling operations to Southeast Asia—particularly the Philippines, Cambodia, Laos, and Burma (Myanmar)—outside the reach of Chinese law enforcement.[7] Yet as China continued to crack down on online gambling platforms, criminal syndicates turned to scamming as an alternative source of revenue.[8] The first reported cases of "pig butchering" scams, which initially targeted Chinese victims, emerged in China in 2018.[9] According to Chinese reports, between January and August 2019 Chinese citizens lost more than $500 million to these scams.[10]

During the COVID-19 pandemic, Chinese criminal organizations expanded their scamming operations in Southeast Asia by exploiting forced laborers to target non-Chinese victims around the world. After the outbreak of the pandemic, China recalled many of its citizens from Southeast Asia, depriving Chinese criminal organizations of workers and customers for their casinos.[11]At the same time, China banned cryptocurrency transactions and launched new crackdowns on online gambling and scamming. Chinese criminal groups adapted to these changes in several ways:

- To replace lost revenue from casinos and online gambling, Chinese criminal organizations expanded their operations to focus more heavily on scamming, converting empty hotels and casinos into compounds devoted specifically to pig butchering scams and other forms of online fraud.[12]
- To make up for the loss of Chinese workers, criminal organizations turned to human trafficking as their main source of labor, forcing trafficking victims to work in scam compounds under conditions observers have described as "modern slavery."[13]
- As Beijing's domestic crackdowns made it more difficult to target people in China, Chinese criminal groups increasingly focused on scamming non-Chinese victims in wealthy countries like the United States.[14]

The sophisticated Chinese criminal groups behind scam centers deploy an ever-evolving array of technologies to ensnare victims and evade detection. The perpetrators of pig butchering scams often reach out to potential victims on social media and dating applications.[15] After contacting a potential victim, scammers often move their communication to encrypted messaging services to make their activities more difficult to track.[16] Scamming operations also increasingly use tools such as translation software, generative artificial intelligence (AI) chatbots, and AI-powered face-changing technology to expand their reach and efficacy.[17] After establishing trust, scammers convince their victims to invest in fraudulent investment schemes connected to accounts controlled by the scammers.[18] Finally, the scammers use money laundering services advertised on encrypted messaging apps to move the stolen assets across thousands of digital wallets before laundering it into the formal economy.[19]

China-Linked Scam Centers in Southeast Asia Have Exploded into an Enormous Criminal Industry

Over the past several years, scam centers have exploded into a massive criminal industry that rivals the global drug trade—including the fentanyl market—in scale and sophistication.[20] An expert working group convened by the United States Institute of Peace (USIP) estimated that pig butchering scams generated $63.9 billion in global revenue in 2023.[21] Burma, Cambodia, and Laos are currently the epicenter of scamming operations.[22] Scam centers in these three countries produced approximately $43.8 billion in revenue in 2023, equivalent to about 40 percent of their combined official gross domestic product (GDP).[23] The explosive growth of scam centers in Southeast Asia has also fueled large-scale human trafficking. In August 2023, the Office of the UN Commissioner for Human Rights estimated that 220,000 people from dozens of countries were being held as forced laborers in scam centers in Cambodia and Burma alone.[24] Often lured into scam centers through fake recruitment ads offering positions in fields like "online marketing," scammers are forced to work long hours in compounds that resemble industrial-scale call centers surrounded by armed guards and subject to brutal beatings if they fail to meet their quotas or attempt to escape.[25] On May 19, 2025, a group of UN experts released a joint statement warning that human trafficking tied to scam centers in Southeast Asia "has reached the level of a humanitarian and human rights crisis."[26]

Chinese Criminal Groups Have Promoted China's BRI and CCP Propaganda to Gain Chinese Government Support

As Chinese criminal networks expanded across Southeast Asia, they developed a mutually beneficial relationship with officials eager to promote China's Belt and Road Initiative (BRI).[27] Known syndicates invested large sums in infrastructure projects branded under the BRI, helping build the physical and digital backbone of their scamming operations in places like Cambodia and the Thai-Burmese border.[28] In turn, Chinese officials and state-owned enterpris-

es (SOEs) backed these projects to demonstrate progress advancing the BRI—despite their ties to transnational crime.[29]

While Beijing has taken action against criminal groups that defy its control, it has often turned a blind eye when syndicates align with the CCP's broader agenda. The cases of two notorious Chinese kingpins—She Zhijiang and Wan Kuok-Koi ("Broken Tooth")—highlight how criminal actors gained tacit support from Chinese authorities while amassing vast profits from scam centers.

From a "Model BRI Project" to a "City Built on Scams": She Zhijiang's Yatai New City Project

The case of Chinese criminal kingpin She Zhijiang's "Yatai New City" project in the town of Shwe Kokko on the Thai-Burmese border illustrates how the Chinese criminal groups behind scam centers secured Chinese government support by embracing BRI.[30] In 2017, She Zhijiang, a convicted criminal with a long history of involvement in illegal gambling operations in the Philippines and Cambodia, launched a $15 billion project to construct a "smart city" in Shwe Kokko, which he promoted as part of China's BRI.[31] Despite She's criminal history and reports that Yatai New City was designed to host illicit activities, Chinese officials embraced the project. China's official Xinhua news agency promoted the Yatai New City project as "a model for deep economic and cultural cooperation between China and Myanmar," and China's state-owned *Global Times* extolled the project as a model example of private entrepreneurs contributing to BRI.[32] Senior Chinese Embassy officials participated in the signing ceremony for the project, which was held in front a large banner promoting it as part of China's BRI.[33] Multiple Chinese SOEs signed lucrative contracts to help construct Yatai New City.[34] By 2021, the development in Shwe Kokko had become "the largest hub for sophisticated Chinese online scam syndicates" in Southeast Asia, which international media has described as a "city built on scams."[35] After Shwe Kokko became synonymous with transnational crime, Beijing retroactively claimed that the Yatai New City project never had any links to BRI, and in 2022 China issued an international warrant for She Zhijiang's arrest. Nevertheless, She Zhijiang's Yatai New City Project illustrates how a known Chinese criminal obtained Chinese government support and resources to help build a development that now houses one of the largest clusters of scam centers in Southeast Asia.

The Patriotic Crime Boss: Broken Tooth's Pro-CCP Criminal Network

The case of Macau-born Chinese crime boss Wan Kuok-Koi ("Broken Tooth") demonstrates that China has been willing to look the other way for criminal networks that expand Chinese influence and promote Beijing's narratives in Southeast Asia.[36] Previously the head of the 14K triad, one of the most notorious criminal groups in Asia, Broken Tooth spent 14 years in prison before reestablishing his criminal operations in Southeast Asia.[37] In 2019, Broken Tooth reached an agreement with the Karen Border Guard Force in Burma to establish the Dongmei Zone near the Thai-Burmese border, which was initially billed as a high-end tourism project but quickly

became a notorious cluster of scam compounds.[38] As Broken Tooth was rebuilding his criminal empire based on scam centers, he also strategically rebranded himself as a patriotic pro-CCP businessperson. In 2017, Broken Tooth founded the World Hongmen History and Culture Association in Cambodia, which claims to be dedicated to promoting the "great rejuvenation" of the Chinese nation and which frequently disseminates articles echoing Beijing's propaganda on issues such as Hong Kong and Taiwan.[39] Broken Tooth famously stated, "I used to fight for the cartels, and now I fight for the CCP."[40] Broken Tooth has reportedly laundered profits from his criminal enterprises into business ventures in China, including investing in China's struggling real estate and construction sectors.[41] To date, China has not taken any action to crack down on Broken Tooth's criminal enterprises, suggesting Beijing is willing to tolerate Chinese criminal groups that use the profits from scam centers to help support its agenda.[42]

China-Linked Criminal Operations Undermine Security and Fuel Corruption in Southeast Asia

Scam centers operated by Chinese transnational criminal organizations have become one of the most significant problems undermining security and governance in Southeast Asia. According to a 2025 survey of Southeast Asian policymakers and elites, "global scam operations" ranked as the region's second most important geopolitical concern, only behind aggressive behavior in the South China Sea.[43]

China-Linked Scam Centers Drive Violence in Burma

In Burma, scam centers have helped finance both the military and ethnic armed organizations (EAOs).[44] Since Burma's military junta overthrew a democratically elected government in a 2021 coup, Chinese criminal groups have exploited the country's lawless environment to build clusters of industrial-scale scam centers near Burma's borders with China and Thailand.[45] Jason Tower, USIP's Country Director for Burma and a leading expert on Chinese transnational crime, testified before the Commission that scam centers in areas controlled directly by armed groups have "brought in billions of dollars in revenue annually," with both the military and EAOs using their cut of the profits to purchase weapons.[46] According to a 2024 USIP report, scam centers in Shwe Kokko provide the Karen National Army, which controls the surrounding territory along the border with Thailand, with about $192 million annually, half of which it hands over to the military junta.[47] Reports based on phone geolocation data gathered in 2024 showed regular movement between scam centers and central government buildings, suggesting the military government coordinates closely with the criminal groups operating scam centers.[48]

Scam Centers Fuel Government Corruption in Cambodia, Laos, and the Philippines

According to recent reports, high-level Cambodian officials have deep ties to the Chinese criminal networks operating scam centers in the country.[49] Hun To, a cousin of the prime minister, is on the board of directors of Huione Group, which has been accused of laun-

dering hundreds of millions of dollars in profits from online scams.[50] It has also been widely reported that in 2017, Sar Sokha, who at the time was the son of the Minister of Interior, partnered with Chen Zhi, a well-known China-born criminal, to construct the Jinbei Casino, which became "one of the largest and most notorious scam centers in the country."[51] Sar Sokha inherited his father's position as Minister of Interior in 2023 and is now Cambodia's top government official in charge of cracking down on scamming.[52] Recently published reports indicate that his family remains "deeply and directly implicated" in scam centers.[53]

Chinese criminal groups are also fueling large-scale government corruption in Laos.[54] In 2007, the Laos government agreed to a deal with a Chinese criminal boss named Zhao Wei to create the Golden Triangle Special Economic Zone, which is fully operated by Zhao's Kings Romans Group, but in which the Laos government holds a 20 percent stake.[55] Long associated with drug trafficking and wildlife smuggling, the Golden Triangle Special Economic Zone has recently become a hub for scam centers. According to a USIP report, the zone houses "tens of thousands of individuals engaged in online scamming operations."[56] The Laos government has continued to support Zhao Wei as it has profited from his illicit activity, and in October 2022 it even presented him with its "Medal of Bravery."[57]

In the Philippines, online gambling hubs serving the Chinese market (locally known as POGOs—Philippine offshore gaming operators) were often able to serve as fronts for scam centers by paying off police and officials in the Bureau of Immigration, including funding a large-scale bribery scheme at the Manila airport.[58] In 2024, the Marcos Administration banned POGOs, and the Philippines has since made significant progress cracking down on scam centers.[59] Nevertheless, reports have indicated that local government and police complicity have enabled some of the criminals behind these scam centers to evade punishment.[60]

China Has Exploited Scam Centers to Expand Its Security Presence in Southeast Asia

China has exploited the problem of scam centers to expand its influence throughout Southeast Asia. In the case of the Philippines, large-scale scam centers were allegedly linked to Chinese espionage. In the mainland Southeast Asian countries of Burma, Cambodia, Laos, and Thailand, China has used the presence of transnational criminal organizations operating scam centers as an excuse to expand the role of its security forces in the region.

Scam Centers Have Allegedly Enabled Chinese Cyber Operations, Signals Collection, and Espionage in the Philippines

Numerous reports have indicated that scam centers in the Philippines were likely linked to Chinese espionage efforts. Philippine police have raided POGOs serving as fronts for scam centers near Clark Air Base (a Philippine Air Force Base previously operated by the United States) and Basa Air Force Base, one of the key bases to which the United States has access under the U.S.-Philippines Enhanced Defense Cooperation Agreement (EDCA).[61] According to

Philippine Senator Risa Hontiveros, "There is persuasive information from the [Philippines] intelligence community" showing that scam compounds have been used for surveillance and hacking activities.[62] Philippine authorities reportedly seized sophisticated listening equipment during raids on scam centers and found evidence of Chinese state-sponsored hackers operating out of scam compounds.[63] The most well-known example of scam centers serving as instruments of Chinese infiltration in the Philippines is the case of Alice Guo, the former mayor of the rural town of Bamban north of Manila.[64] According to media reports, Guo purchased a plot of land in the town in 2019 and invested in constructing a large-scale compound with a license to operate a POGO.[65] After Guo became mayor in 2022, she granted a permit to a company named Zun Yuan Technology Incorporated to continue operating a POGO out of the compound.[66] In February 2024, Philippine police raided the compound and found what reports called "one of the largest scam hubs ever uncovered in the Philippines."[67] According to Philippine investigators who looked into Guo's background after the raid, Alice Guo is actually a Chinese national named Guo Huaping who moved to the Philippines as a child and later obtained a fraudulent Philippine birth certificate.[68] It has since been alleged that Alice Guo was a Chinese spy whose campaign for mayor was "arranged by Chinese state security."[69]

China Has Exploited Scam Centers to Deepen Its Security Presence in Mainland Southeast Asia

Beijing has used the issue of Chinese transnational criminal organizations operating in Southeast Asia as an excuse to pressure Southeast Asian countries to agree to a greater role for Chinese security forces in the region.

- On May 25, 2023, China and Laos agreed to strengthen law enforcement and security cooperation to crack down on transnational criminal activities.[70]
- In September 2024, Cambodia's Minister of Interior Sar Sokha traveled to Beijing and agreed to deepen joint law enforcement cooperation, particularly with regard to transnational crime.[71]
- In January 2025, China hosted a meeting of the Lancang-Mekong Law Enforcement Cooperation mechanism with representatives from Cambodia, Laos, Burma, Thailand, and Vietnam in which the parties agreed to strengthen intelligence sharing and joint operations to crack down on scam centers.[72]

China has successfully exploited the problem of scam centers to pressure Thailand—a U.S. treaty ally that has long resisted allowing Chinese police to operate on its territory—to permit Chinese security forces to work within its borders. After a Chinese actor named Wang Xing was abducted in Thailand and trafficked into a scam center in Burma in January 2025, Chinese tourist arrivals in Thailand reportedly dropped by 33 percent, causing significant harm to Thailand's economy.[73] Under pressure to reassure Chinese tourists, Thai Prime Minister Paetongtarn Shinawatra met with Xi Jinping in Beijing on February 6, 2025, and vowed to "strengthen law enforcement cooperation with China."[74] In late February, Thai-

land allowed high-level Chinese officials and Chinese security forces to participate in cross-border raids on scam centers in Burma that resulted in thousands of Chinese citizens being turned over to Chinese personnel in Thailand and repatriated to China on Chinese charter flights.[75] However, numerous Thai academics and opposition Members of Parliament have since argued that granting China such access violated Thailand's sovereignty and sections of Thailand's penal code prohibiting actions that undermine the independence of the state.[76]

China's Selective Crackdowns Have Prompted Criminal Groups to Target Americans

Beijing has placed intense pressure on governments in Southeast Asia to crack down on scam centers that target Chinese victims.[77] Yet these selective crackdowns have done little to disrupt the increasing scale and scope of scam centers in the region. Instead, China's focus on protecting Chinese victims has accelerated the shift toward targeting Americans.[78]

Despite High-Profile Crackdowns, Scam Centers Continue to Proliferate in Southeast Asia

Recent reports have indicated that scam centers in Southeast Asia are expanding at an "unprecedented scale" despite recent crackdowns.[79] An April 2025 report by the UN Office on Drugs and Crimes concluded that the criminal organizations behind scam centers are "rapidly outpacing" government efforts to contain them.[80] Reports have described scamming operations in Cambodia as being on an "explosive growth trajectory," noting that occasional "show crackdowns" have only served the purpose of alleviating international pressure while the scam industry continues to grow.[81] In Burma, a series of high-profile raids on scam centers has not significantly interrupted their operations. After Chinese law enforcement moved to shut down compounds along the Chinese border with Burma, many simply relocated to the Thai-Burmese border.[82] Attempts to shut down internet access to known scam compounds have likewise proved ineffectual. A *Wired* investigation found that after Thailand began attempting to cut off internet access to scam centers on the other side of its border with Burma in spring 2024, some compounds installed satellite-based internet service to continue their operations without interruption.[83]

Chinese Criminal Groups Have Shifted Focus to Target Americans

China's crackdowns on scam operations targeting Chinese citizens have incentivized criminal groups to target Americans instead.[84] As Beijing has deepened its surveillance over Chinese social media platforms and tightened controls on its banking systems, criminal networks have found it comparatively less risky to target Americans.[85] In 2024, China reported a 30 percent decrease in money lost to online scams.[86] In the same year, the United States witnessed a 40 percent increase in losses from online scamming.[87] According to a February 2025 USIP report, after recent China-led crackdowns, the criminal syndicates operating scam centers in Shwe Kokko shifted

their online recruitment to target individuals with English proficiency to scam Americans and Europeans.[88] In Cambodia, Chinese pressure to crack down on scam centers targeting Chinese citizens has reportedly "had a displacement effect, leading to greater targeting of English-speaking scam victims."[89] Since 2024, scam centers based in Laos have used fraudulent employment advertisements to lure large numbers of Indians who are able to use English to target European and American victims.[90]

According to numerous U.S. indictments, associates of Chinese criminal syndicates are operating on U.S. soil to assist with laundering the profits of scams targeting Americans. In December 2023, the U.S. Department of Justice (DOJ) indicted four individuals in California and Illinois for opening shell companies and bank accounts to launder more than $80 million in losses from pig butchering scams.[91] Since the beginning of 2024, numerous other individuals residing in the United States have been indicted on similar charges related to money laundering for these scams. In May 2024, DOJ announced indictments of two foreign nationals apprehended in the United States for allegedly managing an international criminal syndicate that laundered $73 million in scam proceeds.[92] In February 2025, the U.S. Attorney's Office for the Central District of California announced the arrest of two individuals residing in Los Angeles for laundering $13 million in scam profits.[93]

Chinese Security Forces Have Likely Obtained Sensitive Personal Data of American Scam Victims during Raids

According to Chinese government documents, when Chinese security forces participate in raids on scam centers in Southeast Asian countries, they often confiscate large quantities of devices used by scammers. For example, in 2023 Chinese officials participated in numerous raids on scam centers in Laos and confiscated at least 640 computers and phones used for scamming.[94] In August 2024, China's Ministry of Public Security announced that Chinese security forces had participated in a raid on scam centers in Burma and confiscated a "large quantity" of computers and phones used by scammers, all of which they took back with them to China.[95] These devices likely contain important intelligence pertaining to the Chinese criminal networks as well as highly sensitive private information pertaining to scam victims, including Americans. Jason Tower testified before the Commission that China has been unwilling to share information gleaned from these devices with other countries.[96]

U.S. Government Efforts Have Been Insufficient to Protect Americans from the Increasingly Sophisticated Scams Perpetrated by Chinese Criminal Networks

While the United States has recently implemented several measures to protect Americans from pig butchering scams and combat the Chinese criminal syndicates behind them, the threat from China-linked scam centers to Americans continues to grow rapidly. In January 2024, the Federal Bureau of Investigation (FBI) launched Operation Level Up to identify and notify victims of ongoing scams. As of April 2025, the FBI had notified 5,831 victims of cryptocurrency investment fraud (the vast majority of whom were unaware

they were being scammed), leading to an estimated $359 million in savings.[97] In May 2025, the U.S. Department of the Treasury's Financial Crimes Enforcement Network (FinCEN) labeled the Cambodia-based Huione Group as a primary money laundering concern and proposed severing its access to the U.S. financial system.[98] The United States has also imposed sanctions on several individuals accused of being key players in scam operations.[99] Nevertheless, these measures have not yet deterred Chinese criminal networks, which continue to steal billions of dollars annually from American victims through increasingly sophisticated scams. As long as Chinese criminal networks believe they can earn higher profits with lower risk by scamming Americans, they will likely continue shifting resources away from Chinese targets and toward U.S. victims.

Considerations for Congress

- Americans are now top targets of Chinese criminal organizations operating scam centers in Southeast Asia. In 2024, Americans lost a conservatively estimated $5 billion—a figure that is both likely low and continues to climb. Despite this growing threat, U.S. efforts remain fragmented and under-resourced. Without a coordinated push to raise public awareness, equip law enforcement, and take aggressive action to expose and deter these scams, American losses will almost certainly escalate.
- Chinese criminal networks routinely exploit American social media, dating, and job search platforms to identify and ensnare victims of pig butchering scams. When Southeast Asian governments have cut off internet access to known scam centers, Chinese criminal groups working out of these compounds have used a satellite internet provider to continue scamming uninterrupted. The U.S. government needs to work with technology companies and financial intermediaries to develop systems and procedures to detect and stop sophisticated new scams from reaching Americans. Otherwise, Chinese criminal groups will likely continue exploiting their platforms and services to target Americans with impunity.
- Chinese criminal networks are not only undermining governance across Southeast Asia, they are also providing a pretext for China to expand its security presence in the region. Many Southeast Asian countries lack the capacity to counter sophisticated criminal syndicates, making them increasingly vulnerable to Chinese influence. China-linked scam centers offer the United States a strategic opportunity to strengthen law enforcement cooperation with regional partners—especially allies like the Philippines and Thailand—on an issue of shared concern. If the United States does not strengthen its relationships with Southeast Asian countries and help them build the capacity to tackle scam centers, these countries will likely grow more reliant on China to address transnational crime, further entrenching Beijing's presence and influence.

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CHAPTER 5: SMALL ISLANDS, BIG STAKES: CHINA'S PLAYBOOK IN THE PACIFIC ISLANDS

Executive Summary

As the United States' gateway to the Indo-Pacific region, the Pacific Islands occupy a crucial position in U.S.-China strategic competition. While the United States has relationships with many Pacific Islands dating back more than a century, China's systematic efforts to build influence in the region over the past few decades have heightened the Pacific Islands' strategic significance to the United States and its allies and partners. For Beijing, the Pacific Islands region is crucial to its goals of projecting military power and hindering the United States' ability to flow forces across the Pacific in the event of a conflict in the Taiwan Strait or the broader Indo-Pacific region. In pursuit of these goals, China has sought to enhance its status in the Pacific Islands through diplomacy and strategic investments while also attempting to undermine U.S. relationships through a systematic campaign of malign influence activities, including cyberattacks, economic coercion, and disinformation.

China has become a key trade and investment partner for virtually every Pacific Island country, enabling it to wield economic leverage that helped convince several countries in the region to abandon diplomatic ties with Taiwan and support Beijing's policy preferences in international organizations. Over the past several years, China has also begun to use its economic and political influence in the region to push for new security partnerships and police cooperation agreements with Pacific Island countries, laying the groundwork for Beijing to gain access to dual-use facilities at strategic points throughout the region. If China succeeds at establishing itself as the dominant power in even a small number of the Pacific Islands, it could—alongside China's efforts to project military power in Southeast Asia—hinder the United States' ability to protect its interests in the Indo-Pacific and significantly alter the global balance of power in Beijing's favor.

Key Findings

- Beijing views the Pacific Islands region as essential to its goals of blunting U.S. military power in the Indo-Pacific, projecting its own power beyond the second island chain, and isolating Taiwan diplomatically and militarily. China has invested significant resources into a multifaceted strategy to expand its influence and undermine U.S. relationships across the region to achieve these objectives.

- Over the past two decades, China has systematically expanded high-level diplomacy, propaganda, people-to-people exchanges, media penetration, and malign influence activities in the Pacific Islands in an attempt to shape the region's information environment in ways favorable to Beijing and harmful to the United States and its allies and partners.
- China has spent decades building economic influence in the Pacific Islands. China is now a major trade partner for almost every Pacific Island country, far outpacing the United States and even overtaking traditional partners like Australia. The dependence of Pacific Island economies on exports to China and Chinese tourism have exposed the region to China's economic leverage and coercion. China has also exploited its investments in the region to engage in elite capture, entrench preferred providers in critical infrastructure, and develop control over critical resources.
- Over the past several years, China has leveraged its political and economic influence to expand security and police cooperation with Pacific Island countries, enabling Beijing to promote authoritarian security norms and potentially lay the groundwork for access to dual-use facilities.
- The United States has deep ties to the Pacific Islands that long predate the more recent efforts by China to build influence and undermine U.S. partnerships in the region. In response to China's growing presence in the region, the United States and like-minded countries such as Australia and Japan have taken significant steps to further enhance ties with Pacific Island countries.
- Nevertheless, China is working to exploit reductions in U.S. diplomatic and development assistance in the region and advance the narrative that China is the more stable long-term partner. The relative weakening of U.S. influence in the Pacific Islands could have severe implications for U.S. power projection in the Indo-Pacific, potentially hindering the United States' ability to deter Chinese military aggression in the South China Sea, the Taiwan Strait, and globally.

Introduction

On most world maps used in the United States, the Atlantic Ocean appears at the center, while the countries of the Pacific Islands are—quite literally—marginalized, appearing only as tiny specks, many of them unlabeled, at the far edge of the page.[1] Yet the expansive territory they occupy in the Pacific Ocean has geographically put them in the middle of U.S.-China strategic competition. In the decades prior to World War II, a rising East Asian power (Japan) worked methodically to build dual-use infrastructure, engage in resource extraction, and construct defensive fortifications on islands across a large swath of the central Pacific.[2] After Japan attacked Pearl Harbor on December 7, 1941, the United States had to engage in a brutal "island hopping" campaign to fight its way across the Pacific, losing more than 100,000

American lives in the process.[3] The region continues to be vital as a gateway across the Pacific. China has carefully studied the Pacific Theater of World War II for insights into how Japan could have defeated the United States, and since the beginning of the 21st century it has been aggressively expanding its political, economic, and security influence across the Pacific Islands region.[4] China's efforts to dominate this area are part of Beijing's larger strategy—which also includes the pursuit of military bases in Southeast Asia and the militarization of the South China Sea—to challenge the status of the United States as an Indo-Pacific Power and deter U.S. intervention in a Taiwan contingency.*

The Pacific Islands Region Is Key to Strategic Competition in the Indo-Pacific

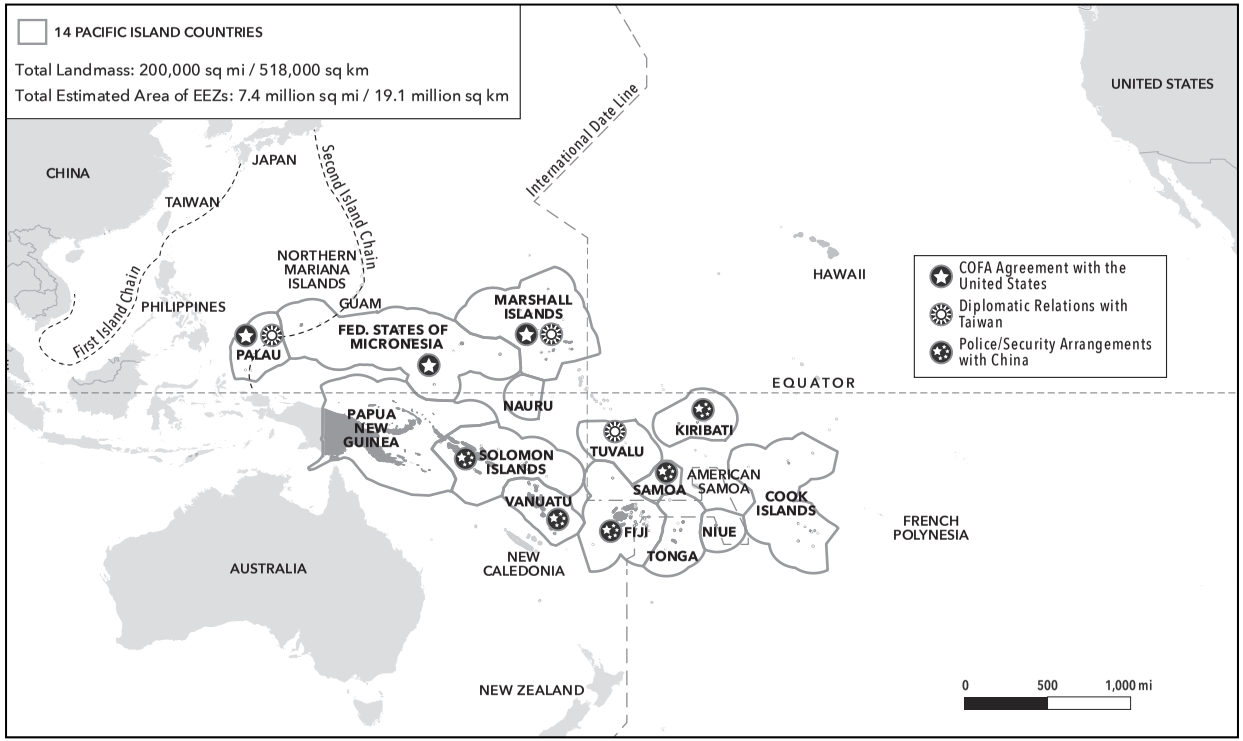
China views the Pacific Islands region as essential to its goals of blunting U.S. military power in the Indo-Pacific, projecting its power past the second island chain, and isolating Taiwan both diplomatically and militarily. While the United States has long appreciated the strategic significance of the Pacific Islands, China's increasingly assertive actions in the region have prompted the United States and like-minded countries to take steps to shore up their ties with countries in the region. Although most Pacific Island countries would prefer to remain neutral in U.S.-China strategic competition and benefit from engagement with both countries, some Pacific Island leaders have begun cozying up to China, while others have raised the alarm about the harmful consequences of China's growing influence.

The Small and Diverse Countries of the Pacific Islands Region Occupy a Highly Significant Strategic Location

The Pacific Islands region is vast—spanning nearly 15 percent of the Earth's surface—and includes 14 countries as well as the U.S. state of Hawaii and the U.S. territories of Guam, American Samoa, and the Northern Mariana Islands.[5] Pacific Island countries range widely in size and population. The largest Pacific Island country, Papua New Guinea, has a population of more than ten million and a total land area slightly larger than California, while the smallest, Nauru, has a population of approximately ten thousand and a total land area an eighth the size of Washington, DC.[6] Culturally and geographically, the Pacific Islands can be grouped into three major subregions. Micronesia (located east of the Philippines) has long had close ties to the United States and is home to the U.S. territories of Guam and the Northern Mariana Islands as well as the Freely Associated States of Palau, the Marshall Islands, and the Federated States of Micronesia. Melanesia, which has traditionally had close ties with Australia and New Zealand, includes Papua New Guinea, Fiji, the Solomon Islands, and Vanuatu. Polynesia, which stretches across the central and southern Pacific, includes both French Polynesia and American Samoa, among other states and territories.[7]

*This chapter's findings are based on the Commission's March 2025 hearing on "Crossroads of Competition: China in Southeast Asia and the Pacific Islands" and open source research.

Figure 1: Map of the Pacific Island Countries



Note: The 14 Pacific Island countries refer to Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu. There are three permanently inhabited U.S. territories in the region: American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands. EEZs are depicted using the standard 200 nautical mile baseline from countries' coastlines.

Source: Various.[8]

The Compacts of Free Association (COFA)

The United States maintains Compacts of Free Association (COFA) with three Pacific Island Countries: Republic of the Marshall Islands, Federated States of Micronesia, and Palau—which are referred to as the "Freely Associated States" (FAS).[9] The COFA agreements grant the United States full military access to all three countries along with the "right of strategic denial," which permits the United States to deny third parties access to their territory, airspace, and territorial waters.[10] In turn, the FAS receive U.S. economic assistance and security guarantees, and FAS citizens have the right to work and reside in the United States and serve in the U.S. military.[11] The United States initially signed COFA agreements with the Marshall Islands and Federated States of Micronesia in 1982, followed by Palau in 1986.[12] In 2023, the United States and each country agreed to extend their COFA agreements for another 20 years.[13] The United States' close partnerships with the FAS are essential to its defense posture in the Indo-Pacific and ability to respond rapidly and effectively in the event of a military conflict in the region.[14]

The Pacific Islands region has enormous geostrategic and military importance to both the United States and China. From the perspective of U.S.-China competition, among the most strategically important geographical features in the Pacific are two "island chains" that have long been important to the United States' defense posture in the Indo-Pacific.[15] The first island chain stretches through Japan, Taiwan, and the Philippines—all important U.S. allies and partners.[16] The second island chain encompasses the Northern Mariana Islands, Guam, Palau, and the Federated States of Micronesia—all of which are either U.S. territories or Pacific Island countries closely tied to the United States through COFA agreements.[17]

The United States' military infrastructure and access rights along the second island chain would be essential during a potential conflict in the Taiwan Strait, the South China Sea, or elsewhere in the Indo-Pacific.[18] U.S. military bases, fuel storage facilities, and distribution centers in Guam would likely serve as the "gas station, repair shop, and command center" for U.S. forces during a confrontation with the People's Liberation Army (PLA).[19] The U.S. military is currently in the process of enhancing its facilities in COFA states, such as a $400 million upgrade to airfield facilities on the island of Yap in the Federated States of Micronesia as well as an over-the-horizon radar facility and significant upgrades to port facilities in Palau.[20]

The United States has also increased defense cooperation with Pacific Island countries beyond the second island chain. The United States signed a Defense Cooperation Agreement with Papua New Guinea in 2023 to pave the way for expanded bilateral and multilateral military exercises.[21] In November 2024, the United States signed a defense agreement with Fiji to enhance logistics cooperation and begin negotiations on a Status of Forces Agreement, enabling the two countries' militaries to work more closely together.[22]

Beijing views the United States' strong position in the Pacific Islands region—and especially along the first and second island chains—as essential to what it sees as a U.S. "containment" strategy targeted at China.[23] Cleo Paskal, a non-resident senior fellow at the Foundation for Defense of Democracies, testified before the Commission that as long as U.S. territories and COFA states along the second island chain "remain outside Beijing's control, there will be limits on its aggression, expansion, and ambitions."[24] The Pacific Island countries located beyond the two island chains could potentially also provide great strategic value to China, as they could serve as resupply points as well as locations for radar, satellite tracking, intelligence gathering, and weapons systems—making them valuable locations for monitoring and potentially targeting ships transiting the Pacific and disrupting the flow of forces in a conflict.

China's Overarching Goals in the Pacific Islands Are to Blunt U.S. Power and Project Its Own Military Might across the Indo-Pacific

Beijing's primary strategic goals in the Pacific Islands region are to gain the ability to impede the flow of U.S. forces and logistics across the Pacific Ocean during a potential conflict and to be able to project power beyond the second island chain. Beijing also sees the Pacific Islands region as essential to its long-term goal of projecting military and economic power on a global scale. Chinese academic experts have argued that the Pacific Islands occupy an "extremely important position" within Chinese strategic planning due to their geographic location as gateways to Oceania and South America.[25] The high strategic value Beijing places on the Pacific Islands is informed by decades of Chinese research on the Pacific Theater of World War II, including extensive counterfactual analysis on what Japan could have done differently to defeat the United States.[26] Cleo Paskal testified before the Commission that Beijing has concluded that its ability to take Taiwan by force might be contingent on denying the United States ready access to the first and second island chains as well as its treaty allies in East Asia and the South Pacific.[27] Therefore, China's strategy to counter the United States in the Pacific Islands has focused on undermining U.S. partnerships and building Chinese influence in the region in order to be in a position to pressure Pacific Island countries not to support the United States in the event of conflict.[28]

Beijing Has Pressured Pacific Island Countries to Abandon Taiwan

In addition to the region's immense geostrategic and military significance, Beijing also sees the Pacific Islands as crucial to its goal of diplomatically isolating Taiwan. Beijing has successfully pressured some Pacific Island countries to switch diplomatic recognition from Taipei to Beijing, including Kiribati and the Solomon Islands in 2019 and Nauru in 2024.[29] Only three Pacific Island countries still maintain diplomatic relations with Taiwan: Palau, Tuvalu, and the Marshall Islands.[30] China has wielded a variety of economic carrots and sticks to convince these last holdouts to switch recognition. In 2017, China penalized Palau for its continued refusal to recognize

Beijing by restricting Chinese tourism to the country—significantly harming Palau's economy, which had become dependent on Chinese visitors.[31] (For more on Chinese tourism in the region, see "Expanding Trade Has Deepened Pacific Islands' Dependence on China" below.) In 2024, Palau attributed a cyberattack to China after attackers stole 20,000 documents from the Palau government and posted them on the dark web just hours before a celebration of a large aid agreement was to take place at the U.S. Embassy in Palau.[32] To entice the Marshall Islands, China has offered to lower import taxes for Marshallese-flagged ships entering Chinese harbors in return for switching diplomatic recognition—a significant incentive because the Marshall Islands has the world's third-largest ship registry.[33] These efforts have thus far been unsuccessful, with the leaders of both countries recently expressing the close and enduring nature of their relationships with Taiwan.[34]

The United States and Its Allies Have Deepened Their Engagement with the Region

The United States and like-minded countries such as Australia and Japan have long engaged the Pacific Islands and have deepened that engagement as China has more aggressively courted influence in the region. In 2023, the United States, the Marshall Islands, the Federated States of Micronesia, and Palau agreed to renew their respective COFA agreements, preserving the United States' exclusive, unfettered military access to this strategic area of the Pacific for another 20 years.[35] Under the renewed COFA agreements, the United States will provide a cumulative total of $7.1 billion in assistance to the three COFA states over the period of the agreements.[36] In December 2024, Australia signed multimillion-dollar deals with Nauru and Papua New Guinea that affirm Australia's status as their "major security partner," providing Australia with the right to withdraw funding should they sign security agreements with third countries outside the "Pacific Family."[37] That same month, Australia reached an agreement to provide the Solomon Islands with $118 million to expand its police force.[38] In addition to the United States and Australia, Japan has continued to work through platforms such as the Pacific Island Leaders Meeting to expand its cooperation with Pacific Island countries on priority issues for the region, including climate, sustainable fishing, and connectivity.[39]

Many Pacific Island Countries Hope to Benefit from Increased Attention Due to U.S.-China Competition, but Some Regional Leaders Remain Wary of Excessive Chinese Influence

In the context of escalating U.S.-China geopolitical rivalry, the leaders of many Pacific Island countries hope to avoid taking sides while benefiting from aid and investment from China, the United States, and U.S. allies and partners. Australian National University Professor Graeme Smith testified before the Commission that "the mantra 'friends to all, enemies to none' is heard so frequently as to be open to parody, but it reflects the genuine connection of many Pacific nations to the non-aligned movement."[40] Regional leaders such as Meg Taylor, former secretary general of the Pacific Islands

Forum, have explicitly argued that Pacific Island countries have an opportunity to play China and the United States off of one another to maximize investment from both. As Taylor stated in 2019, "In general, forum members view China's increased actions in the region as a positive development, one that offers greater options for financing and development opportunities—both directly in partnership with China and indirectly through the increased competition in our region."[41] The Solomon Islands, for example, has exploited geopolitical competition in the region to attract large new investments from both China and Australia.[42] As the host of the 2025 Pacific Islands Forum meeting, the Solomon Islands broke with precedent by excluding all dialogue partners—including the United States, China, and Taiwan—from participating in the meeting.[43] Analysts argued that the Solomon Islands' decision to exclude all dialogue partners was a "compromise" that enabled it to accommodate Chinese demands to exclude Taiwan while avoiding the appearance of choosing sides.[44]

Yet some leaders in the Pacific Islands—particularly in countries that have COFA agreements with the United States and in U.S. territories—have been highly critical of China's growing influence. In March 2023, then–President of the Federated States of Micronesia David Panuelo issued a scathing criticism of how China was attempting to build influence in the region to attempt to secure Pacific Island countries' acquiescence to China's positions on issues ranging from Taiwan to deep-sea mining.[45] In March 2025, William A. Parkinson, a local senator in Guam, stated, "We are a tiny island but we are too strategically important to be left alone. Stay with America or do we let ourselves be absorbed by China?"[46]

China Is Taking a Multifaceted Approach to Deepening Ties with the Pacific Islands and Undermining U.S. Influence

In order to achieve its geostrategic and military objectives in the Pacific Islands, Beijing has invested significantly in a decades-long, multi-vector campaign to build political and economic influence throughout the region. Beijing's systematic approach to increasing its leverage over Pacific Island countries has involved high-level diplomacy, soft power initiatives, trade deals, and strategic investments as well as malign influence activities.

China Has Systematically Expanded Diplomatic Efforts in the Pacific Islands

Over the past two decades, China has devoted significantly more resources than the United States toward diplomacy with the Pacific Islands. China conveys the importance it places on the region through frequent high-level visits and meetings. General Secretary of the Chinese Communist Party (CCP) Xi Jinping has met face-to-face with Pacific Island leaders 32 times since 2014 and made two visits to the region, traveling to Fiji in 2014 and Papua New Guinea in 2018.[47] In 2022, Chinese Foreign Minister Wang Yi visited the region and proposed a China-Pacific Island Countries Common Development Vision, which offered deeper collaboration on policing, security, data networks, and cybersecurity as well as the creation

of a free trade area.[48] While Pacific Island countries rejected the agreement, China has continued to expand its diplomatic engagement with the region in recent years through frequent high-level contacts.[49]

Diplomatic initiatives such as the China-Pacific Island Countries Economic Development and Cooperation Forum, which was first convened in Fiji by China's then–Premier Wen Jiabao in 2006 and has been held periodically since, create space for minister-level discussions on joint economic initiatives.[50] China continued to use gatherings like the Third China-Pacific Islands Foreign Ministers' Meeting on May 28–29, 2025, chaired by Foreign Minister Wang Yi, to promote itself as an alternative to the United States for trade and climate partnership and to oppose support for Taiwan.[51] The United States has also made efforts to increase high-level engagement with the Pacific Islands. In 2022, then–President Joe Biden hosted the U.S.-Pacific Islands Summit in Washington, and then–Secretary of State Antony Blinken visited the region in both 2022 and 2023.[52] Nevertheless, no U.S. president has visited a Pacific Island country, and U.S. presidents rarely hold one-on-one meetings with Pacific Island leaders.[53] While the United States has taken steps in the past few years to open new embassies in the Solomon Islands, Tonga, and Vanuatu, in many Pacific Island countries, Chinese diplomats outnumber their U.S. counterparts by a ten-to-one ratio.[54] Chinese embassies are often the largest missions in a country, staffed with diplomats who are proficient in local languages.[55]

China has also invested in research and education about the Pacific Islands to equip new generations of Chinese diplomats, scholars, and businesspeople to expand the country's influence throughout the region. Beijing Foreign Studies University offers courses in all Pacific Island languages.[56] China has multiple think tanks dedicated specifically to the Pacific Islands, and there are more than 50 scholars studying the region at Liaoning University in Shandong alone.[57] China has also opened several Confucius Institutes at universities in the region that provide opportunities for Pacific Islander students to learn Mandarin and scholarships for them to study in China.[58] Confucius Institutes, which have close ties to the CCP's Propaganda Department and United Front Work Department, are an integral part of China's overseas influence operations and have been used to pressure host universities to censor teaching, research, and activities that paint China in a negative light.[59] The former Prime Minister of Fiji, Mahendra Chaudhry, has argued that Confucius Institutes serve as vehicles for Chinese "indoctrination" in the Pacific Islands region.[60]

China Has Attempted to Shape the Information Environment in the Pacific Islands

In addition to formal diplomacy, China has also adopted a range of tactics aimed at shaping the information environment in Pacific Island countries to promote Chinese propaganda and sow distrust in the United States. As it has in other regions, China has provided all-expenses-paid trips to China for journalists and academics from the Pacific Islands.[61] The Solomon Islands, which

switched its recognition from Taipei to Beijing in 2019, has long been a target of these programs. Desmond Rave, the Royal Solomon Islands Police Force's media officer, said his April 2025 trip convinced him that many criticisms of China are "purely negative propaganda."[62] China has also sought to shape local discourse by exerting influence over traditional local media outlets and propagating its own disinformation campaigns.[63] In 2022, the Chinese government gave $133,000 to the *Solomon Star*, a major newspaper in the Solomon Islands, on the condition that the paper would portray China "as the most generous and trusted development partner in Solomon Islands."[64] When confronted about the case, the *Solomon Star* published a reply stating that many other media outlets in the country had similarly sought Chinese government funding.[65]

China has flooded the Pacific Islands with disinformation targeting the United States and its allies and partners. For example, Chinese-controlled media outlets disseminated false claims that the United States and Taiwan instigated riots in Honiara, the capital of the Solomon Islands, which broke out in protest of the country's decision to recognize Beijing instead of Taipei.[66] Chinese state media outlet *Global Times* falsely blamed the United States and Taiwan for inciting the unrest, and its accusations were then echoed by the *Solomon Star*.[67] China also manufactured rumors about U.S. interference ahead of the Solomon Islands' 2024 election.[68] For example, the *Global Times* published an article titled "Allegations of US Interference Emerge Ahead of Pivotal Election in Solomon Islands," which was rife with disinformation, including unsubstantiated rumors that the United States intended to topple the Solomon Islands' government.[69] The article also suggested that the United States intended to incite "another" riot ahead of the elections.[70] These allegations are particularly ironic as officials in the Solomon Islands have called out numerous instances of China attempting to use bribery and coercion to interfere in its domestic politics.[71]

China Has Sought to Exploit Reductions in U.S. Development Assistance to Present Itself as the More Reliable Partner to Pacific Island Countries

The Pacific Islands is the most aid-dependent region in the world, and Beijing has sought to capitalize on the recent cuts in U.S. assistance to the region by reiterating China's commitment to providing developmental assistance to Pacific Island countries. Local media throughout the region have warned about the potential negative consequences of cuts to U.S.-funded programs in areas such as health and climate change.[72] China has sought to exploit this concern for propaganda purposes. In a recent interview, China's Ambassador to Fiji, Zhou Jian, stated, "Regardless of whether other countries alter their foreign aid policies, China will continue providing PICs [Pacific Island countries] with sincere, no-strings-attached assistance as we always have."[73] During a meeting between China and the foreign ministers of 11 Pacific Island countries in Xiamen, China, on May 28–29, 2025, China vowed not to make "empty promises" with regard to foreign as-

sistance and agreed to "continue to do all it can to support and help Pacific Island countries with economic development and improving people's livelihood."[74] China's recent statements about aid to the Pacific Islands have often focused on climate change, which consistently ranks as the region's top priority.[75] Drawing an implicit contrast with the United States, China's May 2025 Joint Statement with Pacific Island countries called for "full and effective implementation of the Paris Agreement," asked that "advanced economies" take the lead on climate mitigation, and promised that China would continue providing "help and support" to the Pacific Islands on climate issues.[76]

U.S. Foreign Aid Has Supported Palau's Efforts to Build Resilience against Chinese Malign Influence

U.S. foreign assistance has been crucial to helping Palau, which has defense ties and a COFA agreement with the United States and is one of three remaining Pacific Island countries that recognize Taiwan, build resilience against intense Chinese pressure to switch its allegiance. China has subjected Palau to an influence campaign aimed at undermining the country's role in the United States' regional defense posture. In recent years, Chinese actors have hit Palau with numerous cyberattacks.[77] Individuals linked to China's United Front Work Department and to China-linked criminal organizations have leased land near military installations and bribed Palauan officials to support China's interests.[78] Individuals with ties to the Chinese government are executing an aggressive influence campaign that appears to be focused on blocking U.S. military installations in Palau, which reportedly involves bribes to government officials.[79] Many of the same individuals are also reportedly involved in other criminal activity, such as drug smuggling, online gambling operations, money laundering, prostitution, kidnappings, and a gruesome killing with the corpse carried away in a suitcase.[80]

The United States has been a significant financial supporter of Palau's government in the past several years with $80.4 million in financial support to Palau's government planned for the fiscal year that began in October 2024. This would equate to approximately 57 percent of Palau's expected government revenue and 23 percent of its projected total gross domestic product (GDP).[81] While the vast majority of U.S. foreign assistance to Palau is provided through the U.S. Department of the Interior as part of the U.S.-Palau COFA agreement, the U.S. Agency for International Development (USAID) historically also provided grants for programs related to disaster preparedness, electoral integrity, and digital resilience.[82]

U.S. foreign aid to Palau has been focused on helping Palau build resilience against various forms of Chinese malign influence:

- Palau's President Surangel Samuel Whipps Jr. has stated that Beijing has attempted to manipulate national elections in Palau, "erode leadership, disrupt vital services, and weaken confidence in government;" he has also stat-

U.S. Foreign Aid Has Supported Palau's Efforts to Build Resilience against Chinese Malign Influence—*Continued*

ed that Palau's location places it "under constant threat... the best way to combat this is through partnership with like-minded nations who believe that peace comes through strength, and presence is deterrence."[83] USAID has provided numerous grants to promote election integrity and independent media in Palau.[84]

- In 2020, the United States partnered with Australia and Japan on a $30 million project—$3.8 million of which was provided by USAID—to expand reliable and secure digital connectivity in Palau by connecting the island to transpacific undersea fiber optic cables.[85] According to reports, there have been several recent instances of Chinese research vessels suspiciously lingering over undersea cables near Palau.[86] (For more on China sabotaging undersea cables as a gray zone pressure tactic, see Chapter 2, "U.S.-China Security and Foreign Affairs (Year in Review).")
- In 2021, the U.S. Department of the Interior announced a $2.7 million technical assistance program grant to remove all Huawei technology from Palau's core mobile networks and replace it with trustworthy telecommunications equipment that meets internationally recognized standards.[87]

U.S. support for resilience-building activities in Palau has been crucial to helping the country resist China's efforts to undermine its sovereignty. It is likely that China will further increase its malign influence activities in Palau to exploit any significant changes or reductions to U.S. foreign assistance, which could severely harm Palau's democracy and threaten the integrity of the U.S. security architecture in the region.[88]

China Leverages Deeper Economic Ties to the Pacific Islands to Achieve Its Strategic Aims in the Region

Alongside its efforts to increase its diplomatic influence in the Pacific Islands and control the region's information environment, China has spent decades building economic leverage in Pacific Island countries. While commercial interests may have provided some of the original impetus for Chinese firms to explore opportunities in the region, the CCP now seeks to leverage expanded economic ties to achieve its geostrategic aims in the region, often wielding the sheer volume of its trade and investment as a weapon and deploying unscrupulous measures such as bribery.

China Expands Economic Engagement with Pacific Island Countries Primarily Due to the Region's Strategic Value Rather than Its Economic Significance

The small size and scattered nature of the Pacific Island countries are defining characteristics for their external economic relations. The combined GDP of the Pacific Islands represents far less than 1 percent of the global total.[89] Niue has the smallest GDP

among Pacific Island countries at an estimated $31 million.[90] Only four of the Pacific Island countries have an annual GDP above $1 billion: Vanuatu, Solomon Islands, Fiji, and Papua New Guinea.[91] Exports of natural resources, remittances from overseas Pacific Islanders, and inbound tourism represent vital sources of income for these countries, but small populations make it difficult to achieve scale in industry and trade.[92] After an initial rebound in the wake of the COVID-19 pandemic, growth has moderated to pre-pandemic levels.[93] The Pacific Islands are expected to face further headwinds, including reduced investment and natural disasters that could lead to subdued growth moving forward.[94]

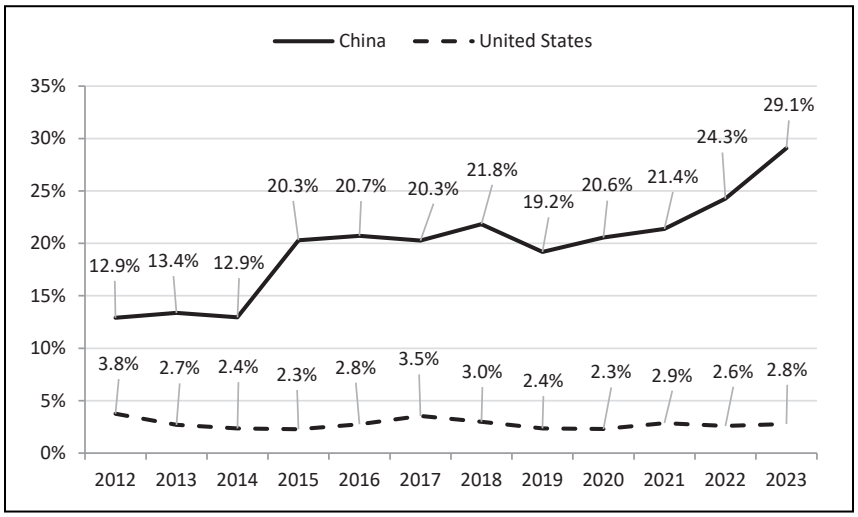
Considering the region's relatively low economic importance to China, China's continued high level of economic engagement with the Pacific Islands is reflective of the strategic importance of the region. Historically, Pacific Island economies have benefited from robust and longstanding economic ties with regional partners, including Australia, New Zealand, Japan, and the United States.[95] After decades of small-scale Chinese business activities in the region, China now constitutes an important and growing market for Pacific Islands' exports of natural resources and inbound tourism, driven by a confluence of private and state interests under the umbrella of the Belt and Road Initiative (BRI).[96] Despite the growing awareness of the risks that accompany closer economic ties to China, Pacific Island leaders have also sought to leverage Chinese infrastructure investment to boost their economies.[97]

China Cultivates Multiple Sources of Economic Leverage over the Pacific Islands

China has accumulated significant economic leverage over Pacific Island countries by expanding trade, investing in strategic sectors, and promoting tourism to the region. China is now the largest regional trading partner to the Pacific Islands as a whole, exposing them to potential geopolitical pressure and economic coercion. Other than sheer magnitude, several features of China's economic ties with the region are notable:

- *The region is dependent on trade with China*. China's share of total goods trade with Pacific Island countries grew from roughly 13 percent in 2012 to 29 percent in 2023 (see Figure 2). China is also the largest trade partner for four of the 14 countries, including three out of the four largest Pacific Island economies (Papua New Guinea, the Solomon Islands, and Vanuatu), and is in the top three trading partners for 12 out of 14 Pacific Island countries (see Table 1).

Figure 2: United States' and China's Share of Total Pacific Islands Trade, 2012–2023



Note: This figure excludes trade between Pacific Islands countries in calculating the percentage of total trade.
Source: CEPII, "BACI: International Trade Database at the Product-Level," January 30, 2025.

Table 1: United States' and China's Goods Trade with Pacific Island Countries in 2023

	Trade as Percentage of Total		Trade Surplus (Deficit) with China (millions USD)	Rank as Trade Partner	
	China	United States		China	United States
Cook Islands	7%	2%	(11.6)	3	Not in top 5
Fiji	13%	12%	(479.3)	3	4
Fed. States of Micronesia	18%	14%	5.3	2	3
Kiribati	17%	1%	(37.7)	2	Not in top 5
Marshall Islands	42%	1%	(3,506)	1	Not in top 5
Nauru	2%	1%	(6.0)	Not in top 5	Not in top 5
Niue	<1%	14%	<0.1	Not in top 5	2
Palau	24%	11%	(42.0)	2	4
Papua New Guinea	27%	1%	2,260	1	Not in top 5

Table 1: United States' and China's Goods Trade with Pacific Island Countries in 2023—*Continued*

	Trade as Percentage of Total		Trade Surplus (Deficit) with China (millions USD)	Rank as Trade Partner	
	China	United States		China	United States
Samoa	16%	8%	(98.2)	3	Not in top 5
Solomon Islands	49%	1%	74.5	1	Not in top 5
Tonga	20%	6%	(56.7)	3	4
Tuvalu	28%	1%	(41.9)	2	Not in top 5
Vanuatu	21%	2%	(110.1)	1	Not in top 5

Source: CEPII, "BACI: International Trade Database at the Product-Level," January 30, 2025.

- *Both China and the Pacific Islands have actively fostered bilateral trade opportunities.* The Pacific Islands have encouraged trade with China through Pacific Trade Invest (PTI), the lead Pacific trade and investment organization with a mandate from Pacific Islands Forum leaders to facilitate the expansion of economic linkages with the world.[98] PTI has offices in China, Australia, Europe, and New Zealand. In return, Chinese officials have hosted Pacific Islands leaders in China to discuss deepening economic cooperation.[99]
- *China dominates exports of natural resources from the Pacific Islands, which is the main driver of economic growth for the largest Pacific Island countries.*[100] China has established a dominant position in the timber trade in the Pacific Islands, with timber among the top three exports to China from Papua New Guinea, the Solomon Islands, Fiji, and Vanuatu in 2023.[101] Papua New Guinea, the Solomon Islands, and Vanuatu exported 89 percent, 93 percent, and 99 percent of their wood products by value to China, respectively.[102] China also dominates the mining industry in Papua New Guinea, which exported $2.8 billion in mineral fuels and nickel—41 percent of its total exports of these materials—to China in 2023.[103]
- *China has structured its investments to cement access to extraction rights in the Pacific Islands.* China has invested in Papua New Guinea's gold and nickel mines, often extending loans to local operators that help Beijing cement access to critical minerals output through its state-owned enterprises (SOEs).[104] In the mining sector, in particular, Chinese loans are typically structured as limited recourse tied to the assets of the project, and Chinese stakeholders are guaranteed a share of the mine's output.[105]
- *Natural resource extraction in partnership with Chinese firms has contributed to severe environmental degradation and illegal land reclamation.* Illegal logging and deforestation are

widespread issues in the Pacific Islands' timber industry, impacting Papua New Guinea, Tonga, Vanuatu, and the Solomon Islands, and China is a primary buyer of these timber products.[106] Myriad issues—including illegal reclamation of land from rightful landowners and tax evasion—plague the logging industries in these countries.[107] Chinese exporters have often sourced timber from illegally operated land leases in Papua New Guinea, looking the other way when questions over origin arise.[108] Disputes over control and environmental issues in mining operations have sparked dissatisfaction with Chinese-owned mines in Papua New Guinea.[109] While Western firms operating in the Pacific Islands are not free from blame, China's sheer size in natural resource extraction and its volume of imports from the region makes it an important stakeholder and gives it outsized influence on governance in these industries.

- *Tourism is a vital revenue source for the Pacific Islands, and China is supporting initiatives that will deepen Pacific Island countries' dependence on Chinese tourism.* The tourism industry comprises upward of 40 percent of the economy in the Cook Islands, Vanuatu, Palau, and Fiji and at least 5 percent in every other country except for Papua New Guinea and Nauru.[110] Countries in the region have experienced major economic hardship during prior interruptions to tourism, including the COVID-19 pandemic and other disruptions to regional air travel.[111] While Chinese tourists remain low as a percentage of total arrivals—2 percent in 2023—the proportion of Chinese visitors can be significant in certain countries, and China has launched a number of initiatives with Pacific Island countries to grow outbound tourism to the region.[112] China's efforts include negotiating for new commercial flight routes to the Pacific Islands from the Mainland, providing training to local industry participants to help ensure standards of service for Chinese tourists, and funding airport upgrades to relieve capacity constraints on the number of arrivals.[113]

China Seeks to Monopolize Untapped Undersea Critical Minerals

China has sought to secure privileged access to untapped critical mineral resources by including clauses in its proposed security agreements for the region that grant access to seabed mining rights. China holds the largest number of exploratory licenses for deep-sea mining with the International Seabed Authority.[114] While the three existing licenses issued by the Cook Islands for exploration in its exclusive economic zone (EEZ) are not held by Chinese entities, the Cook Islands and China signed a memorandum in February 2025 to deepen cooperation and communication on seabed mining.[115] Likewise, Kiribati's relevant ministry held talks with the Chinese ambassador on "deep ocean resources" in March 2025.[116] In addition to seeking exploration licenses, China has also reached out to international seabed mining companies seeking to establish processing partnerships.[117]

China Seeks to Monopolize Untapped Undersea Critical Minerals—*Continued*

The Pacific Ocean's seafloor is rich in minerals that are used for energy and defense technologies—including nickel, cobalt, copper, and manganese—and that hold the potential to diversify global supply chains currently dominated by China.[118] However, there are significant regulatory and technical barriers slowing the progression of seabed mining. The seabed mining industry is still in the exploratory phase, as regulations governing the extraction of these minerals in international waters and set by the International Seabed Authority are incomplete.[119] Many Pacific Island countries have called for a moratorium on seabed mining, largely due to environmental concerns, despite the potential associated revenues.[120] If China successfully positions itself as the dominant player in seabed mining in the Pacific Ocean, it could help Beijing maintain its chokehold on critical mineral supply chains.

China Exploits Its Economic Leverage over Pacific Island Countries as a Tool of Political Influence

In recent years, China has sought to wield its economic leverage over Pacific Island countries as an instrument of political pressure—especially on the issue of diplomatic recognition of Taiwan. The CCP uses Chinese business interests entrenched in the Pacific Island economies as a source of bargaining power to achieve its geopolitical interests, especially when Chinese companies have a large market share and the industry is politically powerful in the target country.[121] In the years before Kiribati switched its diplomatic recognition from Taiwan to the People's Republic of China (PRC), Chinese companies had reportedly built up significant ownership and influence in the fishing industry, from which the Kiribati government receives the majority of its revenue.[122] These close ties in commercial fishing likely influenced Kiribati's decision to recognize Beijing. According to the Lowy Institute's Pacific Aid Map, Kiribati received no development finance from China up until 2020, after which it received $64.1 million over the next three years.[123] As noted above, tourism is important to many of the Pacific Island economies, and China has used tourism as a tool of economic coercion, with ministries such as the China National Tourism Administration issuing travel warnings or imposing direct restrictions to halt travel to particular countries.[124] For example, by 2017, Chinese tourists had grown to represent 54 percent of visitors to Palau.[125] However, in November of that year, China instituted a ban on tourist groups to Palau in an attempt to pressure the country to swap its diplomatic recognition from Taiwan to China.[126] Despite the subsequent huge drop, Chinese tourists still make up the largest share of foreign arrivals to Palau as of 2024, and China continues to offer hotel and tourism development deals as an enticement for Palau to drop ties with Taiwan.[127]

China Seeks Inroads into Correspondent Banking in the Pacific

Global financial institutions have exited markets in the Pacific Islands, leaving fewer options for Pacific Islanders to access vital financial services, and China is eager to step in. Traditionally, the largest providers of banking services in the Pacific Islands were Australian or local banks. However, high compliance costs and low profitability have led international banks to close branches and cancel correspondent banking services in the Pacific Islands.[128] Correspondent banking relationships—a system where local banks act as intermediaries for other banks that do not have a direct presence in the market, often to facilitate funds transfer, currency exchange, and settlement—are particularly important to the region. Access to financing is a key concern for Pacific Island exporters and has worsened since 2014.[129] Correspondent banking infrastructure underpins financial flows in the region, including tourism, overseas remittances, and access to low-cost financing for trade and investment.[130] The Pacific Islands lost 60 percent of their correspondent banking relationships between 2011 and 2022.*[131] Although economic ministers raised concerns about the closure of correspondent banks in the Pacific Islands Forum in both 2021 and 2022, correspondent banking relationships have continued to decline, according to the Forum's analysis.[132]

In place of departing global banks, Chinese institutions have offered to step in. For instance, the Bank of China announced its first Pacific Islands branch in Papua New Guinea in June 2023, and it has explored opening branches in Nauru and Vanuatu.[133] Four months later, the United States and Australia announced the launch of the first Pacific Banking Forum.[134] The inaugural forum was held in July 2024, during which the countries pledged support for rebuilding the presence of Western financial institutions in the Pacific.[135] The World Bank also initiated a project in late 2024 providing temporary correspondent banking solutions and training to improve compliance standards in an effort to retain international banks.[136] In May 2025, Australia announced a plan to maintain its status as the financial service provider to the government of Nauru by replacing Bendigo Bank Agency with the Commonwealth Bank of Australia.[137]

China's BRI Projects Further Its Strategic Aims in the Region

China's BRI lending in the region provides openings for corruption, which is perceived as a widespread issue in the Pacific Islands.[138] Despite the presence of other bilateral and multilateral lenders in the region, Chinese lenders or contractors are sometimes the only option, leading to poor outcomes, including shoddy construction work and heavy debt burdens. The legacy of China's BRI lending remains mixed.

- *Although China's development finance in the region has fallen in recent years, China remains a significant provider of loans and*

*The most recent data on this issue was released by Swift in 2022.

grants to almost all Pacific Island countries. China has provided a significant amount of development finance to the region, trailing only Australia in the years leading up to the COVID-19 pandemic.[139] Chinese grants and loans to the region totaled approximately $15 billion in the years from 2000 to 2021, peaking at $3 billion annually in 2009 and seeing another surge between 2016 and 2018 before falling to $426 million in 2021.*[140] Of the 14 Pacific Island countries, only Tuvalu and Palau—two of the three countries that still recognize Taiwan—have yet to receive official Chinese lending.†[141]

- *China's lending to the Pacific Islands from 2007 to 2018 was differentiated by large average project sizes, geographical concentration, and a focus on infrastructure.* During this time, the average commitment amount per development project reached tens of millions of dollars and financed the buildout of mines, liquefied natural gas pipelines, hydropower plants, energy grids, and roads.[142] Together, Papua New Guinea and the Marshall Islands were the recipients of 84 percent of China's lending to the region. Papua New Guinea received $7.1 billion total, including over $800 million for energy projects and over $4.9 billion for industry, mining, and construction, paralleling the vast amount of natural resources exported from Papua New Guinea to China.[143] Over $4.5 billion flowed to the transport sector in the Marshall Islands, primarily representing bilateral and syndicated loans for ships.[144]
- *The pace of Chinese BRI lending in the region and globally has slowed, as China—under competitive pressure from other regional players and dealing with a domestic economic slowdown—shifts its attention from making large infrastructure loans to a more targeted approach.*[145] From 2019 to 2021, China's lending to Pacific Island countries other than Papua New Guinea and the Marshall Islands totaled 44 percent of its assistance to the region, a sharp increase from the prior decade, and average project size has declined sharply.[146] China provided over $160 million in official loans to the Solomon Islands and Kiribati each, both of which shifted diplomatic recognition from Taiwan to China in 2019.[147] Senior Chinese leaders have encouraged firms to pursue more targeted projects partly in hopes of improving public perception of BRI and China's standing in the region.[148]
- *Chinese SOEs dominate bids for construction contracts and further Chinese state interests.* Chinese SOEs dominate infrastructure development projects in the Pacific Island countries. For projects under the BRI, Chinese SOEs generally control

*This is a small fraction of the total $1.5 trillion in global Chinese development aid and loans disbursed during this time period. The William and Mary AidData database was last updated through 2021, and a more recent comprehensive dataset is not publicly available. Data from the Lowy Institute's Pacific Aid Map indicates that Chinese grants and loans to the region may have ticked up slightly in 2022. *AidData*, accessed June 18, 2025; Riley Duke and Alexandre Dayant, "China's Pacific Aid Is Rebounding and Recalibrated," *Lowy Institute*, November 21, 2024.

†The Marshall Islands, given its diplomatic recognition of Taiwan, has not signed a BRI Memorandum of Understanding with China. However, it has received loans in the shipping industry from Export-Import Bank of China and other Chinese financiers. "Global Chinese Development Finance Dataset, Version 3.0," *AidData*, 2023; "China's Influence on the Freely Associated States of the Northern Pacific," *United States Institute of Peace*, September 2022, 29.

the contracting process.[149] Even when the Asian Development Bank (ADB) or other non-Chinese bilateral donors are funding a project, Chinese state-owned construction firms often undercut competitors to win construction services contracts.[150] Even countries that recognize Taiwan are reliant on Chinese SOEs to implement construction projects financed by non-Chinese lenders.[151] Chinese firms have also helped build connections with local officials and serve to further China's geo-economic interests in the region.[152] In one instance, lobbying by a Chinese SOE reportedly played a role in the Solomon Islands' 2019 decision to switch recognition from Taiwan to China.[153] In interviews with employees at Chinese SOEs, Peter Connolly, adjunct fellow at the University of New South Wales, found that China requires SOEs to prioritize state interests above profit.[154] This alternative tool of furthering state interests has allowed China to maintain its influence in the Pacific Islands even as total Chinese funding has declined.[155]

- *Chinese investments are associated with corruption.* Numerous reports have alleged that China directs aid money or bribes to political elites in the Pacific Islands in exchange for awarding contracts or access to natural resources to Chinese companies.[156] Chinese SOEs also use unscrupulous business practices such as providing low bids to win the project, followed by raising the price during the implementation, a practice that erodes fiscal capacity of local governments and leads to higher tax burdens for the population.[157]
- *Pacific Island elites are incentivized to leverage Chinese investment and aid for political gain, even if the investment does not necessarily benefit long-term local development.* China's BRI lending has often been directed into highly visible infrastructure projects that lead to an outsized return in local recognition compared to the total proportion of money required.[158] Governments may also award bids to Chinese companies because they promise faster completion, even if that sometimes comes at the expense of quality.[159] Local politicians can then claim credit for projects completed during their terms, thus winning favor with local populations.[160] In addition, Chinese lenders make fewer requirements for good governance, financial reform, human rights, and democracy compared with non-Chinese lenders.[161]
- *Some Chinese projects have provided marginal benefits to local populations and, at times, caused outright harm to local economies.* Chinese companies have on multiple occasions undercut their competitors using lower input and labor costs by hiring a local Chinese workforce or bringing in Chinese laborers.[162] In Papua New Guinea, the proliferation of ancillary Chinese businesses that accompanied construction projects led to increased competition for locally owned firms; local employees of the businesses also accused them of poor working conditions.[163]
- *Over a decade of BRI lending has saddled the Pacific Islands with debt owed to China while constraining access to financing for future development.* Tonga, Samoa, and Vanuatu have some of the highest debt payments in the world relative to GDP.[164]

The Export-Import Bank of China is Vanuatu's largest external creditor, comprising 31 percent of total debt.[165] Over half of Tonga's external debt is owed to China.[166] While concerns China would force distressed sovereign borrowers to cede ownership of important infrastructure have largely not played out in the Pacific Islands, China remains an obstacle to debt relief, as it often refuses to offer major concessions.[167] The Export-Import Bank of China does not forgive foreign debts and makes only modest concessions on repayment dates or interest rates.[168] According to the World Bank, Kiribati, the Marshall Islands, Papua New Guinea, Tonga, Tuvalu, and Vanuatu are all at high risk of debt distress.[169] In response, Pacific Island countries including Samoa, Papua New Guinea, Fiji, and Tonga have canceled some planned borrowing and applied greater scrutiny to new deals, including those with Chinese lenders.[170]

China Advances Its Security Presence in the Pacific

After spending decades building political and economic influence in the Pacific Islands, China is now using this leverage to expand its military and security presence in the region.[171] Beijing has invested in developing ports, airfields, and information and communications infrastructure purportedly for civilian use, but they are constructed in such a way that they have dual-use capabilities that could be drawn upon to support PLA operations, creating implications for any future conflict with the United States and its partners.[172] China's pursuit of dual-use infrastructure in the Pacific Islands—alongside its construction of Ream Naval Base in Cambodia and continued militarization of the South China Sea—are key components of its broader strategy for projecting military power across the Indo-Pacific and challenging U.S. access to the entire region. (For more on China's military power projection in Southeast Asia and the South China Sea, see Chapter 4, "Crossroads of Competition: China and Southeast Asia.")

The PLA Navy's Ability to Operate across the Region Is Growing, Enabled by Dual-Use Infrastructure

The PLA Navy has been steadily increasing its ability to operate in the Pacific for over a decade, and deployment of PLA warships to the region may soon become routine as China fulfills its plans to build its blue water navy and expand access to the infrastructure necessary to resupply it. The PLA Navy routinized drills in the Western Pacific and has increased the scale and duration of recent deployments, achieving a milestone in May 2025 when two aircraft carriers simultaneously operated past the first island chain and into the second.[173] Meanwhile, the PLA Navy has been familiarizing itself with the operating environment in the Pacific Islands region through naval diplomacy, humanitarian assistance missions, as well as the deployment of intelligence-gathering and satellite-tracking vessels. China has also prepared to deploy its Coast Guard in the region. As China becomes increasingly confident in its ability to compete with the United States in the far seas, it is acutely aware that the Pacific Islands would play a critical logistical role if the

United States were to intervene in a Taiwan contingency or other Indo-Pacific conflict scenario.

China made an unprecedented demonstration of its ability to project force into the "far seas" of the South Pacific in February 2025 when it conducted live fire exercises in the Tasman Sea in an attempt to intimidate Australia and New Zealand.[174] The PLA Navy had sent a task force of an advanced Type 055 destroyer, a frigate, and a replenishment vessel around New Guinea, transiting through the Coral Sea, potentially accompanied by a nuclear submarine.[175] The exercises demonstrate Beijing's willingness to use the PLA Navy to challenge Australia within its sphere of influence, and represent the beginning of what is likely to be an increased presence in the South Pacific.[176]

China's capacity to project power in the Pacific will require infrastructure to sustain it, and the BRI port and airfield projects across the region could serve PLA needs. Often located on or near the sites of U.S. WWII bases, underscoring their strategic significance, these projects have raised alarm about their potential to evolve into basing arrangements. One such example is Luganville Wharf in Vanuatu; soon after its completion in 2017, Australian media reported that China was in early talks for basing access at the facility.[177] Projects like this have made Vanuatu one of the countries most indebted to China among Pacific Islands, which China could use as leverage for access.[178] While Australia has worked to strengthen defense ties with Vanuatu, China continues its close engagement, choosing it as the resupply stop for its first deployment of Type 055 destroyers to the South Pacific in the months prior to the Tasman Sea exercises.[179] Papua New Guinea and Samoa are likewise highly indebted and are also key sites for upgrades to ports and wharves, potential dual-use facilities that could accommodate Chinese warships in addition to large cargo vessels.[180] Although leaders around the Pacific have tried to provide reassurances that the refurbished facilities are for civilian use and their countries will not host bases, the PLA Navy's port visits are already demonstrating their dual-use potential.[181]

China Has Used "Nonwar Military Operations," Research Vessels, and Military Support Missions to Acclimate Pacific Island Countries to Its Presence

The PLA Navy has conducted a varierty of nonwar military operations in the region in recent years, including bilateral training in 2023 with Fiji, Papua New Guinea, and Indonesia; four missions between 2014 and 2023 by the PLA Navy hospital ship *Peace Ark* that included stops in the region;* and the deployment of a PLA Navy supply ship and a PLA Navy amphibious dock landing ship in response to the 2022 eruption of the Hunga Tonga volcano.[182]

**Peace Ark* visited Tonga, Fiji, Vanuatu, and Papua New Guinea in 2014 following participation in the Rim of the Pacific (RIMPAC) exercises; visited French Polynesia on its way to South America in 2015; visited Papua New Guinea, Vanuatu, Fiji, and Tonga in 2018; and visited Kiribati, Tonga, Vanuatu, and the Solomon Islands in 2023. *Peace Ark* saw over 5,700 visitors and treated almost 1,000 patients during the 2023 Vanuatu port visit, according to Vanuatu media. A new hospital ship, *Silk Road Ark*, left for its first mission in September 2025, with stops in Nauru, Fiji, Tonga, and Papua New Guinea. "PLAN Hospital Ship Silk Road Ark Sets Sail for Mission Harmony 2025," *China Military Online*, September 12, 2025; Andrew Orchard, "China's Navy in Pacific Island Ports," *Diplomat*, September 16, 2023.

China has the world's largest fleet of civilian research vessels, many of which are active in and around the first and second island chains as well as in the Pacific Islands region more broadly.[183] While these ships ostensibly conduct seafloor surveys and other scientific research, their inherent dual-use nature enables them to gather information useful for the PLA Navy in "waters that China's navy considers strategically vital."[184] For example, China's research ships have been very active studying areas around Taiwan and near Guam and Palau.[185] A recent Center for Strategic and International Studies report stated that over 80 percent of 64 active Chinese research vessels "demonstrated suspect behavior or possess organizational links suggesting their involvement in advancing Beijing's geopolitical agenda."[186]

PLA ships are already conducting substantive military support missions in the Pacific Islands region. The PLA Navy has been conducting missions in the Pacific for decades, particularly intelligence-gathering and support missions; it has developed relationships with some Pacific Island countries in the course of port stopovers. The PLA has made 20 visits to Fiji, including four in 2022 alone, most of them resupply stops for Yuan Wang-class satellite tracking ships.*[187] Fiji's deputy prime minister called the Suva port the Yuan Wang fleet's "second home" during a 2025 ceremony celebrating 31 years of the ships' visits to the country.[188] Although a Chinese diplomat emphasized the ships' role in the peaceful development of space during the ceremony, the fleet is under the command of the PLA Aerospace Force and supports and provides tracking information during rocket and missile launches.[189] Additionally, two Yuan Wang ships likely helped track China's intercontinental ballistic missile test fired into Kiribati's EEZ in September 2024, the first such test conducted by China in the Pacific in four decades, earning the condemnation of Pacific Island countries, including Fiji.†[190] Chinese Type 815 intelligence-gathering ships are also frequent visitors to the Pacific Islands region, often monitoring U.S. and Australian naval exercises such as the Rim of the Pacific (RIMPAC), among others.[191]

China Has a Deep Presence in Pacific Island Communications Infrastructure, with the Exception of Undersea Cables

Researchers have documented the use of Huawei infrastructure for government information systems, national broadband networks, and mobile communication towers in Samoa, the Cook Islands, Fiji, Tonga, Vanuatu, the Solomon Islands, and Papua New Guinea.[192] Huawei's links to China's military and intelligence sectors raise concerns about the possibility for China to conduct

*China operated a ground space tracking facility in Kiribati until 2003. Liu Zhen, "Could Ties with Kiribati Be a Boost to China's Space Ambitions?" *South China Morning Post*, September 21, 2019.

†China failed to warn any Pacific Island country, suggesting a lack of concern for their reaction, although it notified the United States, France, Australia and New Zealand. Camille Pohle, "'Not Welcome': China's ICBM Test Raised Alarms in the Pacific Islands," *Diplomat*, October 22, 2024; Nectar Gan, "China Fires ICBM Into Pacific Ocean in First Such Public Test in Decades as Regional Tensions Flare," *CNN*, September 26, 2024.

China Has a Deep Presence in Pacific Island Communications Infrastructure, with the Exception of Undersea Cables—*Continued*

surveillance and cyber operations and to control communications in the region.

The United States and Australia's concerted pushback on China's efforts to make inroads in the undersea cable sector represents a success in reducing risk from China in one aspect of critical infrastructure in the Pacific.[193] In 2017, reports alleged that Huawei had promised to donate $6.5 million to the Solomon Islands' ruling party in exchange for a contract for an undersea cable project connecting the Solomon Islands to Australia backed by the ADB.[194] The Solomon Islands government had abruptly switched the project's contractor from a British-American company to Huawei Marine, prompting Australia to refuse to issue a landing permit for the cable and the ADB to withdraw its approval due to violations in procurement processes.*[195] The United States also moved to block Huawei Marine's successor, HMN Tech, from winning a contract to lay a cable connecting the Federated States of Micronesia, Nauru, and Kiribati in 2021.[196] The three Pacific Island countries ultimately awarded the contract to Japan's NEC Corporation, with Australia, Japan, and the United States providing grants for implementation of the project.[197] Despite concerted efforts to promote domestic companies on the world stage, China remains a minor player in the undersea cables industry, which is dominated by French, U.S., and Japanese firms.[198] Chinese firms have had to bypass connections to countries that are likely to see risks from their involvement, forcing them to focus on emerging markets in Asia and Africa.[199] However, China is making efforts to promote domestic cable-laying companies on the world stage, and the China Academy of Information and Communications Technology has projected that Chinese companies will be involved in the installation of 45 percent of cables globally between 2023 and 2028.[200] Additionally, China maintains a significant presence in the undersea cable repair industry, primarily in the northwest Pacific Ocean, and launched several new cable-laying ships in 2024, which could expose cables laid by trusted vendors to hacking.[201] In response to the increasingly urgent problem of limited capacity for cable maintenance and repairs, Australia has launched a Pacific Islands subsea cable resilience center that will help strengthen maintenance capabilities.[202]

Policing Agreements Expand China's Presence and Influence

Because only three Pacific Island countries have standing militaries,† security engagement in the region is primarily conducted through police forces, making it an ideal target for Beijing's strategy of using internal security outreach to help developing countries in-

*Huawei sold its stake in Huawei Marine to a Chinese cable manufacturer named Hengtong Group in 2019, and the company is now called HMN Tech. Anna Gross, "How the US Is Pushing China Out of the Internet's Plumbing," *Financial Times*, June 13, 2023.

†Papua New Guinea, Fiji, and Tonga. Lois Ramilo, "Island Connections: Defense and Security Cooperation with the Pacific Islands," *Asia Matters for America*, February 9, 2025.

crease "regime security."[203] China's growing police presence in these countries serves as an additional vector of influence over their domestic politics and Chinese citizens residing there, spreads its authoritarian vision through training and equipping regional police forces, creates intelligence-gathering opportunities, and provides leverage for future access for military forces.[204]

China has made efforts to keep the nature of these security agreements secret, as exemplified by the Solomon Islands security agreement with China signed in April 2022.[205] The negotiations around the agreement were conducted behind closed doors, but a leaked draft revealed the deal allows the president to call in Chinese police to maintain his rule and included a secrecy clause allowing China to obscure its intervention in the Solomon Islands.[206] In return, Chinese ships would be allowed to stop and replenish supplies in the islands' ports, and China could use its "relevant forces" to protect Chinese personnel and projects in the Solomon Islands.[207] The deal appears to have been motivated by Prime Minister Sogavare's desire to gain Chinese assistance in staving off any threat to his rule caused by the political turmoil and divisions between the country's main islands stemming from the country's switch of recognition from Taiwan to China in 2019.[208] Evidence suggests that China has a longstanding interest in basing access in the Solomon Islands; in 2019 Chinese SOEs explored leasing and developing land in the Solomon Islands to seek out "opportunities to develop naval and infrastructure projects on leased land for the PLA Navy."[209]

Australia views the possibility of a Chinese military presence in the Solomon Islands as a significant security threat because it could challenge Australia's position in the South Pacific and possibly cut it off from allies like the United States.[210] Although Prime Minister Sogavare told Australia there would be no permanent Chinese military presence, there are concerns that security agreements could evolve into something resembling a basing agreement, giving China's access to dual-use infrastructure under the agreement.[211]

Just a month after securing the agreement with the Solomon Islands, China proposed a multilateral development and security cooperation pact with ten countries during Foreign Minister Wang Yi's 2022 visit to Fiji.*[212] The proposal was ultimately rejected amid concerns about how it circumvented the Pacific Islands' consensus decision-making process and the role of the Pacific Islands Forum.[213] Despite this, the proposed agreement provided further details on China's vision for security cooperation with the Pacific Island countries, which included "cooperation on law enforcement, customs, inspections, quarantine, network governance, cybersecurity, [and] laboratory construction used for fingerprint testing" and "support for drugs, electronics, and digital forensics."[214]

Undeterred by the failure of the multilateral cooperation proposal, China continued pushing for agreements with individual countries and stationed police advisory teams in Kiribati and Vanuatu in 2023 that appear to be maintaining a permanent presence.[215] In contrast to security agreements the United States and its partners

*The countries approached with the deal were Samoa, Fiji, Tonga, Kiribati, Papua New Guinea, Vanuatu, Solomon Islands, Niue, Cook Islands, and Micronesia. Nick Perry, "China Wants 10 Pacific Nations to Sign a Major Cooperation Agreement," *Diplomat*, May 26, 2022.

undertake in the region, the details of the policing agreements between China and the two countries remain undisclosed, but they appear to follow the model established in the Solomon Islands, with permanent "police advisory teams" of up to 12 officers stationed on six-month rotations.[216] The Chinese police team in Vanuatu was involved in the construction of a crime database and a community policing program and has donated a significant amount of police equipment to the country, including uniforms, riot gear, motorcycles, and patrol boats.[217]

China is likely to use these police teams to advance its geopolitical interests. Chinese police first arrived in Vanuatu in 2023 in the midst of a political crisis triggered by controversy over a proposed security pact with Australia, which remains unsigned.[218] China appears to shift resources from its security presence in countries around the region independent of local authorizations. In 2024, a letter from some Solomon Islands police officers accused China of transferring additional police from Kiribati and Vanuatu to the Solomon Islands to bolster security in advance of the country's elections, although the Solomon Islands had not approved of these transfers.[219] The letter may reflect tensions between officers trained by Australia and China within the Solomon Islands police forces.[220]

China's efforts to advance its security footprint in the Pacific Islands has been dealt some setbacks by the region's determination to remain nonaligned and the United States and Australia's increased attention. This includes a weakening of China's first regional policing agreement, signed with Fiji in 2011 while the island was under military rule.[221] The deal allowed Chinese police to be embedded with Fijian police for up to six months and included training for Fijian police in China.[222] Following the democratic election of President Sitiveni Rabuka in 2022, the deal was reviewed due to concerns about Chinese presence undermining the country's democracy.[223] Although the agreement was ultimately retained, Chinese police would no longer be embedded in the Fijian police force.[224] In 2024, Papua New Guinea decided not to sign a proposed agreement with China, and instead established a formal alliance with Australia in 2025, as well as deepened defense cooperation with the United States.[225] Australia has also expanded its efforts to maintain a position as security partner of choice for the Solomon Islands and Nauru in 2024 to counter China's considerable influence in those countries.[226]

The Chinese Coast Guard is Increasingly Active in the Pacific Islands Region

The Chinese Coast Guard (CCG) is poised to become another significant tool of China's non-military statecraft in the Pacific Islands region, mirroring its policing engagement with countries that have no formal military. Coast guards have long been welcomed in the region as they are equipped to deal with the non-traditional security threats Pacific Island countries find most pressing, including drug trafficking and illegal, unreported, and unregulated (IUU) fishing.

In 2024, China registered 26 coast guard vessels to operate in the Western and Central Pacific Fisheries Commission Conven-

The Chinese Coast Guard is Increasingly Active in the Pacific Islands Region—*Continued*

tion Area, allowing them to conduct high-seas boarding and inspections of foreign fishing vessels in the same waters where the U.S. and Australian Coast Guards maintain an active presence through security deals with Pacific Island countries*[227]

The CCG's growing presence in the Pacific Islands region is concerning because it is a militarized force under the control of the Central Military Commission, which has been at the forefront of carrying out illegal, coercive, aggressive, and deceptive gray zone activities against China's neighbors. Given the role the CCG plays in Chinese aggression in the South and East China Seas, its authorization to board ships in the Pacific is concerning, particularly due to the widespread presence of vessels from Taiwan, which might be targeted and subjected to Chinese law. It remains to be seen to what extent the CCG will police Chinese vessels; in the past, China has objected to the U.S. Coast Guard helping Pacific Island countries inspect Chinese vessels.[228] Although Chinese ships are the main perpetrator of IUU fishing in the EEZs of many Pacific Island countries—representing a threat to their economic and environmental wellbeing—Pacific Island countries avoid confronting China on the issue.[229]

China intends to increase its influence in the Pacific Islands region's maritime governance by getting involved in shaping the rules around boarding vessels in the region, providing support for the development of the region's legal frameworks and technical standards, training seafarers and maritime officials, and providing law enforcement equipment.[230] These efforts represent the maritime equivalent of China's policing engagement in the region, creating a challenge by offering an alternative to the types of support traditionally provided by the United States and its Indo-Pacific partners.

Implications for the United States

Although the United States has maintained close ties with some countries in the Pacific Islands region for well over 100 years, Beijing has made significant inroads in building greater economic and security leverage over the region in recent decades both to secure greater influence over decision-makers and to undermine their relationships with the United States. Continued U.S. support for the security, development, and autonomy of Pacific Island countries is an important cause in its own right. **Yet there is no question that China's concerted efforts to expand its economic leverage and security influence throughout the Pacific Islands have heightened the region's strategic significance to U.S.-China competition.**

*The United States have 88 inspection vessels registered with the Western and Central Pacific Fisheries Commission Convention Area; Australia has 54, while Japan has 6. Western and Central Pacific Fisheries Commission Convention Area, "WCPFC Inspection Vessels," *https://www.wcpfc.int/register-inspection-vessels*.

The Pacific Islands region is critical to projecting U.S. power and deterring Chinese military aggression in the Indo-Pacific and is crucial for U.S. national security more broadly. The United States' continued access to the region is essential to its ability to support a military contingency in Taiwan, the Philippines, or many of its other allies and partners in the Indo-Pacific. **If even one or two Pacific Island countries permitted China to place radars, deploy missiles, or develop a military base, it would present a significant challenge to the United States and its allies and partners—potentially helping China to impede the flow of U.S. forces across the Pacific Ocean and altering the military balance of power in the Indo-Pacific in Beijing's favor.**

Considering the Pacific Islands region's immense strategic importance, the significant inroads into Pacific Island countries that China has made through its holistic strategy of diplomacy, economic engagement, economic coercion, security cooperation, and malign influence activities should be of great concern to the United States and like-minded countries. China's efforts have already resulted in several countries in the region shifting their recognition from Taipei to Beijing. **Over time, China's growing trade and investments in the region could further enhance its leverage and erode the position of the United States and its allies and partners, leaving Pacific Island countries even more vulnerable to Chinese coercion.**

China's attempts to secure greater leverage over Pacific Island leaders through expanded internal security relationships, particularly those advancing Chinese norms of policing behavior focused on quelling internal dissent, should be of particular concern to the United States, as this is a part of China's larger playbook on exporting tools that support—and even advance—authoritarian behavior around the world. While many of the countries do have a serious need for basic public security support, including items as simple as police cars, the Chinese have often stepped forward to provide them at low cost and with fewer strings attached.

Additionally, China's investments in much-needed infrastructure in the region enable it to create long-term strategic advantages. They allow China to construct infrastructure in a way that can facilitate its dual use by the increasingly capable PLA Navy. They also allow China to embed technologies from firms such as Huawei into critical information and communications infrastructure in a manner that—outside of the many security concerns this creates—may help bind these countries into the Chinese technological ecosystem, creating long-term economic and strategic dependencies in its favor. In the event of conflict, China could attempt to assert control over these infrastructure assets, particularly if Chinese entities control their operation.

China's efforts to secure privileged undersea mining exploratory licenses are another avenue through which China is seeking to secure leverage over Pacific Island officials and advantage over the United States and its allies. Unless the United States and its allies work together, China will likely move into a dominant role in the deep-sea mining industry and further consolidate control over the

world's critical minerals supply while potentially creating negative environmental consequences for the Pacific Islands in the process. China is working to exploit reductions in U.S. diplomatic and development assistance in the region, casting itself as a source of global stability and a more reliable long-term partner. **Considering the small size but large strategic importance of countries in the region, the Pacific Islands is an area where a small amount of U.S. diplomatic attention and assistance can go a long way toward advancing U.S. security interests.** As then–Assistant Secretary of Defense Randall Schriver stated in 2019 regarding the need for the United States and its allies and partners to strengthen their historic ties with Pacific Island countries: "A little bit goes a long way, but you need to have the little bit."[231]

All told, China's increasing activity in the Pacific Islands region is less about advancing its economic and cultural relationships and more about positioning itself to blunt U.S. power projection capabilities across the Pacific Ocean while enhancing its ability to project its own power. **Unless the United States—and its allies and partners—develop a concerted strategy to respond to China's increasing influence in this vital region, we may face a future with significant constraints on our ability to protect our interests in the Indo-Pacific, and with a global balance of power tilted in Beijing's favor.**

Recommendations

The Commission recommends:

- Congress pass a Pacific Islands Security Initiative bill that would:
  - Bolster U.S. Coast Guard cooperation with Pacific Island countries and provide training and resources to support Pacific Island countries' efforts to enhance law enforcement capacity, improve maritime domain awareness, and combat illegal, unreported, and unregulated (IUU) fishing;
  - Strengthen economic and security assistance to Pacific Island countries to support U.S. national security interests and the priorities of partner countries;
  - Provide dedicated funding for Voice of America and public diplomacy programs focused on investigative journalism and countering disinformation in the Pacific Islands;
  - Create rapid response teams of legal, financial, and information specialists to support efforts by Pacific Island countries to counter Chinese malign influence; and
  - Assess how to enhance U.S. deterrence in the Pacific Islands region, including the advisability of offering Compact of Free Association (COFA) agreements to additional countries.

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PART III

COMPETITION IN CONTESTED FRONTIERS

CHAPTER 6: INTERLOCKING INNOVATION FLYWHEELS: CHINA'S MANUFACTURING AND INNOVATION ENGINE

Executive Summary

In the decade since launching Made in China 2025 (MIC2025), the Chinese Communist Party's (CCP) industrial, science, and innovation policies have multiplied and expanded in scope. China deploys an arsenal of tools to execute these policies and affect its capacity to develop and produce advanced technology. The evidence shows that comprehensive strategic planning, massive state funding, and adaptive implementation have allowed China to overcome previous industrial policy failures. As roads and bridges act as public goods benefiting the entire state, China's policies have constructed an "industrial commons"—a collective resource base Chinese firms can exploit to advance technological capabilities. This industrial commons positions China to develop and support firms that will dominate established markets and control emerging sectors.

Numerous industrial policy successes demonstrate the strength of China's industrial commons and how advances in overlapping industries catalyzed innovation in other technologies or products. China's electric vehicle (EV) industry was built on a range of preexisting capabilities, including lithium batteries for consumer electronics and a large automobile manufacturing sector. In turn, EVs served as a platform that helped drive innovation in directly related sectors, like battery technology, and in related capabilities, like LiDAR used in autonomous systems. Similarly, China's capabilities in industrial robotics are supporting the emergence of artificial intelligence (AI)-enabled factory production models, promising scalable gains across the manufacturing sector. In synthetic biology, China's sophisticated laboratory infrastructure and growing biotech manufacturing base are positioning it to become a leader in commercializing global scientific discoveries from pharmaceutical to non-pharmaceutical applications, with state-backed facilities enabling rapid translation from research to production at scale.

Key Findings

- Chinese industrial policy has established the landscape for becoming an advanced manufacturing and innovation powerhouse. By conducting industrial policy on an unprecedented scale, China now leads global innovation in many targeted sectors and has built a manufacturing base that is integrated into many legacy and advanced technology supply chains.
- China's industrial policy systematically constructs clusters of interconnected manufacturing capabilities while securing control over foundational technologies. Innovation follows manufacturing, and China is leveraging this approach to generate "interlocking innovation flywheels"—technical advances in one sector rapidly catalyze breakthroughs in adjacent sectors, creating compounding technological advantages that accelerate with each cycle.
- Through MIC2025 and related policies, China has secured dominance in much of the legacy and advanced componentry for today's most prevalent consumer and enterprise technology products. Given that key innovations often happen on the factory floor, China's current dominance gives it a significant leg up in terms of future cycles of iteration and innovation as well as a source of essential components for new technologies.
- China's industrial policy and Party-state control have also positioned it to attain first-mover advantage in technologies of the future, like synthetic biology, quantum technologies, and automation (including humanoid robots). Where the key sectors in MIC2025 mostly reflect mature markets in which China seeks to displace incumbents, becoming the first mover in emerging and nascent technologies would position China to set the future rules of the road.
- Rapid growth in targeted industries has not offset weakness in the broader economy, producing a two-speed economy in which prioritized high-tech sectors contrast with lagging sectors beset by structural economic challenges. All indications suggest General Secretary of the CCP Xi Jinping will prioritize China's technology ambitions over other policy goals. He believes developing and moving into new technologies can strengthen China's competitiveness vis-à-vis the United States and other prospective competitors. China's expenditure on industrial policy has had a cumulative impact that will continue to drive advances in research and development (R&D) and manufacturing capabilities, meaning that momentum in the high-speed economy will likely continue to grow.
- Overinvestment and overcapacity resulting from China's industrial policies have consistently led to large economic distortions across the value chain for targeted sectors. These distortions often threaten U.S. producers and developing economies attempting to move up the value chain. They also

create an environment of intense competition within China as firms compete for market share in artificially expanded markets, forcing firms to increase efficiency, reduce production costs, and repeatedly cut sales prices to stay ahead of rivals. The firms that survive this process, like EV maker BYD, are then typically highly competitive in global markets.

- In the early stages of these product cycles, and often beyond, China's approach is divorced from market principles, and its success largely stems from using subsidies, state coordination, and other nonmarket practices to undercut competitors in foreign markets.

Introduction

China was already the world's largest manufacturer when it unveiled MIC2025 and laid out precise market share and localization targets aimed at catching up with and surpassing incumbents in ten key sectors, ranging from aerospace equipment to biopharmaceuticals and advanced medical devices. While China has successfully reached many of its MIC2025 targets, the important questions for policymakers look forward, not backward: What industries will China seek to dominate next? How will it apply the lessons learned from MIC2025 toward its next set of technology development goals?*

To answer these questions, this chapter maps China's vast industrial policy toolkit, detailing both the CCP's strategic approaches and specific tactics to foster successful firms. It then uses case studies to show how the cumulative and mutually reinforcing gains from industrial policy have fostered the world's most advanced industrial commons—the shared pool of resources and capabilities that drive innovation and technological upgrading. Case studies illustrate this dynamic:

- In autonomous systems and robotics, China's robust manufacturing ecosystem positions it to make advances through mutually reinforcing improvements in adjacent technologies.
- In synthetic biology, China's sophisticated laboratory infrastructure and growing biotech manufacturing base are positioning it to become a leader in commercializing global scientific discoveries from pharmaceutical to non-pharmaceutical applications, with state-backed facilities enabling rapid translation from research to production at scale.
- In quantum information sciences, concentration of talent and resources in laboratories—combined with advanced manufacturing capabilities—is positioning China to scale quantum technologies from research breakthroughs to commercial deployment, as discussed in detail in the Commission's paper on U.S.-China competition in quantum technologies.

While Congress long ago provided the Executive Branch with broad industrial policy authorities, and U.S. policy mechanisms ex-

*This chapter draws on the Commission's 2025 hearing on "Made in China 2025—Who Is Winning?," consultations with policy experts, and open source research and analysis.

ist—or are under development—to address individual facets of this multipronged issue, this challenge cuts across every department, agency, and border. The United States currently lacks any coherent plan—no empowered official and no strategy to bend the innovation curve in critical technologies to ensure continued U.S. leadership, rebuild our R&D capabilities, and break our dangerous and growing dependence on Chinese supply chains.

MIC2025 and Contextualizing China's Industrial Drive

This chapter uses "MIC2025" and "the MIC2025 period" as shorthand to refer to China's evolving industrial policy approach from 2015 to 2025. China launched its MIC2025 program in 2015 with the goals of becoming an advanced "manufacturing powerhouse" and establishing China as a global leader in ten technology sectors.*[1] MIC2025 itself was not unique in the objectives it set to achieve or the sectors it identified as important but rather in combining these sectors into a grand strategy to make China a manufacturing superpower.[2] China's Innovation-Driven Development Strategy, an overarching plan to guide Chinese innovation released by the CCP Central Committee and the State Council shortly after MIC2025, espoused a broader vision that aimed to reorient China's technological approach and strengthen its capacity for innovation.[3] Additionally, as detailed below, China's government subsequently issued a series of policies that sought to develop industries beyond the original scope of MIC2025, such as AI and synthetic biology, while employing many of the same approaches.[4]

China's Whole-of-Nation Drive toward Industrial Policy

Since launching a sweeping initiative to improve China's capacity for local innovation in 2006, China's leaders have introduced a relentless array of industrial, science, and technology policies in hopes of overtaking, displacing, and ultimately leapfrogging advanced economies in emerging fields.[5] The focus on catching up to and surpassing the United States and other industrialized nations took on greater urgency during the MIC2025 period, as Xi Jinping described the ongoing technological revolution as the "main battlefield of international competition."[6] Much as the United States attained decades of technological leadership by capitalizing on breakthroughs in information and communications technologies following World War II, Chinese leaders assess that technological advances are key to overtaking the United States. In addition to providing geopolit-

*MIC2025 aimed to move China up the global value chain and establish manufacturing dominance by targeting state support in ten sectors that Beijing considered strategically important yet underdeveloped. These were next-gen information technology and semiconductors, computer numerically controlled machines and robotics, aerospace, offshore engineering equipment and high-tech ships, advanced rail transportation equipment, energy-saving and new energy vehicles, electrical equipment, agricultural machinery and equipment, new materials, and biopharma and high-performance medical devices. For an evaluation of China's performance toward its MIC2025 goals, see Daniel Blaugher, Benton Gordon, and Matthew Dagher-Margosian, "Made in China 2025: Evaluating China's Performance," *U.S.-China Economic and Security Review Commission*, November 2025.

ical advantage, the CCP believes capitalizing on the current technological revolution will enable it to overcome perceived existential threats to China's economic growth and resilience, national security, and social stability as well as its legitimacy and control, including:

- *Expanding China's share of value added in global value chains:* Despite becoming a major manufacturing center by the early 2000s, China's production was initially trapped in assembly for export—often the lowest rung on the value chain. Chinese manufacturers have gained a larger share of value added, as China has shifted from net reliance on foreign components like LCD displays to being a major exporter.[7] Chinese-owned factories also account for a much larger share of exports than those with foreign ownership, whose share of China's exports plummeted from 46 percent in 2014 to 27 percent in 2024.[8] Nonetheless, more complex activities like the product design and production of niche, high-end components are still largely located in the United States and other advanced economies.[9]
- *Reliance on foreign chokepoint technologies and vulnerability to economic coercion:* Reducing and eventually eliminating reliance on foreign technology is now Beijing's top technology priority, driven by heightened U.S.-China tensions and expanded U.S. export controls.*[10] China's 14th Five-Year Plan (2021–2025) explicitly identified technology self-reliance and overcoming bottlenecks as key goals, and these objectives form part of a broader effort to ensure the economy is prepared for "extreme situations," including protracted war.†[11] Concurrently, the CCP is deepening its ability to weaponize foreign dependence on Chinese production. In a 2020 speech, Xi stated, "We must tighten international production chains' dependence on China, forming a powerful countermeasure and deterrent capability against foreigners who would artificially cut off supply."[12]
- *Barriers to innovation in China's defense industrial base:* Stovepiped bureaucracy and weak market incentives among China's state-owned defense conglomerates have long hampered China's defense research, development, and acquisition (RDA) processes.‡[13] Among other goals, China's Military-Civil Fusion (MCF) strategy seeks to remedy this shortcoming by leveraging commercial innovation and civilian technical expertise for military applications.[14] MIC2025 and other industrial policies aim to align China's manufacturing ecosystem with the needs of its defense industrial base.[15]

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*Union College political scientist Mark Dallas highlighted four inflection points in China's pursuit of technological self-reliance: in 2014, following revelations about U.S covert digital surveillance capabilities revealed in documents leaked by Edward Snowden; in 2018, following the United States' introduction of export controls on China's telecommunications champion ZTE over its role in evading Iran sanctions; controls on Huawei in 2019; and the broadening of advanced chip controls to cover all of China in October 2022. Mark Dallas, written testimony for the U.S.-China Economic and Security Review Commission, *Hearing on U.S.-China Competition in Global Supply Chains*, June 9, 2022, 17.

†For more on China's efforts to prepare for extreme scenarios and its stockpiling measures, see U.S.-China Economic and Security Review Commission, "China's New Measures for Control, Mobilization, and Resilience," in *2024 Annual Report to Congress*, November 2024, 458–539.

‡For more on China's drive for defense innovation, see U.S.-China Economic and Security Review Commission, "Weapons, Technology, and Export Controls," in *2023 Annual Report to Congress*, November 2023, 439–452.

- *Looming demographic challenges threaten China's economic growth:* The size of China's population dropped for the first time in decades in 2022, and its workforce is projected to continue shrinking.*[16] As such, China will rely on further increases in factory automation and replacing human labor with autonomous systems to mitigate the adverse effects of an aging and declining population, while advances in biomedicine will likely offer the potential to extend the working life of the population. In anticipation of these challenges, China has made robotics and related autonomous systems, as well as biopharma, top priorities since the early 2010s, including in MIC2025.[17]

Multi-Pronged Industrial Policy Strategy

To address these challenges, China is undertaking a whole-of-nation effort to lead global innovation and high-value manufacturing through industrial policy. Building on the approach launched with MIC2025, Beijing has increasingly organized its policies around the concept of the "new-style whole-of-nation system," a strategy that takes inspiration from China's approach to accelerate its nuclear weapons efforts in the 1960s and 1970s.[18] This approach seeks to mobilize all resources available to advance China's technological objectives. At a strategic level, China's approach adopts key features of successful industrial policies from other East Asian economies—particularly Japan and South Korea—but builds on them to attain a breadth and scale without historic precedent. At the operational level, China's implementation of industrial policy under Xi has been highly iterative, refining policies as goals are met, lessons are learned, and technology evolves. At a tactical level, China's national and local governments have developed an ever-expanding suite of incentives and programs to enlist the private sector in fulfilling state objectives as well as complex methods to acquire foreign technology. Each of the strategies and tactics detailed in this chapter are important in themselves, but the defining features of China's industrial policy are its scope and the degree to which its constituent parts are coordinated, driving what is initially an inefficient and often wasteful ecosystem into one that encourages fierce competition for government support and ultimately accelerates innovation.

Vertical Integration and Industrial Clusters

Like Japan and South Korea, China has moved up the value chain through scale economies generated by a vertically integrat-

*China has an unusually low official retirement age—currently set at 60 for men and 50–55 for women—which exacerbates the challenges of an aging population. China's restrictions on labor mobility and weak social safety net for migrant labor—often factory and low-skill service workers from inland provinces working in coastal cities—also mean its workforce is inefficiently deployed, adding to the challenge of slowing growth from an increasing dependency ratio. Conversely, reforms to these policies could mitigate the demographic drag—to a degree. Beginning in 2025, the government plans to gradually raise the retirement age to 63 for men and 55–58 for women by 2040, but demographers project the reform will only marginally boost the working population. Arthur Kroeber, "China's Slowing Economic Growth: Causes and Impacts," in *China's Economic Slowdown and Its Impact on Trading Partners*, eds., Arthur Kroeber and Jonathon Marek (National Bureau of Asian Research, June 2025), 16–17; Joe Leahy and Wenjie Ding, "China to Raise Retirement Age for First Time since 1978," *Financial Times*, September 13, 2024; Fan Zhai, "Macroeconomic Implications of China's Population Aging: A Dynamic OLG General Equilibrium Analysis," *AMRO Working Paper*, September 2024, 21–22; Dudley L. Poston, "Raising the Retirement Age Won't Defuse China's Demographic Time Bomb—But Mass Immigration Might," *The Conversation*, August 15, 2024; Alicia García-Herrero, "China's Aging Problem Will Be Much More Serious When Urbanization Is Completed," *China Leadership Monitor* 80 (Summer 2024).

ed production base.[19] Chinese policymakers sought to emulate the success of conglomerates, like South Korea's chaebol (e.g., Samsung and SK Group) and Japan's keiretsu (e.g. Mitsubishi and Mitsui), that became leading exporters by mobilizing resources and reducing costs through integrating the entire supply chain within a tightly knit corporate network.[20] This approach focused on fostering national champions that could serve as architects of supply chains and translate central policy priorities into economic realities.[21] Vertical integration also translated well to China's top-down economic management, enabling policymakers to implement decisions through centralized governance structures.

Additionally, Chinese policies concentrate support geographically through industrial clusters, seeking to collocate innovative firms and complementary production processes to promote knowledge spillovers and other agglomeration externalities. In implementing MIC2025, China selected 30 pilot cities to support industrial upgrading, technological innovation, and talent training.[22] China's flagship industrial parks, National High-Tech Industrial Development Zones, have also grown significantly under MIC2025, from around 50 zones in 2009 to 173 by 2022.[23] These zones host 84 percent of China's State Key Labs, which are government-supported research organizations tasked with carrying out cutting-edge basic and applied research and building out China's capacity for indigenous innovation.[24] Additionally, Chinese conglomerates use "innovation consortia" to foster key breakthroughs by coordinating R&D efforts across firms and labs within a vertically integrated supply chain.[25] After codifying the concept in the 2021 Science and Technology Law, China counts hundreds of innovation consortia across various sectors, ranging from new materials to carbon capture and sequestration technology.[26] In 2024, China had 26 of the World Intellectual Property Organization's top 100 global science and technology clusters—the most of any country—and four of the global top ten.[27]

Scale and Persistence

Rather than choosing a few sectors to build through industrial policy like Taiwan's approach to semiconductors, China has pursued state-led development across all its core manufacturing industries simultaneously.[28] Under MIC2025, China's industrial policies shifted focus from near-term export opportunities to fundamental improvements in China's manufacturing ecosystem and general-purpose technologies.*[29] Because of the breadth of industries it targeted, China was able to benefit and learn from intermittent victories even when many of its industrial policy results were mixed.† As China

*General-purpose technologies refer to transformational technological advances that create new growth engines and radically alter the trajectory of technological development. Examples of past general-purpose technologies include electricity, the steam engine, and computerization. Jeffrey Ding, *Technology and the Rise of Great Powers: How Diffusion Shapes Economic Competition* (Princeton University Press, 2024), 22–23.

†Such a recalibration appeared to occur in the middle of China's Medium- and Long-Term Plan for Science and Technology Development (2006–2020), which set the goals of China's innovation strategy to 2020 and laid the groundwork for the more prescriptive industrial policy documents that followed. By 2012, six years into the plan, China's leaders seemed to voice disappointment with progress toward the plan's objectives, and China's then–Vice Premier wrote, "Chinese capacity for indigenous innovation is weak, Chinese industrial technology is at a low level, and Chinese basic and cutting-edge research is unimpressive." A subsequent policy document proposed a shift in approach toward helping firms lead in innovation, breaking with the idea of government-driven "megaprojects" that were pursued under the Medium- and Long-Term Plan.

has moved to target additional sectors, the spillover benefits and network effects from prior rounds of industrial policy have helped firms gain a foothold in markets more quickly. For instance, leading EV maker BYD got its start as a cellphone battery manufacturer before shifting to lithium-ion batteries for vehicles.

Automation and Digitization as Long-Term Targets in MIC2025

Aside from the ten targeted sectors, MIC2025 encouraged widespread integration of automation, digitization, and AI integration (which China calls "intelligentization")* across its manufacturing ecosystem in a bid to lead the "Fourth Industrial Revolution."[30] This effort was closely linked with China's Internet Plus strategy, first proposed by then Premier Li Keqiang in 2015, which aimed to digitize the economy and apply information technology solutions like cloud computing, big data, and the Internet of Things to industrial production.[31] Among other objectives, the policy aimed to harness the transformative potential of digital technologies to create "smart factories"† throughout the manufacturing process.[32]

Iterative Implementation and Policy Experimentation

Chinese industrial policies during the MIC2025 period built upon one another, continuously deepening government support and refining execution toward methods that delivered results. To implement MIC2025, China issued 445 national-level policy documents providing detailed guidance and implementing regulations, in addition to scores of provincial- and municipal-level policies.[33] Since 2015, China has also deployed numerous industrial policies targeting sectors beyond the ten prioritized under MIC2025, such as China's National AI Development Plan, issued in 2017.[34] These reinforce and extend MIC2025. For instance, the AI Plan includes broad support for industrial automation and autonomous vehicles; this support builds on and benefits the same companies targeted by the robotics and new energy vehicle (NEV) policies under MIC2025.[35] The proliferation of planning across China's bureaucratic hierarchy contributes to an adaptive policymaking process—one that is augmented by the discretion and flexibility local-level officials have in implementing top-level directives, although a recentralization of power under Xi has narrowed the scope for experimentation (see textbox).[36]

Local-Level Experimentation Duplicates Efforts to Innovate across the Economy

Though leaders in Beijing set the science and industrial policy agenda, Chinese industrial policy is not implemented according to

Tai Ming Cheung et al., "Planning for Innovation: Understanding China's Plans for Technological, Energy, Industrial, and Defense Development" (prepared for U.S.-China Economic and Security Review Commission), July 28, 2016, 34.

*The term intelligentization (智能化) is literally translated as "becoming intelligent" and is used in Chinese policy documents to refer to making systems capable of autonomous perception, learning, decision-making, and action. Xu Zongben, "把握新一代信息技术的聚焦点" [Grasping the Focal Points of New-Generation Information Technology], *People's Daily*, March 1, 2019.

†Smart manufacturing refers to a production line where interconnected machines collect large volumes of data, communicate across the factory floor, and adaptively make decisions to optimize production. Smart factories promise a more flexible and customizable production process. Jost Wübbeke et al., "Made in China 2025: The Making of a High-Tech Superpower and Consequences for Industrial Countries," *MERICS*, December 2016, 13.

a singular centrally devised plan. Instead, China's top-down target setting encourages local experimentation in policy approaches to pursue these objectives, with a recent detailed National Bureau of Economic Research working paper estimating that over 80 percent of China's industrial policies are issued by subnational governments.[37] These policies range from financial incentives to regulatory reforms, creating multiple innovation pathways that can accelerate tech development, though they often result—accidentally or by design—in excess production. As Kyle Chan, a post-doctoral researcher at Princeton University, noted in written testimony before the Commission, "China often employs not one but multiple strategies simultaneously, testing to see what works and then quickly doubling down on ones that appear to be gaining traction."[38] For instance, as China prioritized the EV sector in the early 2010s, dozens of Chinese cities sought to become national hubs by offering generous direct subsidies, consumer subsidies to incentivize purchases, procurement contracts, cheap land, and tailored industrial parks to EV startups and battery firms.[39] While these policies, alongside national-level incentives, led to over-investment, with over 100 brands selling NEVs in 2024, they also helped foster several globally competitive EV companies, including BYD, NIO, and XPeng, that are now postured to dominate the sector on an enduring basis globally.*[40]

Scope for Local Policy Experimentation Narrows as Xi Recentralizes Decision-Making

Though policy experimentation and local initiative continue to play key roles in Chinese industrial policy, central leaders have begun setting stricter bounds on local flexibility and improvisation.[41] Since 2012, Xi has enshrined the concept of "top-level design" and worked to recentralize decision-making and ensure uniformity in policy execution at lower levels through more prescriptive policy frameworks.[42] The rise in anticorruption probes under the Xi regime also raises the risks for local officials acting beyond the bounds of what the Party has explicitly authorized.[43] Although local discretion will retain a role on issues that are more peripheral to the central government's agenda, subnational governments are becoming more risk averse in adapting centrally defined policies to on-the-ground conditions.[44] Reflecting the decline in local policy autonomy, one longitudinal study of over three million Chinese industrial policies issued between 2000 and 2022 found that local policies have signaled their adherence to central policies more frequently since 2013, reversing a downward trend in references to higher-level policies that persisted until 2012.[45] As Jessica Teets, a political scientist at Middlebury College, testified before the Commission in 2022, "This is the era of authoritarian bureaucrats, and not policy entrepreneurs."[46]

*The number of NEV manufacturers has declined since 2018, when China had over 400 EV manufacturers. However, the industry remains overcrowded, and consultancy AlixPartners projects that only 15 Chinese EV brands will remain by 2030. Stephen Dyer and Yichao Zhang, "AlixPartners 2025 Global Automotive Outlook: China's 'New Operating Model' Redefines Speed, Efficiency, and Market Leadership in Automotive Industry Amid Accelerating Disruptions," *AlixPartners*, July 3, 2025; Trefor Moss, "China Has 487 Electric-Car Makers, and Local Governments Are Clamoring for More," *Wall Street Journal*, July 19, 2018.

Overcapacity and Managing Market Competition

Excess production and overcapacity—where the level of supply exceeds what domestic demand can absorb and causes the underutilization of industrial capacity—are systemic outcomes of China's industrial policy.[47] Campaign-style mobilization of China's entire government apparatus often leads policy support to overshoot expected market demand, resulting in excess entry and overinvestment.[48] As seen in numerous industries like active pharmaceutical ingredients (APIs), robotics, solar panels, and EVs, competition in the market drives down prices, eliminating weaker firms while stimulating demand for domestic brands.[49] While hyper-competition—where the market is fragmented between too many domestic firms for any to succeed—is often a byproduct of China's industrial policies, it seeks to manage the risks by revising subsidies, adjusting barriers to foreign entry, and arranging industry-wide consolidations—but only after the strongest firms have gained sufficient scale and capability.[50] China often applies this approach to boost productivity in its state-owned sector as well, where the Party-state often maintains multiple state-owned enterprises (SOEs) in the same market to create "orderly" competition—enough to restrain some inefficiencies without wholly undermining their capacity to advance policy objectives.[51]

Multi-Pronged Strategy to Assimilate and Re-Innovate Foreign Technology

China views foreign manufacturing knowhow and the associated technology as core to its industrial strategy, and it uses a variety of tools to acquire foreign technology, promote its diffusion across the country, and support its assimilation and in some cases reverse-engineering.*[52] China's Medium- and Long-Term Plan for Science and Technology Development (2006–2020) explicitly identified "assimilation and absorption of imported technology" as a core driver of indigenous innovation.[53] One of the Party-state's key tactics is to compel foreign companies into a variety of different arrangements that result in technology transfer deals. Additionally, the Party-state backs Chinese companies' targeted acquisitions of high-tech Western companies. China also leverages Western multinationals to develop domestic component supply chains that can subsequently provide inputs to the foreign companies' Chinese competitors. These component manufacturers themselves also emerge as competitors to established suppliers internationally. In parallel, China tries to recruit top foreign experts as well as encourage Chinese nationals in key science and

*China has articulated a four-step framework for absorbing foreign technology—Introduce, Digest, Assimilate, and Re-Innovate—commonly referred to as the IDAR system. "Introduce" refers to the targeting and importation of foreign technology and knowledge, which are then "digested" by China's science and technology system and disseminated throughout China's economy. "Assimilate" means to combine foreign technologies with local technologies, while "re-innovation" involves reverse-engineering the technology and developing capabilities to produce it domestically. IDAR has been promulgated by Chinese officials since the late 1990s, but it gained prominence in the Medium- and Long-Term Plan (2006–2020) period following the issuance of policy guidelines to support the IDAR approach. Tai Ming Cheung, *Innovate to Dominate: The Rise of the Chinese Techno-Security State* (Cornell University Press, 2022), 214–226; China's Ministry of Commerce et al., 关于鼓励技术引进和创新, 促进转变外贸增长方式的若干意见 [Opinions on Encouraging Technology Transfer and Innovation and Promote the Transformation of the Growth Mode in Foreign Trade], July 14, 2006.

technology roles to return to China through recruitment initiatives like the Thousand Talents Programs.* The ultimate objective is to create a self-reinforcing cycle whereby China achieves technological self-sufficiency and competitive advantage.

Forced Technology Transfer

China accelerated its techno-industrial development by coercing foreign companies into providing Chinese competitors access to their technology as a condition for market access.† One study found that the number of policies that targeted forced technology transfer in strategically important industries increased sixfold between 2006 and 2015.[54] Policies such as the Special Administrative Measures for Foreign Investment Access (also known as the Foreign Investment Negative List) require special approval for investment in China in specified sectors and often require foreign companies to establish joint ventures (JVs) with Chinese partners. China routinely utilizes both tools as leverage to demand foreign companies transfer technology to China as a condition for being allowed to invest in the market.[55] China uses the JV requirement to obtain access to foreign intellectual property (IP), promote the flow of skilled workers from the JV to the rest of the economy, foster a component supplier network that also serves the Chinese competition, and facilitate technology theft.[56] Chinese JV requirements and foreign ownership restrictions have relaxed in recent years with the implementation of the Foreign Investment Law in 2020 and revisions to the Foreign Investment Negative List—though many of these restrictions were lifted only after China had already extracted much of the foreign technology it needed.‡[57] Still, in 2024, 40 percent of surveyed U.S. multinational enterprises in China that shared technology with local partners reported that the government compelled them to do so as a condition for conducting ordinary business in the market.[58]

China's acquisition of high-speed rail technology is illustrative. It required industry-leading foreign companies to form JVs with Chinese train makers. Seeing a once-in-a-century chance to profit from China's rail expansion, foreign firms transferred technology and knowhow in a quid pro quo for market access—helping cultivate their top global competitor in the process.[59] Today, China has deployed the largest and most advanced high-speed rail system on earth, with over 28,000 miles of track.[60] The flagship Beijing-Shanghai line covers 819 miles—roughly the distance from New York to Chicago—in just four and a half hours at speeds of 217 mph.[61]

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*For more on China's talent programs, see Anastasya Lloyd-Damnjanovic and Alexander Bowe, "Overseas Chinese Students and Scholars in China's Drive for Innovation," *U.S.-China Economic and Security Review Commission*, October 7, 2020.

†For more, see Sean O'Connor, "How Chinese Companies Facilitate Technology Transfer from the United States," *U.S.-China Economic and Security Review Commission*, May 6, 2019.

‡By 2022, China removed all restrictions on foreign ownership in the automotive sector, terminating a 50 percent ownership cap that had been in place since 1994 and had forced foreign auto companies into JVs with Chinese partners. Foreign EV companies have been allowed to have wholly foreign-owned enterprises since 2018. Shunsuke Tabeta, "China Scraps Foreign Investment Curbs in Auto Sector," *Nikkei Asia*, December 28, 2021; "Chinese Carmakers under Pressure as Joint-Venture Caps Erased," *Bloomberg*, April 17, 2018.

Even when China faced barriers to acquiring leading-edge capabilities through forced technology transfers,* foreign firms more readily agreed to provide mature technologies and knowhow that were still more advanced than what was available domestically—playing a key role in upgrading Chinese industry's position globally.† [62]

Overseas Acquisitions

Chinese overseas investment has been a strategic and blunt tool for advancing domestic industrial capabilities and helping close China's gap with the technology frontier. China's government has provided financing support and technical assistance for acquisitions of Western companies and has encouraged Chinese entities to invest in foreign startups in high-tech sectors.‡ [63] Since the launch of MIC2025, Chinese investments in key technologies and critical infrastructure have accelerated, ranging from semiconductors to biotechnology.[64] One study found that between 2014 and 2017, 112 Chinese direct investments in German companies—representing 64 percent of the total—took place in sectors related to the ten key technologies identified in MIC2025.[65] In industrial robotics, which was central to its MIC2025 ambitions, China was able to shortcut its way to global competitiveness through its controversial acquisition of the German robotics company Kuka (see textbox).[66] As discussed in the section "China's Industrial Commons in Advanced Technology Manufacturing" below, the widespread adoption of robotics fueled productivity growth across China's manufacturing sector. Chinese companies also acted opportunistically to acquire distressed U.S. tech companies in sectors aligned with the Party-state's industrial policy priorities, capitalizing on Western firms' decisions to abandon or sell legacy technologies and IP that remained relevant and in use but that the firms had deprioritized.[67]

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*John David Minnich, a professor at the London School of Economics, argued that Chinese officials were unable, and perhaps unwilling, to leverage market access to impose JV or tech transfer requirements on leading semiconductor firms. This is because in the early 2000s and into the 2010s, most chip imports into China went to its export manufacturing sector. Foreign-sourced chips were critical to China's export manufacturing-led growth, and Chinese policymakers were unwilling to risk this export engine by imposing market barriers to force non-Chinese companies to transfer advanced technologies for market access, although many firms agreed to set up less advanced facilities. John David Minnich, "Scaling the Commanding Heights: The Logic of Technology Transfer Policy in Rising China," *MIT Political Science Working Paper*, June 29, 2023, 31.

†One study of the auto sector found that forming a JV with foreign automakers improved the quality—as measured in J.D. Power surveys—of vehicles made independently outside of the partnership by as much as 12.7 percent from 2007 to 2014. In other words, these JV requirements successfully enlisted foreign companies to accelerate the development of China's domestic auto champions, even if China's auto sector still ultimately lags behind leading foreign brands in internal combustion engine vehicles. Jie Bai et al., "Quid Pro Quo, Knowledge Spillover, and Industrial Quality Upgrades: Evidence from the Chinese Auto Industry," *NBER Working Paper*, September 17, 2023, 5.

‡China has employed its whole-of-nation approach to boost investment in strategic assets. China's Ministry of Science and Technology employs "science and technology diplomats" that are located in Chinese embassies and help Chinese companies by identifying and publicizing potential acquisition targets in key technology areas and playing match-maker by hosting conferences and other events, often in coordination with overseas United Front Work-linked entities. Companies pursuing these acquisitions benefit from tax exemptions and low-cost financing from China's state-backed financial sector. Ryan Fedasiuk, Emily Weinstein, and Anna Puglisi, "China's Foreign Technology Wish List," *Center for Security and Emerging Technology,* May 2021; Elisabeth Braw, "How China Is Buying Up the West's High-Tech Sector," *Foreign Policy*, December 3, 2020; Thilo Hanemann and Daniel H. Rosen, "Chinese Investment in the United States: Recent Trends and the Policy Agenda" (prepared for the U.S.-China Economic and Security Review Commission), December 2016, 71–72.

Kuka Robotics Transaction Expands China's Control over Automation Tools

Chinese company Midea's unsolicited 2016 acquisition of the German company Kuka, a leading manufacturer of robotic arms and other industrial robotics used to automate production lines, accelerated its effort to shape the next generation of advanced manufacturing. MIC2025 identified smart manufacturing and automation as drivers of a manufacturing transformation, making the development of a domestic robotics industry a top priority.[68] China's biggest step toward this goal came when the Chinese appliance manufacturer Midea acquired Kuka in a transaction valued at $5 billion.[69] Midea initially acquired a small stake in Kuka in late 2015. Over a few months it quickly expanded its interest to 30 percent while claiming that it had no intention to gain controlling shares or acquire the company; a few weeks after such statements, Midea mounted a takeover effort.[70] Though some German commentators in 2016 recognized the risk of transferring technological leadership to China, and Chinese official sources directly linked the takeover to MIC2025, the German government did not obstruct the deal.*[71] Today, Kuka has six robotics factories inside China, and its robots are ubiquitous in facilities throughout the country, including in advanced sectors like satellite and rocket manufacturing.[72] Kuka remains the only Chinese-owned industrial robotics firm in the top 10 largest globally, suggesting that homegrown Chinese competitors have yet to replicate its success.[73] Nonetheless, the acquisition catalyzed Beijing's effort to dominate key tools of production, which Liza Tobin, managing director of risk advisory Garnault Global, described as "the base layer of machines, materials, and systems that determine who can manufacture and who cannot and who reaps the benefits of innovation."[74]

Indirect Technology Transfer through Shared Supplier Spillovers

Multinational companies played an instrumental role in catalyzing the growth of China's innovation and entrepreneurial ecosystem and training top Chinese engineering talent at firms that became competitors to U.S. and other foreign counterparts. (See also "Foreign Direct Investment's Role in Developing China's Advanced Industrial Commons" box below.) China incentivized foreign partners to help develop domestic supply chains that diffused knowledge to local firms, resulting in industry-wide benefits to China. Many U.S. tech firms acted as supply chain architects within China that worked alongside Chinese suppliers to enhance their production capabilities

*Following the Kuka acquisition, the German government revised its legal framework for investment screening to cover a broader range of transactions. Additionally, the European Commission enacted an EU-wide investment screening framework, although only 24 of the 27 EU member states have adopted the voluntary framework. For more, see U.S.-China Economic and Security Review Commission, Chapter 5, Section 1, "Europe-China Relations; Convergence and Divergence in Transatlantic Cooperation," in *2023 Annual Report to Congress*, November 2023, 544; European Commission, Directorate-General for Trade and Economic Security, *Foreign Direct Investment Screening Continues to Boost EU Economic Security*, October 14, 2025; Cynthia Wrage and Jakob Kullik, "After Kuka—Germany's Lessons Learned from Chinese Takeovers," *China Observers in Central and Eastern Europe*, July 21, 2022.

and quality. The efforts of U.S. companies like Apple and Tesla to foster a network of suppliers for their own products simultaneously created an ecosystem of firms that could support China's own tech companies.[75] Journalist Patrick McGee argued "China would not be China today without Apple … [which,] in feeding its own global ambition, helped fuel China's technological rise." According to his reporting, Apple constructed—rather than merely outsourced—its supply chain by embedding designers and engineers in Chinese suppliers and investing billions to install custom equipment within these firms.[76] Many of these companies would go on to also supply Apple's Chinese competitors, such as Vivo and Oppo.[77] Tesla's investment in China provides another example where foreign firms helped develop Chinese advanced manufacturing supply chains. As part of its investment, Tesla partnered with Chinese firm LK Group to design and create its "giga-press"—a large-scale machine capable of casting an entire car frame in a single piece in just 100 seconds, an important technology for Tesla's manufacturing process.[78] LK Group then reportedly shared this technology with other companies in China, including EV newcomer Xiaomi, giving them the same critical advantages Tesla once possessed in EV manufacturing.[79] Western firms, including Apple, Microsoft, and Cisco, also supported the growth of China's innovation ecosystem through investments in R&D centers and startups.[80] Experts note that these investments were often part of explicit or implicit agreements with Chinese officials to gain favorable regulatory treatment and market access.[81]

Co-opting Market Mechanisms to Advance State Policy Goals

Recognizing that SOEs were often ill-equipped to pursue innovative technology development initiatives, China has introduced novel mechanisms to increase private-sector participation and reward success. Beijing believes it can combine state guidance with market-based competition to create sandbox-like environments that provide innovative firms resources and support to engage in risky experimentation and iterative innovation while setting boundaries for where such activity takes place.[82] To overcome a bias toward SOEs and large firms within China's financial system that deprives smaller companies of capital, China has established a system of targeted mechanisms to help domestic small and medium-sized enterprises (SMEs) scale and replace foreign suppliers, often in markets for specialized components.[83] This system includes initiatives like the "Little Giants" program that was launched in 2018 and aimed to identify 10,000 innovative SMEs. Rather than picking a winner ex ante, this approach aims to identify a champion through tournament-style competition that encourages entry and risk-taking by multiple firms while withdrawing support from those that lag behind.[84] For instance, China has at least seven companies attempting to commercialize reusable launch vehicles and compete with industry leader SpaceX.[85]

China's Industrial Policy Arsenal

To operationalize the strategies in MIC2025, China has deployed a latticework of mutually reinforcing policy instruments to steer the trajectory of innovation and industrial upgrading, including:

- *Market entry barriers:* China systematically shields domestic companies from foreign competition through market access barriers and informal restrictions that create an uneven playing field, such as skewing preferential public procurement policies toward domestic firms, manipulating the licensing process, and creating lengthy approval delays for foreign competitors.[86] Examples abound of domestic industries where China created an artificial home market advantage, such as in solar panels and medical devices.[87] These discriminatory policies align with China's industrial priorities, aiming to give domestic competitors a protected foothold in the home market and the opportunity to achieve economies of scale before facing global competition. This strategy has proven effective in sectors like telecommunications and high-speed rail, where protected domestic champions eventually became global exporters.
- *Subsidies, tax breaks, and financial incentives:* In addition to subsidies through directed financial support, Chinese policymakers use R&D tax incentives, cheap capital, below-market land sales, worker repression and forced labor,* favorable regulatory treatment, and other tactics to implement industrial policy. Unsurprisingly, measuring the full breadth of China's subsidies policies is challenging, in part by design as transparency around state support would open China to challenges within the WTO. Even comprehensive studies on the topic acknowledge that lack of transparency, and data gaps mean they likely capture only part of the picture. One study estimates that Chinese industrial policy spending in 2019 totaled 1.73 percent of gross domestic product (GDP) (roughly $250 billion), including $54 billion in direct subsidies, $65 billion in R&D and other tax incentives, and $74 billion in below-market credit, more than any other economy.[88]
- *Forced technology transfer policies:* Beijing utilizes a range of measures to extract technology from foreign firms, including compelling foreign firms to form JVs with state-connected Chinese partners, licensing requirements that include technical information disclosures,† mandatory technology transfer agreements as conditions for market access, and systematic cyber and corporate espionage (for more, see "Multi-Pronged Strategy to Assimilate and Re-Innovate Foreign Technology" above).

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*China's polysilicon and solar panel industry is complicit in the CCP's Uyghur forced labor system. In addition to lowering the unit costs of production, Chinese companies were provided tax incentives for participating in forced labor transfers initiatives. The United States has taken several steps to counter the use of forced labor in the solar supply chain, including when the U.S. Customs and Border Protection issued a Withhold Release Order in 2021 against Hoshine Silicon Industry, one of the world's largest silicon producers, over its use of forced labor in Xinjiang. U.S. Customs and Border Protection, *The Department of Homeland Security Issues Withhold Release Order on Silica-Based Products Made by Forced Labor in Xinjiang*, June 24, 2021; Laura T. Murphy and Nyrola Elimä, "In Broad Daylight: Uyghur Forced Labour and Global Solar Supply Chains," *Sheffield Hallam University Helena Kennedy Centre for International Justice*, 2021.

†China may be utilizing its new export control licensing regime to obtain sensitive information from foreign buyers. The *Financial Times* reported in June 2025 that companies seeking approval to export certain rare earths and critical minerals that are subject to Chinese export controls are being asked to provide production details, including pictures and video of production lines, as well as confidential lists of customers. Ryan McMorrow, Joe Leahy, and Kana Inagaki, "China Demands Sensitive Information for Rare Earth Exports, Companies Warn," *Financial Times*, June 12, 2025.

- *Equity investment and government guidance funds (GGFs):* Over the past decade, China has created new financial tools and expanded state-backed funding channels to catalyze investment in startups and innovative small firms. GGFs are financial instruments that have become one of Beijing's primary means for directing financial resources toward priority sectors since 2014. Rather than making equity investments directly, GGFs seek to harness financial markets by operating as funds-of-funds, where they contribute capital as limited partners to venture capital and private equity firms.[89] By the first half of 2024, there were 2,126 GGFs with target allocations totaling $1.8 trillion (12.8 trillion RMB), more than half the size of assets under management in the entire U.S. private equity market, although only roughly one-quarter of funds met their fundraising goals, according to one study based on 2021 data.[90] To create exit opportunities for startup equity investments, China established the STAR Market in 2019 and the Beijing Stock Exchange in 2021, both of which are designed to serve Little Giants and other SMEs.[91]
- *Manufacturing Champions and Little Giants:* China has deployed tiered support programs to nurture globally competitive companies that dominate niche markets for advanced technologies and components.[92] China's Ministry of Industry and Information Technology (MIIT) launched a program in 2016 to boost the competitiveness of "manufacturing champions," firms that are leading producers of specialized technologies, with a particular focus on sectors targeted in MIC2025.[93] In 2018, it launched the Little Giants program to support SMEs competing in emerging technologies, with more explicit focus on filling gaps in supply chains that are currently dominated by foreign firms.[94] The government selects and certifies Manufacturing Champions or Little Giants in batches, based on a range of criteria including market share in an industrial policy priority area and the fulfillment of specific financial thresholds.* This certification effectively acts both as a "golden ticket" to a range of government benefits—including direct subsidies, preferential access to lending and investment, and cheaper access to land, labor, and energy—and as a signal that boosts credibility with the state-dominated financial sector.[95] Continued support is contingent on meeting specific key performance indicators, with the threat of withdrawal designed to incentivize companies to remain innovative.[96] As of July 2023, 12,756 SMEs have received the "Little Giants" golden tickets, and over 1,100 companies have received the "Manufacturing Champions" title.[97]
- *Procurement:* China's massive public procurement market—which exceeded $6.6 trillion in 2022—provides the government with a powerful lever it has used to generate demand for do-

*One of the criteria for receiving this status is operating in a MIC2025 priority sector, but in practice China has applied this standard loosely. Many companies receive support despite a lack of specialization in advanced technology. Alicia García-Herrero and Michal Krystanyanczuk, "How Does China Conduct Industrial Policy: Analyzing Words versus Deeds," *Journal of Industry, Competition and Trade* 24, no. 10 (2024): 14–16; Alexander Brown, François Chimits, and Gregor Sebastian, "Accelerator State: How China Fosters 'Little Giant' Companies," *MERICS*, August 3, 2023, 4.

mestic production, often through discriminatory policies that prevent foreign firms from competing for contracts.[98] For example, Chinese procurement in the medical device market, where China's largely state-owned hospital system provides the government a near monopsony, has included specific local content ratios for items including X-ray machines, MRI systems, and surgical equipment—all technologies targeted in MIC2025.[99]

- *Megaprojects:* Alongside sectoral and industry-specific policies, China has designated a number of key technologies as megaprojects—national flagship initiatives backed by massive state funding that are closely coordinated and often directly overseen by the central government.[100] The Medium- and Long-Term Plan (2006–2020) contained 16 megaprojects, including the C919 narrow-body passenger airplane (now in commercial service), the BeiDou Navigation Satellite System (now providing global coverage), and hypersonic vehicle technology (successfully tested with global orbital capability in 2021).[101] In 2015, China launched its Science, Technology, and Innovation 2030 Major Projects, which introduced another 16 megaprojects, such as quantum communications, deep-space exploration technologies, and AI.[102] These initiatives represent China's most ambitious bets on breakthrough technologies deemed critical for national competitiveness and security.
- *Industrial zones:* China has established hundreds of high-tech industrial zones aimed at fostering clusters of innovative activity, the most prominent of which are the 173 National High-Tech Industrial Development Zones.[103] Beyond providing infrastructure for industrial development and fostering externalities from agglomeration, these zones serve as testing grounds where local officials deploy industrial policy tools and pilot programs.[104] Many zones explicitly target MIC2025 priority sectors, with clusters specialized in robotics, biotechnology, advanced manufacturing, and others.[105] This zone-based approach allows China to test policies on a smaller scale before national rollout.*

Inefficiency and Economic Headwinds Unlikely to Constrain CCP Industrial Policy

By directing resources at scale toward techno-industrial objectives, Beijing's approach creates significant economic costs, wasteful spending, and other unintended consequences that distort its own economy. One study examined how direct government subsidies, including those linked to MIC2025, impacted the performance of Chinese-listed firms, finding that subsidies did little to boost productivity and appeared to be allocated toward less productive firms—in other words, Chinese officials may more often pick losers rather than winners.[106] Other experts have linked the decades-long decline in China's total factor productivity growth to misallocation and distortions caused by China's market interventions.[107] More generally, industrial policy missteps take time to unwind, meaning

*Industrial zones provided benefits beyond just financial support, often acting in effect as consultants, helping firms navigate permitting and Chinese bureaucracy. Jonas Nahm, "China's Specialization in Innovative Manufacturing," in *Collaborative Advantage: Forging Green Industries in the New Global Economy* (Oxford University Press, 2021), 140.

that capital and labor are effectively trapped in underperforming firms or sectors until they can be redistributed to more productive uses. For example, China's EV sector is grappling with the fallout from overinvestment and the influx of underperforming entrants.[108] In the chip industry, an intensification of state support for semiconductor projects created waves of new entrants since 2019—including over 13,000 businesses that registered in 2020 alone—that likely fragmented the market among too many players.[109] The *Financial Times* reported in August 2025 that the government is attempting to consolidate the chip sector through a megamerger but has struggled to attract buyers, as many semiconductor firms lack competitive business models and are unattractive acquisition targets for potential domestic suitors.

The CCP's goal is not to maximize efficiency or capital allocation, however; to state the obvious, Xi Jinping does not believe Western-style capitalism is a superior macroeconomic system to China's state-led model.* From the perspective of China's leaders and their goals, Chinese industrial policy has had significant successes. A decade since it launched MIC2025, China achieved many of the plan's overarching goals and has rapidly built domestically—and, in many cases, globally—competitive capabilities across its ten targeted technologies.† It achieved across-the-board successes in EVs, space, electrical equipment, and biopharma while making significant progress in the other sectors in terms of increased global market share, localization of production, reduced reliance on foreign suppliers, or the development of domestic capabilities in leading-edge technologies.‡ While China fell short of MIC2025 targets in several sectors—most notably advanced semiconductors and commercial aviation—despite extensive support, these setbacks did not negate the policy's effectiveness in other areas. The rapid rise of China's EV industry exemplifies how targeted state support can deliver incredible results, even at the cost of incredible waste, transforming China from a negligible player to the world's largest EV market and exporter in less than a decade.[110]

Some commentators have argued that China's economic downturn will act as a constraint on China's industrial policy, particularly at the local government level. China's economic growth has been slowing since 2007, and it has experienced significant economic challenges since the beginning of the real estate sector crisis in 2021. Prospects for robust future growth face numerous headwinds, including an acute debt burden, long-term demographic decline, and structural imbalances stemming from persistently weak consumption, over-

*Further, China's system means the government has little direct responsibility to the people for waste, fraud, abuse, and political favoritism. There is little negative consequence in terms of public opinion and none in terms of electoral backlash with respect to the failures of China's industrial policy.

†For an evaluation of China's performance toward its MIC2025 goals, see Daniel Blaugher, Benton Gordon, and Matthew Dagher-Margosian, "Made in China 2025: Evaluating China's Performance," *U.S.-China Economic and Security Review Commission*, November 2025.

‡MIC2025 helped boost China's overall manufacturing capacity—which rose from 25.9 percent of global value added in 2015 to 28 percent in 2023—and global market share—with China-based firms accounting for nearly one-quarter of the global growth in exports related to the ten MIC2025 sectors between 2015 and 2023. Within MIC2025-related products, just under 20 percent of global exports in 2023 originated from China. World Bank Group, "Manufacturing, Value Added (Current US$)"; Commission staff analysis based on CEPII, "BACI 202401b HS07;" "Market Power of China's Made in China 2025 Exports," *MITRE* (prepared on behalf of U.S. Air Force, Office of Commercial and Economic Analysis), July 29, 2022.

investment, and other factors (for more, see Chapter 1, "U.S.-China Economic and Trade Relations (Year in Review)").[111] Local governments have faced deteriorating fiscal conditions as Beijing is attempting to rein in off-balance-sheet borrowing, including through local government finance vehicles (LGFVs), severely constraining localities' ability to independently generate revenue—much of which is used to service debt raised through LGFVs.[112] As a result, localities across China have been forced to cut expenditures across a range of government services. In the face of these headwinds, some experts argue that China will face fiscal constraints that force it to cut back on its industrial policy expenditures to preserve space for other priorities.

While all governments face decisions about how to allocate scarce government spending, particularly during periods of declining growth, China is not likely to forego spending on industrial policy.*[113] First, China's industrial policy, while massive compared to other countries,† accounts for a relatively small part of China's total government expenditures. According to a widely cited 2022 Center for Strategic and International Studies report, a lower bound estimate for the combined value in 2019 of Chinese government subsidies, direct R&D support, the provision of below-market credit, and state investment funds, amounted to roughly 3 percent of the government's total fiscal spending. This figure, however, does not capture other forms of state support discussed above that are not recorded as government expenses.[114] A 2025 working paper from the International Monetary Fund employing looser assumptions placed industrial policy spending at 4.4 percent of China's GDP in 2023, though the study authors caveat that their methodology may overestimate subsidies in certain ways.‡

Second, the CCP clearly places a high priority on its industrial policy and believes it is key to its overarching economic and military goals. Since the release of the 2006–2020 Medium- and Long-Term Plan, the ambition and scope of China's industrial policy have steadily grown. China has drawn an ever-larger share of the Party-state apparatus into pursuing these objectives, as reflected in the proliferation of industrial policy documents at all levels of government that target advanced industries.[115] This evolution culminated in the emergence of a "new-style whole-of-nation sys-

*Analysis by the Rhodium Group argued that fiscal constraints are already leading to a slowdown in grants to publicly traded companies. Since 2020, total grants to listed firms in strategic sectors—excluding batteries and EVs—have largely stagnated, potentially reflecting increased risk aversion by local officials facing severe budget constraints. However, China is unlikely to materially downshift support to its top industrial priorities. Camille Boullenois, Endeavour Tian, and Laura Gormley, "The Mountain Is High, the Lead Investor Is Far Away," *Rhodium Group*, September 9, 2024.

†Up-to-date estimates on the full scale of China's industrial policy spending are unavailable, but recent estimates indicate that Chinese government support far outstrips any other economy. The Center for Strategic and International Studies found that, in 2019, China's industrial policy spending totaled 1.73 percent of GDP. By comparison, the researchers applied the same methodology to seven other major economies, including the United States, and estimated spending at between 0.3 and 0.7 percent of GDP. Gerard DiPippo, Ilaria Mazzocco, and Scott Kennedy, "Red Ink: Estimating Chinese Industrial Policy Spending in Comparative Perspective," *Center for Strategic and International Studies*, May 2022, 32–33.

‡The study assumes subsidy rates for non-listed firms are the same as publicly traded firms, which disclose certain subsidies like R&D grants in their financial statements. However, publicly traded companies tend to be larger firms or SOEs and may have higher subsidization rates than other companies. Daniel Garcia-Macia, Siddharth Kothari, and Yifan Tao, "Industrial Policy in China: Quantification and Impact on Misallocation," *IMF Working Paper*, August 8, 2025, 4–12.

tem," a concept Beijing formalized as a key driver of its techno-industrial approach in the 14th Five-Year Plan (2021–2025).[116] The system entails a governance model that enables Beijing to coordinate across the public and private sectors to deploy resources at scale to break through technological barriers and challenges.[117] China adjusted its cadre evaluation system—through which local officials are assessed for promotion within the state bureaucracy—by incorporating key performance indicators tied to the Party-state's techno-industrial objectives.[118] As discussed above, Beijing sees its innovation drive as critical to overcoming the challenges confronting the Chinese economy, society, and national security. In 2024, Xi emphasized that China must develop new growth drivers in order to propel overall productivity and innovation, underscoring the Party-state's view that technological progress can address not only China's technological vulnerabilities but also its broader economic headwinds.* [119]

Given the importance the Party-state places on industrial policy in helping China achieve a variety of goals, when faced with tradeoffs, Xi will prioritize China's technology and industrial policy ambitions over other policy objectives. While local governments may face more fiscal challenges than the central government, to date the economic slowdown has not materially affected their capacity to fund high-tech enterprises. As local government balance sheets have deteriorated, officials have largely cut spending on areas such as community services and domestic security.[120]

To the extent that China's economic headwinds impact the outcomes of its industrial policy, the result is likely to be a two-speed economy where rapidly growing targeted (often high-tech) sectors receiving government support coexist with a broader macroeconomic slowdown. In this case, Chinese policymakers *may* scale back investments in smaller, riskier companies and instead focus on larger companies, SOEs, and priority sectors that are better established and are already significant local employers.[121] Between 2020 and 2023, the median grant size awarded to listed firms in strategic sectors—excluding batteries and EVs—have largely stagnated, even as the average grant value increased by roughly 30 percent, potentially reflecting a greater concentration of support to larger firms over smaller as local officials minimize risks given tighter budget constraints.[122] Support for EVs, batteries, SOEs, and the largest 200 listed companies has continued to grow.[123]

Industrial Commons Provides Foundation for Continued Manufacturing Leadership

China's industrial policies are more than the sum of their parts. While China counts numerous successes in meeting sector-specific goals, the greatest gains are not in market share in a

*In this regard, China appears to be ignoring evidence to the contrary. Although output growth from high-tech manufacturing sectors exceeded total manufacturing output in 2024, China's economy as a whole is struggling to regain its footing. As observed by RAND senior researcher Gerard DiPippo, "China's high-tech industries are only a small share of its total economy. Those high-tech sectors shaping the 'new economy' are indeed growing, but they are not large enough to offset overall weakness in the 'old economy' weighing down key indicators like GDP growth." Gerard DiPippo, "Focus on the New Economy, Not the Old: Why China's Economic Slowdown Understates Gains," *RAND*, February 18, 2025.

specific sector or value-added growth but rather in the industrial commons fostered by MIC2025 and related policies. "Industrial commons" encompasses the interdependent capabilities, resources, skills, and institutions that underpin competitive manufacturing. These elements work collectively to strengthen the entire ecosystem. During the past decade, China's mutually reinforcing investments in production capacity, scientific infrastructure and talent, supply chain development, and the pipeline from applied research to commercialization have created emergent capabilities in advanced manufacturing and innovation beyond the objectives of any single industrial policy. These cumulative advances in China's manufacturing ecosystem have now laid the foundation for rapid progress in other emerging sectors.

The next section discusses China's industrial commons and the related phenomenon of "interlocking innovation flywheels," or the cumulative and mutually reinforcing gains as innovative breakthroughs in one field drive advances in adjacent technologies. Case studies demonstrate how industrial policy fostered foundational, interdependent capabilities that now position China to succeed in emerging technologies that combine skills, knowledge, and production processes across multiple advanced fields.

China's Industrial Commons in Advanced Technology Manufacturing

Harvard Business School professors Gary Pisano and Willy Shih are credited with popularizing the "industrial commons" concept and noting its importance to manufacturing competitiveness, innovation, and economic growth.[124] When a country achieves a core foundation of manufacturing capacity—including capital assets, component supply chains, a skilled workforce, R&D infrastructure, experience moving from prototype to product launch, enhanced knowhow, and capacity to undertake iterative process improvements—it forms a virtuous circle in which these elements can reinforce and strengthen each other. This "industrial commons" enhances a country's ability to produce, scale, continuously improve, and design more complex products, leading to efficiencies and advanced capabilities in overlapping sectors.[125] Closely related to "industrial clusters" described above but acting on a much broader scale, production advantages from industrial commons have been core to numerous industrial success stories.

Over the past two decades, China has developed the world's most extensive industrial commons in advanced manufacturing, first by developing foundational capabilities across a range of sectors, then by systematically moving up the value chain and expanding into new fields. By MIC2025's launch in 2015, China was already the world's largest manufacturer, a position it attained partly by progressing from low-value-added assembly of components produced elsewhere to developing a robust industrial ecosystem of domestic suppliers.[126]

China's deep manufacturing sector provides it numerous advantages. It has extensive production links across a wide variety of industrial sectors, which now generate broader manufacturing-wide clustering and spillover effects that speed up innovation.[127] China

provides a massive base of manufacturing suppliers capable of providing a particular manufacturing service or making a specific component.[128] As Jay Goldberg, founder of tech consultancy D/D advisors, stated, "There's all these subcontracted, specialty niche firms, and nowhere else does that exist… in the world."[129] Its manufacturing sector also facilitates more and faster linkages between different elements of the manufacturing ecosystem, including co-location of manufacturing and R&D, upstream and downstream suppliers, contract research, digital prototyping, and training.[130] Manufacturing companies and workers in China now have extensive experience innovating on factory production lines, iterating processes, and enhancing efficiencies.[131]

Adding to its strong industrial commons is the scale of China's manufacturing sector, which provides certain advantages on its own. Apple CEO Tim Cook once tried to explain China's manufacturing scale, telling an audience that if every tool and die maker in America were invited to the auditorium where he was speaking, they "wouldn't fill the room." Whereas "in China," he added, "you would need several cities to fill with tool and die makers."[132] With an internal market equal to nearly 20 percent of global GDP (on a purchasing power parity [PPP] basis) and the largest manufacturing export sector in the world, China provides manufacturers an opportunity to produce and sell at scale that can be particularly beneficial to a variety of manufacturing industries.[133]

While MIC2025 and related policies focused on advanced and emerging sectors, they concomitantly enhanced China's existing industrial commons for the entire manufacturing sector. MIC2025 helped Chinese firms integrate existing strengths into new technologies and products and supported investments that improved manufacturing processes across the board. For instance, machine tools and automation are core manufacturing capital assets that enhance industrial capability in a variety of sectors. China's support in MIC2025 for precision machine tools and industrial automation tools have helped a broad range of Chinese manufacturers become more efficient, remain cost competitive as wages increase, and close the gap in most sophisticated manufacturing processes with other advanced economies.[134] Even industries that were not directly targeted by MIC2025, such as China's consumer electronics industry, benefited from MIC2025's support in these sectors. As a result, China was able to grow its already outsized share of global manufacturing value added even more.

Robotics and Intelligentization as Key Elements of China's Manufacturing Industrial Commons

As discussed above, one of China's core goals in MIC2025 was to encourage "intelligentization" across its manufacturing ecosystem, or enhanced use of automation, digitization, AI, and robotics to reduce production costs and increase efficiency. It was very successful. In 2015, China's industrial robot density (defined as industrial robots per 10,000 workers) was only 19, compared to 176 in the United States and 531 in South Korea; China was not even in the top 20 globally (Australia was 20th, with a density of 86, more than four times China's at the time).[135] Respected German think tank the

Mercator Institute for China Studies (MERICS) observed in 2016, "Most Chinese factories feature a rudimentary level of automation and almost no digitization."[136] In 2019, China entered the global top ten in robot density and by 2023, China's manufacturing sector had become the third most automated in the world with an industrial robot density of 470, behind only Singapore and South Korea.[137] China now leads the world in total robot installations: in 2023, it reached 1.76 million units operational in factories, accounting for 41 percent of all operational global stock and more than half of new installations in the preceding year, according to the International Federation of Robotics.[138]

China's rapid installation of industrial robots contributes to China's industrial commons in important ways. Robotic automation improves quality and reduces costs. A recent study found an approximate 10 percent increase in total factor productivity (TFP) among manufacturing firms from industrial robot adoption.[139] Other studies have also found significant increases in productivity from industrial robotics automation.[140] Of the 276,000 robots installed in China during 2023, the electronics industry led with over 77,000 installations, followed by automotive with nearly 65,000 units and metal and machinery with more than 41,000 units.[141] Grace Shao, founder of Hong Kong tech consultancy AI Proem, noted that China's installations "cluster where speed and precision pay immediate dividends" like fastening, testing, and packaging circuit boards for complex electronics products or welding and painting in factories—in other words, capabilities with numerous industrial applications.[142] Taiwan contract manufacturer Foxconn was an early leader in automation in Chinese electronics factories, reportedly replacing 60,000 workers with robots in its Kunshan factory in 2016.[143] Other consumer electronics companies have followed suit, with Xiaomi building a "dark factory" with minimal human intervention in Changping that reportedly produces a smartphone every three seconds.[144] Xiaomi's EV factory near Beijing reportedly is 91 percent automated and can produce an EV every 76 seconds.*[145]

Beyond labor savings, smart factories can operate "lights-out," producing continuously without lights and with minimal climate control. Gree Electric Appliances, China Unicom, and Huawei report that their 5.5G-networked lights-out factory, the world's largest, increased production efficiency by 86 percent.[146] As demand for robotic automation has increased, as by far the leading global installer of new industrial robots, China's manufacturing sector is developing knowhow in optimal automated factory design.[147] Strong domestic demand is also driving down costs and improving local robotics manufacturing and innovation capabilities. Although China continues to source a majority of its robots from foreign firms (including foreign firms' operations in China), in 2023 local purchases rose to 47 percent after hovering around 28 percent for a decade, while installations of foreign-made robots fell 21 percent.[148]

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*China's automotive industry is number two in the country in terms of robot density. "Record 1.7 Million Robots Working in China's Factories," *International Federation of Robotics*, September 24, 2024.

Foreign Direct Investment's Role in Developing China's Advanced Industrial Commons

China's outsized role in manufacturing mobile phones, tablets, personal computers, and smart appliances owes to its success in attracting foreign direct investment (FDI) and working with multinational companies to improve the ability of Chinese supply networks to manufacture quality—and in some cases cutting-edge—electronic components.

Supplier relationships with Apple have been instrumental in positioning Chinese firms at the forefront of consumer electronics manufacturing capabilities. Of Apple's total supply chain in 2023, 157 of its manufacturing or component suppliers were either Chinese or based in China.[149] As of 2023, 95 percent of iPhones, AirPods, Macs, and iPads were made in China.[150]

Apple's reliance on China for parts and assembly has been driven partly by pressure from Chinese officials demanding commitments to train Chinese engineering talent and strengthen production processes in order to continue to benefit from its supply network there.[151] This Chinese government "pay to play" tactic led to a 2016 memorandum of understanding under which Apple agreed to invest $275 billion to support the development of China's tech ecosystem over a five-year period, including through collaborating with Chinese universities and investing in local tech firms.[152] In comparison, the Creating Helpful Incentives to Produce Semiconductors (CHIPS) and Science Act of 2022 allocated $52.7 billion over five years to support U.S. domestic semiconductor manufacturing, research, and development.[153]

As it designs new features and specifications for future product generations, Apple has traditionally worked closely with its supplier network in China to conduct R&D on technical advances and develop the manufacturing processes that bring design concepts into production.[154] As part of this process, Apple embedded engineers at more than 1,600 Chinese partners, helping improve efficiency; it has even bought advanced machinery for some suppliers.[155] For example, Apple collaborated with touchscreen manufacturer Lens Technology to develop new laser technology for glass cutting the full screens on iPads and iPhones, a technology which is now an industry standard.*[156] Apple and Lens Technology reportedly continue to collaborate to produce advanced ultra-thin glass used for flexible screens.[157]

Investments and partnerships with foreign companies helped grow China's broader electronics industrial sector, contributing to its status as the world's largest producer of consumer electronics, accounting for 54 percent of global exports in 2023.[158] Some of the largest and most sophisticated Chinese consumer electronics firms are key components suppliers to foreign brands. Lens Tech-

*According to Apple's COO Jeff Williams, "It was actually a big challenge at the time, because no one used glass materials in large-screen mobile phones at that time. We worked with Chairman Zhou to overcome difficulties and make the product." Ni Yuqing, "'果链'崛起 苹果巨资再押中国智造" [The Apple Supply Chain Rises: Apple Places Another Massive Bet on Chinese Manufacturing], *21st Century Business Herald*, October 25, 2024.

FDI's Role in Developing China's Advanced Industrial Commons—*Continued*

nology is now the world's largest manufacturer of touchscreens.[159] Acoustic components maker Goertek is a longtime supplier to Sony and Apple; a subsidiary of the firm also manufactures 80 percent of global medium-to-high-end virtual reality headsets and won a German award for its flexible smart glasses.*[160] Apple iPhone camera lens provider Sunny Optical is now the world's largest smartphone lens supplier, and the firm currently retains a large market share in computer vision and navigation for robotic vacuum cleaners.†[161]

Repeating a story seen in other sectors, many of the Chinese firms cultivated by foreign firms are now global competitors. Chinese suppliers to the consumer electronics industry have played pivotal roles in building up local competitors like Huawei and Xiaomi. Teardowns of Xiaomi's phones reveal components from Chinese suppliers that also have worked with leading international brands (see Table 1).

Table 1: Xiaomi Suppliers Overlap with Samsung and Apple

Supplier	Component	Overlap
Sunny Optical	Camera lenses	Apple
Sunwoda	Batteries	Apple
Goworld	"One-glass" touchscreens	Apple
Janus Precision	Structural components	Samsung
Shenzhen Zowee Tech	Portable power banks	Samsung
Shenzhen Aisidi Co., Ltd	Distribution	Samsung, Apple

Source: Various.[162]

China's Interlocking Innovation Flywheels

China's deepening of its industrial commons and sustained support for advanced and emerging technology sectors during the MIC2025 period have now fostered the capacity for overlapping, mutually reinforcing innovations in adjacent technologies. These "interlocking innovation flywheels" (IIFs) are leading to heightened levels of innovation across China's manufacturing ecosystem. Incremental advances in one technical application support progress in another area, in turn enabling gains in related technologies or products in a self-reinforcing cycle. In other words, China's enhanced innovation capacity and competitiveness in sectors supported by industrial policy fuel its innovation capacity across multiple additional technologies. As research consultancy Rhodium Group observed regarding MIC2025 implementation:

*Goertek's augmented and virtual reality device subsidiary, Goertek Optical, was designated for state support under the fourth tranche of Little Giants.

†China's MIIT designated Sunny Optical in the fifth tranche of Little Giants.

> *[O]verlapping technological achievements across sectors have arguably created a reinforcing effect that will amplify China's progress and grip over global supply chains in the years to come. Strengths in foundational technologies such as advanced materials, semiconductors, and artificial intelligence catalyze advancements in downstream applications like robotics, new energy vehicles, and telecommunications. These will likely continue to accelerate innovation and competitiveness in the future and may position China to deepen its influence across a wide range of strategic sectors globally.*[163]

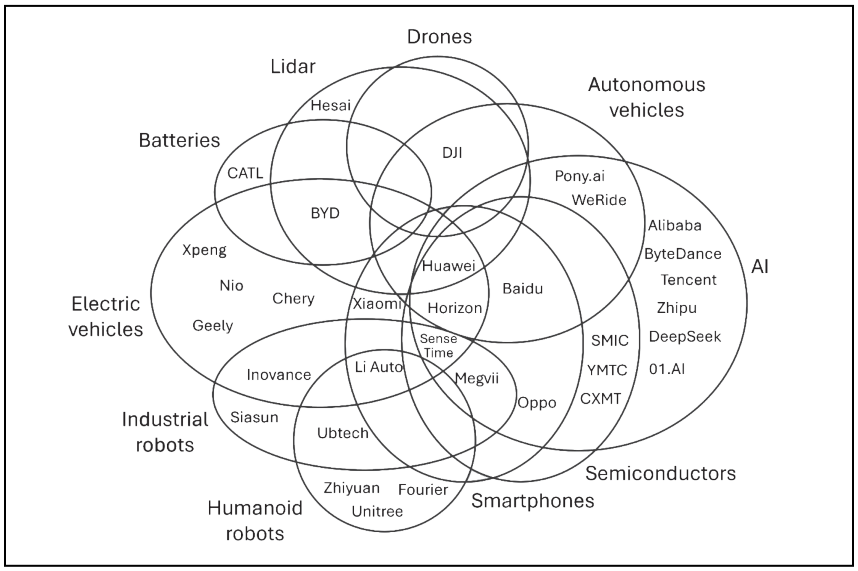
Princeton post-doctoral researcher Kyle Chan has made a similar observation—China's burgeoning strength across multiple overlapping fields positions it to capitalize on a general convergence of technologies as more complex products integrate advances in numerous fields (e.g., EVs, battery technologies, autonomous vehicles, drones, LiDAR, industrial robots, and semiconductors).[164] Dr. Chan highlighted how key sectors targeted in industrial policies like MIC2025 are not silos unto themselves, but are mutually reinforcing with other sectors—integrating capabilities in adjacent fields and helping establish core industrial competencies that enable further innovation in different sectors. He explained:

> *China's success with its EV industry today is really the result of China's strength in a range of overlapping industries, some of which "grew up" together with China's EV industry. The flip side of this is just as important. China's focus on its EV industry is not just about selling cars. It's about using a key industrial node to push progress across a whole network of connected industries—the way that railroads were seen historically as driving broader industrial development.*[165]

As an example, China's EV industry has built on a range of overlapping capabilities, including lithium batteries for consumer electronics, automobile manufacturing, industrial commodities refining, electric motors, AI, wireless communications, and industrial automation in manufacturing processes. In turn, the EV sector helped drive innovation across these fields and a range of other related capabilities, including energy storage, touchscreen displays, onboard software, other manufacturing processes that integrate industrial robotics, and autonomy-related technologies such as LiDAR.[166] The consumer drone industry has a similar production and innovation profile. Improvements in battery density, coupled with advances in composites and other materials to reduce weight, combine with development of autonomous technologies, wireless communications, and edge computing for AI integration. In turn, advances in both EVs and drones improve China's innovation capacity in sectors with overlapping technology and manufacturing profiles (e.g., autonomous vehicles). Dr. Chan visualized the numerous overlapping capabilities of Chinese firms in a Venn diagram (see Figure 1).*

*The Commission recognizes that the diagram is illustrative of a concept and is not meant to reflect a precise level of overlap between the noted industrial sectors and/or company efforts.

Figure 1: Interlocking Innovation Flywheels



Source: Kyle Chan, "China's Overlapping Tech-Industrial Ecosystems," *High Capacity*, January 22, 2025.

The Venn diagram above shows Chinese firms in the center and key technologies at the periphery, reflecting that overlapping capabilities may drive parallel advances while positioning Chinese firms to capture synergies within single companies. Notably, Chinese firms are pursuing more horizontally integrated business models in sectors with overlapping technologies, including—as discussed below—growing integration between the EV and humanoid robot markets.

Interlocking Innovation Flywheels Case Study: EVs and Humanoid Robots

An example of an IIF at work in China recently is the growing rapid efforts by Chinese EV companies to move into humanoid robots. As noted above, MIC2025 and related plans set clear goals for China to become the global leader in robotics innovation and integrated applications; more recent plans have targeted breakthroughs in core technologies now including intelligent motion planning, bionic perception, and cognitive AI.[167] Since at least 2023, when MIIT released a Guiding Opinion on the Innovation and Development of Humanoid Robots, China's policymakers have sought to apply core technology capabilities and China's broader technical and manufacturing competencies to develop a "global leading level" humanoid robot industry.[168] Explicitly connecting sectors targeted by MIC2025 and other industrial policies, MIIT stated: "Humanoid robots that integrate advanced technologies such as artificial intelligence, high-end manufacturing, and new materials are expected to become the next disruptive product after computers, smartphones, and new energy vehicles."[169] For their part, Chinese EV firms have broadly embraced this new state direction (Table 2).[170]

Table 2: List of Chinese EV-Humanoid Overlap

Chinese EV-humanoid overlap	Has company debuted working prototype?	Product under development
GAC Group	Yes	GoMate Humanoid
XPeng	Yes	Iron Humanoid
Li Auto	No	CEO says the company may plan to build humanoid robots, although not currently
BYD	No	Yao Shun Yu
Xiaomi	Yes	CyberOne
Chery Automobile	Yes	Mornine
SAIC Motor	No	Is an early stage investor in several humanoid robot companies
SERES	No	Building out a humanoid robot team
Changan Auto	No	Announced plans to develop a humanoid robot by 2027
Dongfeng Motor	Yes	Partnered with UBTech Robotics to develop Walker S. and released Embodied Intelligence AI architecture with plans to enter humanoid robot market

Source: Various.[171]

The industry has capitalized on the technological and manufacturing expertise overlap between EVs and humanoid robots. Aside from software and batteries, materials, motors, and heating and liquid cooling systems originally developed for EVs can also be applied to humanoid robots (Table 3).[172] In an interview with state-run *People's Daily*, Zhou Jian, CEO of UBTech Robotics, explained:

> *[China's] complete industrial manufacturing system and industrial chain provide guarantees for the mass production of humanoid robots. Humanoid robots have many similarities with industrial robots, new energy vehicles and other industries in terms of supply chain. For example, resources can be shared in the supply of key components such as batteries, chips, sensors, and controllers, thereby promoting the coordinated migration of the supply chain.*[173]

Industry and academic groups are also cooperating in developing interoperability standards for EVs and robotics.[174] Having developed supply chains that contain many overlapping components with humanoid robots, EV companies are positioned to manufacture robots more efficiently, with MIIT researcher Hu Jianya forecasting that automakers' per-unit costs could reach two-thirds the current price of units from general robotics companies.[175] Hu also noted that EV makers could conduct R&D in-house and respond more quickly to market changes.[176]

In turn, Chinese media has highlighted that advances in autonomy and perception for humanoid robots "will further enhance the intelligent and technological image of automobile companies."[177] Along these lines, Chinese autonomous driving firms and automakers like BYD are expanding into developing "embodied intelligence" models that power humanoid robots, taking advantage of the overlap with autonomy.[178] Other companies are mimicking BYD, with rival Xpeng developing its own semiconductors as the "brain" for both EVs and its in-house humanoids.[179] Even Xiaomi, a company known primarily for smartphones and smart devices until it entered the EV market last year, is working on developing a humanoid robot.[180]

Table 3: Illustrative List of Shared Components between EVs and Humanoid Robots

Components and Materials	Used in Tesla Optimus	Used by Chinese EV-Humanoid Companies
Rare earth magnets	Yes	Yes
Harmonic systems	Yes	Unclear
Semiconductors	Yes	Yes
Advanced Driving Assistance System (ADAS) software	Yes	Yes
Actuators	Yes	Yes
Thermal management	Yes	Yes
Cameras	Yes	Yes
Batteries	Yes	Yes

Source: Various.[181]

Ironically, the excess capacity caused by the distortions of China's industrial policies may help accelerate its ability to capitalize on interlocking innovation flywheels. The expansion of many EV companies into humanoid robots may be driven in part by the fierce competition in their own industry due to the massive oversupply caused by years of government support, which is severely cutting into pricing and profitability.[182] In an interview with Chinese tech-focused media outlet 36kr, MIIT official Liu Xingliang noted that China's EV market was "approaching saturation," and humanoid robots offered "strong growth potential" for EV makers.[183]

China's Efforts to Dominate the Bio-Economy of the Future

Commercializing Scientific Discoveries in Synthetic Biology

In synthetic biology, China's investments spanning from foundational science to state-of-the-art biomanufacturing facilities are creating an end-to-end innovation pipeline that positions it to dominate the field. This comprehensive approach—from basic, foundational research through laboratory infrastructure to specialized biomanufacturing—enhances China's ability to translate scientific discoveries into production at scale. As with other sectors, China is well

positioned to be a leader in synthetic biology owing to its persistent policy support, sustained investments in research infrastructure, spillover benefits from innovation and capacity in adjacent fields (such as biopharmaceuticals and medical devices), and vertical integration of supporting supply chains. This combination is leading to a future in which the U.S. and global healthcare systems may depend on China for access to the best pharmaceuticals, biotechnology innovations, and most sophisticated equipment.

In its current form, synthetic biology uses engineering principles to build or modify novel or existing biological systems for desired purposes. Present-day examples include gene synthesis (e.g., developing mRNA vaccines from DNA sequences), gene editing (e.g., CRISPR technologies), and protein engineering (e.g., spider silk for textile and medical uses). As a general-purpose technology, synthetic biology has the potential to revolutionize multiple sectors simultaneously, making it a critical arena for technological competition.

Beyond pharmaceuticals, synthetic biology promises to be a critical enabler in agriculture and industrial manufacturing. Chinese researchers are applying synthetic biology to develop drought-resistant and high-yield crops, engineer lab-grown proteins to replace traditional animal agriculture, and create bio-based materials with properties that surpass petroleum-derived plastics or metals. These bio-materials—from spider-silk-strength fibers that could one day be used in aerospace components to biodegradable packaging for consumer goods—illustrate how synthetic biology could reshape entire industrial supply chains.[184] As such applications are developed and scaled, they could expand China's influence beyond global healthcare markets into food security, climate mitigation, and next-generation manufacturing, magnifying the strategic risk.

Synthetic biology research also has clear dual-use potential with direct military applications. These include performance enhancement for service members; rapid production of vaccines or medical countermeasures for deployed forces; forward deployed food, fuel, and energetics; and creation of bio-based materials for advanced military equipment. Advances in these areas could quickly be adapted from civilian research into capabilities that enhance the People's Liberation Army's operational effectiveness. As Stanford Bioengineering professor Drew Endy noted in oral testimony before the Commission, a sense of urgency and insecurity may be driving China to innovate in such applications more quickly.[185]

Industry and government experts estimate that the bio-economy, currently worth nearly $5 trillion, will grow significantly in the coming decades largely due to advances in synthetic biology.[186] Breakthroughs in biology, AI, and associated computational tools are beginning to demonstrate the potential to accelerate the development and deployment of synthetic biology at an unprecedented speed and scale. The convergence of these technologies could create winner-take-all dynamics, where early leaders can lock in lasting advantages in some applications of synthetic biology. Because progress in synthetic biology builds on prior discoveries and because China leads the world in building blocks like amino acid fermentation capacity, China's 70 percent share of global fermentation infrastructure gives it a potentially insurmountable head start in the iterative

testing required for synthetic biology breakthroughs. Multinational pharmaceutical companies, eager to reduce risks and costs in multi-year R&D processes, see a strong draw in China's state-of-the-art facilities, transferring knowledge and inadvertently cementing China's central role in global biomanufacturing. Meanwhile, Chinese scientists and lab technicians appear increasingly convinced that innovation accelerates when R&D and production are colocated, creating a virtuous cycle that further entrenches China's advantages.

China's Strategic Commitment to Synthetic Biology

China's strategic commitment to and industrial policy support for synthetic biology has deep roots, with early recognition dating back to 2006, when synthetic biology research was incorporated into the National High-Tech R&D Program (Program 863) (see Table 4). This support continued in 2010, with synthetic biology's inclusion in the National Basic Research Program (Program 973). Though MIC2025 focused primarily on biopharmaceuticals, it also emphasized "protein and polypeptide drugs with completely new structures" and called for increased R&D support for bioengineering.[187] More importantly, MIC2025's focus on biotechnology systematically helped China's synthetic biology sector through its biotech clustering efforts, talent cultivation, infrastructure development, manufacturing capacity building, and coordinated research across upstream and downstream sectors. This decade-long cultivation has positioned China to dominate not just individual components but potentially the entire synthetic biology value chain.

Synthetic Biology Clustering: Shanghai's Zhangjiang Hi-Tech Park

One prominent success of China's industrial policy efforts to promote knowledge spillovers and agglomeration externalities is Shanghai's Zhangjiang Hi-Tech Park, which has become an international hub for the biopharmaceutical industry. It houses China's cutting-edge Shanghai Synthetic Biology Innovation Center, established in 2023 with the explicit aim to create a global talent network that draws in foreign expertise while fostering international collaboration on China's terms.[188] University research centers, such as Shanghai Jiao Tong University's Zhangjiang Science Park School of Life Sciences and Biotechnology, offer "a world-class R&D base."[189] More than 1,000 biotech firms have already established their operations in the hub, including U.S.-based Danaher's life sciences affiliate division Cytiva, which trains 2,000 technical and research staff annually, effectively transferring U.S. knowhow to Chinese workers.[190] Biotech incubator ATLATL Innovation Center is also located in the park. It raised RMB 200 million ($27.8 million) to incubate more than 100 biotech startups and provided R&D facilities for large companies such as Mabwell and Grit Therapeutics.[191] This concentration of resources and talent in a single location exemplifies how China's strategic clustering approach creates gravitational pull that makes it increasingly difficult for global biotech firms to operate without a Chinese presence.

Between 2018 and 2023, synthetic biology technology was explicitly featured in several industrial policy plans of the Ministry of Science and Technology, the National Development and Reform Commission, and MIIT, including the 2022 14th Five-Year Plan for the Bio-Economy (see Table 4). These coordinated efforts produced a synthetic biology innovation center and accompanying regulatory frameworks; national scientific and technological programs focused on making breakthroughs in pharmaceutical, agricultural, and new material applications of synthetic biology; a protein data library; and support for technologies to accelerate biosynthesis.[192] In 2023, the Ministry of Commerce placed synthetic biology technology such as human cell cloning and gene editing on the revised Catalogue of Technologies Prohibited and Restricted from Export, a signal that the government believes China has gained an edge in the technology.* Foreign law firms have advised that the restrictions may hinder the ability of firms operating in China from conducting R&D and biomanufacturing overseas and create complications in licensing technologies developed in China to overseas firms.[193] Taken together, these developments show that within 17 years of targeting the sector for policy support, China's accelerating, whole-of-government approach is positioning it to become dominant in frontier synthetic biology technologies.

As a result of this systematic government prioritization, China has made massive investments in building a pipeline of synthetic biology talent and education.[194] In 2023, China's government funding for research related to synthetic biology likely exceeded RMB 20 billion ($2.8 billion), according to estimates from Berlin-based think tank MERICS.[195] Particularly, research in life sciences and medicine sponsored by China's National Natural Science Foundation of China amounted to RMB 8.5 billion ($1.2 billion), and National Key R&D projects in fields such as synthetic biology, biomacromolecules, and microbiomes likely reached a similar amount, according to the same estimates.[196] Most strategically, Chinese officials are systematically elevating the standing of synthetic biology in top science, technology, engineering, and mathematics (STEM) universities. In 2025, the country's first dedicated synthetic biology and biotechnology school at a "double first class" university was established at Tianjin University, a top Chinese university that is also home to the State Key Lab for Synthetic Biology.[197] This institutionalization of synthetic biology education will help China produce thousands of specialized graduates annually, creating a talent pipeline that will be difficult for other nations to match.

*The technology Export Catalogue divides technologies into three categories, each subject to a different level of state oversight. First, technologies not listed in the Catalogue may be exported with minimal friction, requiring only the filing of relevant export contracts with the Ministry of Commerce (MOFCOM). Second, technologies designated as "restricted" may only be exported with a license issued by MOFCOM in advance. Third, a smaller set of technologies is outright prohibited from export. As of July 2025, the Catalogue includes 23 technologies that cannot be exported under any circumstances and 109 that require an export license prior to any cross-border transfer. These restrictions appear to relate specifically to genetic engineering. China's Ministry of Commerce and Ministry of Science and Technology, "Chinese Catalogue of Technologies Prohibited or Restricted from Export [July 2025]," *Center for Security and Emerging Technology*, July 15, 2025; China's Ministry of Commerce and Ministry of Science and Technology, "Chinese Catalogue of Technologies Prohibited or Restricted from Export," *Center for Security and Emerging Technology*, December 21, 2023.

Table 4: China's Policy Support for Synthetic Biology

Year	Agency	Policy	Detail	Strategic Significance
2006	Ministry of Science and Technology	National High-Tech R&D Program (Program 863)	First incorporation of synthetic biology into national research agenda	Foundational commitment—17 years before export restrictions
2010	Ministry of Science and Technology	National Basic Research Program (Program 973)	Expanded basic research support for synthetic biology	Deepened investment in fundamental science
2018	Ministry of Science and Technology	The 13th Five-Year Plan	Named synthetic biology as one among the seven frontier technologies	Elevated to top-tier strategic priority
2020	National Development and Reform Commission; Ministry of Science and Technology	Guiding Opinions on Expanding Investment in Emerging Industries, Cultivating and Strengthening New Growth Areas	Support the construction of a synthetic biology technical innovation center, promote biotechnology development	First dedicated innovation center—infrastructure commitment
2021	National Development and Reform Commission	Notice on the Implementation Plan for Promoting the High-Quality Development of the API Industry	Accelerate development and application of advanced technologies such as synthetic biology and enzyme engineering	Links synthetic biology to pharmaceutical dominance
2022	National Development and Reform Commission	The 14th Five-Year Plan for Bio-Economic Development	Emphasize synthetic biology as the new driving force for China's future economic transformation	Positions synthetic biology as economic game changer
2023	Ministry of Industry and Information Technology	Three-Year Action Plan to Accelerate the Innovation and Development of Non-Food Bio-Based Materials	Create a protein data library and accelerate technologies to support biosynthesis	Targets industrial applications beyond pharma
2023	Ministry of Commerce; Ministry of Science and Technology	Catalogue of Technologies Prohibited and Restricted from Export	Place "synthetic biology technology" on the revised Catalogue of Technologies Prohibited and Restricted from Export	China now restricts technology it once sought from abroad

Source: Various.[198]

Global Leading Synthetic Biology Position from China's Industrial Policy

China's efforts at synthetic biology leadership have achieved important successes. Between 2019 and 2023, China produced nearly 60 percent of highly cited synthetic biology academic papers worldwide.* China is also systematically attracting foreign-trained talent. A striking example is Anping Zeng, a member of the German National Academy of Science and Engineering and one of the first scientists to apply protein-based engineering to develop industrial bioprocesses for amino acids.[199] In 2022, he left his position at University of Hamburg to return to China as founding director at Westlake Center for Synthetic Biology and Integrated Bioengineering in Hangzhou, leading research on industrial synthetic biology and integrating basic and engineering research for industrial applications.[200] While an imperfect metric given known problems with the quality of China's patents, China has seen significant patenting activity in synthetic biology. Between 2010 and 2020, Chinese entities filed over 30,000 synthetic biology patents, more than twice the number of U.S. filings.[201]

China's industrial capacity in synthetic biology is the most significant sign of its progress. The 13th Five-Year Plan called for "development of bulk fermentation products such as amino acids and vitamins."[202] Amino acids are the building blocks of a variety of bio-economy products—from aspartame in diet sodas to insulin for diabetics, from MSG in food to antibiotics that save lives, from animal feed critical to protein production to the mRNA vaccines that ended the pandemic.[203] China's state-led efforts drove China's global-leading fermentation infrastructure. With annual output exceeding 30 million tons, China's fermentation capacity represents 70 percent of global output.†[204] In some ways, fermentation capacity is to synthetic biology what semiconductor fabs are to computing; China's control over the overwhelming majority of global capacity provides it leverage over the U.S. biotech industry and positions it to lead in the future.

Background: Fermentation and Production of Amino Acids in Synthetic Biology

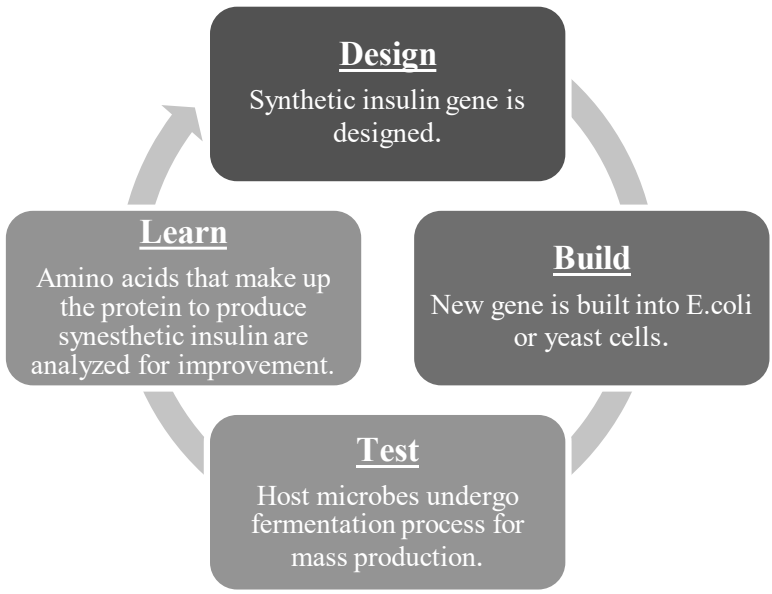
Fermentation, one of humanity's oldest technologies crucial to making wine, bread, beer, and cheese, has become critical to synthetic biology as the core part of the iterative "design-build-test-learn" (DBTL) cycle. Scientists design synthetic biological systems, build them into living cells, test their performance, and

*Research output is one measure of innovation. The methodologies used to count research papers can vary and have their values and limitations. The paper fraction allocation methodology accounts for individual researchers, signaling individuals who go on to win Nobel Prizes, etc., but it can overcount Chinese papers if there is an exceptionally large volume of Chinese researchers as authors and if there is a higher tendency of in-country citation. On the other hand, the methodology that assigns full credit to each country with an author-affiliated research institution accounts for the large volume of collaborative papers but can overlook the number of Chinese researchers contributing to the research. This statistic uses the former fraction allocation methodology. "How is China Performing Against United States in Synthetic Biology," *Australia Strategic Policy Institute*, accessed June 13, 2025.

†It is worth noting, though, that key fermentation equipment, such as stirring probes, sensors, and temperature regulators are dominated by foreign companies. Wei Luo et al., "Synthetic Biology Industry in China: Current State and Future Prospects," *Synthetic Biology and Engineering* (2023); "Global Fermenter Market Size to Worth USD 3.92 Billion by 2033: Market Insight Report," *Spherical Insights*, April 2025.

Background: Fermentation and Production of Amino Acids in Synthetic Biology—*Continued*

learn from results to refine future designs.[205] Critically, fermentation is now the most promising process to produce amino acids with maximum yield and productivity.[206] Researchers use fermentation to test whether engineered biological systems inserted into organisms can grow and perform the desired function at scale for large-volume manufacturing. In the learning phase, researchers study the resulting amino acids to understand interactions between components and variations in experimental setups for future improvements. Without access to fermentation capacity, many synthetic biology innovations cannot move from laboratory to commercial reality. This is precisely why China's dominance in global fermentation infrastructure represents a strategic chokepoint—nations lacking adequate fermentation facilities will be forced to rely on China to scale their own innovations, effectively handing over their IP and future profits.



Fermentation is also essential for China's mass production of organic compounds like amino acids, organic acids, vitamins, and antibiotics.[207] Many of these compounds are crucial building blocks for other bio-economy products. Due to its fermentation dominance, China accounts for 70 percent of the global amino acids market.[208] China's high fermentation capacity enables innovation and production at scale, providing cost benefits that can allow Chinese firms to undercut Western competitors and dominate market segments. For example, China's synthetic biology leader Huaheng Bio's fermentation technology cuts the cost of non-essential amino acid alanine

by 50 percent over traditional enzymatic manufacturing methods, helping Huaheng account for about half of the global market share of alanine.[209] In another case, China's Cathay Biotech's biochemical technologies have driven down costs of production, and it now supplies over 80 percent of global long chain dicarboxylic acids used in a variety of plastics and other chemical applications.[210]

Given the DBTL cycle of synthetic biology, China's global leading fermentation capacity provides a significant advantage. Chinese innovators leverage this infrastructure to rapidly test synthetically designed biological systems and scale production of new synthetic biology products. Each iteration through the DBTL cycle strengthens Beijing's knowledge base, which may create cumulative advantages that compound over time. Without access to fermentation capacity, many of the most brilliant synthetic biology innovations cannot move from laboratory to commercial reality. Meanwhile, the U.S. biotechnology community views the lack of adequate fermentation capacity in the United States as a "biomanufacturing chokepoint" that is creating significant innovation backlogs.[211] The lack of adequate capacity in the United States is already a chokepoint, effectively forcing U.S. biotech startups to partner with Chinese fermentation facilities, transferring their innovations and knowhow to potential competitors. The situation is analogous to the reliance of the U.S. biopharmaceutical industry on China-based contract research, development, and management organizations discussed in the Commission's *2024 Annual Report to Congress*.*

The Chinese government's support for biotechnology has not been consistently matched by China's private sector. Specific government and private-sector support for China's synthetic biology subsector is more difficult to track; investment in China's ostensibly private synthetic biology industry appears to have peaked in 2022 with RMB 2.82 billion ($390 million) in disclosed value and 17 financing events.[212] In 2024, these investments were down to RMB 412 million ($57.3 million) in disclosed value and 15 financing events.[213] These numbers mirror the private sector investment trends in China for the broader biotechnology sector, which fell to a seven-year low of $4.2 billion in 2024.[214] The decline could reflect China's broader economic climate, the relatively small size of China's biotech market (5 percent of the global biotech market versus 35 percent for the United States and 31 percent for the EU), indications that Beijing is looking to slow the growth of healthcare spending, and growing concern about U.S. market access.[215] Despite declining private investment, Beijing's massive public sector commitments ensure continued progress, and indeed China's synthetic biology market is growing. A Chinese industry research group projected that China's synthetic biology market will grow to RMB 12.4 billion ($1.7 billion) in 2025, up 18 percent from RMB 10.5 billion ($1.5 billion) in 2024.[216] Even modest growth in China's synthetic biology market, backed by unparalleled manufacturing infrastructure, threatens to lock in Chinese dominance before Western nations recognize the strategic implications.

*See U.S.-China Economic and Security Review Commission, Chapter 3, "U.S.-China Competition in Emerging Technologies," in *2024 Annual Report to Congress*, November 2024, 220.

Additionally, the declining private investment has further incentivized Chinese firms to find global partners who want to leverage China's testing advantage as a location for cheap, fast early-stage exploration across a range of pharmaceuticals.[217] Many Western labs, including in the United States, are increasingly partnering with Chinese labs to test their drugs as the value of drugs licensed worldwide from China reached $48 billion in 2024.[218] The growing partnership between Chinese and U.S. drug manufacturers will likely continue as U.S. firms are rebuilding pipelines to offset $200 billion in drugs losing patent protection by the end of the decade.[219]

China's Blacklisting of Illumina

U.S.-based Illumina is the world leader in gene-sequencing machines and relied on China for up to 7 percent of its global sales.[220] In February 2025, Chinese officials used the Unreliable Entity List* to implement a ban on imports of Illumina's gene sequencers.[221] China's action against Illumina not only was a retaliatory action against U.S. tariffs on China in February but also likely aimed to boost China's synthetic biology industry by driving domestic demand toward Chinese sequencing companies.[222] Illumina's rivals in China, including MGI Tech—a spinoff of BGI Genomics—immediately offered free trials on their own models and other incentives to win over Illumina's clients, accelerating a trend of increasing market share for Chinese companies in recent years.[223]

Implications for the United States

China's whole-of-nation push for technological supremacy represents a multifaceted threat to U.S. competitiveness and economic security. Sustained investment in state-of-the-art research facilities, state-backed licit and illicit acquisition of key technologies from abroad, and reduced input costs from market-distorting subsidies, vertical integration, and economies of scale all threaten eight decades of U.S. leadership and competitiveness in science and technology. The challenges become more acute as China transitions from moving up the value chain in established industries to securing first-mover advantage in emerging fields.

Chinese industrial policy has cultivated a growing number of national champions that capitalize on China's nonmarket practices to become competitive globally. In some sectors, China has pursued a tournament-style approach to industrial policy implementation, which seeks to build globally competitive firms through fierce but controlled competition in domestic markets. Once these firms enter the global market, many have both market-based advantages—such as competitive pricing and massive scale—and nonmarket advan-

*Established in 2020 and administered by China's Ministry of Commerce, the Unreliable Entity List is largely a counter-sanctions mechanism. The broad criteria for addition to the list include "national sovereignty, security, or development interests of China" and suspending normal commerce with or adopting discriminatory actions against a Chinese enterprise. Firms added to the list may be subject to various economic restrictions or fines, or their officers may be barred from travel to China. "PVH Facing the Risk of Being Placed on China's Unreliable Entities List," *Squire Patton Boggs*, October 10, 2024.

tages from a captive domestic market, subsidies, and state support that free them from normal profit constraints. **These advantages often enable Chinese firms to threaten longstanding incumbents from the United States and other advanced economies.**

The interaction between industrial policy and the market has fostered new forms of innovation that position China to gain first-mover advantage in emerging fields. **Contrary to perceptions that China cannot innovate, Chinese firms have evolved from "fast following" and "process innovation" to breakthrough innovations from interlocking innovation flywheels that rapidly integrate scientific knowledge into production, leverage innovation in adjacent fields, and coordinate innovative efforts across value chains.** In addition, China has captured crucial intermediate manufacturing processes that help keep its companies central in cutting-edge value chains, such as advanced fermentation in biotechnology.

In synthetic biology, China's rapid scaling of bio-manufacturing gives it an advantage over the United States, as innovation and production in the synthetic biology sector are colocated. Leadership in synthetic biology technologies involves the ability to both innovate in the R&D stage and produce a successful product at scale. China's fermentation infrastructure gives it an advantage in both steps. Moreover, China is positioning itself in synthetic biology similar to how it has successfully positioned itself in biopharmaceuticals. For example, though the United States currently leads in pharmaceutical innovation, Chinese biopharmaceutical companies such as Wuxi AppTec are so entrenched in U.S. supply chains that estimates indicate it would take eight years for U.S. companies to decouple and find alternative service providers.[224] China's lead in fermentation means that even innovation outside of China may need to rely on Chinese companies for production at scale. **This creates a strategic vulnerability: even if U.S. firms lead in innovation, America may remain dependent on China for manufacturing synthetic biology inputs and products.** And the Chinese synthetic biology industry, for the foreseeable future, will have access to the innovations and knowhow of global competitors that use their fermentation infrastructure.

China's model of industrial policy will continue to chalk up important victories even when it is wasteful and inefficient, giving its companies an advantage when competing in open markets and against companies that are largely constrained by market principles. This premise is not fully internalized or understood within the U.S. policy system or global trade rules. **Insulating the U.S. economy from the distortions caused by China's subsidized overcapacity, protected domestic markets, and control over key supply chain chokepoints requires significant modifications to U.S. and global economic statecraft, tools, and approaches.**

Countering China's nonmarket policies alone is insufficient, however. **Without a redoubling of U.S. efforts to strengthen its advantages in science and technology, including bolstering the domestic manufacturing base and continuing to attract leading innovators and entrepreneurs from around the world, the United States risks falling behind to China's whole-of-na-**

tion approach. Further, a response to China's industrial policy will be difficult if not impossible to execute effectively without increased coordination with key allies and partners, including joint efforts to pool market demand, prevent state-supported firms from exploiting unfair advantages, and enhance export controls.

Recommendations

The Commission recommends:

- See the Commission's classified recommendation annex for a recommendation and discussion relating to U.S.-China advanced technology competition.
- Congress establish as a strategic national objective that the United States build a resilient bioeconomy industrial base and unlock biology as a general-purpose technology before the end of the decade and support this objective through the following actions:
  - Resource the National Institute of Standards and Technology (NIST) to establish a Bio-Measurement Laboratory (BML). The BML should develop, support, and promulgate standards for biological measurements, materials, and models; advance measurement science and tools for biotechnology; and ensure U.S. standards are adopted globally as the foundation of the 21st-century bioeconomy.
  - Expand the U.S. Department of Energy's Loan Programs Office's (LPO) lending authority and capacity to include biotechnology projects. Recognizing that the biotechnology sector (outside of pharmaceuticals) faces a financing shortage that threatens U.S. competitiveness, Congress should authorize the LPO to provide loan guarantees and direct loans for biotechnology manufacturing, infrastructure, and commercialization projects. All of these efforts should focus on scaling, not on pilot projects. This expansion should include:
    - Explicit authority for the LPO to finance biotechnology projects under its other lending programs;
    - Appropriations to cover the upfront costs of making biotechnology loans; and
    - Faster application timelines and reduced bureaucratic requirements for biotechnology companies to obtain loans.
  - Strengthen and expand the U.S. Department of Agriculture's BioPreferred program to establish the Federal Government as an anchor customer for the bioeconomy by:
    - Establishing binding multi-year procurement commitments for biobased products across federal agencies, with priority for replacing defense and infrastructure materials currently sourced from countries of concern;
    - Expanding BioPreferred program eligibility to include state, local, and tribal governments as well as universities, enabling broader adoption of biobased products;

- Increasing appropriations for the Biorefinery, Renewable Chemical, and Biobased Product Manufacturing Assistance Program (Section 9003) loan guarantees; and
- Directing federal agencies to set quantified targets for biobased product adoption in their supply chains and report annually on progress toward reducing strategic dependencies.

The United States currently faces a future in which it depends on China for access to the most cutting-edge biotechnology innovations, sophisticated biomanufacturing equipment, and advanced biomaterials. The coordinated investments in standards development, measurement science, and deployment financing outlined above are essential to ensure the United States leads in the transformation of biology into a general-purpose technology capable of producing up to 60 percent of physical goods in the global economy by mid-century while maintaining national security, supply chain resilience, and economic competitiveness against strategic competitors.

- Congress strengthen the U.S. Department of Commerce, Bureau of Industry and Security's (BIS) ability to manage strategic competition with China in fast-moving technology sectors, such as leading-edge semiconductors used in artificial intelligence (AI) applications, and increase congressional oversight, including by:
  - Directing BIS to use existing authorities to require tracking technology for export-controlled advanced chips to detect and combat diversion to countries of concern;
  - Shifting the U.S. export control regime on advanced chips from a "sell" model to a "rent" model by mandating that any advanced chips above a certain threshold that are not designated as prohibited for export be accessible exclusively via the cloud. To do this, BIS shall create a license exception in the Export Administration Regulations for renting cloud access to export-controlled AI compute infrastructure with performance capabilities above a certain threshold to entities in countries of concern:
    - BIS shall determine the applicable compute threshold, with periodic adjustments as necessary to ensure the threshold adequately mitigates national security risks while keeping pace with technological developments and other trends; and
    - BIS shall require licensees to implement know-your-customer (KYC) identification programs and report suspicious activity proactively to the agency when entities domiciled within or controlled by countries of concern attempt to access the cloud infrastructure outside of approved licensing procedures or when approved entities use rented cloud infrastructure for suspected military or espionage purposes.
  - Directing the Administration to establish a systemic, integrated intelligence unit embedded at BIS, including analysts from the Intelligence Community, to formally integrate technical, analytic, financial, and collection expertise to improve

enforcement and to report to relevant committees of Congress outlining the additional resources, authorities, capabilities, and subject matter experts needed to anticipate and counter evasion strategies;

- Directing the agency to move all items subject to a "presumption of denial" license application review standard for export to China or a Chinese entity to a "policy of denial." This would ensure the agency's policy prioritizes national security in assessing export license applications for applicable items on the Commerce Control List or for technologies provided to companies on the Entity List; and
- Establishing a whistleblower incentive program for private citizens providing information on export control violations, similar to the program available to the U.S. Department of the Treasury under 31 U.S.C. § 5323.

The recommendation seeks to address important needs in enhancing BIS's capacity to enforce export controls consistent with congressional intent in the Export Control Reform Act of 2018. It complements the Commission's economic statecraft entity recommendation in Chapter 3 for long-term strengthening of economic statecraft functions into a single entity while recognizing that implementation of such a recommendation to Congress is likely a multi-year process and BIS enforcement needs are urgent and ongoing.

- Congress establish a "Quantum First" by 2030 national goal with a focus on quantum computational advantage in three mission-critical domains—cryptography, drug discovery, and materials science. To achieve this ambitious national goal, the Commission recommends Congress should take the following actions:
  - Provide significant funding for U.S. quantum development, focused on scalable quantum computing modalities, secure communications, and post-quantum cryptography. To secure U.S. leadership, Congress should pair this funding with quantum workforce development initiatives, including expanded fellowships, talent exchange programs with allies, and dedicated curricula aligned with mission needs.
  - Prioritize modernization of enabling infrastructure, including cryogenic laboratories, quantum engineering centers, and next-generation fabrication and metrology facilities. These assets are essential to converting scientific discovery into deployable systems, and many current research environments remain under-resourced or technologically outdated.
  - Establish a Quantum Software Engineering Institute (QSEI) focused on developing the software foundations for scalable, secure, and interoperable quantum computing. The QSEI should also coordinate an open source ecosystem to accelerate application development and build a trusted quantum software supply chain. Modeled on the National Artificial Intelligence Research Institutes and National Manufacturing Institutes, the QSEI would ensure that U.S. quantum hardware is

matched by world-class software capabilities, enabling early operational advantage across science, industry, and defense.

Whoever leads in quantum (and artificial intelligence) will control the encryption of the digital economy; enable breakthroughs in materials, energy, and medicine; and gain asymmetric and likely persistent advantage in intelligence and targeting. It is imperative that the United States treat quantum not as a research silo but as a mission-critical national capability—and act accordingly.

While the United States retains world-leading research capabilities, China has mobilized state-scale investment and industrial coordination to dominate quantum systems and standards. For the purposes of this recommendation, the Commission presumes that China is actively racing to develop cryptographically relevant quantum computing capabilities and is likely concealing the location and status of its most advanced efforts. This is a domain where first-mover advantage could yield irreversible strategic consequences, particularly given the vulnerability of current global systems that rely on public key cryptography.

The Quantum First 2030 timeline is essential to ensure the United States achieves quantum leadership before any adversary can leverage these capabilities against American interests. Quantum technologies—spanning computing, sensing, and communication—will shape the future of strategic advantage.

- Congress enact legislation to promote investments that further three objectives: (1) continued U.S. leadership in advanced manufacturing and the associated workforce; (2) critical supply chain resilience; and (3) the security of U.S. critical infrastructure, including energy infrastructure. Such legislation should include support for programs and authorities to:
  - Establish an industrial finance entity oriented toward domestic investments. Its authorities should include financing, equity investments, and demand-side mechanisms like purchase guarantees and, with respect to inputs at risk because of nonmarket practices, price floors for domestic procurement. Congress should consider a board membership structure appointed by the Speaker and Minority Leader of the House of Representatives and the Majority and Minority Leaders of the Senate;
  - Reauthorize and expand, or create complementary legislation expanding, the authorities created by the CHIPS and Science Act of 2022 with respect to the three noted objectives, including:
    - Establishing funds to provide grants, loans, and loan guarantees to key strategic sectors;
    - Extending the advanced manufacturing investment tax credit to key strategic sectors;
    - Providing support to workforce development and education efforts, including the full range of skills necessary for production in the United States; and

    - Funding national hubs for research and development in key strategic sectors.
  - Direct and expand procurement authorities to enable the Administration to utilize the full acquisitions toolkit to address supply chain vulnerabilities and nonmarket challenges, including by:
    - Leveraging and expanding industrial mobilization authorities;
    - Adding dual sourcing requirements to acquisition plans for key inputs, such as foundational semiconductors and printed circuit boards;
    - Providing for, where appropriate, a true-up reimbursement for U.S. manufactured products in critical sectors; and
    - Requiring services like software testing and simulation to be performed by U.S. firms on U.S.-owned servers operated in the United States.
  - Procurement actions and authorities should be stated with sufficient notice and lead time to allow firms to adjust necessary supply chains, and Congress should consider a multi-step process to achieve desired outcomes with limited disruption.

  The United States must continue to support sustained investment in advanced manufacturing and basic and applied research to maintain technological leadership and remain on the cutting edge of innovation. The Commission notes that China is advancing in multiple domains and continues to deploy licit and illicit means to gain a manufacturing and technological edge, which includes a coordinated and well-funded industrial policy alongside nonmarket policy distortions.

- Congress direct the Secretary of Defense to establish a Government-Owned, Contractor-Operated Rapid Manufacturing Facility Facility (GOCO RMF) focused on high-rate, reconfigurable production of airborne and maritime unmanned systems (both lethal and non-lethal), excluding major platforms such as ships and submarines.

  The facility should:

  - Serve as a surge-ready national asset, able to pivot between different system types based on operational need—including attritable drones, loitering munitions, autonomous surface vessels, and mission-tailored payloads;
  - Leverage modular architectures and advanced manufacturing techniques—such as additive manufacturing, robotics, and digital engineering—to enable high-mix, low-volume, or high-volume production on demand;
  - Retrain both U.S. Department of Defense personnel and the industrial workforce in the principles of rapid design, agile production, and iterative fielding, enabling a cultural shift away from long-cycle, perfect-on-paper procurement models;

- Be operated by a competitively selected contractor or consortium with a proven track record in agile manufacturing, rapid prototyping, and defense system integration;
- Integrate and coordinate with existing efforts—including the Defense Innovation Unit's Blue Manufacturing Initiative, the Manufacturing Innovation Institutes, and Defense Advanced Research Projects Agency (DARPA) transition partners—while serving as the unifying hub for defense-relevant production at speed; and
- Prioritize the production of systems that can be fielded within 12 to 24 months, using iterative deployment and feedback to improve successive generations rather than deferring capability in pursuit of flawless specifications.

In the event of conflict with China, the United States would face an adversary with an industrial base far exceeding its capacity, efficiency, and adaptability, and would confront modes of warfare that leverage China's industrial strengths and emerging capabilities in autonomy and embodied intelligence. The GOCO RMF represents an initial effort to maintain preparedness and deterrence while establishing a model for defense procurement that would better position the military services to match and exceed the pacing challenge from the People's Liberation Army.

- Congress recognize that autonomous systems—including humanoid robots, industrial automation, and unmanned systems—represent the physical embodiment of artificial intelligence and a critical domain where the People's Republic of China is rapidly advancing. To address the challenges from China's development and deployment of autonomous systems, Congress should direct the President to establish an Interagency Task Force on Autonomous Systems, chaired by the National Security Advisor, to coordinate federal efforts and report to Congress within 180 days with specific implementation plans requiring:
  - The U.S. Department of Defense to establish a Robotics and Automation Task Force with authority to rapidly prototype and deploy autonomous systems across military logistics, maintenance, security, reconnaissance, and combat operations;
  - The U.S. Department of Commerce to investigate Chinese robotics dumping under applicable trade remedy laws, lead international standards development, and expand export controls on advanced autonomous technologies to China;
  - The U.S. Department of Homeland Security to assess vulnerabilities from Chinese-made autonomous systems in U.S. critical infrastructure and establish mandatory cybersecurity standards;
  - The U.S. Department of Labor to launch workforce retraining programs and robotics technician certifications for workers displaced by automation;
  - The U.S. Departments of Transportation, Energy, Agriculture, and Health and Human Services to accelerate regulatory approvals for autonomous vehicles, infrastructure inspection

systems, precision agriculture equipment, and medical robotics;

- The U.S. Department of the Treasury to expand Committee on Foreign Investment in the United States (CFIUS) review of all Chinese investment in U.S. robotics companies and impose sanctions on Chinese robotics firms supporting the People's Liberation Army; and
- The U.S. Department of State to counter Chinese robotics exports to developing countries and lead allied coordination on autonomous weapons arms control.

China is deploying autonomous systems at scale across its economy and military while the United States remains mired in pilot programs and bureaucratic delays. These systems will transform civilian life, manufacturing, and warfare faster than current U.S. policy anticipates. Without immediate and decisive action across all departments and agencies, the United States will cede a strategic advantage that may prove impossible to recover.

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CHAPTER 7: THE FINAL FRONTIER: CHINA'S AMBITIONS TO DOMINATE SPACE

Executive Summary

China has embarked on a whole-of-government strategy to become the world's preeminent space power. Beijing views space as a warfighting domain and it seeks to achieve space superiority as a cornerstone of its broader effort to establish information dominance—a prerequisite to controlling the battlespace and gaining operational advantage in future conflicts. To this end, China has rapidly developed, deployed, and operationalized advanced capabilities in space launch, satellites, and ground-based infrastructure spanning its civil, military, and commercial sectors. These advancements are closing the gap in the strategic competition between the United States and China in space.

The People's Liberation Army (PLA) is rapidly expanding its space- and ground-based assets to enhance its battlespace awareness, operational coordination, and capacity for force projection. These capabilities improve China's ability to monitor, target, and challenge U.S. and allied forces across the Indo-Pacific. Over the past decade, China has launched more than 1,000 satellites, dramatically increasing its capacity for persistent surveillance, communications, and precision targeting in support of long-range strike systems. The PLA has also fielded both ground- and space-based counterspace capabilities designed to deter U.S. military action or, in the event of a conflict, degrade U.S. space-enabled operations and power projection. However, as Beijing has expanded its military space capabilities, it has also deepened its own dependency on space assets, potentially creating vulnerabilities of its own. Like any spacefaring nation, this dependency exposes China to counterspace threats that could disrupt its command and control (C2), precision strike, and situational awareness capabilities in a conflict.

Globally, China has harnessed its ambitious space program to deepen relations with developing countries and expand its space architecture in support of military, commercial, and broader strategic gains. China's rapid progress in establishing a private, though state-directed, commercial space ecosystem in just a decade poses a formidable technological, economic, and geostrategic challenge to the United States. Employing state-led industrial policy and drawing on its vast network of state-owned enterprises in aerospace and defense, China has quickly cultivated a dynamic startup sector focused on seeking to rival U.S. firms in commercial launch and satellite networks. With a growing list of civil space achievements, China is aggressively positioning itself as a

global leader in space technology and exploration. It is now seeking to reshape international space governance, influence the development of technical standards, and displace the United States as the world's premier space power.

Key Findings

- China is pursuing an aggressive long-term, whole-of-government campaign to expand its space capabilities across military, commercial, and civil domains with the explicit intent of surpassing the United States. These rapid advances in space pose an escalating threat to U.S. national security, intensify U.S.-China strategic competition for international partnerships, and undermine the ability of U.S. commercial firms to compete internationally.
- China views space as a warfighting domain and has invested heavily in weapons and technologies that can degrade, damage, or destroy the U.S. satellites that provide the backbone of the U.S. military's C2 network as well as its targeting system. By seeking to deprive the U.S. military of the use of space-based assets, the PLA aims to deny the United States the ability to use its advanced military systems, eroding the foundations of U.S. power projection and joint operations.
- Over the past ten years, China has launched a wide variety of satellites on an aggressive schedule, fielding a growing array of space-based capabilities that has strengthened its ability to coordinate its own operations as well as to conduct the persistent surveillance and targeting of U.S. forces. The expansion reflects China's broader strategy to achieve space superiority and strengthen its ability to use long-range precision weaponry to target and disrupt the flow of U.S. forces in the Indo-Pacific.
- China is actively leveraging its space capabilities as strategic tools to expand its geopolitical influence. Through offering other countries the use of its satellite networks, launch services, and space infrastructure, China enhances the resilience and global coverage of its space architecture. At the same time, it draws partner nations more deeply into its technological ecosystem, creating long term strategic and economic dependencies on Chinese technology.
- China's military-civil fusion strategy erases the line between military and civilian space activities, enabling systems and technologies such as satellites, robotic arms, and launch systems to serve both commercial ends and PLA objectives. The dual-use nature of these systems—compounded by blurry lines between state-owned enterprises and nominally private firms—makes it difficult to distinguish commercial innovation from military capability.
- In just ten years, China has dramatically transformed an almost non-existent commercial space sector into a thriving, state-orchestrated startup ecosystem. Fueled by strong govern-

ment backing and industrial prowess, Beijing is now seeking to cultivate national champions that will challenge U.S. space companies on the global stage at a fraction of the cost. This strategy does not just seek innovation and commercial advancement—it seeks to reshape the competitive balance in what will be the most strategic domain of the 21st century.

- China has achieved major civil space milestones, such as the Chang'e-6 mission returning the first samples from the Moon's far side. These "global firsts" are much more than just about science; Beijing uses them to assert technological leadership to reshape global perceptions of power. The competition now extends beyond symbolic milestones to a contest over who will define the rules, infrastructure, and norms governing space. If the United States cedes leadership, China is poised to advance a state-driven, opaque governance model that could embed long-term global reliance on its systems and standards.
- Losing U.S. leadership in space would amount to relinquishing the advantage first secured during the original space race. China seeks to use its rapid advancements in space to position the country as a technological powerhouse and undermine U.S. prestige and economic competitiveness. Falling behind in space would not only diminish U.S. standing, it would also threaten U.S. national security, global influence, technological dominance, and commercial competitiveness in the growing space economy.

Introduction

The Soviet launch of Sputnik in 1957 shocked the United States, driving then-President Dwight Eisenhower to accelerate space efforts. These initiatives were later expanded under then-President John F. Kennedy, who undertook a "Space Race" to the Moon to demonstrate to the world that the U.S. model for economic development and technological innovation was superior to that of the Union of Soviet Socialist Republics and worth emulating.[1] For over half a century, space has existed in the popular imagination as the "final frontier"—the last realm for humankind to explore and harness in favor of human progress.[2] Through rapid experimentation, technological advancement, visionary government support, and determination, the United States became the world's premier space power, bestowing many benefits on U.S. citizens, advantages to the U.S. military, and global prestige for the United States and its economic, innovation, and governance models. This leadership position secured during the Cold War is now at risk due to China's rapid advances in space.

China has undertaken a rapid and multifaceted expansion across its military, civil, and commercial space sectors that is presenting a comprehensive challenge to U.S. space leadership. This growing competition reflects the broader strategic rivalry between the United States and China as both countries view the space domain as critical to national security, economic growth, and global influence. If

the United States does not rededicate itself to winning the new race, it will surrender its military advantage, jeopardize critical space-based infrastructure, undermine key sectors of the U.S. economy, and be subject to a space environment increasingly shaped by China's strategic priorities for years to come.*

Intensifying U.S.-China Competition in Space

China's Rapid Advancements in Space Capabilities Should Concern Every American

Most Americans depend on space far more than they realize. Many may think of GPS navigation and weather forecasting, but many do not comprehend the scope and breadth of our reliance on space. Cell phones, the internet, and streaming services routinely use satellites to increase the speed and resiliency of their networks. Banks, stock markets, and online payment services rely on satellites to ensure secure transactions. Utility companies rely on control systems that communicate via satellite to monitor energy flows and reroute electricity across power grids. Farmers use satellite imagery to monitor crop health, optimize fertilization and irrigation, and plan harvesting schedules. Airlines, railroads, and shipping and logistics companies use satellites to navigate, optimize routes, and track cargo. The U.S. military relies on space for a wide range of missions, including navigation, global communications, intelligence gathering, early warning, and targeting weapons systems, to name but a few. These capabilities are vital, especially in the context of a Western Pacific contingency, where long distances and dispersed forces require resilient space-based systems to coordinate military operations, monitor and target adversary movements, and project power effectively.

So, what are the risks to the United States if it is no longer the dominant space power? General B. Chance Saltzman, Chief of Space Operations of the U.S. Space Force, put it starkly: "Space superiority is not only a necessary precondition for Joint Force success but also something for which we must be prepared to fight. Gained and maintained, it unlocks superiority in other domains, fuels Coalition lethality, and fortifies troop survivability. It is therefore the basis from which the Joint Force projects power, deters aggression, and secures the homeland."[3]

Key Space Concepts

The space ecosystem involves interconnected sets of capabilities and assets. Below is a basic discussion of key space concepts and how they inter-relate.

- *Space-based assets:* These include satellites,† vehicles, and payloads in orbit that deliver mission-critical capabilities from space. Space-based assets include various types of satellites, including those dedicated to communications; intelli-

*The chapter draws on the Commission's April 2025 hearing on "The Rocket's Red Glare: China's Ambitions to Dominate Space," consultations with experts, and open source research and analysis.

†Simply defined, a satellite is a body that orbits around another body in space. Catherine G. Manning, "What Is a Satellite?" *NASA*, September 5, 2018.

Key Space Concepts—*Continued*

gence, surveillance, and reconnaissance (ISR); position, navigation, and timing (PNT); and those hosting sensors, such as for weather observation, as well as those that provide on-orbit support capabilities. While some space-based assets are solely designed for military use, others may support both military and civilian uses. This is particularly true of PNT satellites as they support systems like the U.S. Global Positioning System (GPS), which provides targeting data to the U.S. military, but also provides data to civilian companies that offer navigation services to U.S. consumers. Many civilian satellites are also capable of supporting military activities, if called upon.

- *Orbit types:* Different orbital regimes support different mission sets. In recent years, there has been increased focus and investment in "proliferated low Earth orbit" (pLEO) satellite constellations to enable global broadband, persistent surveillance, and resilience through redundancy. Other examples include medium Earth orbit, useful for PNT capabilities, and geo-stationary orbits used extensively for weather monitoring and communications. While space seems vast and limitless, orbit locations are a scarce resource. The International Telecommunications Union (ITU) is a specialized agency of the UN through which countries allocate radio frequency spectrum and coordinate orbital positions.
- *Deep Space:* A subset of space assets are those used in deep space, generally understood to mean beyond the Earth's orbit and beyond "cislunar" space (defined as the areas of space between the Earth and the Moon). To date, deep space assets are generally used for science and civil space exploration (i.e., not commercial or military uses), though in recent years, commercial entities have begun planning deep space missions.
- *Launch:* Launch refers to the systems that propel assets from Earth into space, including the ground-based facilities that support launch operations. Launch technology varies depending on the size of the payload and the distance into space it must travel. The United States and China are both investing heavily in reusable launch vehicle (RLV) technologies. SpaceX is currently the global leader in these technologies, which provide cheaper and faster launch options, enabling greater activity in space.
- *Ground-Based Infrastructure:* This includes the terrestrial systems that link, connect, and communicate with space-based assets. These include ground stations that conduct telemetry, tracking, command and control, provide space-domain awareness (i.e., the ability to detect, track, and identify objects and threats in orbit), and receive down-links from satellites. Ground-based infrastructure is necessary for communication with and/or control of space-based assets.

China recognizes how dependent the U.S. general public and U.S. military are on space-based assets for day-to-day activities. Just as China has invested heavily in cyber tools to exploit U.S. reliance on the internet, China has invested heavily in counterspace capabilities—kinetic and non-kinetic weapons that can deny, degrade, or destroy U.S. satellites. Many U.S. satellites have limited defensive capabilities as many were deployed when the United States viewed space as a benign environment, not a warfighting domain.[4] The United States has also not markedly changed its restrictive guidance and direction that has long sought to avoid the perception of "weaponizing" space, leaving the United States with no real offensive space program of its own.

China leverages its bold space program to advance both domestic and international security goals. Under General Secretary of the Chinese Communist Party (CCP) Xi Jinping, space exploration has been closely tied to the "China Dream" of national rejuvenation with high-profile missions—such as lunar sample returns and the construction of a space station—used to showcase Party leadership, reinforce domestic confidence, and signal China's rise as a global scientific and technological power. Internationally, these accomplishments are used to build prestige, grow China's space economy, support efforts to reshape global space governance to reflect China's interests, and position China as a strategic rival to the United States. Over the past decade, China has systematically expanded its space capabilities across military, civil, and commercial sectors. It has launched satellite constellations that provide global communications and navigation, deployed sophisticated counterspace weapons, and is developing a rapidly growing commercial space sector that could challenge U.S. leadership within the decade.[5] Enabled by a state-directed model and its military-civil fusion strategy, this holistic approach reflects China's ambition to establish itself not only as a space power, but also as a global leader in science and innovation, using space development to boost its comprehensive national strength and international influence.[6]

China's Military Has Rapidly Developed Space Capabilities

"Mind-boggling."[7] That is the word General Saltzman used in testimony before the Commission to describe China's rapid military buildup of its space capabilities over recent years.[8] He added, "[China's] potent and expanding arsenal of space-based capabilities multiplies its combat potential many times over" and threatens the U.S. military's access to—and effective use of—space in conflict.[9]

Over the past ten years, China has launched increasing numbers of satellites—with more than 1,060 satellites in orbit as of December 2024—significantly enhancing the PLA's use of space for warfighting.[10] These satellites support both intelligence, surveillance, and reconnaissance (ISR) and positioning, navigation, and timing (PNT) missions as well as provide a suite of counterspace capabilities that could monitor, target, deny, degrade, or destroy U.S. and allied space assets.

The PLA's growing space capabilities undermine the U.S. military's ability to rely on the space assets that are integral to the suc-

cess of its operations and force projection across all domains—land, air, sea, cyber, and space.[11] The degradation or destruction of U.S. space assets could prevent U.S. forces from fully seeing the battlefield, guiding munitions, providing missile warning, and supporting global command and control (C2). This could severely limit U.S. and allied forces in their ability to respond rapidly in any theater of operations, particularly in the Indo-Pacific.[12]

The PLA Views Space as a Critical Warfighting Domain and Seeks Space Superiority

Although the PLA has long viewed space as a critical war fighting domain, China's test of an anti-satellite weapon in 2007 marked its growing ambitions in space.[13] China's military space program dates back to the 1950s, when it began the development of its first nuclear weapons. In 1970, China launched its first satellite and, in the 1990s, began development of various anti-satellite vehicles and possible directed-energy weapons.[14] General Saltzman referred to China's 2007 successful anti-satellite weapon (ASAT) test as a "pivot point" that demonstrated China's destructive capability using an offensive missile in space, creating the largest debris field in space and threatening other space assets in orbit.[15] In 2015, China published a Defense White Paper that was the first official government document to lay out the need for an advanced military space program, referring to outer space as one of the "new commanding heights in strategic competition" and describing these revolutions in military affairs—such as informationized warfare, precision strike capabilities, and space-enabled operations—as posing "new and severe challenges to China's military security."[16] The PLA's creation of the Strategic Support Force (SSF) in December 2015 and its subsequent reorganization as the Aerospace Force in April 2024, further solidified the integration and increased role of space capabilities in military operations.[17]

For the PLA, achieving space superiority is important to establish the information dominance that would allow it to control the battle space and gain operational advantage in wartime.[18] The 2020 edition of the strategic-level PLA textbook *Science of Military Strategy* highlighted the importance of space control, noting that without it, information control would be impossible, and consequently air control, sea control, and land control would quickly fall one after another.[19] PLA strategists also advocate targeting space systems such as communication satellites, early warning platforms, and reconnaissance assets, viewing them as critical nodes in the enemy's command, control, and intelligence capabilities.[20] China's expanding military space capabilities advance its warfighting concept of multi-domain precision warfare, enabling the PLA to exploit key vulnerabilities in an adversary's "network information system-of-systems."[21] China's development and expansion of its space and counterspace strategies and capabilities reflect how the PLA may conduct multi-domain precision warfare and target U.S. space assets as a means to deter and counter a U.S. military intervention during a regional military conflict.*[22]

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*For more on China's military capabilities for "counter-intervention" designed to undermine the U.S. military's ability to become involved in a conflict between China and its neighbors, see U.S.-China Economic and Security Review Commission, Chapter 8, "China's Evolving Counter-Intervention Capabilities and the Role of Indo-Pacific Allies," in *2024 Annual Report to Congress*, November 2024, 552–561.

The PLA Has Vastly Expanded its ISR and PNT Satellite Constellations

The PLA has acted with urgency to develop overhead intelligence, surveillance, and reconnaissance (ISR) capabilities to ensure it can persistently monitor U.S. and allied activity in the Pacific region.[23] Overhead ISR space systems provide support to warfighters through the collection and processing of signals and imagery, monitoring adversary weapons and force movements, generating accurate targeting data, and enabling battle damage assessments.[24]

Over the past decade, the PLA has rapidly increased the number and capabilities of satellites in orbit. The number of Chinese satellites in orbit since the end of 2015 has increased by approximately 620 percent (+875 satellites), with more than 1,060 satellites in orbit as of December 2024.[25] Currently, China has about 510 ISR-capable satellites equipped with a variety of optical, multispectral, radar, and radio frequency sensors that benefit the PLA, increasing its ability to detect U.S. military assets in the air and sea, including aircraft carriers, expeditionary forces, and air wings.[26] In addition, China has expanded its ISR capabilities by launching synthetic aperture radar (SAR) remote-sensing satellites in geostationary orbit (GEO) that offer higher-resolution imagery and persistent, all-weather condition surveillance.[27] In December 2023, China launched the Yaogan-41,* its fourth optical surveillance satellite in GEO, which likely provides China with continuous surveillance of the Pacific and Indian oceans and the ability to identify and track car-sized objects, including U.S. military assets.[28] The PLA's increased investment in, and deployment of, remote sensing ISR capabilities means that even as U.S. forces in the Indo-Pacific are shifting to a more distributed, resilient posture, it is increasingly difficult for them to be undetected in the region.[29]

In addition to ISR, China has developed positioning, navigation, and timing (PNT) capabilities to ensure its forces and weapons platforms are able to navigate and more accurately target and achieve operational objectives across the globe. The third generation of BeiDou satellites, China's competitor to the U.S. Global Positioning System (GPS), achieved full operational capacity in 2020.[30] BeiDou's 49 operational satellites provide global, high-accuracy, all-weather, PNT services.[31] BeiDou has increased the PLA's capabilities to conduct precision strikes globally and offers the PLA global coverage for coordinated operations and maneuver across multiple theaters.[32] BeiDou's short messaging service could also provide real-time updates for missile systems and allow military operators to provide commands to autonomous weapons, enhancing the PLA's global command and control of weapons systems.†[33]

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*China referred to Yaogan-41 as a remote sensing satellite for civilian purposes such as land surveying, crop yield estimation, meteorological warning and forecasting, and disaster prevention and reduction. The Yaogan satellites have dual-use purposes, likely serving as electronic intelligence satellites for the PLA. Tate Nurkin et al., "China's Remote Sensing," *OTH Intelligence Group LLC* (prepared for the U.S.-China Economic and Security Review Commission), December 16, 2024, 55; "China Launches New Remote Sensing Satellite," *Xinhua*, December 15, 2023; Clayton Swope, "No Place to Hide: A Look into China's Geosynchronous Surveillance Capabilities," *Center for Strategic and International Studies*, January 19, 2024.

†BeiDou could also be used for anti-submarine warfare and subsurface navigation for tracking underwater vessels. Kevin Pollpeter, "To Be More Precise: BeiDou, GPS, and the Emerging Competition in Satellite-Based PNT," *China Aerospace Studies Institute*, May 2024, 36–37, 41–42.

The Inherent Dual-use Nature of China's Space Program

Under China's military-civil fusion strategy, rather than maintaining a strict separation between sectors, China leverages its civilian and commercial industries to advance national defense and security capabilities.[34] As a result, many advancements and tests of space systems that are framed as having civil or commercial purposes may have potential military applications as well. The inherent dual-use nature of these technologies and programs is further complicated by blurry distinctions between state-owned enterprises (SOEs) and commercial companies—due to overlapping funding, firms founded by former SOE employees, or SOE spinoffs—which obscures the line between civilian and military activities.[35] The Party's oversight of commercial companies also gives it great influence in ensuring that commercial activities align with national policies and objectives. Civilian and commercial capabilities—including satellites, launch systems, ground stations, and on-orbit servicing technologies—support legitimate civil purposes such as communication, navigation, and maintenance operations, but they could also be adapted for military applications, such as targeting missiles, tracking adversary submarines, or disrupting and maneuvering adversary satellites. Specific examples of these dual-use systems and their applications are provided throughout this chapter.

While China's ISR and PNT systems provide high-resolution, persistent surveillance in the Indo-Pacific region, the build out of its global coverage holds serious consequences for U.S. global force posture.[36] A truly global ISR and PNT capability would be a major component of the PLA's expanding Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) infrastructure and support its efforts to develop what has variously been called a space "kill mesh" or "kill web." China's aspiration is to create an integrated, resilient network that would automatically collect, integrate, and analyze information from ISR and PNT satellites and rapidly distribute it to weapon systems to provide the PLA with accurate, space-enabled targeting of U.S. forces using its long-range precision weapons. China has designed its satellite constellations to focus coverage on the Western Pacific region, but as it launches additional satellites into a greater variety of orbits—and makes corresponding advancements in the other aspects of its C4ISR network—the "kill mesh" will provide broader coverage, enhanced precision, and increased resiliency to PLA operations. General Saltzman assessed that China's full deployment of such a space-enabled targeting network could "prevent [U.S.] forces from taking meaningful action before they even reach theater."[37] He further warned that if the threat posed by the network is not mitigated, it would mean U.S. military objectives "will be tough to meet" without significant threat of major U.S. casualties.[38]

The PLA Has Invested Heavily in Counterspace Capabilities

Over the past two decades, China has invested heavily in capabilities to deny, degrade, or destroy U.S. satellites. Those capabilities would allow China to incapacitate U.S. communications, PNT, and ISR satellites (including those providing early warning of missile launches) as well as to undermine the ability of the United States to conduct joint operations and project power.[39]

China has continued to invest in a broad range of counterspace capabilities, including ground-based and space-based kinetic, radio frequency, and directed energy systems.*[40]

- *Kinetic*: China has at least one, if not three, programs underway to develop direct-ascent anti-satellite (DA-ASAT) capabilities.[41] U.S. intelligence has assessed that by 2021, China had the capability to field ground-based ASAT missiles that could target and destroy satellites in low Earth orbit (LEO), and that the PLA intends to field ASAT weapons with the capability to destroy satellites in geostationary orbit (GEO) at 36,000 kilometers (about 22,369 miles).[42] The U.S. Department of Defense (DOD) assessed that since 2006, China has been researching space-based kinetic weapons, including technical areas such as reentry methods, payload separation, delivery vehicles, and transfer orbits—all of which are necessary to make space-based kinetic operations effective.[43] China has also conducted tests of satellite operations that could lead to a co-orbital anti-satellite capability, such as satellite maneuvers and rendezvous and proximity operations (RPOs) that could change the orbital trajectory of another satellite.†[44] China has been experimenting with on-orbit satellite maneuvers since 2010.[45]

Robotic Arms and Rendezvous Operations: Civilian Maintenance Tools or Anti-Satellite Weapons?

China uses robotic arms powered by artificial intelligence (AI) for various civil space missions including satellite maintenance, refueling, and removal of space debris. Robotic arms have been used on China's Tiangong space station to support assembly, maintenance, and operations in orbit.[46] Orbital analysts and U.S. officials believe that in 2022, China's SJ-21 satellite was conduct-

*Kinetic counterspace capabilities refer to two systems that run together to create an explosion or destructive force. Radio frequency weapons emit an intense focused beam of microwave energy that could cause damage to electronic circuitry. Directed energy weapons refer to systems that utilize concentrated beams of electromagnetic waves, such as lasers or particle beams that could dazzle or damage a satellite's sensors or systems. Secure World Foundation classifies radio frequency weapons as a type of directed energy weapon. Other counterspace capabilities include cyber activities that could interfere with a satellite's computer networks or disrupt the ability of a satellite or ground station to collect, process, and disseminate data. B. Chance Saltzman, oral testimony for U.S.-China Economic and Security Review Commission, *Hearing on The Rocket's Red Glare: China's Ambitions to Dominate Space*, April 3, 2025, 26; "Global Counterspace Capabilities," *Secure World Foundation*, April 2025; Jennifer DiMascio, "U.S. Counterspace Capabilities," *Congressional Research Service* (Report No. IN12420), September 11, 2024, 1.

†However, Secure World Foundation assessed that public evidence suggests China has not conducted an actual destructive intercept of a target indicative of a co-orbital ASAT capability and states there is "no proof that these technologies are definitively being developed for counterspace use as opposed to intelligence gathering or other purposes." "Global Counterspace Capabilities," *Secure World Foundation*, April 2025.

Robotic Arms and Rendezvous Operations: Civilian Maintenance Tools or Anti-Satellite Weapons?—*Continued*

ing sophisticated rendezvous and proximity operations (RPO),* using a robotic arm to capture and tow another object.[47] Although RPOs can be used for peaceful operations like inspection, repair, refueling, upgrades, or removal of space debris, they also have the potential for military purposes such as disabling or interfering with another country's satellites.[48] SJ-21's ability to dock with and tow a satellite introduces a potential counterspace capability that would allow China to disable a satellite without generating dangerous space debris or the associated reputational cost.[49] In counterspace operations, avoiding debris or international backlash is strategically valuable, making SJ-21's capabilities appealing for low-visibility, high-impact interference. In 2024, the U.S. Space Force reported that China conducted its first proximity operations involving five satellites, three Shiyan-24C and two Shijian-6 05A/B, in synchronized maneuvers in LEO.[50] This shift from simple two-satellite rendezvous to complex, coordinated movements signals China's advancing dual-use space capabilities and suggests potential for future "dogfighting" tactics intended to maneuver near or potentially interfere with other satellites, threatening the security and stability of space assets for strategic gain.[51] Despite China's peaceful framing of robotic arms and RPOs, SJ-21 demonstrates that these technologies and operations are inherently dual use, posing complex challenges for space security and military stability by enabling covert, reversible interference with adversary satellites without creating debris.

- *Radio frequency*: China has significant electronic warfare counterspace capabilities that can be directed against global navigation satellite systems and satellite communications.[52] The PLA regularly incorporates radio frequency jammers targeting space-based communications, radars, and navigation systems during military exercises.[53] Ground-based cyber and electronic warfare can also be used to degrade satellite services by interfering with an adversary's telemetry, tracking, and control (TT&C)† ground stations and jamming uplink and downlink communications with satellites.[54] DOD reported that China is probably developing jammers to target adversary synthetic aperture radar (SAR) satellites to protect its own ground-based assets from being imaged and targeted during a conflict.[55] China could use RPO satellite capabilities to position radio frequency jammers close to an adversary satellite, amplifying its ability to interfere with communications.[56]
- *Directed energy*: Lasers offer significant potential for military counterspace applications. Ground-based laser systems are ca-

*RPO refers to the operation of two (or more) independent space objects that purposefully maneuver to within close "proximity" of each other via various rendezvous techniques.

†TT&C facilities use antennas to communicate with satellites by sending commands and receiving data. They can only track and manage satellites to which they are connected and cannot monitor space debris or satellites operating on different frequencies.

pable of dazzling or blinding Earth-orbiting satellites and can inflict thermal damage on most LEO satellites.[57] DOD assessed that the PLA has multiple ground-based laser weapons capable of disrupting, degrading, or destroying satellites and may also possess limited capabilities to target satellite sensors directly.[58] These lasers could provide a non-kinetic means of attack that is hard to detect and difficult to trace back to the source.[59]

The U.S. Approach to Counterspace Operations

While China has continued to actively pursue both offensive and defensive counterspace capabilities, the United States has refrained from developing an offensive space program and has dutifully sought to avoid actions that could be seen as "weaponizing space." This position was originally rooted in the principles for the peaceful use of outer space and later tied, especially during the Cold War, to the notion that satellites were stabilizing, as they would provide early warning of a nuclear strike and allow time for a response.*[60] Thus, an attack on those satellites could be interpreted by an adversary as a sign of an imminent nuclear strike.[61]

However, as the space environment has evolved and is now seen by China as a warfighting domain, the U.S. Space Force is spearheading a new approach to counterspace operations to meet the growing threats to U.S. space assets.[62] In March 2025, the U.S. Space Force released a framework on space warfighting that emphasized the need to establish space superiority and described counterspace operations as essential to joint operations. The framework said the United States needed to be able to undertake offensive actions to disrupt, degrade, deny or destroy enemy counterspace capabilities and other space assets that support their military forces as well as defensive actions to protect friendly space capabilities from attack, interference, and unintentional hazards.[63] In testimony before the Commission, General Saltzman stated that much of the U.S. Space Force's time and effort has been spent on delivering services, which has consequently led to underfunding of capabilities to defeat an adversary's counterspace weapons.[64]

China's Growing Dependency on Space Creates Vulnerabilities of its Own

While U.S. space assets may increasingly be held at risk by the PLA's space buildup, China has also exposed itself to vulnerabilities due to its own growing dependency on space assets that could be exploited by changes to the U.S. military's approach to offensive and defensive space operations. As the PLA has increased the number and capabilities of satellites in orbit, it has become increasingly reliant on its space-based ISR, PNT, and communication satellites for its own joint warfighting.[65] The PLA's long-range strike capabilities

*The United States formally committed to the peaceful use of outer space with the signing of the Outer Space Treaty on January 27, 1967, which entered into force on October 10, 1967. U.S. Department of State, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, accessed August 28, 2025.

depend on ISR satellites for targeting and damage assessments, as well as communications for command and control (C2), and PNT to enable precision strikes.[66]

China's growing dependency on space may, in turn, also help deter escalatory activities in space. In a study assessing how the United States could deter China's use of force in space, Kevin Pollpeter, Director of Research at the U.S. Air University's China Aerospace Studies Institute, suggested that as China's dependency on its space assets increases, the ability of the United States to deter China from attacking space assets could also increase.[67] Mr. Pollpeter assessed that due to its advancements, China may be more reluctant to engage in escalatory behavior in space that risks a widening space war.[68] In his testimony to the Commission, General Saltzman noted that China has developed such a need for its space capabilities that the idea of irresponsible space behavior may be starting to affect the way the PLA views the space domain.[69] General Saltzman cited Russia's 2021 anti-satellite test as an example of irresponsible behavior that China could view as jeopardizing the way it may want to use space.[70]

China Uses Its Space Program to Leverage Relations with Developing Countries to Accrue Military Advantages and Geopolitical Influence

China is actively cultivating space partnerships with developing countries as part of its broader strategy to expand its global influence. A central part of this effort is the Belt and Road Initiative (BRI) Spatial Information Corridor, also known as the Space Silk Road.[71] This initiative consists of constructing a global network of ground infrastructure across BRI countries to support Chinese space operations, which strengthens Beijing's ties to developing countries while enhancing its satellite, navigation, and remote sensing capabilities.[72] To entice countries to participate in the Space Silk Road, China offers free access to the BeiDou satellite navigation network as well as a wide range of services to partner countries including satellite communications, Earth imaging, and broadcasting capabilities, while encouraging regular reliance on, purchase of, and integration of Chinese satellite data into their own government and commercial operations.[73] Additionally, partner countries receive low-cost internet and telecommunications services as well as the ability to launch their own satellites using Chinese systems.[74] For many developing countries with limited means to build out their own indigenous space technologies, China presents an attractive option for securing access to space-based services.

In Africa, for example, China has been active in pursuing its space partnerships as part of the Space Silk Road. This year, China completed a satellite production facility in Egypt that manufactures satellites with remote sensing capabilities that can be used for defense intelligence gathering.[75] On April 20, 2025, the African Union opened the African Space Agency (AfSA) near Cairo, Egypt, to serve as the primary point of contact for other nations and organizations.[76] The agency's location is strategically significant, as it sits near the Chinese-funded satellite production facility in Egypt. This new institution will likely serve as a forum for deepening China-Af-

rica space collaboration as Beijing aims to position itself as a key partner in serving the region's space development needs.[77]

While China markets the Space Silk Road as supporting a wide range of civilian sectors—agriculture, disaster response, port logistics, telemedicine, transportation, financial services, and urban planning, to name a few—the PLA undoubtedly could benefit from the enhanced situational awareness and extended operational reach these capabilities provide across BRI regions.[78] In addition, China often promotes satellite services that are interoperable with its telecom, AI, and data platforms—such as Huawei's technology integrated into BeiDou applications. This enables China to essentially market an exportable tech ecosystem that extends beyond the space sector, creating long-term economic and strategic dependencies on Chinese technology and magnifying concerns about data security.[79] General Saltzman warns that there are significant strategic implications to China's expanding space partnerships, emphasizing that other countries' choices to adopt BeiDou are not merely technology issues, but also reflect deeper geopolitical alignment.[80] This strategy not only strengthens the resilience and global coverage of China's space architecture but also binds partner nations more deeply into Beijing's technological ecosystem.

BeiDou Seeks to Displace GPS as the World's Dominant Satellite Navigation System

Originally designed to protect national security by providing the PLA with navigation and targeting capabilities, China's global satellite navigation system, the BeiDou Navigation Satellite System (BDS), has been increasingly marketed for commercial and scientific purposes in recent years.[81] China has offered BeiDou services as a key component of the Space Silk Road, claiming it offers affordable satellite services, equipment, and training to users globally.[82]

As of 2025, BeiDou has 49 operational satellites in orbit, significantly more than the U.S. GPS system's 31 operational satellites, and a global network of monitoring stations, many of which are located in developing countries.[83] China is using BeiDou as a strategic tool to expand its geopolitical influence, particularly in Southeast Asia, Africa, and other developing regions. It integrates BeiDou into economic development, infrastructure, and training programs through bilateral agreements and regional forums. As of 2019, China had signed agreements with 120 partners to use BeiDou satellites.[84] In 2021, Beijing hosted the first China-Africa BDS Cooperation Forum, which was attended by representatives from nearly 50 African countries and promoted BeiDou's role in economic and environmental development.[85] In Southeast Asia, countries such as Thailand, Brunei, Laos, Indonesia, and Malaysia have expanded cooperation through platforms like the China-ASEAN Technology Transfer Forum and the Mekong-Lancang Cooperation Forum.[86] China has also promoted BeiDou in Central Asian and Arab regions through similar forums.[87]

China is aggressively seeking to expand the use of BeiDou beyond navigation and transform it into a core component of its

BeiDou Seeks to Displace GPS as the World's Dominant Satellite Navigation System—*Continued*

global digital infrastructure. The upcoming BeiDou-4 constellation aims to provide more precise, resilient, and reliable positioning services, which will improve accuracy from meters to decimeters and expand applications for use in aerospace, maritime, and autonomous systems.[88] These upgrades could further reduce global reliance on the United States' GPS system, strengthen China's appeal as a space technology partner, and expand Beijing's ability to set technical standards in global navigation and positioning infrastructure.

China is actively working to grow its commercial space sector, including launch services, satellite manufacturing, and downstream applications, as part of a broader strategy to expand its global market share and reduce reliance on Western systems.[89] Currently, China Great Wall Industry Corporation, a subsidiary of the state-owned China Aerospace Science and Technology Corporation, is the primary commercial provider of international satellite services, offering launch, construction, and operational support to countries such as Pakistan, Nigeria, and Venezuela.[90] China's international expansion of its space services acts as a force multiplier for its geopolitical ambitions. Through a heavily state-led model, Beijing closely coordinates military, civil, and commercial activities—enabling civilian space services to directly support the PLA's goals while being marketed globally as purely commercial services. By embedding dual-use technologies in partner nations' infrastructure, China boosts its global space market share, gains access to sensitive data, and draws developing countries deeper into its geopolitical and economic orbit.[91]

China Uses Ground Infrastructure to Support Space Activities as Well as Advance Geopolitical Objectives

In testimony before the Commission, Victoria Samson, Chief Director of Space Security and Stability at Secure World Foundation, noted that China often builds ground infrastructure and hosts satellites for other countries in regions that are rich in natural resources or have strategic value.[92] This approach allows China to gain access to those resources and collect sensitive data or communications that can be used to exert diplomatic leverage and secure support for its broader geopolitical objectives.[93] China's network of ground stations supports satellite constellations like BeiDou, as well as Earth observation and communications platforms, by enabling faster and more robust data transfer and enhancing China's ability to perform critical telemetry, tracking, and command (TT&C) functions.[94] China currently operates or is developing overseas ground stations in South America, Africa, and the Asia-Pacific.[95] Previously, China had access to ground stations operated by the Swedish Space Corporation in Sweden, Chile, and Australia, but in September 2020 the company decided not to renew its contract with China, citing geopolitical changes and security concerns.[96]

Figure 1: Map of Space Cooperation with China

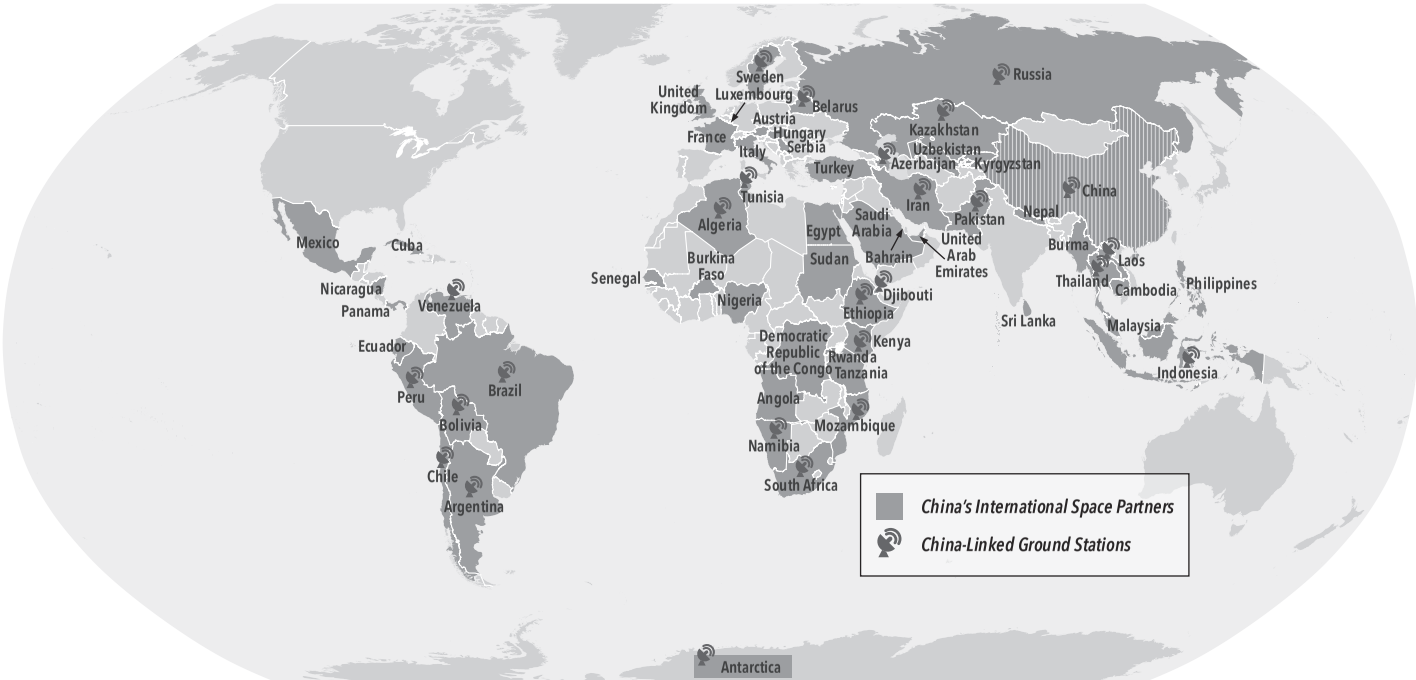


Table 1: Breakdown of Areas of Space Cooperation with China

Country	*Ground Station*	*Satellite/ Launch*	*Partnership*
Algeria	X	X	X
Angola			X
Antarctica	X		
Argentina	X	X	X
Austria			X
Azerbaijan	X		X
Bahrain		X	X
Belarus	○	X	X
Bolivia	X	X	X
Brazil	X	X	X
Burkina Faso		○	X
Burma (Myanmar)			X
Cambodia		□	X
Chile	□		□
Cuba			X
DRC		○	
Djibouti	○		
Ecuador		X	
Egypt		X	X
Ethiopia	X	X	X
France			X
Hungary			✦
Indonesia	X	X	X
Iran	○	X	X
Italy		X	X
Kazakhstan	X	X	X
Kenya	X		X
Kyrgyzstan			X
Laos	X	X	X
Luxembourg			✦
Malaysia		X	X
Mexico		X	X
Mozambique	X	X	
Namibia	X		X
Nepal		X	
Nicaragua			X
Nigeria		X	X
Pakistan	X	X	X
Panama			X
Peru	X		X
Philippines			X
Russia	X	X	X
Rwanda			X
Saudi Arabia		X	X
Senegal			X
Serbia		○	X
South Africa	X		X
Sri Lanka		X	
Sudan		X	X
Sweden	□	□	□
Tanzania			X
Thailand	X	X	X
Tunisia	X	X	X
Turkey		X	
UAE			X
United Kingdom			X
Uzbekistan			X
Venezuela	X	X	X

Ground Station: Countries allowing China to use and/or build local ground infrastructure, often to support telemetry, tracking, and command of space assets.
Satellite/Launch: Countries that have agreements to use Chinese satellites and/or to have China build or launch a satellite for them.
Partnership: Countries that have signed some type of agreement to work with China on space issues.

Caveats:
□ - Countries have cooperated with China on this in the past. However, the media reported that the cooperation has been or will be discontinued.
○ - The media reported that China has reached an agreement to undertake certain activities, but there are no indications the activity has occurred.
✦ - The cooperation is between a non-government entity and China.

Source for Figure 1 and Table 1: Various.[97]

China markets ground stations as providers of civilian services such as navigation, weather forecasting, disaster monitoring, and remote sensing, but experts raise concerns that the same infrastructure could also support the PLA's military objectives.[98] The majority of these facilities are built and operated by the China Satellite Launch and Tracking Control General (CLTC), a state-owned entity closely linked to the PLA's then-Strategic Support Force Space Systems Department.[99] All TT&C operations are centrally coordinated through the Xi'an Satellite Control Center, a subordinate arm of the CLTC, suggesting a high degree of military integration.[100] A prominent example is the Neuquén ground station operated by China in Argentina, which opened in 2017 under a 50-year, tax-free lease.[101] Despite its framing as a diplomatic and cooperative venture, the facility is staffed by Chinese military personnel and operated solely by the CLTC; Argentina is granted access for just 10 percent of its operational time.[102] Argentina is barred from interfering with the site's activities, and the site is surrounded by a 62-mile frequency exclusion zone under Chinese control.[103] Essentially, China is using Argentine territory to advance its strategic goals. This imbalance, where host countries have little visibility or authority, raises broader concerns that such installations may serve military functions, such as ISR, under the guise of peaceful civilian cooperation.[104]

From a military operations perspective, China's expansive global network of ground stations could enhance the PLA's ability to conduct resilient and survivable space operations in conflict.[105] TT&C stations are essential for monitoring satellite health, tracking orbits, and sending commands, but they require line-of-sight, limiting contact to brief windows between satellites and ground stations.[106] To maintain continuous control, China augments its network with Yuan Wang-class tracking ships and the new Liaowang-1 vessel.[107] This globally dispersed architecture provides global coverage, reduces vulnerability to localized disruptions, and could complicate adversary efforts to target satellite control. It also accelerates the reception of real-time ISR, navigation, missile warning, and secure communications, enabling faster, more precise decision-making.[108]

China's Commercial Space Sector Is Growing Rapidly

In the competition to lead the emerging space economy—the commercial market to sell goods and services related to space—the United States is currently the global leader, but China has distinct capabilities that could translate to significant geostrategic and military advantage. Building on its established state-led aerospace and defense sector and network of research institutions, China has quickly fostered a dynamic startup ecosystem focused on rivaling U.S. firms in commercial launch and satellite networks. Though the United States currently leads in two capabilities vital to the future space economy—reusable launch rockets (RLRs) and LEO satellite constellations—China is deploying its industrial policy playbook and leveraging strengths in manufacturing and rocketry in an attempt to rapidly catch up. The stakes are high, as the competition extends beyond technological development to finite orbital positions for satellites, international influence in establishing ground stations, and

control over future markets and space-based applications—many of them with significant national security implications.

The Commercial Space Economy Is Dramatically Transforming

The commercial space economy is on the precipice of a dramatic transformation due to several concurrent advances. In the upstream segment (see Table 2), launch frequency is accelerating and costs are dropping rapidly due to the advent of RLRs by companies like SpaceX,* while innovations in satellite design are similarly enabling companies to build satellites at lower cost and faster. Both also have clear military implications, as the ability to rapidly deploy or reconstitute space assets could be vital in a space-based conflict. Meanwhile, in the mid-stream segment, improvements in satellites' onboard technology—like higher throughput for data transmission and faster processing through edge computing—are enabling larger satellite networks to communicate with each other and ground stations more efficiently and perform more complex tasks.[109] Taken together, these advances are enabling mega-constellations of LEO satellites to provide less expensive, more feature-rich applications in the downstream segment, including global telecommunications and internet connectivity, enhanced navigation and tracking, and remote sensing and imagery (for more on the transformation of the commercial space economy, see Appendix).[110] Starlink's essential role in Ukraine's defense since Russia's invasion in 2022—from providing real-time encrypted communications to imagery and geolocation used to coordinate attack drones—demonstrates the breadth of dual-use applications possible through LEO constellations.[111]

Table 2: Commercial Space Market Segments and Ecosystem

Segment	Key Activities	Example Companies or Organizations	
		China †	United States
Upstream—Components and manufacturing	Launch vehicle manufacturers	China Academy of Launch Vehicle Technology (CALT)	SpaceX, Blue Origin
	Satellite manufacturers	China Aerospace Science and Technology Corporation (CASC)	Lockheed Martin, SpaceX
	Propulsion developers and rocketry firms	CASC, Shanghai Academy of Spaceflight Technology, LandSpace	Lockheed Martin, Anduril Industries Inc., SpaceX
	Subsystems providers (e.g., satellite communication systems or power systems)	China Academy of Space Technology (CAST)	Northrop Grumman, Ball Aerospace

*It is not clear that any company other than SpaceX has yet used a reusable launch rocket to launch a satellite into space, though other companies have used RLRs for space tourism and experiments, and numerous companies are working on the technology. "Reducing the Cost of Space Travel with Reusable Launch Vehicles," *National Security Technology Accelerator*, February 12, 2024.

†Many of the entries under China are state-owned entities as these are currently the dominant providers in China in the space economy.

Table 2: Commercial Space Market Segments and Ecosystem—*Continued*

Segment	Key Activities	Example Companies or Organizations	
		China*	United States
Midstream—Operations and mission services	Satellite constellation management	China Satellite Network Group Co. Ltd.	Starlink, Planet Labs, ViaSat
	Ground control systems and mission management	Chang Guang Satellite Technology	Kratos, General Dynamics
	Secure data relay	China Satellite Communications Co. Ltd	Starlink, Capella Space
	On-orbit services (e.g., satellite repair)	China Academy of Space Technology	Maxar Technologies
Downstream—Space-enabled applications	Satellite internet	SpaceSail (Qianfan), China SatNet (Guowang)	Starlink, ViaSat
	Geolocation and navigation	BeiDou Navigation Satellite System (BDS)†	Global Positioning System (GPS)†
	Remote sensing and imaging	Chang Guang Satellite Technology, Space View Technology, and Spacety	Planet Labs, Maxar Technologies, BlackSky

Source: Various[112]

In just a decade, China has gone from having an almost nonexistent private commercial space sector to a vibrant ecosystem of space startups. Like other strategic industries, this rapid progress is an outgrowth of extensive government support to break through technological "chokepoints," foster innovation, and catch up to and surpass competitors, particularly in the United States.[113] At the same time, space has been a heavily-regulated and state-dominated industry in China, so industrial policy initially took a gradualist approach, and commercial activity remains largely dependent on technical support and regulatory coordination from state-owned aerospace conglomerates.[114] After China declared space a strategic sector in 2023, several provinces and cities announced plans for regional clusters that compete with and complement one another, developing redundant capabilities and alternative paths to achieve the same goals.

China's approach builds on the lessons of its other industrial policy successes, drawing on extensive government support and adjacent manufacturing capabilities to accelerate industry development. At the same time, it is contributing to similar challenges as other market-distorting Chinese industrial policies, with unprofitable startups propped up by government support as too much supply

*Many of the entries under China are state-owned entities as these are currently the dominant providers in China in the space economy.

†While there is a robust economy of companies using geolocation and navigation services, BDS is constructed and operated by the China National Space Administration; GPS is owned by the U.S. government and operated by navigation warfare unit Mission Delta 31. U.S. Space Force Space Operations Command, *Mission Delta 31 - PNT & SCN Integrated Mission Delta*; U.S. Department of Defense, "Global Positioning System Standard Positioning Service Performance Standard," September 2008; "Beidou Constellation," *SatNow*.

chases too little demand.[115] As with other sectors, the likely outcome is that China's competitors will bear the brunt of these distortions: with commercial firms relentlessly cutting costs to compete in an oversaturated domestic market, China is poised to develop a few national champions capable of rivaling the leading international firms at a fraction of the cost.

From Deregulation to Regional Clusters

China's policy support for private commercial space firms evolved fairly rapidly while being implemented through incrementally larger opportunities for the private sector. A 2021 white paper on China's space sectors made growth of China's private space sector a central element of many objectives.*[116] Before 2014, China's space sector was confined to state-led aerospace conglomerates that focused mostly on civil and military applications as well as navigation.[117] These SOEs were poorly positioned to innovate and compete in emerging areas like low-cost satellite production and commercial space applications.[118] Seeking to rectify these weaknesses, in 2014 China's state planning agency, the National Development and Reform Commission, relaxed restrictions on satellite manufacturing and commercial launch.[119] A broader strategy for industrial development followed in 2015, with a focus on reducing foreign reliance, and in 2016 China announced plans to promote commercial satellite services abroad through the BRI.[120] The private space economy further accelerated after 2019, when China reduced barriers to private investment in rocketry.[121] Then in 2020, telecommunications firms became more involved as China encouraged the growth of satellite internet in its sweeping "new infrastructure" investment plan.[122] Only in 2023 did China designate commercial space as a "strategic emerging sector," the same label it first applied to new energy vehicles and other major beneficiaries of industrial policy in 2007.[123]

*Among other goals, the white paper notes Beijing's intention to accelerate commercial launch and satellite manufacturing, offer more space-based services, and further ease market restrictions for private firms. China's State Council, *Full Text: China's Space Program: A 2021 Perspective*, January 28, 2022.

Figure 2: Active Rocket Production in China for 7 Leading Commercial Space Firms

Note: Among China's commercial space companies, Orienspace, Landspace, Space Pioneer, Galactic Energy, Interstellar Glory, Deep Blue, and CAS Space (a subsidiary of the Chinese Academy of Sciences) are the only firms to hold the Launch Vehicle Overall Technical Research and Production License as of August 2025. Space Office, "中国商业运载火箭之路将何去何从?" (Where Is China's Commercial Space Launch Path Going?), *Huxiu*, August 13, 2025.

Source: "我国7个民商公司，搞出了51个火箭基地！是不是太多了?" [Seven Chinese civilian and commercial companies have built 51 rocket bases! Is that too many?], *Hangtianfan*, July 15, 2025.

The 2023 designation, later codified in 2024, kickstarted a series of provincial-level action plans to build regional commercial space clusters.[124] For instance, the plan for Wenchang, located in southern Hainan province, builds on the city's preexisting strengths as China's southernmost spaceport and launch site for Long March rockets

used in space station missions and deep space exploration. The regional plan seeks to expand the volume of commercial launches and position Wenchang as a space tourism hub.[125] A nearby "satellite mega factory" announced in 2024 is projected to have an output of 1,000 satellites annually, using processes from auto-manufacturing to mass-produce satellites that could then be put into orbit immediately from adjacent launch sites.[126] Beijing, Shanghai, Shenzhen, and Wuhan, among other cities and provincial-level municipalities, have announced similar plans that build on preexisting strengths, such as Shanghai's civil aviation industry, Shenzhen's telecommunications industry, and Beijing's rocketry industry and research institutes and universities. Notably, many of these plans include fiscal incentives for satellite manufacturers, driving a surge in production capacity.[127]

State-Owned Enterprises Provided the Foundation for China's Commercial Space Sector

State-owned enterprises (SOEs) were the foundation of China's commercial space economy and remain dominant players today even as private space firms have grown rapidly. Prior to 2014, virtually all space initiatives were under China Aerospace Science and Technology Corporation (CASC) and China Aerospace Science and Industry Corporation (CASIC), the two major state-owned aerospace and defense conglomerates.[128] Aside from their military focus and efforts in space exploration, these firms and their affiliates led almost all commercial space activity, with CASC subsidiaries the China Academy of Launch Vehicle Technology (CALT) and Shanghai Academy of Spaceflight Technology (SAST) conducting most of China's launches. CASC also led China's highly successful buildout of the BeiDou Navigation Satellite System (see "BeiDou Seeks to Displace GPS as the World's Dominant Satellite Navigation System" textbox above).[129]

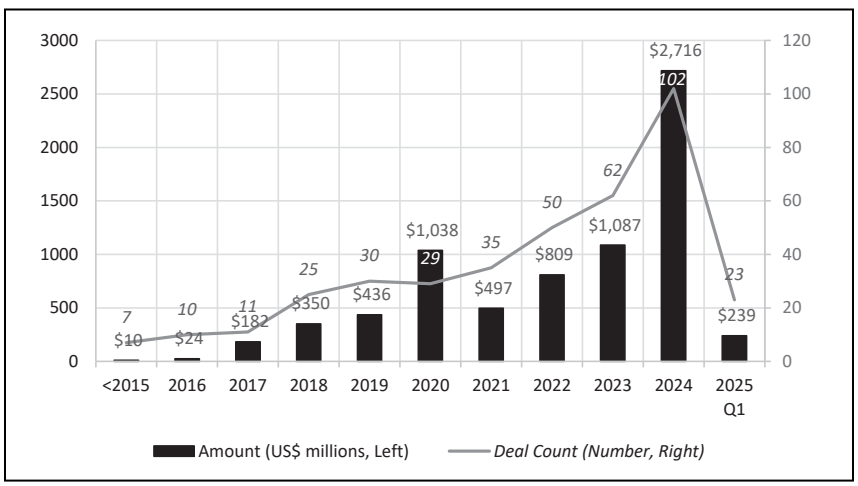
Today, the breadth of SOEs' operations complements the targeted capabilities of China's private firms, and they are both competitors and collaborators. CASC still leads in annual launches (including non-commercial launches), with 49 in 2024—the second-most globally, behind SpaceX's 140.[130] CASC is also leading the buildout of one of China's two LEO mega-constellations, with the other being state-coordinated but mostly privately built. It remains the top Chinese manufacturer of GEO satellites, while Chinese startups focus on cheaper LEO satellites. At the same time, SOEs are investors in and customers of China's private space firms, and private firms seek partnerships with SOEs to clear regulatory hurdles.[131] CASC's investment arm, China Aerospace Investment Holdings, funds startups that advance China's strategic objectives like Beijing Xingtu (Space Trek), a rocketry firm developing solid-fueled rapid launch capabilities.[132] Many Chinese space startups were also founded by former CASC employees, including MinoSpace, Spacety, and Galaxy Space.[133]

Commercial Space Investment Follows Policy Lead

Investment in China's commercial space firms has closely tracked the expansion of policy support, accelerating to a crescendo with China's designation of the sector as a strategic emerging industry in 2023 (Figure 3). The following year, China surpassed the United States in venture capital (VC) funding for commercial space startups for the first time, receiving $2.7 billion compared to the U.S. funding of $2.6 billion.[134] Preceding that, China's commercial space market has grown rapidly since China eased private investment in rocket companies in 2019—growing from $113 billion in 2019 to $268 billion in 2023, with projections reaching $900 billion by 2029[135] Capital from both U.S. and foreign investors has also contributed at least in part to China's commercial space sector, with Sequoia, Lightspeed, and Matrix as notable funders.*[136] Aside from VCs, foreign funds such as the state-led Abu Dhabi Investment Authority (ADIA) have also invested in Chinese commercial space firms, notably rocketry.[137]

This funding landscape has led to a rapid increase in the number of commercial space firms, with private companies now outnumbering state-owned counterparts four to one, even as the latter maintain much larger, more complex operations by comparison.[138] In 2024, the Chinese government accounted for the majority of investment in China's commercial space sector, rising from 49 percent in 2023 to 51 percent in 2024 and reaching 54 percent in the first quarter of 2025.[139] However, government support comes with strings attached, as commercial space firms face pressure to focus on long-term goals in chokepoint technologies rather than near-term profitability.[140]

Figure 3: Venture Capital Investments in Chinese Commercial Space Firms



Source: Adapted from Denis Kalinin, "China: Private Space Ecosystem of the Rising Superpower," *Space Ambition*, April 25, 2025.

*While these global VCs do invest in China's commercial space ecosystem, these investments are orchestrated by fully local and separate entities, for example Sequoia China. Denis Kalinin, "China: Private Space Ecosystem of the Rising Superpower," *Space Ambition*, April 25, 2025; House Select Committee, *Gallagher, Krishnamoorthi Probe Sequoia's PRC High-Tech Investments, Examine Implications of Announced Split*, October 18, 2023.

China's Nascent but Growing Commercial Launch and Satellite Ecosystem

Compared to the United States, China's commercial space ecosystem appears fairly nascent, but the breadth of companies competing in similar technologies, government support, and synergies from the substantial capabilities of China's aerospace SOEs provide firm footing to close this gap. For the moment, SpaceX and Starlink are market leaders in RLR and LEO constellations, respectively, and retain a substantial first mover advantage due to vertical integration: SpaceX reduces market risk with Starlink as a guaranteed customer, while near-cost access to space through in-house launch has enabled Starlink to rapidly and affordably scale its satellite network.[141] Although China trails in satellites currently in orbit, its construction of multiple mega factories puts it on track to rival production volumes at SpaceX's Redmond facility, which in August 2025 indicated it was producing 70 satellites per week or roughly 3,600 annually.[142] According to research from intelligence firm Exovera and *SpaceNews*, planned mega-factories and projected output include:

- Geespace Mega Factory in Zhejiang—500 satellites annually.[143]
- Aerospace Satellites Mega Factory in Hainan—1,000 satellites annually.[144]
- Galaxy Space Nantong Intelligent in Jiangsu—300 small satellites and 100–150 medium satellites annually.[145]
- Shanghai Gesi Aerospace Technology (Genesat)—300 satellites annually.[146]

Similarly, although China trails in total launches, it has firms experimenting with far more approaches to propulsion and reusable launch, from liquid and solid fuels (SpaceX uses liquid methane) to novel technologies such as Maglev launch systems akin to high-speed trains.[147] The vibrancy of China's ecosystem could ultimately provide a competitive edge over the United States, which is highly concentrated in a few companies and heavily invested in a narrow set of approaches.[148] These limitations create a higher risk of setbacks and may leave the U.S. government with limited leverage when negotiating with a monopolistic or oligopolistic industry.

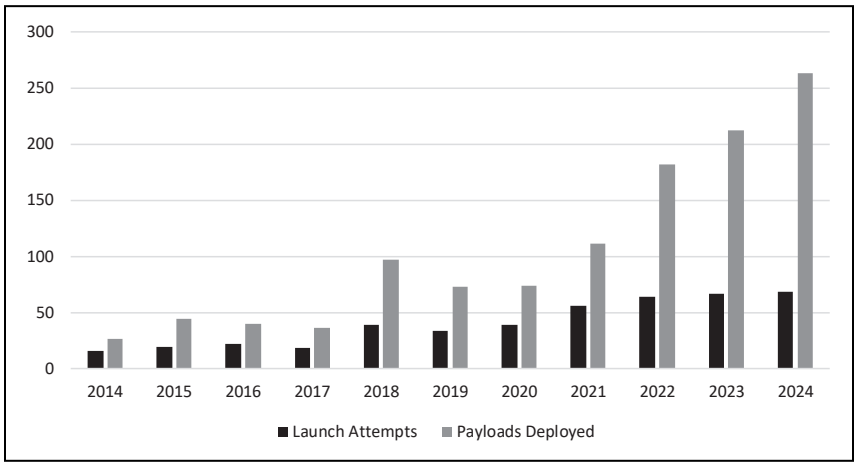
Launch and RLR

China currently has about 50 commercial launch firms, a number Orbital Gateway Consulting founder Blaine Curcio highlighted in his testimony before the Commission on its diversity and breadth compared to U.S. firms.[149] While U.S. leader SpaceX is far ahead of China's leading commercial launch company, Galactic Energy, and U.S.-based Rocket Lab is also ahead of China's second most developed commercial launch company, Mr. Curcio estimates that China's fifth-most-developed company is probably on par with its U.S. counterpart.[150] In 2024, China had 66 successful launches carrying 263 satellites, compared to 66 launches carrying 212 satellites in 2023.*[151] Mr. Curcio's tracking found 15 launches by commercial

*This figure does not include Chang'e 5's successful launch from the moon in June 2023 to return to Earth. By comparison, the United States had 158 launches deploying 2,256 spacecraft

firms that sent 67 satellites into orbit.[152] The country is aiming to exceed 100 launches in 2025; as of September 25, 2025, it had conducted 55 launches (by comparison, the United States had conducted 126).[153]

Figure 4: Chinese Orbital Launch Attempts and Satellite Payloads* Deployed, 2014–2024



Note: The graph shows launch attempts rather than successful launches as a more apt industrial indicator, demonstrating the expansion of China's capacity. Generally, a small number of launches each year will not be successful; for instance, in 2024, China attempted 68 launches and succeeded in 66. In some cases, satellite payloads deployed may include satellites launched in a preceding year; for instance, China launched 263 and deployed 264 satellites in 2024.

Source: Jonathan McDowell, "Space Activities in 2024," *Jonathan's Space Report*, January 24, 2025, 4, 9, 61; Jonathan McDowell, "Space Activities in 2023," *Jonathan's Space Report,* January 15, 2024, 4, 9, 63; Jonathan McDowell, "Space Activities in 2022," *Jonathan's Space Report*, January 17, 2023, 4, 9, 111; Jonathan McDowell, "Space Activities in 2021," *Jonathan's Space Report*, January 3, 2022, 3, 8, 92; Jonathan McDowell, "Space Activities in 2020," *Jonathan's Space Report*, January 15, 2021, 3, 8, 93.

Numerous Chinese firms are also advancing in RLR development, with both SOEs and commercial firms planning test flights for reusable rockets. In 2024, China made significant strides in developing reusable space launch vehicles, including a successful 12-kilometer (7.4 miles)-high vertical takeoff and landing test.[154] At least seven Chinese commercial RLR prototypes are scheduled for their maiden launch in 2025, with experts predicting they will be competitive with SpaceX's RLR by 2030.[155] Landspace, Space Pioneer, Galactic Energy, Deep Blue Aerospace, and iSpace, are among the major Chinese commercial companies working towards launchers that could

in 2024, counting four near orbital launches from Starship and 14 launches from New Zealand by Rocket Lab subsidiary Electron. Jonathan McDowell, "Space Activities in 2024," *Jonathan's Space Report*, January 24, 2025, 5, 6, 9; John Holst, "The Ill-Defined Space Global Orbital Launch Summary: 2024," *Ill-Defined Space*, January 3, 2025.

*A payload refers to a device or instrument onboard a spacecraft or rocket, which can vary depending on the spacecraft's mission. A payload on a rocket or spacecraft could include satellites, warheads, or humans. Other payloads include: cargo payloads that transport supplies and equipment for the international space station; observation payloads that include cameras, radar, and lidar; communication payloads that include radio antennas, modems, and transponders; and navigation payloads that are used to determine the position and orientation of a spacecraft such as star trackers. "What is…A Payload," *EVONA*; Glenn Research Center, "Payload Systems," NASA; Brandon Bailey, "Using SPARTA to Conduct Space Vehicle Cyber Assessments," *Aerospace Corporation*, 2024, 6, 7, 12, 14.

be made reusable in the future.[156] iSpace's chief designer estimated that in 2025, the firm's RLR could achieve technological parity with SpaceX's 2015 rocket technology.[157] General Saltzman highlighted China's investment in reusable launch as one of the inflection points in space access that may result in China overtaking U.S. leadership in launch.[158]

LEO Satellite Constellations

China's investment in LEO satellite constellations supports both military and geopolitical aims as Chinese companies attempt to catch up to and compete against U.S. constellations, in particular Starlink's.[159] China currently has about ten commercial companies working to build LEO communication satellites for two prominent state-owned mega constellations, Thousand Sails (Qianfan) and Guowang (China Satnet). Both currently trail Starlink, with 2,272 U.S. satellites launched in 2024 compared to China's 270.[160] However, Guowang aims to launch a total of 13,000 satellites, primarily for domestic telecommunications and potential military use.[161] Qianfan plans to launch 15,000 satellites focused on providing service to foreign telecom companies. Hongqing Technology has filed a plan with the ITU to launch a third mega constellation of 10,000 satellites, bringing China's total close to Starlink's planned constellation.[162] Finally, smaller entrants like Geespace (a satellite manufacturer funded by commercial firm Geely Automotive) and commercial space firm GalaxySpace are also planning satellite constellations of 6,000 and 1,000 satellites, respectively.[163]

The state-backed Guowang and Qianfan constellations programs will be the largest driver of demand for China's commercial space sector, including commercial manufacturing and development of satellite systems, subsystems, and components.[164] Since 2023, the Shanghai Engineering Center for Microsatellites (SECM) and its joint venture subsidiary Genesat have been the key entities building the Qianfan constellation.[165] China's SOE China Academy of Space Technology (CAST) will likely continue to be the prime manufacturer of the Guowang constellation, and Mr. Curcio expects all other LEO communications manufacturers will likely become system suppliers to SECM and CAST.[166]

Table 3: Chinese Companies Developing LEO Satellites Compared to StarLink

Organization	Commercial or SOE	LEO Satellite Constellation Plan	Satellites Launched
Shanghai Lanjian Hongqing Technology Company	Commercial	10,000	TBD
China Satellite Network Group Ltd. (Guowang/Xingwang)	SOE	13,000	110[167]
Shanghai Spacecom Satellite Technology (SSST/ Qianfan)	SOE	15,000[168]	90[169]
Geespace	Commercial	6,000	64[170]

Table 3: Chinese Companies Developing LEO Satellites Compared to StarLink—*Continued*

Organization	Commercial or SOE	LEO Satellite Constellation Plan	Satellites Launched
GalaxySpace	Commercial	1,000[171]	TBD
Starlink	Commercial	42,000[172]	9,868[173]

Source: Various.[174]

As China's satellite manufacturing and launch capabilities increase, Chinese LEO satellite offerings could inundate the global market and offer developing countries a cheaper alternative to Starlink.[175] The role of Chinese SOEs in the development of LEO constellations could also afford the Chinese government and the PLA the benefit of state control over how LEO satellites are accessed and operated.[176]

China's Advances in Satellite Communications and Remote Sensing

In parallel to its advances in launch and satellite manufacturing capacity, China has reached new milestones in demonstrating key enabling technologies for satellite communications and other space-based applications. In March 2025, China's Chang Guang Satellite Technology announced that its Jilin-1 satellite constellation achieved a record-setting 100 gigabit-per-second laser transmission to a mobile ground station (roughly equivalent to transmitting ten full-length high-definition feature films in one second).[177] Laser-based communications offer higher data transfer rates, less susceptibility to interference, and greater security than conventional radio signals,* though greater risk of atmospheric disruption (e.g., from rain or fog).[178] Chang Guang's demonstration of the laser communication to a mobile ground station has clear commercial and defense implications and suggests China may be ahead in providing satellite communications for contexts requiring secure highspeed links in remote or austere environments.[179]

Relatedly, in May 2025, *South China Morning Post* reported that SatNet, the SOE that manages the Guowang mega-constellation, completed the first 5G satellite-to-smartphone video call.† [180] The demonstration stands out both for the volume of data transmitted and the use of 5G standards rather than special equipment unique to a network. To date, "direct-to-device"

*Laser or optical communications transmit infrared light broadcast in narrow, precise beams to specific ground stations, and are capable of transmitting data in much higher volumes. DVD players use similar technology in a controlled space. By contrast, radio waves are broadcast to a much larger geographic area, increasing the likelihood communications are intercepted or run into interference from nearby satellites, terrestrial broadcasts in adjacent frequency bands, and intentional jamming. Starlink uses laser communications between satellites but radio communications for transmission to ground stations. Laura Heckmann, "Optical Comms Beaming Through Technological Barriers," *National Defense Magazine*, April 29, 2024.

†UK Telecom operator Vodafone UK and satellite provider AST SpaceMobile reported making the world's first video call to a standard smartphone via satellite in January 2025, using a special base station and satellite designed to connect to Vodafone's network. Luke Pearce and Ben Wood, "What Vodafone's Historic Satellite Video Call Means for Direct-to-Device Services," *CCS Insight*, February 6, 2025; Paul Sandle, "Vodafone Makes World's First Satellite Video Call Using Standard Smartphone," *Reuters*, January 29, 2025.

(D2D) communications—satellite-to-smartphone connectivity—has focused on transmitting text messages and voice calls, rather than video, with T-Mobile and Starlink partnering to soft launch satellite text messaging in January 2024 on select handsets.[181] Moreover, other satellite-to-terrestrial network communications, including Starlink's partnership and Vodafone and AST SpaceMobile's partnership, use custom technology rather than global 5G standards.[182] D2D connections via 5G protocols would effectively enable satellites to become an orbiting extension of terrestrial networks, delivering coverage to remote areas and potentially opening up competition for new markets with limited ground-based telecommunications infrastructure. China Telecom has already announced hopes to expand its D2D geosynchronous Tiantong satellite constellation from Hong Kong and the Mainland to Southeast Asia, South Asia, and Belt and Road participants in other regions.[183]

Chinese satellite constellations are also surpassing U.S. capabilities in orbital remote sensing, or collecting information from a distance using reflected or emitted radiation to provide imagery or other data. In an October 2024 ranking of global commercial space-based remote sensing systems, researchers from the Center for Strategic and International Studies, Taylor Geospatial Institute, Taylor Geospatial Engine, and the U.S. Geospatial Intelligence Foundation, found Chinese firms led in five of eleven areas, compared to just four for the United States (see Table 3).[184] The findings build on a U.S. National Geospatial-Intelligence Agency ranking in 2021 that found that U.S. and China tied, each leading a third of the market across nine areas.[185]

China's emerging dominance in remote sensing poses both national security and market risks. The U.S. Department of the Treasury sanctioned Chang Guang Satellite Technology in December 2023 for providing satellite imagery to the Wagner Group, the private military contractor supporting Russia's military in Ukraine.[186] In April 2025, the U.S. Department of State indicated Chang Guang supplied Houthi rebels with satellite imagery to target U.S. warships and international vessels in the Red Sea.[187] Aside from supporting attacks on U.S. assets and aiding Russia's invasion of Ukraine, Chang Guang is attempting to seize global market share for its services by undercutting competitors.[188] As in other industries, including potentially commercial satellite communications, below-market pricing threatens the viability of U.S. remote sensing startups.[189]

Table 4: Remote Sensing Categories and National Rank

Category		Description	China Rank (firm)	U.S. Rank (firm)
Electro-optical	Electro-optical (EO) imaging	A sensing technology that combines visual spectrum and thermal imaging, often used for surveillance and domain awareness	1 (China Siwei SuperView Neo-1)	3 (Maxar Worldview)
	EO revisit	How quickly a provider can revisit a target for imaging	1 (Chang Guang Jilin-1)	3 (Planet Sky SkySat)
	EO video	How high a resolution and the number of frames a provider can capture relative to time over a target	3 (Chang Guang Jilin-1)	1 (Planet Sky SkySat 16-21)
Synthetic aperture radar	Synthetic aperture radar (SAR) X-band	Especially high-resolution imagery, good for monitoring small changes on the ground	not in top 3	1 (Umbra SAR)
	SAR revisit	How quickly a provider can revisit a target for imaging with SAR X-band	not in top 3	2 (Umbra Constellation)
	SAR C-band	Wider than X-band, C-band imaging is good for monitoring broader areas	1 (SAST Gaofen -12)	not in top 3
Spectral	Multispectral capability	Imaging that collects data on specific wavelengths, often used in agriculture such as to detect pests	1 (China Siwei SuperView Neo-3)	3 (Planet SkySat 16-21)
	Hyperspectral capability	Imaging that collects high definition data on the electromagnetic spectrum, useful for identifying materials like ores and petroleum based on reflectance	3 (Zhuhai Orbita)	1 (Orbital Sidekick GHOSt)
Infrared	Short-wave infrared	Imaging at wavelengths beyond the visible spectrum, good for sensing through fog and smoke	3 (SAST Gaofen—5)	1 (Maxar WorldView—3)
	Mid-wave infrared	Imaging beyond the visible spectrum, good for tracking heat signatures (e.g., of jet engines).	2 (SAST Gaofen—5)	not in top 3
	Long-wave infrared	Imaging beyond the visible spectrum, good for detecting objects solely based on temperature	1 (CAST Ziyuan)	not in top 3

Source: Adapted from Kari Bingen, David Gauthier, and Madeleine Chang, "Gold Rush: The 2024 Commercial Remote Sensing Global Rankings," *Center for Strategic and International Studies*, October 2024, 5, 7.

China's Commercial Space Ambitions in the Middle East & North Africa

China's commercial space firms are increasingly turning to the Middle East as a growth market, with Abu Dhabi—and to a lesser extent Egypt and Saudi Arabia—at the center of these efforts. In early 2024, USpace, a Hong Kong-based firm with several satellites already on orbit, unveiled plans for the Abu Dhabi Space Eco-City, a massive project designed to serve as a global hub for aerospace innovation and trade.[190] The development will span three million square meters in the Khalifa Economic Zones, rolled out in two phases, and is intended to provide commercial aerospace services worldwide.[191] In parallel, USpace also signed 2024 agreements with Egypt to establish satellite factories, and it plans to sign similar agreements with Saudi Arabia, further extending China's presence in the region.[192]

Alongside USpace, the UAE's space initiatives have also drawn a host of Chinese commercial space firms. XSat, a satellite payload and communications systems manufacturer, was among the first partners to join.[193] It was followed by China Unicom Airnet, a subsidiary focused on satellite provided in-flight internet, InterstellOr, a Beijing-based commercial crewed spaceflight startup, and Fujian Jiwang Huimin Group, a diversified technology and industrial firm.[194]

For Chinese companies, the appeal is clear: exporting industrial capacity abroad while expanding their international footprint, often with state support and fewer restrictions on technology transfer than Western competitors. Middle Eastern governments, for their part, are eager to develop their domestic space industries and have welcomed Chinese firms as partners in building local capabilities.[195] With Chinese, Middle Eastern, and North African leaders championing expanded civil, commercial, and TT&C cooperation along the Space Silk Road, initiatives like the Abu Dhabi Eco-City and Egypt's recently completed satellite assembly, integration, and testing (AIT) Center are likely just the beginning of a wider Chinese commercial space presence across the Middle East and North Africa.[196]

China's Investments in Emerging Space Technologies

While commercial launch, mega-constellations, and the infrastructure they require as well as downstream applications they enable are the primary arenas of U.S.-China commercial space competition, China is also investing in several "over-the-horizon" space-based technologies. Though in nascent stages, success in these projects could give China a decisive advantage in elements of a space-based competition. Even failure or delay would provide China's research community and aerospace engineers with valuable insights, much as the United States' government-led space initiatives led to numerous consumer products. Some key technologies include:

- *Quantum communication satellites*: Quantum communication satellites use quantum networking to enable highly encrypted communications, which potentially offer faster and more secure

data transmission for finance, government, or military users.[197] China launched its first LEO satellite designed for quantum communication, the Micius, in 2016 and its second LEO satellite, the Jinan-1, in 2022.[198] China is planning to launch a third quantum communications satellite into LEO in 2025.[199] Eventually, China is also planning to experiment with building a quantum communications satellite network based on low-earth orbit quantum satellites.[200]

- *Space planes*: Space planes are aircraft designed to fly both within the atmosphere and outer space, unlike space shuttles that rely on propulsion from auxiliary rocketry to transcend the atmosphere. Like RLRs, space planes are reusable, but they can both take off and land on runways designed for airplanes.[201] This makes them ideal for commercial applications that require frequent deployment, such as staffing or resupplying space missions, as well as for military uses, including domain awareness and counterspace operations like disabling adversary satellites.[202] In 2024 China began testing a highly secretive orbital spacecraft believed to mimic the U.S. Space Force's X-37B military-use space plane.[203] Space planes are not suitable substitutes for RLRs due to their design limitations.[204]
- *Space-based computing and AI*: Higher volumes of space-based computing could sharply increase the demand for real-time data processing, particularly in dual-use applications like earth observation. In May 2025, China launched the first 12 satellites of its "three-body computing constellation," a space-based supercomputer comprising a planned constellation of 2,800 satellites.[205] Slated for completion in 2030, the full constellation aims to reach 1,000 peta operations per second—putting it on track to rival the world's most powerful supercomputers.[206] While space-based computing can reduce energy costs due to uninterrupted access to solar power and lower cooling requirements than terrestrial data centers, the harsh environment of space requires especially durable materials, likely raising construction costs and limiting the performance of space-based data centers. Current radiation-hardened processors are generations behind the performance of leading-edge off-the-shelf chips.[207]
- *Space solar power satellites*: Leading scientific organizations in China have called for space solar power satellites (SSPS) as a potential breakthrough in clean energy and a new frontier in space-based competition.[208] SSPS involves orbiting satellites equipped with solar arrays that collect solar energy and wirelessly beam it—typically as microwaves or lasers—to receiving stations on Earth, where it is converted into electricity.[209] Unlike terrestrial solar power, SSPS has been dubbed the "Manhattan Project" for the energy industry, given its revolutionary potential to provide continuous, weather-independent energy and deliver reliable, high-volume power to areas with limited infrastructure.[210] In 2023, Xidian University announced it had begun testing "Chasing Sun," the world's first complete ground verification system to receive transmissions from SSPS.[211] Alongside these present-day efforts, the Chinese Academy of

Engineering (CAE) revealed that a major SSPS project, known colloquially as "Three Gorges Dam in Space," is currently in the planning stages, with a vision of collecting in one year the energy equivalent of "the total amount of oil that can be extracted from the Earth."*[212] As with other emerging space technologies, SSSP has distinct dual-use potential: satellites capable of delivering concentrated energy could be adapted for military use, with CAS scientists stating that space-based energy grids could be used to power "airships, drone fleets, [and] mobile maritime platforms."†[213]

- *Nuclear thermal propulsion*: China is investing in nuclear-powered space propulsion technologies that, if realized, could drastically reduce the time required for deep space missions and unlock a new era of strategic space mobility.[214] In early 2024, Chinese researchers revealed a compact, lithium-cooled fission reactor capable of delivering 1.5 megawatts of power—a reactor that fits in a container-sized package on Earth but expands in orbit to the size of a 20-story building.[215] Ground tests have validated key components, including advanced lithium cooling systems and power conversion cycles, and officials claim the system could reduce a round-trip Mars mission to just three months.[216] While the technology remains in the prototype stage and no nuclear-powered craft has been launched to date, Beijing is reportedly developing launch safety protocols and autonomous AI controls to enable long-duration missions.[217] These efforts, though early, signal China's ambitions to field nuclear thermal propulsion capabilities that could outpace the United States and establish a new technological beachhead in deep space.[218] China's progress suggests it is preparing not just to reach farther but to get there faster—and potentially first.‡

China's Civil Space Program Seeks to Outpace NASA, Become World Leader

China Has Achieved Significant Civil Space Milestones and Has Ambitions to Become the Global Leader

China's civil space ambitions go beyond science and technology and are a means to gain long-term strategic advantage. In addition to accumulating an impressive list of achievements, China has ar-

*For an SSPS of this scale to be possible, experts acknowledge that China will need to massively improve the load-carrying capabilities of the country's reusable launch rocket fleet, as well as overcome technical challenges such as space-based robotics and improved microwave transmission and reception. Henri Bardi, "A Skeptic's Take on Beaming Power to Earth from Space," *IEEE Spectrum*, May 9, 2024; Zhang Tong, "China Plans to Build 'Three Gorges Dam in Space' to Harness Solar Power," *South China Morning Post*, January 9, 2025.

†However, experts have flagged the cost of SSPS as another potential obstacle to its viability. These include cost effectiveness relative to Earth-based energy sources, significant upfront capital investment relative to speculative completion, and revenue generation. Henri Bardi, "A Skeptic's Take on Beaming Power to Earth from Space," *IEEE Spectrum*, May 9, 2024.

‡Nuclear and systems engineers note there are numerous challenges to developing nuclear thermal propulsion, including developing cooling systems and heat-resistant materials, building lightweight and compact reactor systems, and designing systems that can simultaneously release propellant at a controlled rate while containing fuel. Additionally, there are significant public safety considerations in launching nuclear reactors into space. Michael G. Houts, L. Dale Thomas, and Bahram Nasser-sharif, "Centrifugal Nuclear Thermal Rocket Challenges and Potential," 45th Annual American Astronautical Society, Guidance, Navigation and Control Conference, January 12, 2023; Sinead Harvey, "Ensuring Safety on Earth from Nuclear Sources in Space," *International Atomic Energy Agency*, October 28, 2020.

ticulated ambitious plans to establish itself as the global leader in space technology and exploration, sought to reshape rules regarding international space governance, and aimed to position itself as a strategic rival to the United States.[219] China has made it clear it does not seek to merely repeat U.S. efforts, but to achieve "global firsts," such as its June 2024 Chang'e-6 mission that returned the first-ever lunar samples from the Moon's far side.[220] These accomplishments serve not only scientific and technological goals, but also political and diplomatic ones, bolstering national pride and supporting China's narrative of global leadership.

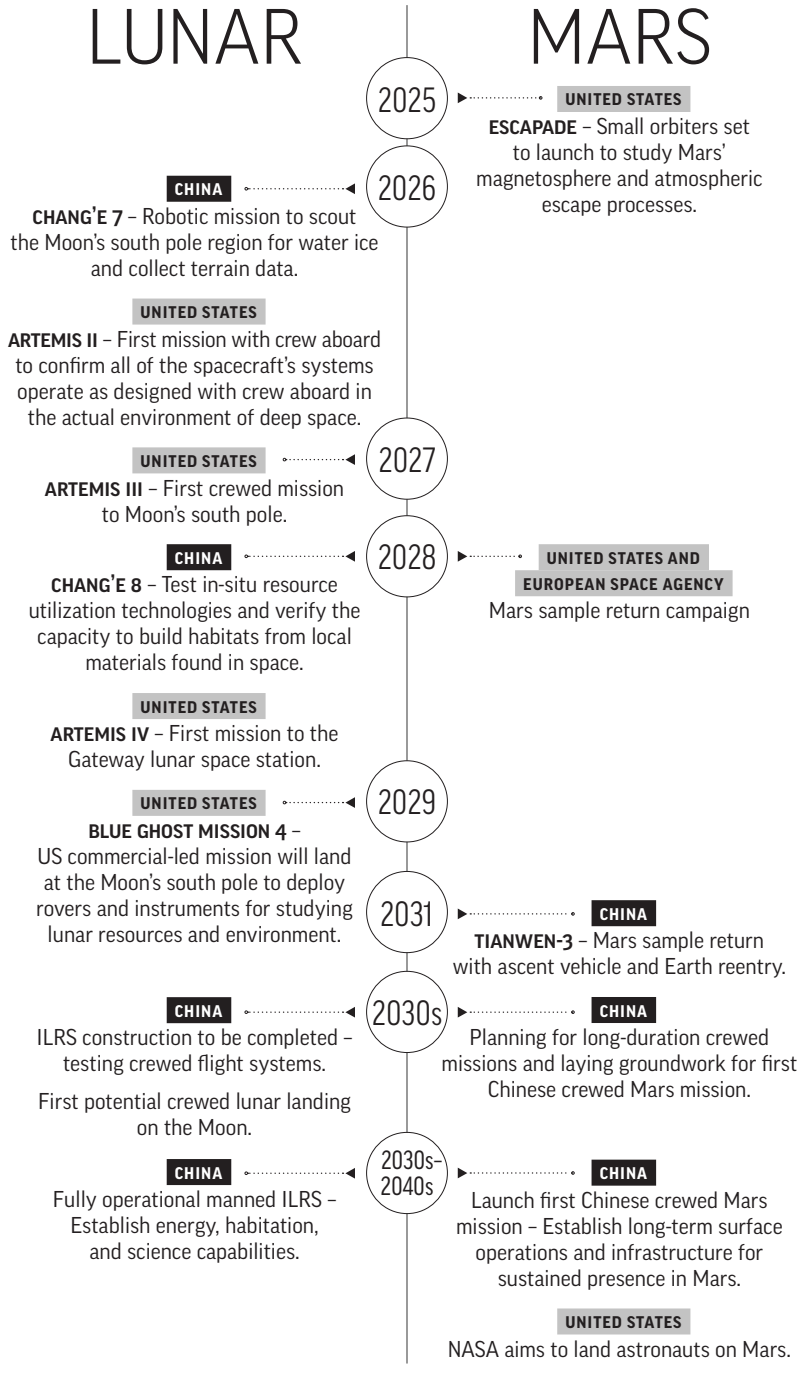
China Seeks to Shape Outcomes in International Space Governance Bodies and Influence Technical Standards

China has actively sought to shape the rules and norms governing outer space to align with its own strategic interests, while undermining existing standards and U.S. leadership. Existing rules and norms support transparent practices and multilateral cooperation, while China has promoted bilateral arrangements and frameworks that emphasize sovereign rights gained through exploration. For example, this includes claiming rights to extract lunar minerals, which challenges the norm of space being a global commons. By pursuing high-profile "firsts" and leading initiatives like the International Lunar Research Station (ILRS), China has sought to boost its global influence and attract partners to support its preferred model of space governance. If China is able to reshape the norms and rules of outer space, future missions to the Moon and Mars could give China early access to strategic resources, support the development of onsite infrastructure, and allow it to set technical standards that influence how other nations operate in space.[221] Increasingly, China's civil space program is a tool of global competition not just over capabilities but also over who sets the rules on the Moon and beyond.

China Overwhelms, Obstructs the ITU to Advance its Preferred Standards

China has adopted a strategy to both inundate and obstruct deliberations within the International Telecommunication Union (ITU) in an effort to shape the foundational architecture of global communications, including the management of satellite constellations and the adoption of global technology standards.[222] The ITU is a specialized agency of the UN responsible for coordinating global telecommunication networks, setting standards, creating regulatory frameworks, and allocating resources, including those used in space.[223] If China can exert influence over the global spectrum and orbital slot allocations—which are coordinated primarily through the ITU—it could restrict other countries' and companies' ability to launch or expand satellite constellations.[224] China has inundated these groups with proposals and technical specifications on critical issues such as satellite positioning, spectrum allocation, space-based internet, AI, and next-generation communications infrastructure.[225] Beijing has reportedly instructed its delegations to block consensus in negotiations, applying pressure until its preferred standards are adopted.[226]

Figure 5: Timeline of U.S. and China's Civil Space Goals



Source: Various.[227]

China Overwhelms, Obstructs the ITU to Advance its Preferred Standards—*Continued*

Beijing's assertive role in the ITU is part of its broader China Standards 2035 plan, which aims to set global benchmarks in high-tech sectors, including those central to its space power.[228] By seeking to institutionalize Chinese-led standards in multilateral bodies like the ITU, China hopes to boost its technological market share, secure long-term commercial advantages, and marginalize foreign competitors.[229] If Chinese standards become dominant, others may be forced to redesign products or adopt technical baselines that reduce interoperability and increase costs, which would have significant implications for U.S. companies and those of its allies.

Beijing has also leveraged international bodies not only to legitimize its space activities and advance rules favorable to its interests, but also to challenge U.S.-led initiatives, most notably the Artemis Accords and the Artemis Program. The Artemis Accords, established by the United States through bilateral diplomacy beginning in 2019 and formally announced in 2020, set forth voluntary principles to guide the peaceful exploration and use of outer space.[230] The Accords include provisions promoting transparency, interoperability, emergency assistance, space object registration, scientific data sharing, preservation of space heritage, space resource extraction, deconfliction of activities, and orbital debris mitigation.[231] Rooted in the 1967 Outer Space Treaty, the Accords have been signed by over 50 partner nations that support these principles.[232]

Key Principles of the 1967 Outer Space Treaty

The 1967 Outer Space Treaty, formally known as the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, is the foundational framework of international space law.[233] Initially signed by the United States, the Soviet Union, and the United Kingdom and now ratified by over 110 countries, the treaty establishes key principles for the peaceful use of outer space. Some of these principles include:[234]

- States shall not place nuclear weapons or other weapons of mass destruction in orbit or on celestial bodies or station them in outer space in any other manner;
- The Moon and other celestial bodies shall be used exclusively for peaceful purposes;
- States shall be liable for damage caused by their space objects; and
- States shall avoid harmful contamination of space and celestial bodies.

While many of the norms promoted by the Accords, such as debris mitigation and spacecraft disposal, are consistent with standards China has also endorsed, Beijing views the initiative as a geopolitical tool intended to constrain its space ambitions. Instead, China, alongside Russia, is leading its own multilateral initiative, the ILRS. The initiative is framed as an inclusive alternative to the Artemis Program, the U.S.-led initiative to return humans to the Moon and eventually to Mars. The ILRS offers technical cooperation and lunar mission opportunities, particularly for developing countries. China has announced goals to build an operational ILRS on the south pole of the Moon by 2035. As of 2025, 17 countries and international organizations have joined the ILRS along with a dozen subnational entities and firms that have signed ILRS cooperation agreements with China.*[235] Wu Weiren, chief designer of China's lunar exploration program, announced plans to attract 50 countries, 500 foreign research institutions, and 5,000 researchers to participate.[236] If realized, this would enable China to build a coalition of countries that may eventually back its preferred norms on space resource utilization, sovereignty-related claims, and standards of behavior on the Moon and beyond. Over time, such support could erode the universality of U.S.-led frameworks and lead to competing legal and operational regimes in outer space, complicating international coordination and undermining efforts to promote transparency, interoperability, and peaceful cooperation in the lunar exploration domain.

Implications for the United States

Losing U.S. leadership in space would amount to relinquishing the advantage first secured during the original space race—when space became essential to military superiority, global prestige, and geopolitical influence. Today's contest with China is about who controls the critical infrastructure and rulemaking mechanisms that will define the future of the space domain. If the United States retreats, China is prepared to fill the void with a model of space governance that serves its interests—state-directed, opaque, and designed to embed long-term global dependencies on Chinese systems.

China's rapid expansion of space capabilities across the military, commercial, and civil/diplomatic realms—and intent to displace the United States as the world's premier space power—should concern all Americans. The challenges the United States faces in space are not only in the military sector. China's space capabilities allow it to threaten vital services enabled by satellites that affect the health and welfare of everyday U.S. citizens. China's attempts to reset international norms and standards in its favor could also undermine key sectors of our economy. **U.S. policymakers must act urgently to ensure that the United States wins this new space race and retains the strategic high ground that has long underpinned our military and economic leadership.**

Even as the U.S. military increasingly relies on space-enabled assets to fight and win modern wars, many of those assets are vulnerable to China's sophisticated offensive space capabilities**. Although**

*The 13 countries that have joined the ILRS include Belarus, Pakistan, Azerbaijan, Venezuela, Thailand, Serbia, Nicaragua, Senegal, Djibouti, Bolivia, Egypt, Ethiopia, and South Africa.

the U.S. Space Force was established at the end of 2019 with the mission of ensuring continued U.S. space superiority, longstanding policy constraints have placed effective limits on its ability to achieve its critical mission. These constraints include limits on developing and using offensive counterspace capabilities like ASAT weapons, electronic jamming, and cyber operations as well as limited resources to update legacy systems or build new capabilities.

The practical limits on the U.S. Space Force are in stark contrast to China's commitment. In his testimony to the Commission, General Salzman clearly laid out the broad military implications of China's advances in space, warning that without space superiority, other domains of warfare become untenable. **"Taken as a whole, China's potent and expanding arsenal of space-based capabilities multiplies its combat potential many times over... China can hold U.S. and allied forces at risk with long-range precision weapons, preventing our forces from taking meaningful action before they even reach theater. The consequence of failing to mitigate this threat means military objectives will be tough to meet without unacceptable loss of American lives."**[237]

China has sought to leverage its notable civil space achievements to gain a normative and technological edge to shape the future of global norms and standards in space exploration in its favor. If China succeeds in establishing a sustained presence on the Moon or takes the lead in developing lunar infrastructure, it could set precedents in areas such as resource utilization, territorial access, and the management of satellites, communications networks, lunar bases, or other orbital and lunar assets. Over time, China's approach could erode the universality of U.S.-led frameworks and lead to competing legal and operational regimes in outer space, complicating international coordination, and undermining efforts to promote transparency, interoperability, and peaceful cooperation in the lunar exploration domain. **The United States must confront the reality that civil space exploration is increasingly part of the broader U.S.-China strategic competition and that China's achievements could reshape global norms, shift technological power centers, and determine who sets the rules for the next era of human space activity.** This web of influence not only gives Beijing a broader diplomatic coalition—it provides physical access, data advantages, and potential staging points for strategic operations in future conflicts.

China's expanding use of space technologies and applications to leverage partnerships with low- and middle-income countries not only has led to more resiliency and redundancy in its space architecture, but also has advanced its broader geostrategic interests. China has developed a network of ground stations around the world and has increasingly used a variety of government tools to tighten relations with those governments, pulling them further into China's orbit. **By offering favorable launch terms and free access to the BeiDou satellite navigation network and embedding technologies from firms such as Huawei into critical infrastructure, China has sought to bind these nations into its technological**

ecosystem, creating long-term economic and strategic dependencies in its favor. In the long run, there may be significant commercial implications to China's approach—China may use these relationships to lock in a greater share for its providers in launch and satellite markets, reducing market share for U.S. commercial space companies.

China's rapid progress in establishing a private—though state-guided—commercial space ecosystem in just a decade demonstrates the significant technological, market, and geostrategic challenge China's commercial space sector poses to the United States. Building on its extensive industrial policy experience, vast operations of its state-owned aerospace conglomerates, and affiliated research network, China has fostered a broader range and larger number of commercial space firms to compete with the United States' leading, but highly concentrated sector. The next five years could determine a generation of market dynamics in reusable launch and proliferated LEO satellite constellations—where China's ambitious plans could lead to a scarcity of orbits, limiting future competitors. Winners of this commercial competition will gain geopolitical influence and military advantage. **Though U.S. companies currently enjoy an early lead, China's proven playbook of extensive government support, development of excess capacity, leveraging of adjacent manufacturing capabilities, and use of other government programs to advance its commercial interests (in this case, its civil space program), could position it to close the gap and potentially surge ahead if the United States takes a misstep—a higher threat with a limited roster of U.S. firms.**

Without urgent efforts to develop innovative technologies, modernize the U.S. space infrastructure, acquire robust counterspace capabilities, and strengthen international partnerships, the United States risks ceding its leadership in the space race to China. Winning this race is not only about securing dominance in orbit—it is about protecting critical infrastructure, maintaining operational resilience, safeguarding democratic values in space governance, and ensuring that U.S. standards guide the development of rules and norms in space. Otherwise, China will use space to advance its own strategic interests to the disadvantage of the United States.

Recommendations

The Commission recommends:

- To preserve and strengthen U.S. primacy in the critical space domain as China pursues sweeping advancements across military, commercial, and civil space sectors, Congress should:
  - Increase or reallocate appropriations for the U.S. Space Force to levels necessary to achieve space control and establish space superiority against China's rapidly expanding space and counterspace capabilities.
  - Direct the U.S. Department of Defense to enhance the U.S. Space Force's capacity to conduct space wargaming and develop realistic modeling and simulation of potential threats from China, including training programs for space operators

on warfighting tactics, techniques, and procedures necessary for space control.

- Conduct oversight hearings and other activities to ensure the United States maintains primacy in the space domain by identifying investments in cutting-edge space technologies and assessing China's space capabilities and threats to U.S. space industrial base capacity.
- Direct the U.S. Department of Commerce, in coordination with the U.S. Departments of Defense, State, and the Treasury, to produce an unclassified report to Congress within 180 days identifying China's commercial space capabilities, the dual-use nature of Chinese space technologies, and China's commercial space industry's support to the People's Liberation Army.
- Direct the U.S. National Space Council to increase international outreach on space launch services and ensure the United States remains the partner of choice for both government and commercial space launch.
- Express support for the strategic importance of U.S. leadership in civil space exploration and direct relevant agencies to assess the progress of the Artemis Accords, evaluate risks China poses to U.S. civil space priorities, including National Aeronautics and Space Administration (NASA) programs, and ensure program delays do not undermine U.S. credibility in establishing global norms for lunar and Martian exploration.

Appendix: Evolution of the Commercial Space Economy

Several concurrent and mutually reinforcing advances are leading to rapid development of the commercial space sector, driven by increased demand for satellite internet, remote sensing, and other space-based commercial services.

Advances in launch and satellite manufacturing

Space used to be the provenance of governments and a limited number of large companies because of the immense costs associated with developing, launching, and operating space assets. Space launch and related infrastructure required hundreds of millions, if not billions, of dollars in investment. At the same time, satellite launches demanded heavier, more expensive rocketry because satellites were larger and were headed to very high geo-stationary orbits (GEO, roughly 22,000 miles above the Earth).[238] Much of the technology needed was complex and had limited commercial application outside of the space sector.

Within the last decade, parallel cost reductions and efficiency gains from reusable launch rockets (RLRs) and satellites have accelerated the commercial space market. Even before the advent of RLRs, economies of scale from higher launch cadences and reduced launch costs from smaller satellites that orbit closer to Earth's surface have made it quicker and cheaper to send satellites into space. RLRs reuse their first-stage booster, payload fairings, or other critical launch components that can account for as much as 70 percent of the rocket's total cost.[239] At the same time, satellite design has improved and manufacturing costs have dropped significantly due to the advent of "SmallSats" and even miniaturized "CubeSats," advances in technology, improvements in production processes like 3D printing, and developments in durable, lightweight materials.[240]

Advances in satellite constellations, ground stations, and laser communications

The cost reductions from RLRs and cheaper, miniaturized satellites are critical to the economic viability of low Earth orbit (LEO) mega-constellations—groups of hundreds to tens of thousands of satellites in LEO.[241] Because data transmissions from satellites in LEO reach Earth more quickly, they enable applications requiring low latency like satellite internet, offering solutions where ground-based infrastructure is not viable, such as on airplanes or ships, or in remote areas where building terrestrial networks is costly.[242]

However, unlike GEO satellites that remain in a fixed position relative to the Earth, LEO satellites close to the Earth's surface move quickly, providing coverage in a given area for only a short time. Ensuring continuous coverage for terrestrial users requires networks of hundreds or thousands of satellites, so the same location on earth's surface remains continuously serviced (i.e., a proliferated constellation). Moreover, the satellites must communicate with each other to handoff data transfers as different satellites orbit out of range and new ones replace them. The complexity of coordinating these constant transitions requires a wide network of

ground telemetry, tracking, and control (TT&C) stations capable of tracking satellites in real time.[243] The bandwidth for transmissions has also improved dramatically with intersatellite laser links that transmit higher volumes of data via lasers rather than traditional radio waves.[244]

Competition for limited "orbital real estate" and third country ground stations

Aside from competition for the underlying technologies, the future space economy is fueling a competition for satellite network positions in low-earth orbit and supportive ground infrastructure. The governing body for international satellites is the UN's International Telecommunication Union (ITU), which has a system for allocating satellite spectrum—the radio frequencies satellites use to transmit data back to Earth—and orbital slots on a first come, first served basis (for more on China's role in the ITU, see "China Overwhelms, Obstructs the ITU to Advance its Preferred Standards" textbox in the main chapter).[245] Before launching satellites, companies must file with the ITU to secure spectrum rights for ground-space communication. ITU rules give firms seven years to launch their first satellite and another seven to show steady deployment, or they risk losing their allocations.[246] Thus, companies are incentivized to stay on schedule, rapidly and repeatedly launching LEOs, or risk losing their claims.[247] With an estimated 70,000 LEO satellites expected to launch by 2029, commercial space firms are in a race against time to secure the best spectrum for their LEO satellites—Starlink alone hopes to launch 42,000 satellites by 2029 (as of September 25, 2025, it had 8,460 working satellites in orbit.[248]

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PART IV

EXPOSURE TO CHINA'S ECONOMIC DISTORTIONS AND COERCION

CHAPTER 8: CHINA SHOCK 2.0

Executive Summary

China's economic model continues to generate a major imbalance between weak domestic demand and excess supply of manufactured goods. China uses its excess capacity to manufacture goods like steel and automobiles at a scale it cannot consume on its own, leading to extreme price wars between producers. Rather than attempt to rebalance its economy, China is exporting its economic distortions in the form of low-priced goods, thereby threatening the world with a second "Shock." This China Shock 2.0 is already upending manufacturing sectors in both developing and developed countries, up and down the value chain, as China's flood of exports is no longer limited to low-value-added goods like furniture and clothing. While these industries are more at risk than before, China has also begun to produce higher-value-added goods at scale, the result of years of technology theft, government subsidies, and aggressive industrial policies.

The glut of Chinese exports is deepening global market dependence on China and exacerbating supply chain vulnerabilities. Regions like Southeast Asia that once benefited from global trade integration are now at risk of deindustrialization as their exports are undercut by Chinese goods. Germany, South Korea, and Japan are also at risk as their basket of exports increasingly resembles China's. Beyond merely carving out a larger share of global profits for Chinese corporations, China's market dominance is translating into control over chokepoints in key global supply chains for goods like pharmaceuticals and electronics. China's investment in manufacturing facilities abroad undercuts efforts by the United States and its allies and partners to diversify production to other emerging markets.

Responses to this new Shock have been fragmented, relying on outdated tools that no longer match the reality of today's global trading system. Additionally, incentives to push back on these export practices are not always aligned with the desire to continue selling commodities to China or benefiting from Chinese outbound foreign direct investment (FDI). At risk are not just today's factories and jobs in manufacturing: as China floods global markets with its goods, it will gain a more dominant share of key

markets, gutting foreign competitors and propelling them into a downward spiral of deindustrialization (the focus of this chapter). This in turn will lead to greater control over critical supply chain chokepoints (the focus of the next chapter). Beijing has already shown its willingness to weaponize its control of the critical minerals sector; a new China Shock will further strengthen China's leverage over supply chains and ability to employ economic coercion to advance its interests.

Key Findings

- The world is facing the threat of a China Shock 2.0, whereby overproduction in key industries across China's highly subsidized manufacturing sector floods outward, causing major harm to industries in other countries. China Shock 2.0 is a manifestation of General Secretary of the Chinese Communist Party (CCP) Xi Jinping's economic plan—massive state subsidies and other distortions to boost production, reliance on foreign markets to absorb the excess supply, and minimal attention to addressing continued, structurally weak domestic demand.
- China's export of excess production is undercutting global competitors and winning market share across the value chain, from commodities to intermediate inputs to finished goods. China's economic model increasingly limits other emerging market countries to the lowest-value-added stages of manufacturing.
- Emerging markets have traditionally been welcoming to Chinese FDI in manufacturing, viewing it as an opportunity to facilitate labor upskilling and the development of local industry. However, Chinese FDI poses potential problems for host countries as well. Chinese officials are increasingly reluctant to allow domestic firms to transfer technology abroad, lessening benefits to host countries. In addition, Chinese FDI may deepen reliance on Chinese inputs and open the host country to concerns that it serves as a base for Chinese transshipment or tariff evasion.
- In emerging markets, China's surging exports have already led to job losses and factory closures. Emerging market countries have begun to wake up to the threat, employing various tools to push back against China's unfair trade practices and preserve local industry and jobs, with varying degrees of success. International trade agreements have proven less durable protection; in many cases they merely constrain the policy responses of China's trading partners, facilitating the harms from China Shock 2.0, even though China's economic model is inconsistent with the foundational assumptions of those trade agreements.
- China's surging exports of higher-end goods are taking market share from producers in other countries, particularly those in developed countries, including the United States.

> While emerging markets are imperiled by other aspects of China Shock 2.0, they have little incentive to implement barriers to Chinese exports in those industries that do not compete with local manufacturing. Over time, the long-term harm to U.S. and other non-Chinese producers may be significant. Revenue from foreign markets has helped sustain U.S. economic strength and technological leadership by providing opportunities to scale. Losing this revenue will make it harder to invest in next generation technology.

Introduction

A foundational precept of globalized fair trade is exchange of goods based on a country's comparative advantages. China has turned this concept on its head by trying to produce and export everything from low- to high-end goods, using government support, subsidies, and numerous other nonmarket distortions to undercut global competitors that might otherwise hold the advantage. The first China Shock, after China's entry into the WTO, resulted in major job losses for U.S. manufacturing industries over the following decade, and labor markets in many communities in the United States still have not recovered. The world is now experiencing a second China Shock, as China's massive state support for industry leads to overproduction that is then exported throughout the world at unprecedented scale. The United States is less directly threatened by China's exports this time, partially from years of de-risking efforts and the implementation of protective tariffs in strategic industries but also because the U.S. manufacturing sector has been shrinking for decades. However, many other countries are facing job losses and bankruptcies from this new wave of exports. Over time, China's growing dominance in key sectors may exacerbate deindustrialization in emerging markets, enabling China to dominate global supply chains and eroding the long-term international competitiveness of non-Chinese companies. By undercutting alternative producers, China Shock 2.0 may increase the dependence of other countries, creating more opportunities for Chinese economic coercion against allies and partners in the future.*

China Shock 2.0: Impacts and Origins

The China Shock that occurred around the turn of the 21st century was ignited by a unique set of events: China's integration into the global trading system, including the normalization of trade relations with China and its entry into the WTO. In the aftermath, as explored by researchers David Autor, David Dorn, and Gordon Hanson in a series of papers beginning in 2013, the flood of exports from China in goods like toys and furniture contributed to manufacturing job losses in specific geographic labor markets in the United States. The Shock also affected a specific cross-section of society, primarily individuals without college degrees working in manufacturing. While

*This chapter draws on the Commission's June 2025 hearing on "Dominance by Design: China Shock 2.0 and the Supply Chain Chokepoints Eroding U.S. Security," consultations with experts, and open source research and analysis.

macroeconomists continue to debate the overall impact of Chinese exports on certain aspects of U.S. manufacturing, average incomes, and the U.S. economy as a whole, the China Shock data indicate how certain regions and industrial sectors could be vulnerable to sudden disruptions.[1] U.S. manufacturing job losses decelerated after 2007, but contrary to the predictions of most trade theorists, a decade after the beginning of the Shock, many affected individuals in these labor markets were either still unemployed or underemployed, and these areas showed both large reductions in average wages and substantial increases in government transfer payments to citizens.[2]

By 2008, the initial Shock had largely run its course, as China's share of total global exports leveled off and the composition of its exports stabilized.[3] China's trade surplus as a share of gross domestic product (GDP) peaked in 2007 at 8.5 percent and then declined to a low of 0.6 percent in 2018 before rising again in more recent years.[4] While most affected areas in the United States never fully recovered, the impacts more broadly appeared to be contained. Prevailing economic theory anticipated that the benefits would exceed the drawbacks based on arguments that China's growth helped expand its middle class consumers and lift other emerging markets through their participation in global value chains while also expanding purchasing power in developed markets by lowering prices for consumer goods. Many economists are now reevaluating the costs and benefits of free trade and globalization in the face of long-term evidence of harms associated with how these principles have played out in the real world.[5]

Now, the world is in the midst of a second China Shock. This time, the cause is an acute and accelerating supply-demand mismatch in China's domestic economy, reflected by an economic strategy that has failed to deal effectively with structurally weak domestic demand and instead prioritized growth driven by ever-rising production. Foreign countries are left to absorb the excess supply as Chinese firms seek out less saturated markets. Because China's economy and export sectors are now so large and dominant in so many critical supply chains, China Shock 2.0 is set to have a major impact on a wide range of developed and developing economies alike.

China Shock 2.0 Is a Culmination of China's Massive Market Distortions, Failure to Rebalance Its Economy, and Effort to Have Global Markets Absorb Its Excesses

China's Push to Control Production Leads to Overcapacity and Oversupply in Manufacturing

At its core, China Shock 2.0 is driven by China's massive market distortions in favor of manufacturing and exports, an effort to both drive growth domestically as well as secure greater control over global production. Over the last decade, China's industrial policies have aimed to move China up the value chain, reduce reliance on foreign technology, and seize leadership in emerging sectors. These policies include the ten-year "Made in China 2025" plan to upgrade Chinese manufacturing, produce more of the world's high-technology goods, and reduce reliance on imports.[6] The plan has helped China accelerate its share of manufacturing value–added at the expense of the rest of the world.[7] (For more on China's industrial policies, see

Chapter 6, "Interlocking Innovation Flywheels: China's Manufacturing and Innovation Engine.") China's focus is not just on advanced manufacturing, however, as Beijing aims to dominate global production for both traditional industries and cutting-edge goods.[8] While Made in China 2025 has received the most global attention, China has introduced thousands of industrial policies over the years, many overlapping, most at the provincial or city level.[9] These local policies often target the same industries, leading to tremendous redundancy and significant overcapacity as localities vie to become the nation's leader in producing goods targeted by the central government.[10] In recent years, Chinese officials have built on the foundation of Made in China 2025 and begun emphasizing a concept called "New Quality Productive Forces," introduced by Xi Jinping in September 2023. The goals of New Quality Productive Forces are similar to Made in China 2025 but applied across more of China's industrial base—to "foster and build up advanced manufacturing clusters" and "promote integrated and clustered development of strategic emerging industries" in a push to advance China's move into higher-value-added products.*[11]

Collectively, China's various industrial policy programs are significantly larger, more sustained, and more distortive than other countries. A Kiel Institute study found that China's various subsidies for its domestic industries are three to nine times greater than Organisation for Economic Co-operation and Development (OECD) countries' subsidies; a Rhodium Group study found firm-level impacts from China's industrial policies to be more than six times greater than the OECD average.[12] China's distortive industrial policies in pursuit of manufacturing dominance have led to widespread, structural excess capacity. Overcapacity occurs when an industry's production capacity—the supply its factories are capable of producing—exceeds what customers are willing to buy at profitable prices. There is no singular measure of overcapacity, but the phenomenon is evident when firms or whole industries over sustained periods of time experience low capacity utilization rates, near-zero or negative profits, high inventories from unsold goods, or some combination of these indicators.[13] Overcapacity is not a China-only phenomenon; it can occur in the United States and other market economies as an organic part of the business cycle, typically leading to downsizing, firm exits, and bankruptcies, which help reduce production capacity to meet demand.[14] Yet, because of these adjustments in market economies, overcapacity generally does not lead to oversupply (excess production) over extended periods.† In China, however, rampant and persistent overcapacity is a structural outcome of its

*The official list of "future industries" published by China's Ministry of Industry and Information Technology in January 2024 spans several broad fields such as manufacturing, information, materials, energy, space, and health but also mentions specific items such as humanoid robots, nanomanufacturing, quantum computing, nuclear fusion, hydrogen energy, exploration of the Moon and Mars, deep-sea mining, and genetic technologies.

China's Ministry of Industry and Information Technology, *MIIT and Seven Other Departments' Opinions on the Implementation of Promoting Innovation and the Development of Future Industries* (工业和信息化部等七部门关于推动未来产业创新发展的实施意见), January 29, 2024.

†Overcapacity relates to the total capacity a firm or industry is capable of producing; oversupply relates to the actual levels of production. Overcapacity does not necessarily lead to oversupply if firms with excess capacity are not actually using it to produce goods—e.g., they are in the process of downsizing or do not produce goods at a loss.

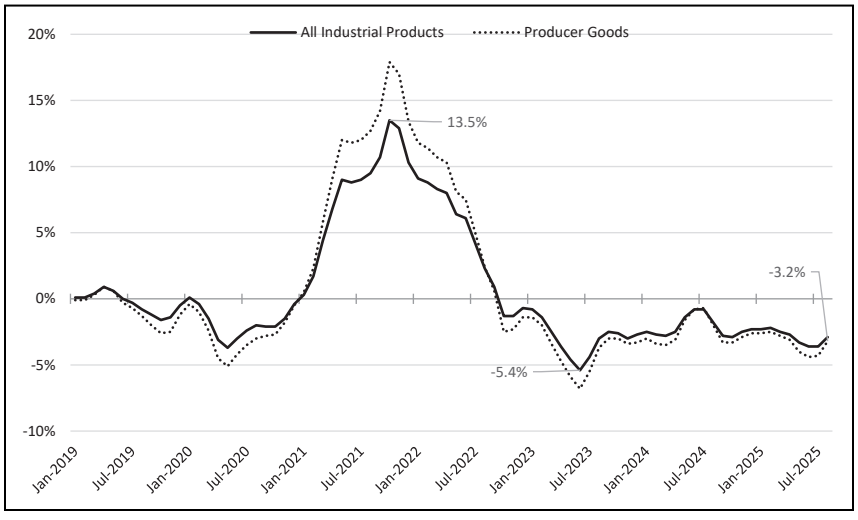
system, as CCP policies typically prevent markets from forcing loss-making firms to reduce underutilized capacity or reallocate resources to more productive endeavors, and even encourage additional entrants to already saturated industries.[15] Those same structural factors mean overcapacity in China routinely leads to oversupply.

For years, China's production capacity expansion in various manufacturing sectors has outpaced projected demand growth, in spite of clear "warning signs" of existing overcapacity—such as high rates of loss-making firms and declining capacity utilization rates—as highlighted by then-Undersecretary of the U.S. Department of the Treasury for International Affairs Jay Shambaugh in 2024.[16] An Economist Intelligence Unit report found that Chinese sectors experiencing the highest levels of overcapacity in 2024 included cement, food and beverage, automotive, steel, and construction machinery.[17] In 2024, China had the capacity to manufacture twice as many internal combustion engine cars as its domestic demand.[18] A similar phenomenon has led to massive excess production in China of steel, low-end semiconductor components, solar panels and inputs, and electric vehicles (EVs).[19] (For more on China's overcapacity in new energy industries, including batteries, EVs, and solar panels, see Chapter 10, "Power Surge: China's Electrification Drive and Push for Global Energy Dominance.")

The overcapacity problem in Beijing's favored industries, including electrical equipment and "new energy" automobiles, has accelerated since the COVID-19 pandemic.[20] At the same time, excess capacity has grown in traditional industries like steel, chemicals, and cement.[21] According to official statistics, capacity utilization rates in China's manufacturing industries have fallen even as production has expanded. All but two of China's 13 manufacturing sectors—ferrous metals and chemical fibers—experienced declining capacity utilization from 2019 through the latest data.[22] Moreover, Chinese data likely overstate capacity utilization, as the National Bureau of Statistics reports figures for enterprises with at least 20 million renminbi (RMB) in operating revenue (called "enterprises above a certain scale"), potentially excluding firms with low revenue resulting from idle capacity.[23] Official data claimed that capacity utilization in Chinese automaking decreased from 78.5 percent to 77.2 percent between Q4 2019 and Q4 2024.[24] Unit data compiled by Shanghai-based Gasgoo Automotive Research Institute show Chinese carmakers' utilization rates at only 46.4 percent in 2019, increasing slightly to 49.5 percent in 2024.[25] Many of these industries have continued to report climbing inventory levels since 2023, indicating that Chinese manufacturers are continuing to produce goods even as they struggle to sell them.[26]

China's interference with market forces that would have spurred a reduction in capacity has led to severe price wars among manufacturers and a growing proportion of unprofitable firms. China's deflationary pressures are worsening, with the producer price index turning negative in October 2022 and falling 3.2 percent year-over-year in August 2025 (see Figure 1).[27]

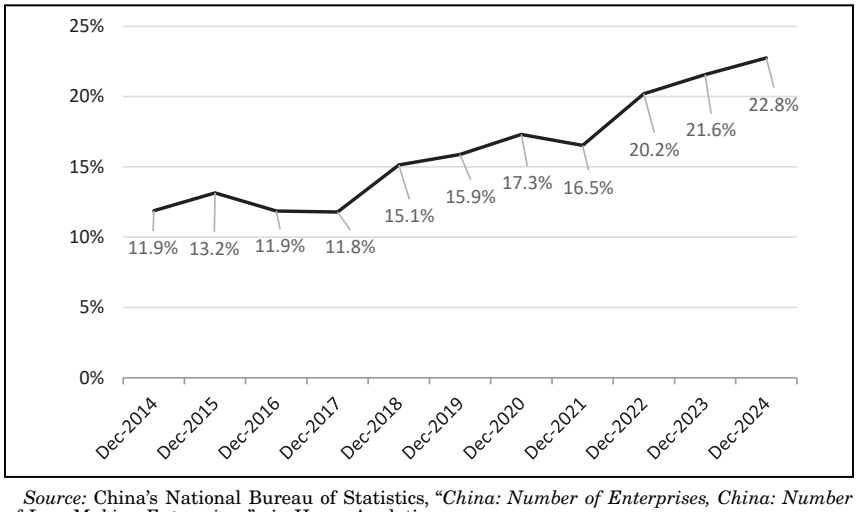
Figure 1: China Producer Prices, Year-Over-Year Percent Change, January 2019–August 2025



Source: China National Bureau of Statistics, "*Producer Prices: All Industry Products, Producer Goods*," via Haver Analytics.

As prices decline, firms have cut costs in an attempt to preserve shrinking margins, leading to a downward spiral as deflationary pressures intensify.[28] Falling prices can also exacerbate excess supply, as firms are incentivized to grow output as a survival mechanism.[29] The scale of market distortions is reflected in the growing share of loss-making firms in China, which nearly doubled from 12 percent in 2014 to over 22 percent in 2024 (see Figure 2).

Figure 2: Share of Chinese Industrial Entities Operating at a Loss, December 2014–December 2024



Source: China's National Bureau of Statistics, "*China: Number of Enterprises, China: Number of Loss-Making Enterprises*," via Haver Analytics.

China's Failure to Rebalance Exacerbates Problem

Had China rebalanced its economy according to market principles, domestic consumption would have been able to absorb at least some of its excess supply—or else that oversupply would have been short-lived. But despite many years of China claiming to rebalance its economy away from investment in favor of consumption, little progress has materialized beyond the rhetoric. In its 14th Five-Year Plan for 2021–2025, China set a goal to hold the manufacturing share of GDP constant—given that China's economy was growing, this meant its manufacturing sector also had to grow.[30] No parallel effort was devoted to structurally boosting consumption's share of GDP.[31] The Chinese government has paid lip service to the idea: "Dual circulation," a strategy introduced in 2020, was announced with the two distinct prongs of boosting domestic consumption to reduce reliance on external demand while also facilitating greater supply chain diversification and investment in higher-value-added products.[32] Once again, the first prong focused on consumption failed to materialize—weak domestic demand continues to pull down China's consumption share of GDP.[33] Household consumption's contribution to GDP growth slowed to below 4 percentage points for 2024 and came in below 3 percentage points in each of the first two quarters of 2025.[34] In March 2025, the general offices of the CCP Central Committee and China's State Council published an action plan listing 30 measures to boost consumption, but many of the proposals were repeated from last year's plan, underscoring how officials have failed to reverse prolonged weakness in consumer confidence and high savings rates.[35] (For more on China's repeated failure to rebalance its economy in favor of consumption and structural impediments to doing so, see Chapter 1, "U.S.-China Economic and Trade Relations (Year in Review).") These concurrent trends, policies, and policy failures have left China with far more production capacity than it (or, in some cases the entire world) needs, producing far more output than its domestic market can consume as other pillars of economic growth falter, setting the stage for the second China Shock.

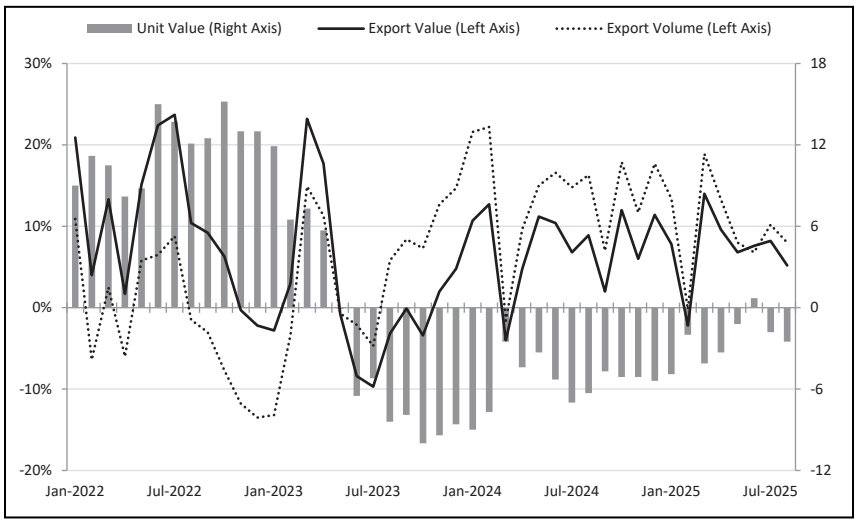
China Relies on Its Trading Partners to Absorb the Economic Costs of Its Imbalances

China Shock 2.0 is driven by the inherent distortions of China's current economic model and exacerbated in recent years by its economic challenges. Rather than reduce production and accept slower growth, China has instead sought to maintain and even expand output by relying on global markets to keep its manufacturers afloat and growing. For example, as China's property market challenges have played out, domestic excavator sales fell by half, while exports nearly tripled.[36] China's construction slowdown contributed to a huge reduction in domestic demand for steel; even as China's steel output flattened from 2020 to 2024, its exports by volume nearly doubled, crowding out European and other producers in global export markets.[37] In other words, China is relying on global markets to absorb the economic costs of its massive economic imbalances.

As deflationary pressures hit China's exports, export volume growth has surpassed export value growth, sending growth in unit

value into negative territory for the majority of the last two years (see Figure 3).[38] Export prices for goods like steel and solar panels, which have been under pressure for years from overcapacity, have fallen the most.[39] However, in goods like EVs and lithium-ion batteries, prices have risen since 2020 as Chinese exports, honed by fierce competition at home, became competitive products abroad.[40]

Figure 3: China's Exports by Unit Value, Value, and Volume, Year-Over-Year Percent Change, January 2022–August 2025



Source: China's National Bureau of Statistics, "*Exports: Value, Exports: Volume, Exports: Unit Value Index*," via Haver Analytics.

Over the past year, China's leadership has publicly acknowledged deflationary pressure resulting from rampant overcapacity in certain sectors, but so far it still has not demonstrated willingness to endure the domestic economic pain required to confront its overcapacity challenge. In July 2025, Party ideology magazine *Qiushi* backed a position to "comprehensively remediate 'involution-style' competition."*[41] The National Development and Reform Commission (NDRC), China's economic planning agency, describes "involution-style competition" as setting prices below product costs to seize market share, leading to market distortions.[42] Other state media, including the *People's Daily*, have acknowledged the issue publicly, and officials—including those at the NDRC—have begun testing measures to rein in excess capacity.[43] These include requiring capacity cuts in key industries and discouraging local officials from expanding production in loss-making industries.[44]

And yet, China's prior experience indicates that any attempts to address overcapacity will likely encounter major obstacles. In 2016, Chinese leaders launched a wave of restructurings, ostensi-

*The anthropological concept "involution" (内卷, *neijuan*) became a Chinese internet slang term to describe cut-throat competition in staying ahead of others and gained popularity in characterizing price wars in overcapacity sectors. Official media and even policy documents now use "involution-style competition" to describe firms focusing on cutting costs and lowering prices rather than innovating and improving their products.

bly to reduce overcapacity in industries like steel.[45] However, local officials maintained procurement incentives that favored their own steelmakers while barring neighboring provinces' products; some regions directly subverted instructions to reduce capacity by disguising new capacity as a "replacement" for outdated mills.[46] Just as the 2016 efforts were undermined by local officials' attempts to preserve underperforming local companies and employment, a new round of capacity cuts would likely face similar challenges absent a change in incentive structures within the CCP.[47] Reducing capacity in advanced manufacturing may face even more obstacles, as these industries tend to be led by ostensibly private firms, which can be more resistant to official directives than state-owned enterprises (SOEs).[48] With China's economic outlook and local finances much shakier now compared to a decade ago, local leaders will be even more cautious in their attempts to downsize unproductive firms and lay off workers.[49]

Central policymakers continue to contradict their own calls for reducing excess capacity by launching policies that will spur even more lending to saturated manufacturing sectors. In August 2025, the NDRC, People's Bank of China, Ministry of Finance, Ministry of Industry and Information Technology, and three other high-level agencies released guidance calling on the finance industry to support advanced manufacturing.[50] The document contains two cursory mentions of avoiding involution, in one provision instructing financial institutions to limit "involution-style competition."[51] The overarching guidance of the document likely undermines attempts to curb excess capacity though, as the policy could exacerbate incentives to support government-favored industries.[52] (For more on the Chinese government's attempts to address involution, see Chapter 1, "U.S.-China Economic and Trade Relations (Year in Review).")

China Shock 2.0 Threatens More Trade Partners across a Wider Swath of Products

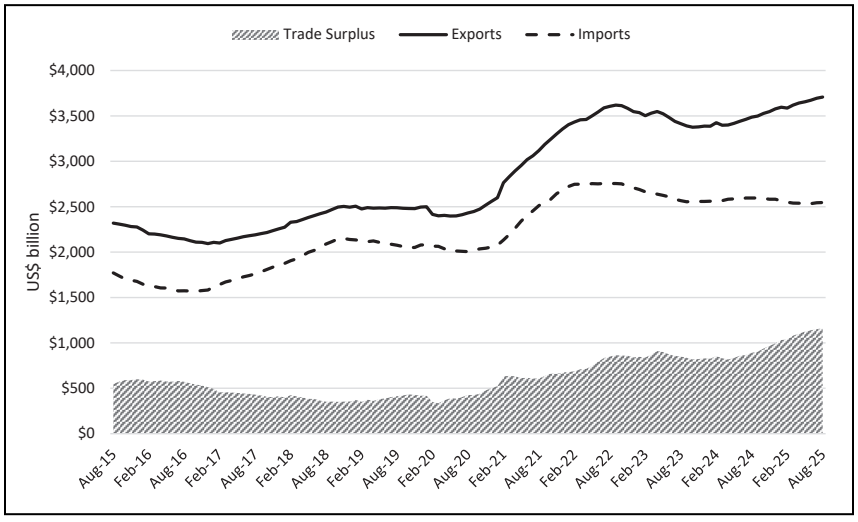
China Shock 2.0 will have a much more widespread impact on the global economy than the first Shock due to a variety of factors: the size of China's economy and export machine, its deep integration into global supply chains, the growing imbalances caused by its economic model, and the increasing range and sophistication of products it exports.

China's economy and exports are much larger than at the time of the first China Shock. At the end of 2001, when China joined the WTO, China's GDP was about 4 percent of the world total.[53] In 2024, China's share of global GDP stood at 17 percent.[54] China's exports have grown to comprise a massive global footprint. Between 2001 and 2023, China's exports grew from 4 percent of the global total to 15 percent.*[55] In manufacturing, China's exports are even more significant, accounting for over 20 percent of the global total.[56] This means not only that the scale of its exports in absolute terms is multiple times the size of the first China Shock but also that the

*Based on data available through October 9 on UN Comtrade's Trade Data database, China's exports were 17 percent of the 2024 global total. United Nations Statistics Division, "UN Comtrade Database."

comparative economic size of the "rest of the world" capable of absorbing China's exports has shrunk.

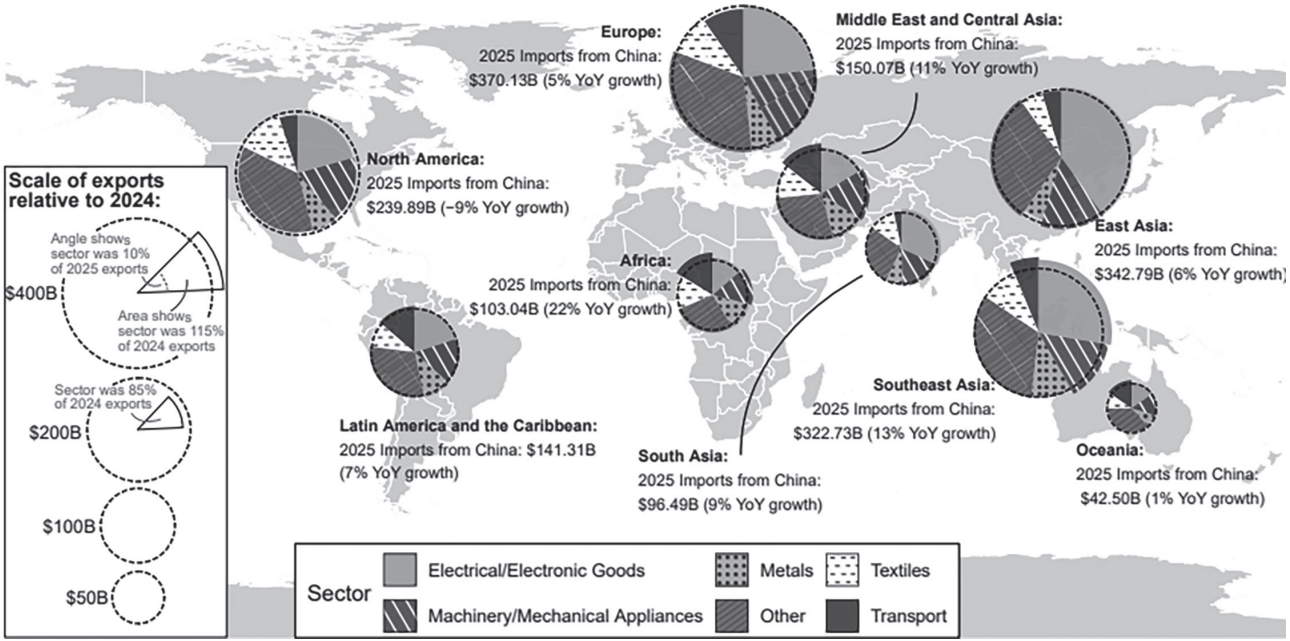
Figure 4: China's Trade with the World (Rolling 12-Month Total, Seasonally Adjusted), August 2015–August 2025



Source: China's General Administration of Customs, via Haver Analytics.

China's trade is also more diversified in terms of trading partners than during the first China Shock, as it has become deeply integrated into global supply chains after years of offshoring and globalization. In 2001, China's top ten trade partners made up 70 percent of its international trade, but that number has since fallen to just below 50 percent.[57] China is now a major trade partner to the majority of the world's countries and in 2024 was the largest trade partner for 87 countries.[58] By comparison, in 2001 China was the number one trade partner of only three other countries, and just 40 countries counted China within their top five trade partners.[59] In addition to an expansion in total volume, China's trade has become increasingly imbalanced, with its trade surplus soaring to a record $1 trillion in 2024; it is on track to hit $1.3 trillion for 2025 if current trade trends continue (see Figure 4).[60] The proportion of traded products where China had a trade surplus grew from 68 percent in 2019 to 74 percent in 2024.[61]

Figure 5: Year-Over-Year (YoY) Change in Mainland China's Exports by Region and Sector, 2025 H1 vs. 2024 H1



Note: The map charts the scale of China's 2025 exports around the world by sector, displaying how China's sector-level exports changed relative to the first half of 2024. Because the chart relies on the most up-to-date information from China's customs authority, China's exports to Hong Kong are reflected as exports to East Asia. Hong Kong's trade with third countries is not shown in this graphic. In addition, the chart does not reflect transshipment or Chinese content incorporated into exports from third countries. See Appendix for more detail on the breakdown of Hong Kong's exports.

Source: China's General Customs Administration, *Custom Statistics*, July 28, 2025.*

*The Electrical/Electronics Goods category is defined as products under Harmonized System (HS) chapter 85; Machinery/Mechanical Appliances as ch. 84; Metals as ch. 72–83; Textiles as ch. 50–67: and Transport as ch. 86–89.

Chinese Manufacturers Access Protected Markets via Transshipment

Direct exports from China to North America have fallen in 2025 as the United States levied new tariffs on China (see Figure 5), but transshipment of products through third countries to evade duties likely obscures true levels of U.S. imports from China. The exact scope of transshipment is difficult to quantify, but experience in 2018–2021 indicates it is significant. As U.S. imports of Chinese goods subject to Section 301 tariffs* dropped 13 percent from 2018 to 2021, according to modeling by the U.S. International Trade Commission, imports of these same products from Vietnam and Mexico increased.[62] Much of the trade reallocation reflected sourcing from local suppliers or relocation of production, often limited to final assembly of mostly Chinese inputs. However, billions of dollars' worth of this trade also constituted Chinese products rerouted and relabeled to obscure their origin. One Harvard Business School study used transaction-level data to estimate that 8.8 percent of the $52.8 billion increase in Vietnamese exports to the United States from 2018 to 2021 owed to rerouting Chinese goods, including rebranding Chinese products as made in Vietnam.[63]

A similar dynamic is likely playing out in 2025, but transshipment is difficult to measure—particularly in near real-time—due to delayed and incomplete customs data, methodological challenges, and inaccurate information inherent in purposeful evasion. While China's growing exports may initially appear to be directed to emerging markets, at least some of these goods are almost certainly bound for the United States.

During the Commission's trips to Southeast Asia, some officials downplayed transshipment risks, viewing the issue as primarily a problem for U.S. enforcement. Yet transshipment directed at the United States hurts emerging markets as well. First, emerging markets can become unwilling partners in circumvention and evasion, risking enforcement scrutiny across a wide range of their imports. To address transshipment, Customs must bring greater scrutiny to imports from risky sources, potentially slowing and complicating unrelated trade from those countries. Second, a reputation as a transshipment hub threatens opportunities from shifting supply chains. As developed economies have begun to promote de-risking from China, companies may avoid supply chains routed through emerging markets that are seen as risky due to facilitation of Chinese transshipment or tariff evasion.

*The 7.5 to 25 percent tariffs in response to the Section 301 investigation into China's forced tech transfer and intellectual property theft were introduced in four tranches between July 2018 and September 2019, ultimately targeting $370 billion in exports based on value by product category in 2017. This value does not encompass additional tariffs imposed on Chinese steel and aluminum exports to the United States as part of the Section 232 investigation concluded in January 2018. Karen M. Sutter, "U.S.-China Tariff Actions Since 2018: An Overview," *Congressional Research Service* IF12990, July 10, 2025; U.S. International Trade Commission, *Economic Impact of Section 232 and 301 Tariffs on U.S. Industries*, March 2023, 37, 52, 62–68.

China now competes in a much larger variety of sectors as well. China continues to be a major exporter of lower-value manufactured products, while at the same time it has moved up the value chain in many sectors.[64] Over this time period, China became a net exporter of passenger vehicles and auto parts, which are viewed as cornerstones of manufacturing ecosystems.[65] As discussed extensively in Chapter 6, "Interlocking Innovation Flywheels: China's Manufacturing and Innovation Engine" and Chapter 10, "Power Surge: China's Electrification Drive and Push for Global Energy Dominance," China is globally competitive in many advanced technology products, including batteries, high-speed rail, robotics, and consumer electronics. As a result, China's trading partners have become more reliant on China for a wider variety of products. A 2023 study found China is the world's dominant exporter (defined as products for which China's share of exports represents over half the global total) of over 600 different product categories—a figure six times as large as the next-largest country.[66]

China Shock 2.0 Will Hurt Both Developed and Emerging Economies

For Developed Economies, the New Wave of Chinese Exports Represents a Direct Challenge in Areas of Advanced Technology

The second China Shock will be felt again by advanced economies. As discussed above, in the last decade, China's growth in manufacturing has focused on moving up the value chain, and many of its exports are now challenging those from advanced economies for market share. (For an evaluation of Chinese industrial policies and their impact on value-added manufacturing, see Chapter 6, "Interlocking Innovation Flywheels: China's Manufacturing and Innovation Engine.") Adam Wolfe, emerging markets economist at Absolute Strategy Research, uses an export similarity index to measure where China competes by exporting the same goods as other countries.[67] The index shows that Chinese exports have the greatest overlap with advanced manufacturing economies, with Germany being the most similar.[68] Considering only the goods where China's exports are growing the fastest reveals growing vulnerabilities to competition in South Korea and Japan's export baskets.[69] While advanced economies often have greater export diversity by total number of products, a few firms and sectors at the technological frontier tend to dominate these exports by volume, making them vulnerable to export shocks if a new entrant challenges their market share.[70] At the same time, China is importing fewer of the specialized goods that advanced manufacturers export as it pursues self-reliance, eliminating opportunities for Europe and other developed economies to benefit from China's move up to high-end manufacturing.[71]

Falling prices have contributed to Chinese products' growing market share and harmed competitors from developed countries. Chinese export prices shrank by 16 percent between 2022 and 2024, the byproduct of rising excess supply pumped into the system.[72] For producers in developed countries taking a hit in their market

share, the harms are reflected in lower revenues, tighter profit margins, and reduced capacity for R&D that would otherwise help them maintain an edge in future generations of technology.[73] While far from an exhaustive list, the following products illustrate these dynamics:

- *China's automobile exports have eroded market share of European, Japanese, and U.S. car manufacturers:* Since 2020, car exports from Germany, Japan, and the United States have fallen as a share of the global total, while China's share has climbed from less than 2 percent to nearly 10 percent in 2025.[74] As noted above, China has significant excess capacity in both electric and internal combustion engine (ICE) vehicles.[75] Its domestic production of EVs has skyrocketed over the past few years, while the number of EVs produced in China by foreign manufacturers has remained virtually stagnant.[76] Forecasts project that China's share of the global market for all types of passenger vehicles will grow from 21 percent in 2024 to 30 percent by 2030.[77] More than 70 percent of the growth in China's exports of automobiles has been due to excess production of ICE vehicles.[78] China's share of global passenger vehicle exports—excluding fully electric vehicles—rose from 1.4 percent in 2020 to 5.3 percent in 2023, during which time it has transitioned from being a net importer of vehicles to a major net exporter to developed and emerging markets alike.[79]

- *Chinese makers of organic light-emitting diode (OLED) screens from domestic producers are overtaking their more advanced competitors:* China has eroded South Korean manufacturers' share of the OLED market from 90 percent five years ago to less than 60 percent.[80] In spite of their increasing market share, many Chinese producers in the industry are not profitable and continue to rely on government subsidies to survive.[81] Just as China's ramp-up of EV production led to a flood of exports in ICE vehicles, so too could the rise of OLED screens impact the liquid crystal display global market, where China already has a majority share and its competitors are struggling.[82]

- *China's machinery exports have expanded, supported by deep supply chains for machinery parts also made in China:* China's exports of machinery and machinery parts grew 11 percent in 2024.[83] Weak domestic demand due to a years-long property market slump have made it likely that the machinery sector will see additional pressure from China's overcapacity.[84] China's largest construction machinery producers earn an almost equal share of revenues abroad compared to domestic sales, a sharp change from the peak of the property bubble.[85] Developed markets, including the UK and the EU, have imposed tariffs and antidumping duties on Chinese exports of construction machinery to protect their domestic producers.[86] These exports are increasingly winning market share in Southeast Asia; in India, a Japanese and Indian joint venture called on officials to protect local manufacturing from China's growing share of the market.[87]

China Shock 2.0 Already Hurting Emerging Markets

China Shock 2.0 will cost jobs and hurt local industry in emerging markets, threatening their ability to move up the value chain. Crucially, China's policies had the effect of reducing opportunities for emerging economies to export to China. By producing greater quantities of components domestically, China's imports of manufactured goods from emerging markets like Malaysia and Thailand have fallen, and its total manufacturing trade surplus has increased $870 billion between 2019 and 2024.*[88] At the same time, China's total imports of industrial supplies have stagnated since 2021, and imports of manufactured goods such as capital goods and transportation equipment have declined.[89] Meanwhile, China's exports of intermediate inputs grew 49 percent from 2019 to 2024, outstripping total growth in exports.[90] As a result of China's policies, emerging markets have seen previously valuable pipelines of opportunities to export intermediate goods to China dramatically curtailed. Replicating a methodology employed by analysts Camille Boullenois and Charles Austin Jordan to analyze the impact of China's missing demand, China's exports of manufactured goods grew 45 percent from 2019 to 2024, compared with only 14 percent growth in its imports of the same categories of goods.[91] Had imports increased as much as exports, China would have generated additional demand for $415 billion of these goods in 2024, equivalent to 14 percent of all other developing countries' total manufacturing exports in 2024.†[92] Yet now, rather than providing additional opportunities for emerging markets to contribute inputs to China commensurate with its overall growth, China competes with them both within their own economies and abroad.[93]

The deluge of exports from China increasingly poses a challenge for producers in emerging markets as well. China is the leading trade partner for many countries in ASEAN and the Middle East, the largest trade partner for South America, and the second-largest trade partner for Latin America as a whole.[94] Trade ties with China in the first two decades of this century were sometimes seen by emerging markets as an opportunity to embark on a path to industrialization through integration into global supply chains. However, these trade ties are increasingly a liability rather than an asset for producers in emerging markets. As the United States and other developed economies continue their de-risking efforts and enact barriers to respond to China's nonmarket economic policies, China's exporters have sought new markets, especially in countries participating in the Belt and Road Initiative.[95] Exports from China to Southeast Asia and Latin America in 2024 grew 9 percent and 12

*China's falling imports represent another key difference with China's period of rapid growth in the early 2000s. During that time, China imported growing quantities of intermediate inputs from emerging and developed markets alike to fuel its domestic manufacturing. Excluding the years of the global financial crisis, China's imports grew steadily almost every year until 2015. Since then, as China's growth engine as slowed, imports have seen inconsistent growth and basically flattened in recent years. China General Administration of Customs, "*China: Merchandise Imports*," via Haver Analytics.

†The list of emerging and developing economies is sourced from the International Monetary Fund. To determine the total 2024 manufacturing exports from this group of countries, World Bank Group data on manufacturing exports as a percentage of total merchandise (most recent available) are multiplied by total merchandise exports (2024) for each country and summed. Only countries for which data are available since 2019 are included. "Groups and Aggregates Information," *International Monetary Fund*, April 2023.

percent, respectively, and they continued to surge 15 percent and 6 percent, respectively, through August 2025.[96] In 2025, China's exports to Africa are on track to exceed $200 billion for the first time after growing 28 percent through September to $163 billion compared to the same period in 2024.[97] One survey of Chinese firms involved in international trade found that 75 percent intended to expand into emerging markets to make up for lost sales to the United States.[98] Emerging markets may welcome the lower prices afforded by China's exports of high-end goods compared with exports from developed markets.[99] However, China is exporting more intermediate and finished goods that compete with local production as well, threatening emerging markets' ability to move up the value chain and eroding existing manufacturing industries in those countries.[100] In just one example, Brazil's chemical industry recorded a 17-year low in output in 2023 as cheap Chinese imports undercut local producers, a trend that has worsened through the beginning of 2025, leading to at least one factory closure already and sparking fears of wide job losses.*[101] This pattern is repeating itself across emerging markets, as discussed more fully in the Southeast Asia case study in this chapter.

Chinese FDI in Emerging Markets Brings Fewer Benefits

Chinese firms have ramped up a strategy of using FDI to boost exports and avoid targeted trade restrictions. In 2024, Chinese investment in overseas markets increased for the first time since 2017, driven by capital-intensive projects and the buildout of supply chains in Asia, the Middle East, Africa, and other emerging manufacturing hubs—shifting some of their production to those markets.[102] Some emerging markets have thus generally welcomed inbound investment from China as a means of enhancing local capacity for manufacturing, assembly, and packaging.[103]

Although host country governments have traditionally embraced inbound Chinese investment as a potential growth driver, the presence of Chinese firms sometimes fails to transfer significant benefits to local communities in areas like upskilling and technology transfer. Chinese firms typically prioritize vertical integration and rely on inputs made by other Chinese suppliers.[104] In some cases, this tendency means in-country suppliers have been cut off from the opportunity to supply the new firms.[105] According to analysis by the Carnegie Endowment for International Peace of the Suez Economic and Trade Cooperation Zone (SETCZone), a Chinese-built industrial park in Egypt:

> *The performance of the SETCZone is thus heavily influenced by Chinese control and asymmetrical power relations, which shape the type of development the zone fosters. The absence of an active role by domestic [actors]… leav[es] the host economy unable to fully leverage the advantages of foreign investment. As a result, the strategies adopted by firms*

*China's ability to manufacture cheap petrochemicals stems partly from its purchases of Russian oil above the price cap recognized by many international countries but below global prices. Laurence Norman and Georgi Kantchev, "Under Trump Pressure, EU Proposes Going After Chinese Companies Buying Russia Oil," *Wall Street Journal*, September 19, 2025; Volodymyr Dubrovskiy and James Nixey, "Tightening the Oil-price Cap to Increase the Pressure on Russia," *Chatham House*, September 4, 2025.

> *operating in these zones do not offer opportunities for technology transfer, industrial upgrading, and diversification, foreclosing the opportunity for the development of a competitive industrial sector in the host economy.*[106]

Communities in emerging markets centered around Chinese-invested factories have voiced concerns that Chinese firms bring in skilled labor and managers from China rather than hiring local workers.[107]

Chinese officials have also recently begun pressuring Chinese firms not to transfer technology as part of their FDI; for example, leading Chinese EV and battery manufacturers were warned to avoid transferring technology to local partners in their overseas investments in a bid to maintain China's edge.[108] This guidance included encouragements to continue producing key components domestically and instead focus on assembly in overseas facilities.[109] Additionally, Chinese officials have made it more difficult for equipment and employees in sectors China views as economically important to transfer to production hubs abroad. For example, China has actively sought to inhibit efforts by Taiwan phone producer Foxconn to expand production in India. In July 2025, a large number of skilled Chinese workers were directed to return to China from India, likely dampening the potential for skill spillovers to local workers.[110] Denied the opportunity to move into higher-value-added manufacturing, countries may become stuck in low-value assembly and packaging.

Chinese dominance in trade and investment exposes the world to risks beyond the immediate impacts of slower growth and lower employment in emerging markets. Foreign companies have long faced an unfair playing field in China's domestic market, but as long as the distortions were contained, so too was the impact to the rest of the world. As China moves entire production processes and supply chains abroad, it exports these distortions and expands the scope of its toolkit for leverage and coercion. The dominance of state-owned firms creates an environment where Chinese companies may employ monopolistic practices, including collusion with other firms, mergers and consolidation, pricing power, or restrictions on purchasing to pressure their local suppliers.[111] China has already used its market power to undercut local competitors in emerging markets.[112] By continuing to prioritize domestic producers, whether out of a desire to retain control over supply chains or to reduce reliance on foreign key components, Chinese firms present a challenge for other emerging economies to move up the value chain.[113]

Emerging Markets Struggle to Respond to Influx of Chinese Goods

As the threat from China Shock 2.0 increases, some emerging markets have employed tariff and non-tariff barriers to protect local industries, with varying degrees of success. Many emerging markets have employed targeted bans with protections for specific industries, such as restrictions on low-value e-commerce imports, local content requirements on vehicles, and investment incentives to encourage local production. (For examples on emerging market responses, see the Southeast Asia case study below.) Many emerging economies have turned to WTO-permitted trade

remedy cases against Chinese exports as well.[114] Yet, price distortions in China's domestic market have made it difficult to determine dumping margins, and due to excess supply-driven price cutting within China, Chinese exports may not fit the traditional definition of dumping because they may be priced higher in international markets than they are domestically.[115] While U.S. law allows the use of surrogate country data for the purposes of calculating margins when handling cases related to nonmarket economies, not all countries' laws may have such provisions.*[116] As a result, these remedies may not be able to address the full scope of China's market distortions.[117] Further, many WTO-permitted remedies are only available after harm has been done, by which time it can be too late for harmed industries to recover. Dispute settlement at the WTO is also problematic—it often takes years between the time when consultations are requested and a final decision is made and even longer to authorize retaliation.[118]

Ironically, the market distortions from China Shock 2.0 are often enabled by international trade agreements intended to promote market-based competition. China is a party to a number of international trade agreements, including the WTO, "free trade" agreements with various countries and ASEAN, and the Regional Comprehensive Economic Partnership involving 14 other Asia Pacific countries. Each of these involve rules requiring China's trading partners to keep their markets open to China's exports and constrain policy responses to China's market distortions.

To date, there has been little in the way of a coordinated response to China's trade practices. China can use its size to play trade and investment partners off of one another; if one country imposes limits on Chinese trade and investment that are too stringent, Chinese companies can set up shop somewhere else. For example, when the EU voted to impose tariffs on imports of Chinese EVs, Germany abstained from voting out of fear of retaliatory measures.[119] These fears are validated by reports that China directed its car manufacturers to suspend large investments in countries that supported the tariffs.[120] China has used the promise of deeper trade and investment ties to induce countries in the Pacific Islands to switch diplomatic recognition from Taiwan to Beijing.[121] (For more on China's trade and investment ties to the Pacific Islands, see Chapter 5, "Small Islands, Big Stakes: China's Playbook in the Pacific Islands.") For regions like Latin America and Southeast Asia, reliance on commodities exports to China can make it more difficult to reach a consensus with emerging manufacturers who are trying to protect their markets from Chinese imports.[122] These tensions are apparent even within individual countries, as Indonesia refrained from implementing 200 percent tariffs on Chinese textile imports in 2024 in part to protect its own nickel exports to China.[123]

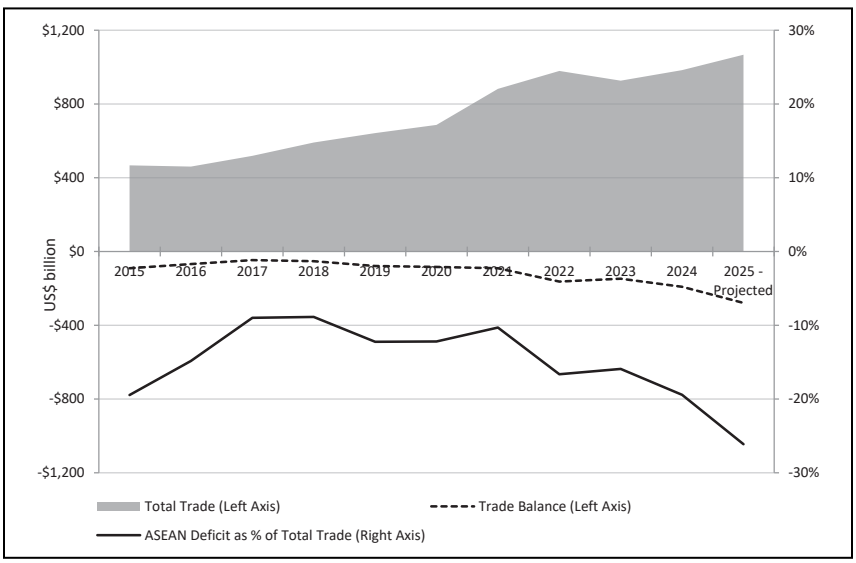
*Article 15 of China's protocol of accession to the WTO included a provision specifically allowing WTO members to use surrogate data in calculating antidumping margins against China in certain circumstances. While part of Article 15 expired in 2016, the use of the surrogate country methodology in antidumping was a practice under the General Agreement on Tariffs and Trade and the WTO preceding China's accession; there is no prohibition on countries continuing to employ this methodology in appropriate circumstances. André J. Washington, "Not So Fast, China: Non-Market Economy Status Is Not Necessary for the 'Surrogate Country' Method," *Chicago Journal of International Law* 19, No. 1, Article 8 (2018).

Southeast Asia Case Study

Southeast Asian economies are especially at risk from China Shock 2.0 both as connectors between China and the rest of the global trading system and as vibrant consumer markets. A wave of low-cost exports from China is undermining existing manufacturing in ASEAN countries as China seeks to offload excess supply onto global markets. Local companies and employment have already been adversely impacted by imports from China. Chinese imports have also spread deflation to the region. Meanwhile, China's FDI into ASEAN often provides scant benefits for recipients, as Chinese multinationals move low-margin assembly with limited tech transfer to China's neighbors in Southeast Asia.

As China has doubled down on export-led growth policies, its trade surplus with Southeast Asia has grown significantly. While trade between ASEAN countries and China is bidirectional, ASEAN as a whole tends to import more from China and export more to the United States. In 2022, China and the United States were tied for the two largest export markets for ASEAN countries, with a 14.8 percent share each.[124] At the same time, exports from Southeast Asian countries to China are slowing and, in some cases, even falling in absolute terms as China's domestic economic growth has slowed. As a result, Southeast Asian countries are experiencing widening trade deficits with China—increasing by 30 percent in 2024 to $191 billion.[125] ASEAN's annual trade deficit as a percentage of total trade with China has grown from 10 percent in 2021 to 19 percent in 2024.[126] In the first eight months of 2025, it has reached 27 percent.[127]

Figure 6: ASEAN's Growing Trade Deficit with China, 2015–2025 (Projected)



Note: The 2025 full-year projection is calculated as the product of 2024 total trade and year-over-year growth in year-to-date total trade through August 2025.

Source: China General Administration of Customs, "*China: Imports from ASEAN, China: Exports to ASEAN*," via Haver Analytics.

Growing competition from Chinese exports is hurting local companies and employment. While many Chinese exports to ASEAN are intermediate goods incorporated into other products that are themselves exported, exports of low-cost finished goods from China to Southeast Asia have surged in recent years, driven in part by the growing presence of Chinese e-commerce firms.* [128] These imported goods, from textiles to cosmetics to electronics and machinery, compete directly with goods made by domestic ASEAN producers and have already started causing significant job losses and dislocation in the region. In Indonesia, dozens of textiles and garment firms have shuttered, and an Indonesian industry association estimates that 250,000 Indonesians in the sector lost their jobs in 2023 and 2024; another 280,000 jobs in the sector are estimated to be at risk in 2025.[129] These losses pose a significant challenge to Indonesia's aim of having textiles comprise one of five key industries that generate 60 percent of Indonesia's GDP going forward.[130] Of the other four industries targeted for growth by Indonesia's government, at least three—autos, electronics, and chemicals—are also under threat from Chinese exports.[131] Thailand faces similar concerns as Chinese imports undercut local producers, including in small household appliances, furniture, electronics, garments, autos, and steel, contributing to the closure of over 4,000 Thai factories in 2023 and 2024.[132] Since May 2024 in just one Philippine city's export-focused economic zone, over 4,500 garment workers have lost their jobs along with dozens of employees in the fashion, semiconductor, and renewable energy sectors due to downsizing or closed factories.[133]

China's export surge has had significant macroeconomic effects as well. China's oversupply-driven price cuts have spread deflationary pressure in the ASEAN region. In May 2025, Reuters reported that Thailand is already experiencing deflation alongside China and "Malaysia and Singapore may get there rapidly."[134] Imported deflation can have numerous negative consequences, including downward pressure on revenue and profits for domestic competitors, reduced consumption, delayed investments, reduced wages, and even layoffs.[135]

China Shock 2.0 also threatens the manufacturing sector in ASEAN economies. China's domestic overcapacity and exports of goods like petrochemicals, construction and electrical machinery, semiconductors, and medical devices to Southeast Asia may also begin to challenge higher-value-added manufacturing industries.[136] Research from investment bank Nomura found that countries that experienced large increases in share of manufactured imports from China have also experienced the sharpest slowdowns in domestic manufacturing.[137] There is strong evidence that ASEAN has encountered this phenomenon: from 2021 to 2024, as Chinese imports to the region have increased, every ASEAN country except for Brunei, Cambodia, and Laos experienced a decline in manufacturing share of GDP (see Figure 7).

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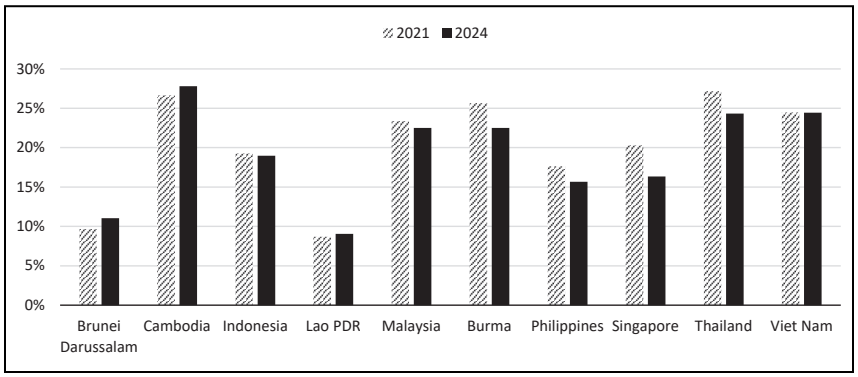
*Chinese e-commerce platforms TikTok Shop, Temu, and Alibaba-owned Lazada are undergoing fierce competition for market share in the region. Similar to the United States, many of the goods sold on these platforms in Southeast Asia are made in China and shipped directly from factories in China to consumers around the globe. Fan Feifei, "E-Commerce Firms Accelerate Push into Southeast Asia," *China Daily*, April 18, 2025.

Figure 7: ASEAN Countries Manufacturing, Value Added (% of GDP), 2021–2024



Note: From 2021 to 2024, manufacturing value-added share of GDP fell or remained flat for ASEAN's major manufacturing economies. During this time, China's exports to the region increased 21 percent to $588 billion.
Source: World Bank, "*Manufacturing, Value Added (% of GDP)*"; United States Statistics Division, "UN Comtrade Database."

A growing number of China's exports to Southeast Asia are finished goods, which do not create assembly or production jobs in Southeast Asia.[138] Indonesia, Malaysia, the Philippines, Thailand, and Singapore, with their large potential consumer markets, have been the main recipients of this flood of imports.[139]

- *Autos:* In Indonesia, where domestic car manufacturing output fell 18.6 percent from a peak of almost 1.5 million vehicles in 2022 to 1.2 million vehicles in 2024, the value of vehicle imports from China rose 73 percent from $1.5 billion in the first half of 2024 to $2.6 billion in the first half of 2025.[140] The value of China's exports of vehicles to Malaysia has grown from $1.5 billion annually in 2019 to $3.5 billion in 2024.[141] Chinese vehicle exports to Thailand follow a similar trend despite tariff and non-tariff barriers in place to protect domestic manufacturing.[142] Chinese car imports have even eroded market share from Japan, traditionally the dominant player in the region.[143]
- *Construction machinery and electrical equipment:* China's construction equipment industry, which was hard hit by the domestic property sector slowdown, exported a record number of machines in 2022.[144] In 2023, exports of construction equipment exceeded domestic sales.[145] Exports of forklift trucks to Indonesia, Malaysia, Thailand, and Vietnam have spiked in recent years; exports to Vietnam grew nearly 70 percent from 2023 to 2024.[146] These exports to Southeast Asia will compete directly with U.S. and Japanese manufacturers while threatening domestic electrical machinery industries in Thailand and Malaysia.[147]
- *Solar panels:* Chinese exports of solar panels to Indonesia, Malaysia, Thailand, and Vietnam grew 46 percent from 2022 to 2023.[148] Astonishingly, China's total solar cell production capacity in 2023 was more than double the global market demand.[149] China's exports of solar cells compete directly with domestic

producers for market share. One investigation of Malaysian solar cell producers found that Chinese products had undercut domestic producers who then sought other international markets for their own goods, highlighting how China's excess capacity in one country can trigger distortions around the world.[150]

Even where Chinese inputs help Southeast Asian exports, China has been reaping more of the benefits. As noted above, manufacturing as a percentage of GDP has stagnated or declined in much of Southeast Asia. At the same time, Southeast Asian countries' global value-added share of manufacturing exports has stagnated relative to GDP, with the notable exception of Vietnam.[151] China has been capturing more of that value-added. Data through 2021 show Chinese value-added in Southeast Asia's exports has been increasing; in other words, more of the value of Southeast Asia's growing exports flows back to China rather than supporting local economies.[152] Although more recent data are not available, the trend has almost certainly accelerated as suppliers to U.S. manufacturers have increased their own dependence on Chinese suppliers.[153]

China's export of excess production has led to pushback from Southeast Asian trading partners who are concerned about preventing job losses and harm to their economies. Southeast Asia's manufacturing powerhouses have imposed a variety of measures to protect their economies from China's export surge, including antidumping duties, WTO disputes, and various non-tariff measures (see Table 1). Others, like Cambodia and Laos, have not imposed restrictions on Chinese imports. Cambodia, in particular, continues to import raw materials like fabric—used to produce garments for export—from China.[154]

Table 1: Recent Trade Protection Measures Imposed by ASEAN's Manufacturing Hubs

	Antidumping Actions against China	Non-Tariff Measures
Indonesia	• Iron and steel products • Nylon film • Ceramic tile • Textiles (under investigation)	• Temu ban • Prohibitions on social media e-commerce transactions • Minimum $100 transaction value on online marketplace imported goods • Restrictions on number of individual goods carried by passengers • Import approval requirements on electronic goods • Limited ports of entry for commodity imports (under consideration) • Lowered de minimis import value from $75 to $3
Malaysia	• Iron and steel products • Polyethylene terephthalate (plastic) • Strengthened antidumping legislation	• Price floor on imported EVs • 10 percent sales tax on imported e-commerce goods

Table 1: Recent Trade Protection Measures Imposed by ASEAN's Manufacturing Hubs—*Continued*

	Antidumping Actions against China	Non-Tariff Measures
Thailand	• Steel products • Citric acid (under investigation) • High-carbon wire rods (under investigation) • Aluminum (under investigation)	• 7 percent value-added tax on de minimis imports
Vietnam	• Steel products	• Temporary suspension of Temu and Shein • De minimis revoked

Source: See below.[155] Adapted from Brendan Kelly and Shay Wester, "ASEAN Caught between China's Export Surge and Global De-Risking," *Asia Society Policy Institute*, February 17, 2025.

ASEAN countries face challenges in fashioning effective responses to China's market distortions. In particular, ASEAN countries are members of numerous trade agreements with China, including the WTO, the China-ASEAN Free Trade Agreement, and the Regional Comprehensive Economic Partnership, each of which includes rules that, if followed, constrain the range of permissible responses. It is ironic that China's basic economic model is inconsistent with the assumptions underlying the WTO and economic theories of free trade, yet the constraints in those agreements operate to enable China's market-distorting practices.

Chinese Manufacturing Moves to Southeast Asia

Chinese companies' global trend of greenfield manufacturing investment holds true in Southeast Asia. Annual Chinese investment into ASEAN countries has more than doubled from $9.2 billion in 2019 to $19.3 billion in 2024, with over one-third of Chinese investment into ASEAN poured into manufacturing ($6.7 billion out of $19.3 billion total).*[156] ASEAN is also the top destination for Chinese manufacturing FDI by number of announced transactions.[157]

Chinese Producers Use FDI to Improve Access to Southeast Asia's Markets

Chinese companies have invested in production in Southeast Asia as a way to sell directly into markets that have high tariff and non-tariff barriers, competing directly with domestic firms and sometimes dominating local industries. Although almost all ASEAN countries have lowered average tariffs to below 5 percent, ASEAN countries have a significant number of non-tariff measures that impede imports.[158] Thailand, the Philippines, Indonesia, and Malaysia together had over 6,000 recorded non-tar-

*For perspective, China's $6.7 billion is only a fraction of the total investment in manufacturing that flows into ASEAN from all countries each year ($43.8 billion in 2024). Total U.S. investment in ASEAN was also double China's investment in 2024. However, these numbers are subject to debate. Different databases report different transaction volumes, and the picture is further obfuscated by a vast amount of investment being routed through regional financial hubs Hong Kong and Singapore. Armand Meyer and Agatha Kratz, "China's Manufacturing FDI in ASEAN Grew Rapidly, but Faces Tariff Headwinds," *Rhodium Group*, April 24, 2025; ASEAN Stats, "*Flows of Inward Foreign Direct Investment to ASEAN by Source Country and Industry*."

iff measures as of 2019.[159] In response, Chinese manufacturers have established production bases in the region across technology industries, consumer goods, and commodities. Malaysia, which places high tariffs on imported automobiles, has attracted a joint venture investment by a Chinese EV company. BYD is pursuing a similar strategy in Indonesia, which provides tax breaks for exporters that invest in domestic EV production.[160] Chinese EVs now account for 90 percent of Indonesia's EV market, although Japanese car makers are still dominant in traditional ICE vehicles.[161] A similar story is playing out in the steel sector. The global steel industry faces massive overcapacity from existing Chinese production, and Indonesia, Malaysia, Vietnam, and Thailand have all imposed tariffs on steel exports from China (see Figure 8 above).[162] However, China already has a foothold in Southeast Asia's steel markets, with investments and factories in Vietnam, Malaysia, and Indonesia and plans to expand production in Thailand.[163]

Chinese EV assembly in ASEAN countries demonstrates limits to local benefits from Chinese investment. China's BYD and Great Wall Motor have recently started producing EVs in Thailand to access the country's domestic market without tariffs.[164] However, Chinese technology transfer restrictions on EV production limit the value-added production that occurs within Thailand. Reporting by Bloomberg also indicated that Chinese officials have sought to prevent the transfer out of China of technology needed to manufacture consumer electronics, EVs, and solar manufacturing and have prevented factory equipment sales to Southeast Asian countries, including Vietnam, Malaysia, and Thailand.[165] At the same time, BYD and Great Wall Motor's launch of Thai operations has coincided with a threefold increase in Chinese-invested auto parts suppliers in Thailand, sparking concerns from local auto parts manufacturers, an established market segment that initially developed to support Japanese multinationals as early as the 1960s.[166]

China's Dominance in Indonesia's Nickel Processing Industry

The case of the nickel industry in Indonesia demonstrates how China has come to dominate certain overseas processing sectors. In 2014, Indonesia implemented an export ban on unprocessed minerals to diversify its economy away from dependence on the export of raw materials and ensure that it developed a domestic nickel processing capacity, with a long-term goal of moving up the global value-added chain.[167] The timing coincided with the launch of the Belt and Road Initiative, and Indonesia's government welcomed investment from Chinese companies in industrial parks across the country despite occasional pushback from local constituents over illegal workers and working conditions.[168] Even with a temporary relaxation in the restrictions from 2017 to 2020, the ban harmed the U.S. steel industry by contributing to rising

China's Dominance in Indonesia's Nickel Processing Industry—*Continued*

global prices for nickel.* [169] At the same time, rising Chinese investment in Indonesia's steel industry gave China a workaround for the ban while creating oversupply that was primarily exported abroad.[170] China now dominates the country's processing industry, leading to significant market power over the upstream Indonesian mining operators.[171] While China channeled its nickel output into steel production, the explosion in EV demand is now driving rising global demand for nickel and thus an expansion in Chinese investment in Indonesia.[172] Chinese firms control around 75 percent of Indonesia's nickel refining capacity, with major implications for control over downstream producers of batteries.[173] Investment in battery production in the country is also overwhelmingly led by Chinese and South Korean firms.[174] In conversations with the Commission, Indonesian officials indicated they have had limited success so far in encouraging the development of domestic battery champions despite requiring all foreign investors to partner with the state-owned Indonesian Battery Corporation.

Transshipment and Tariff Evasion Risks in Southeast Asia from Chinese FDI

Chinese investment in manufacturing in Southeast Asia provides a pathway for Chinese companies to continue shipping their goods to the United States, bypassing tariffs imposed on direct imports from China. When the first Trump Administration imposed tariffs on $370 billion worth of Chinese exports to the United States in 2018, there were several high-profile examples of Chinese companies using outposts in ASEAN countries for simple transshipment (i.e., shipping goods through a third country and falsely labeling them as having originated in that country) as a means of evading the tariffs. After the 2018 tariffs, direct shipments from China to the United States were replaced by shipments through connector countries to hide the origin of the goods. Declining volumes of direct exports from China to the United States hide the fact that upstream supply chains are still reliant on China for many of these goods.[175] The same product categories that experienced an increase in shipments from China to Vietnam also experienced a similar increase by quantity in shipments from Vietnam to the United States.[176] Vietnam Customs identified that Chinese producers were using it as a pathway for transshipment of textiles, seafood, agricultural products, steel, iron, and aluminum.[177] The U.S. Department of Commerce has found

*The EU filed a case with the WTO challenging Indonesia's nickel export ban and domestic processing requirement in November 2019, a case the United States joined. The WTO ruled in favor of the EU, although Indonesia has appealed the decision. Sekarsari Sugihartono, "Indonesia's Trade Dispute on Nickel Ore in the WTO: Current Progress and Developments," *Modern Diplomacy*, October 28, 2024; David Guberman, Samantha Schreiber, and Anna Perry, "Export Restrictions on Minerals and Metals: Indonesia's Export Ban of Nickel," *U.S. International Trade Commission*, February 2024, 13; "Indonesia-Measures Relating to Raw Materials," *World Trade Organization*, December 8, 2022.

numerous cases of transshipment through ASEAN countries.*[178] However, since 2020, estimates of illegal transshipment volumes from Vietnam have fallen, though data are difficult to collect given the illicit nature of the activity.[179]

Rules of Origin and Scope in International Trade

Trade agreements play a key role in setting percentages of value added necessary before a good can be assigned a country of origin via "rules of origin" (ROOs). Specific ROOs vary by product and agreement.[180] Country of origin—the country of manufacture, production, or growth of a product—is central to international trade rules as it defines the rate of tariff applied to a good when it crosses international borders.[181] Many traded goods like automobiles, electronics, and other consumer goods are not made from start to finish within the borders of a single country; if further work or material added in another country constitutes a "substantial transformation" to the product, then the country where this work was performed may become the country of origin for purposes of calculating tariff rates.†[182] However, ROOs are often set at a low enough threshold that not even a majority of the content needs to come from work done in the country of origin. For example, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) sets the threshold of content from CPTPP members for many products at only 35 percent—meaning 65 percent of content can come from China and the product could still receive preferential treatment under that agreement.[183]

Separate from an import ROO is the concept of "scope" in trade remedy cases, such as antidumping duties. Scope refers to the detailed description of the goods under investigation and determines how broadly remedies can be applied.[184] Antidumping and countervailing duty investigations undergo procedures to define the technical and physical characteristics of the products under review.[185] However, many disputes still arise over whether or not certain products fall under resulting trade remedies. Inherent tension exists between ensuring U.S. industry is afforded sufficiently broad protection while still providing enough specificity to minimize harm to non-injurious trade.[186] Exporters who wish to circumvent definitions of scope can try to do so in numerous ways, including by packaging the product with other goods that are not subject to an order or by making minor modifications that bring the product out of technical scope but do not fundamentally change it.[187] Scope disputes were so prevalent that in 2021, the Commerce Department revised its existing regulations to sepa-

*In the case of the Malaysian cabinet makers, the original Chinese supplier had indeed set up a factory to manufacture some cabinets in Malaysia, but at the same time the company was still allegedly shipping completed cabinets to Malaysia for transshipment to the United States. Inti Pacheco, "The Not-So-Secret Way around U.S. Tariffs," *Wall Street Journal*, December 22, 2024.

†The U.S. International Trade Administration (ITA) defines substantial transformation as undergoing "a fundamental change in form, appearance, nature, or character" that "adds to the good's value at an amount or percentage that is significant, compared to the value which the good (or its components or materials) had when exported from the country where it was first made or grown." The ITA expressly states that repackaging and similar minor processes usually do not cause a substantial transformation. International Trade Administration, *Determining Origin: Substantial Transformation*, accessed August 4, 2025.

Rules of Origin and Scope in International Trade—*Continued*

rate circumvention and scope inquiries.[188] Imports from China are often involved in scope disputes—for example, as of July 2025, 13 of 15 final scope rulings by Commerce involved Chinese imports.[189]

Chinese battery, medical device, and semiconductor manufacturers have all explored or are moving assembly and production to Malaysia in recent years as part of efforts to avoid the impact of U.S. tariffs.[190] Or, in the case of antidumping and countervailing duties, which have different rules establishing what products are in scope, Chinese production in ASEAN countries may seek to make minimal changes necessary to evade the scope of the trade remedy duties. While not all, or even a significant portion, of Chinese-linked production in ASEAN countries may engage in such forms of duty evasion, the extensive history of these efforts from Chinese companies means that exports from ASEAN host countries will likely be subject to additional scrutiny from enforcement authorities.[191]

The case of imported solar cells and modules provides an example of Chinese companies moving production abroad in an attempt to avoid unfavorable tariff rates. In January 2018, the Office of the U.S. Trade Representative imposed safeguard tariffs on Chinese solar cells; the tariffs were extended in February 2022.[192] Chinese firms began shifting manufacturing to Southeast Asia, in particular Malaysia, Cambodia, Thailand, and Vietnam, in an attempt to avoid the tariffs.[193] At that time, manufacturing exports in Cambodia were expanding rapidly without a concurrent increase in solar imports, indicating that this was primarily not a case of relabeling and illegal transshipment.[194] In May 2024, however, the U.S. International Trade Administration (ITA) opened an antidumping and countervailing duty investigation into imported solar cells and modules from Cambodia, Malaysia, Thailand, and Vietnam.[195] Many of the companies listed in the ITA's preliminary affirmative determination in October 2024 were subsidiaries of Chinese solar companies operating in Southeast Asia.[196] Prior to additional tariffs imposed by the Trump Administration in April 2025, Chinese-owned solar manufacturers had already begun to set up plants in Indonesia and Laos to maintain access to U.S. markets.[197]

Economic Coercion and Market Distortions in Southeast Asia from Chinese FDI

Chinese exports to Southeast Asia are already eroding the economic strength of Southeast Asian economies, leaving important U.S. allies and partners at risk of Chinese coercion and influence. China has weaponized Southeast Asia's trade dependencies in the past, for example, when it suspended certain agricultural imports from the Philippines in an attempt to pressure the country over competing maritime claims in the South China Sea.[198] China has also targeted Vietnam over South China Sea disputes and singled out individual companies in Thailand and Malaysia over content it viewed as subverting its territorial integrity.[199] As China makes up

a larger portion of investment and intermediate inputs for Southeast Asian manufacturing, its ability to threaten employment and output in key economic sectors for these countries will grow.

Implications for the United States

The original China Shock provides an important lesson for how policymakers can fail to recognize and adapt to unfair and market-distortive trade, especially when the benefits—such as lower costs for consumers—are immediate, while the drawbacks are longer term. **As China's economy has grown and moved up the value chain, a broader swath of global manufacturing is now vulnerable to China's massive export machine, including critical manufacturing industries in the United States.** U.S. exports of advanced technology products currently represent almost one-fourth of its total exports, and yet as China targets the production of higher-value-added goods, the two nations are increasingly in direct competition for export markets.*[200]

China Shock 2.0 may result in Chinese producers taking over market share in countries all over the world, including in emerging markets with rapid population growth. Chinese incumbency could be difficult for U.S. and other producers to overcome.[201] Lack of access to these market opportunities for U.S. companies can substantially erode profitability over time and constrain future investments in next-generation manufacturing equipment and R&D.[202]

China Shock 2.0 also threatens to complicate de-risking efforts, as China's market share gained from export dominance can be quickly turned into leverage over supply chains. As China's exports grow and Chinese companies expand their overseas presence via FDI, Chinese products and components may become embedded, if not dominant, in critical supply chains, including those with serious implications for defense and national security (see Chapter 9, "Chained to China: Beijing's Weaponization of Supply Chains"). The growing presence of Chinese companies in overseas markets also may make it more difficult for the United States to prevent illegal transshipment and tariff evasion.

China Shock 2.0 may further strengthen China's capacity for economic coercion. As discussed in "Chapter 9, Chained to China: Beijing's Weaponization of Supply Chains," China has a plan and demonstrated capacity to use control of supply chains to serve its interests. As China grows its manufacturing exports, it simultaneously grows the extent to which other countries depend on it for key inputs needed for their own economic growth and national defense needs. Further, the market distortions from China's export surge may put non-Chinese manufacturers that are subject to market constraints out of business, further narrowing the scope of alter-

*To illustrate the importance of exports across U.S. technology sectors, U.S. semiconductor exports totaled $57 billion in 2024. Foreign customers accounted for 46 percent of Boeing's revenue in 2024. The U.S. pharmaceutical industry exports around 25 percent of its output. The U.S. automobile industry exported 1.5 million cars, about 15 percent of output in 2024. U.S. International Trade Administration, "New Vehicle Trade Data Visualization," accessed October 6, 2025; Erick Burgueno Salas, "Vehicle Production in North America from 1990 to 2024," *Statista*, August 8, 2025; "State of the U.S. Semiconductor Industry," *Semiconductor Industry Association*, 2025; "Form 10-K," *Boeing*, December 31, 2024, 10; Maggie Fick, "Exclusive: US Pharma Tariffs Would Raise US Drug Costs by $51 Billion Annually, Report Finds," *Reuters*, April 25, 2025.

native suppliers to China and strengthening China's role in global manufacturing.

China was perhaps the biggest beneficiary of the multilateral rules-based trading system over the past two decades, despite boasting an economic model that was often fundamentally at odds with that system. **In many ways, China Shock 2.0 is enabled by the limitations of that system—many countries are constrained in how they can respond to the deluge of China's excess production despite the growing threat of damage to their labor markets and home industries.** As China's export tidal wave begins to impact the entire world, there is a need for like-minded countries, including both developed and emerging markets, to better coordinate a response to China's market distortions and ensure a more balanced and fair global trading system moving forward.

Recommendations

The Commission recommends:

- Congress enact legislation to:
  - Establish a rebuttable "presumption of denial" with respect to foreign investment in U.S. companies that could support the acquisition by China or other foreign adversaries of the capabilities necessary to attain self-sufficiency in critical technologies or otherwise impair the economic or national security of the United States, including:
    - Investments in technology areas prioritized in China's or other foreign adversaries' industrial policies, such as Made in China 2025, and successor initiatives;
    - Investments in U.S. firms that have received funding from the U.S. Departments of Defense, Commerce, and Energy, or other U.S. government funding for projects critical to national security and competitiveness; and
    - Other investments that may provide privileged access to expertise, business networks, and production methods critical to maintaining U.S. economic and technological competitiveness.
  - Require the review of greenfield investments in the United States by Chinese-controlled entities to assess any potential harm to U.S. national and economic security. And, consistent with the previous provision, establish a rebuttable presumption of denial with respect to such greenfield investments if their operations would meet any of the criteria enumerated in that provision; and
  - Direct the Administration to engage with allies and partners to adopt similar measures through bilateral or multilateral engagement or agreements.

The Commission has consistently provided Congress recommendations regarding the improvement of and expansion to the Committee on Foreign Investment in the United States (CFIUS), including a recommendation in 2023 and a slate of recommendations in 2017, many of which were adopted under

the Foreign Investment Risk Review Modernization Act of 2018 (FIRRMA). The Commission continues to raise concerns that the current structure of foreign investment screening is insufficient to protect the United States and U.S.-developed intellectual property and that the United States needs stronger efforts to coordinate with allies and partners to guard against these emerging threats.

- Congress develop legislation to provide for cooperation on and mutual recognition of unfair trade practices.
  - The procedures could provide for a voluntary, expedited mechanism to support coordinated application of trade remedies against unfair trade practices, including but not limited to antidumping (AD) and countervailing duty (CVD) orders.
  - Under this procedure, the United States and partner countries could recognize that an AD/CVD finding is a finding of an unfair foreign trade practice. The United States could then request a third-party country take action within its own market to ensure a coordinated response to the unfair trade practice, and partner countries could request similar action by the United States.

  The United States and its allies and partners have multiple procedures to protect their domestic markets from unfair trade practices. Nonetheless, these procedures are lacking when the exports of domestic firms are harmed by unfair trade practices in third countries. That is, existing authorities enable the U.S. government to protect U.S. manufacturers from products dumped in their home market, but not when those same products are dumped in a third country's market. The concept of addressing unfair trade practices in third-country markets, alongside home markets, is recognized in international trade law but, in general, has been unutilized, harming U.S. firms and the firms of U.S. allies and partners.*
- To address the harmful consequences of the Second China Shock—the massive outpouring of subsidized, underpriced Chinese manufactured goods now flooding the world economy and threatening to undermine the prospects for industrialization and future prosperity of developing countries while denying potential markets to U.S. exporters—Congress should:
  - Direct the U.S. Department of State, in conjunction with other agencies, to prepare a report detailing the impact of China's recent export surge on the developing world, proposing U.S. and allied policies to counteract its negative effects as part of a larger strategy for blunting the growth of China's global influence, and identifying ways in which the U.S. government may employ existing statutory authorities to work with foreign countries to respond collectively to the Second China Shock; and

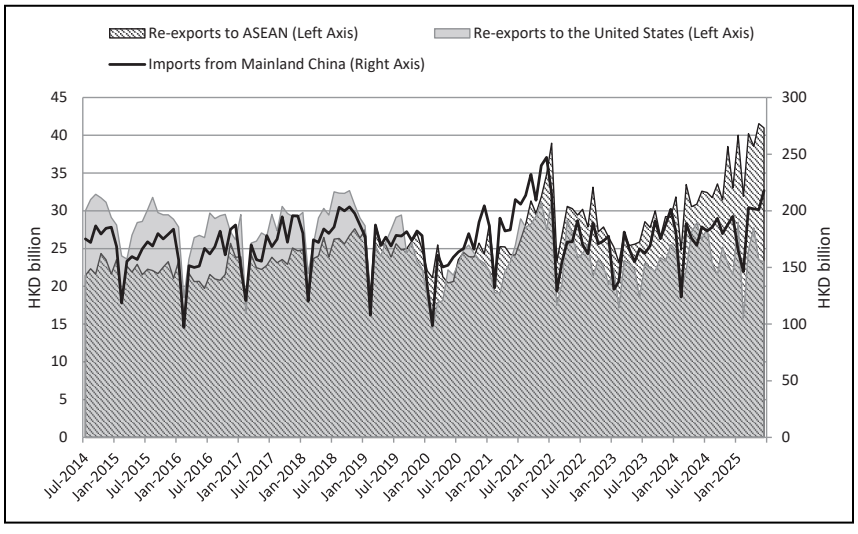
*Agreement on Implementation of Article VI of the General Agreement on Tariffs and Trade 1994, April 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1A, art. 14, 1868 U.N.T.S. 201; Third-Country Dumping, 19 U.S.C. §1677k (1994); *Regulations Amending the Special Import Measures Regulations*, SOR/2023-26, *Canada Gazette*, Part II, 157, no. 5 (March 1, 2023): 396.

- Direct the Departments of State, the Treasury, and Commerce and the U.S. Trade Representative to establish an international forum to coordinate a multilateral response to the Shock, taking into consideration issues of reciprocal market access and ensuring fair treatment for U.S. exporters in third countries.

Appendix

Hong Kong, as a global trade hub, re-exports the vast majority of its imports from mainland China. As imports from mainland China have climbed over the first half of 2025, Hong Kong's re-exports have shifted away from the United States toward ASEAN. The figure below displays Hong Kong's monthly trade value. A decrease in shipments to the United States has occurred commensurate with an increase in shipments to ASEAN, reflecting Hong Kong's role in global trade re-routing. These trends indicate that some of the growth in China's exports to Hong Kong reflects efforts to transship goods through Southeast Asia to their ultimate destination in the United States in order to avoid tariffs.

Figure 8: Hong Kong Exports Mimic China in Reorienting toward ASEAN, July 2014–June 2025 (HKD billions)



Source: Hong Kong Census and Statistics Department, "*Imports, Re-Exports*," via Haver Analytics.

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CHAPTER 9: CHAINED TO CHINA: BEIJING'S WEAPONIZATION OF SUPPLY CHAINS

Executive Summary

China has long made clear its willingness to use its economic heft to advance the Chinese Communist Party's (CCP) strategic interests. In the past five years, however, it has intensified this strategy by prioritizing control over key supply chains. China has already deployed export controls on critical minerals as a coercive tool, including to seek policy concessions in trade negotiations with the United States and to punish other countries. However, critical minerals are just one among several key sectors in which the United States is highly dependent on Chinese sources or could become dependent in the near future.

Other key sectors include active pharmaceutical ingredients (APIs), printed circuit boards (PCBs), and foundational semiconductors—all of which are vital to national security and commercial stability and for which even short-term, partial disruption could cripple critical industries and military readiness. With potentially as much as one quarter of all APIs sourced from China directly—or indirectly through India—U.S. pharmaceutical supply chains face a vulnerability that could have drastic consequences for the American healthcare system. PCBs are critical to all electronics—from the simplest to the most advanced. Though Beijing faces practical barriers to restricting Chinese PCB content to U.S. end users, China has substantial and growing leverage in this important sector, both via direct sales to the United States and much more significantly via made-in-China PCBs embedded in global electronics products. Foundational semiconductors are a likely future vulnerability. China's breakneck expansion in production capacity threatens to flood the market and put competitors out of business if left unaddressed. In that case, the United States may soon depend on access to China's chip industry for producing a wide variety of electronic devices.

As covered in the preceding chapter, an ongoing flood of low-cost Chinese goods is spilling into global markets amid a second China "Shock," threatening to put global competitors out of business in sector after sector and positioning China for dominance over ever more supply chains. Without bold action to strengthen domestic production, de-risk from potential adversaries, and coordinate more closely with allies and partners, the United States will become ever more dependent on Chinese supply chains while Beijing in turn strengthens its ability to exert leverage via those supply chains by imposing either targeted controls or larger-scale embargoes on critical exports to the United States.

Key Findings

- China has held a dominant position in many global supply chains for years, once concentrated in lower-value products and materials but now extending to advanced technologies. In the past few years, the country's economic coercion toolkit has evolved rapidly in sophistication and impact. China now appears poised to accelerate its weaponization of supply chain chokepoints, potentially imposing significant short-term costs on the United States and other trade partners, eroding industrial resilience, and constraining U.S. policy choices.
- China's economic model systematically leads to a concentration of global productive capacity in industries targeted for state support, and establishing such chokepoints has been an explicit CCP policy goal for years. China's supply chain leverage in key sectors will continue to grow over time if unchecked. To date, the United States and other countries have taken only limited measures to mitigate this threat. In the short term, China has already shown an ability and willingness to weaponize its dominant position in critical minerals supply chains, including export restrictions on gallium, germanium, and rare earth magnets in 2023–2025.
- China dominates the supply of APIs and other key starting materials (KSMs)—all of which are essential for U.S. drug supply chains. If Beijing actively restricts U.S. access to these materials, the consequences could be catastrophic for U.S. health security, the broader economy, and potentially military readiness.
- China controls roughly half of global production of PCBs, the essential building blocks of virtually all electronic devices on which integrated circuits and other components are mounted. The United States has lost much of its domestic capacity to produce PCBs and has become heavily reliant on Chinese imports. Losing access to this supply of Chinese PCBs would likely shut down U.S. electronics manufacturing across multiple sectors, including those related to defense, aviation, and critical infrastructure.
- China's coming production surge in foundational semiconductors will pose a serious economic and security threat to the United States and other major semiconductor-producing economies. Foundational semiconductors are workhorse components that, while less advanced than leading-edge chips, are critical to the functionality of most electronic devices. Overcapacity in this sector could drive other producers out of business and make the world heavily reliant on Chinese producers for components that form the backbone of both the modern economy and a modern military.
- Because supply chain vulnerabilities can take years to unwind, it is critical for the United States to immediately de-

velop a more effective risk-mapping tool that identifies where Chinese leverage currently exists as well as the sectors where Beijing's leverage will likely grow in the future. In order to eliminate such critical dependencies and avoid them in the future, the United States must formulate and commit to a long-term strategy of supply chain de-risking—requiring close cooperation with allies and partners—to achieve the conditions necessary for greater safety and resiliency.

Introduction

China's temporary suspension of rare earth exports to Japan in 2010, following a collision between Chinese and Japanese vessels near the disputed Senkaku Islands, demonstrated to the world Beijing's willingness and ability to weaponize supply chain control for geopolitical ends. In the intervening years, China deepened global dependence on its rare earth refineries while concentrating the industry under state control, and it more recently institutionalized a bureaucratic process to impose targeted controls on rare earth exports. Despite a decade and a half of forewarning, the U.S. government failed to develop a policy response sufficient to address this threat, and in 2025, fears were realized as China curbed exports of rare earth elements and permanent magnets to the United States. China's actions threatened U.S. production of a wide range of goods important to economic and national security, including the automobile sector, many critical defense products, medical devices, lasers, and spacecraft.[1] Worse, policy options were constrained by the need to avoid damage from further escalation.

China's supply chain leverage poses a significant threat to both U.S. economic resilience and national security. Beijing's ability to deny access to critical inputs enables it to disrupt production across key industries and stall the U.S. manufacturing sector, or in the case of APIs, deny life-saving drugs to U.S. patients. A sustained disruption could make U.S. firms less competitive on the global stage, compromise defense industrial base resilience, and devastate America's healthcare system. Even short of outright denial, U.S. policymakers may repeatedly find their desired policy responses constrained or stymied because of fear of Chinese retaliation. U.S. firms could also be forced to divert scarce resources toward stockpiling, securing alternative suppliers, or managing higher transaction costs—diverting investment from innovation and growth. Moreover, similar dependencies among U.S. allies can create ripple effects that further undermine U.S. security. Four case studies—critical minerals, pharmaceuticals, PCBs, and foundational semiconductors—demonstrate these risks from China's weaponization of supply chain vulnerabilities.*

*This chapter draws on the Commission's 2025 hearing on "Dominance by Design: China Shock 2.0 and the Supply Chain Chokepoints Eroding U.S. Security," consultations with policy experts, and open source research and analysis.

When Does a Supply Chain Vulnerability Exist?

Different studies offer varying definitions of supply chain vulnerability, some focused on criticality of supply chains to economic and national security and others on measuring degree of exposure to potential manipulation.[2] This chapter considers the following six conditions in evaluating where the United States is vulnerable to Chinese coercive leverage over supply chains. U.S. vulnerability is greatest when:

- There is a high level of dependence on content produced in China—materials, components, or finished goods—for any stage of production or consumption;
- The product is not easily substitutable;
- There is a lack of alternative or immediate suppliers, or China maintains the ability to coerce potential alternative suppliers into restricting sales to the United States;
- The product is a necessary part of an important supply chain, whether essential to the economy (e.g., automobile production), health security (e.g., pharmaceuticals), national defense (e.g., weapons systems), or other vital sectors;
- There is limited surge capacity or long timelines for ramping up alternative sources of production, and
- Stockpiling challenges exist, such as a short inventory shelf-life for medications.

The Imperative to Address China's Leverage over the U.S. Economy

Creating Supply Chain Dependencies Is Now a Feature of China's Economic Model and an Explicit Policy Goal

China's economic model has long used tools of industrial policy to expand its manufacturing dominance across everything from low-end to higher-value goods, all the while capturing market share and thereby increasing its control over key supply chains. In examples ranging from APIs to solar panels to ships, Chinese policies have subsidized production and over-investment, leading to excess supply that then floods global markets at depressed prices, often pushing market-disciplined competitors out of business and leaving the global economy few alternatives but to rely on its production base. While these outcomes have long been at least a byproduct of China's economic model, in the past half-decade Beijing has shifted toward an explicit policy goal of establishing uncontestable dominance across global value chains, eliminating its own vulnerabilities while creating global dependencies on Chinese products. As Xi Jinping proclaimed in a 2020 speech:

> *"We must sustain and enhance our superiority across the entire production chain in sectors such as high-speed rail, electric power equipment, new energy, and communications equipment, and improve industrial quality; and we must*

tighten international production chains' dependence on China, forming a powerful countermeasure and deterrent capability against foreigners who would artificially cut off supply [to China]."[3]

China is Refining its Ability to Weaponize Supply Chains

While China has a history of employing economic coercion through ad hoc import bans against smaller trading partners, its formalization of an export control regime and recent use of these controls against the United States, Europe, and others represents a marked shift in the boldness of its geopolitical agenda.[4] For the United States and other countries, the controls on critical minerals demonstrate that China can wield supply chain leverage not just through brute force embargoes in a conflict scenario—crudely shutting down all exports in a critical supply chain—but also through calibrated controls that impose calculated economic pain to achieve strategic effects. China's effective application of controls on critical minerals owes in part to the consolidation of its domestic industry under state control and institutionalization of internal coordination mechanisms to ensure enforcement. Yet the degree to which Beijing may choose to extend similar controls to other sectors in which it dominates supply chains likely depends on a number of factors, including the effectiveness of its export control regime, the level of U.S. dependence, market conditions, surge capacity, and economic constraints on China.

Modernization of China's Export Controls System

Under Xi Jinping's push for "rule by law," China has formalized its tools for economic coercion by expanding its export control regime.*[5] Future export restrictions will be easier to impose and will likely be used more proactively to assert China's interests, whereas past economic coercion was often retaliatory and frequently aimed at defending what China identifies as its "core interests" like Hong Kong, Xinjiang, or Taiwan.[6]

Lessons Learned from China's 2010 Critical Mineral Restrictions on Japan

In 2010, China informally and temporarily cut off its rare earth element (REE) exports† to Japan following a collision of a Japanese coast guard ship with a Chinese commercial fishing vessel off the disputed Senkaku Islands. At the time, Japan depended on China for more than 90 percent of its rare earth imports.[7] The incident served as a wake-up call not only for Japan but also for the international community, exposing the risks of dependence on a single dominant supplier. Nonetheless, Japan was the only country to take significant steps to reduce its reliance on China. After Japan met China's demands by releasing the Chinese fishing trawler captain to resolve the dispute, it also put together a 100 billion Japanese yen (JPY) ($1.2 billion) package to develop

*For more on China's "rule by law," see U.S.-China Economic and Security Review Commission, Chapter 2, Section 1, "Rule by Law: China's Increasingly Global Legal Reach," in *2023 Annual Report to Congress*, November 2023, 175–206.

†China never officially stated that this action was an export ban.

Lessons Learned from China's 2010 Critical Mineral Restrictions on Japan—*Continued*

and acquire REE mines elsewhere, stockpile REEs, and develop the technology to reduce, recycle, and substitute the use of REEs.[8] Japan also formed partnerships with the United States, Australia, Mongolia, India, Vietnam, and Kazakhstan to secure REE deposits.[9] Today, Japan's dependence on China for REEs has fallen to 60 percent.[10] As dependence remains high, Japan continues its efforts with plans to reduce its reliance to below 50 percent by the end of 2025.[11]

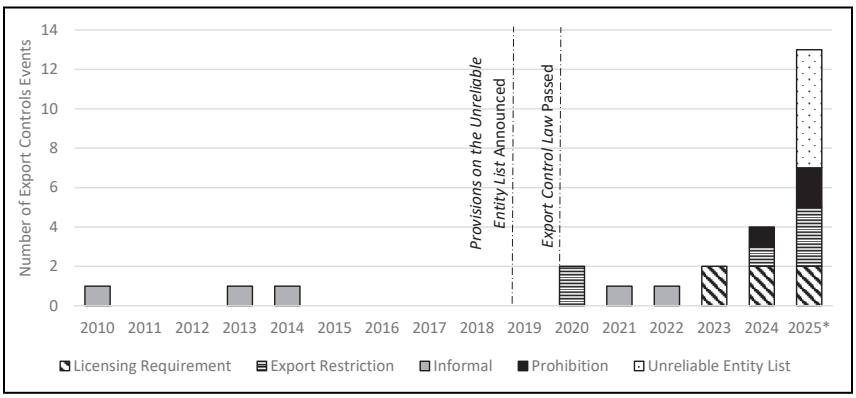
China, in turn, learned that it needs a legal system that allows Beijing to credibly signal its intention, effectively enforce any restriction, and help to minimize international repercussions. Following the 2010 dispute, the United States, Europe, and Japan filed a dispute with the WTO which ruled against China's rare earth export quota system.[12] China dropped the embargo and replaced it with a production quota that kept prices artificially low and stabilized.[13] Additionally, the Chinese government realized that it lacked complete control over REE exports due to smuggling.[14] After Xi Jinping came to power, China's REE export governance evolved into one with much stronger centralized state control and eventually the formalization of its export controls system.[15] The Party-state consolidated the industry and enhanced its ability to exert control over the domestic and global market by reducing the number of REE producers from over 100 to just six by 2016, which then merged to become the China Rare Earth Group in 2021.*[16] The government saw this industry consolidation as an effective strategy to overcome illegal mining and smuggling challenges.[17]

Though the Party-state is mostly unbound by legal constraints in imposing economic restrictions, formalizing its toolkit for implementing export controls can increase the speed and efficacy of its application and provide the appearance of legitimacy under trade rules. While China's export controls system is not new, the 2020 Export Control Law centralized its regime and consolidated various control policies that govern the dual-use catalogue, licensing requirements, extraterritoriality provisions, and end-use and end-users certification.[18] As China gains an edge in technologies that it seeks to prevent others from accessing, Beijing has found it useful to develop a centralized control regime that in many ways mirrors that of the United States. However, unlike the U.S. regime, and those of other countries following the Wassenaar Arrangement, China's sys-

*The Party-state's control over the REE industry stems from a variety of factors and serves a variety of purposes. Industry consolidation is one of the factors to seek control; other policies such as the 2011 Notice on Joint Inspections of the Rare Earth Rectification Campaign strictly targeted illegal mining, production beyond quotas, smuggling, and environmental violations, resulting in closure of small refining and smelting facilities. The Party-state wanted not only to prevent smuggling but also to control pricing and environmental pollution. Guo Fang and Dong Xianping, "江西赣州官员百姓偷采稀土调查:比毒品更上瘾" [Investigation into Officials and Civilians Illegally Mining Rare Earths in Ganzhou, Jiangxi Province], *China Economic Weekly*, April 18, 2012; China's Ministry of Industry and Information Technology, 关于开展稀土专项整治行动联合检查的通知 [Notice on Carrying Out Joint Inspections of Special Rectification Actions for Rare Earths], November 10, 2011.

tem is not grounded in international consensus and is deliberately opaque, enabling deniability and flexibility to navigate geopolitical shifts.[19] Beijing has employed this economic tool more frequently and broadly since late 2023 (see Figure 1). With the proliferation of licensing requirements, Beijing can request supply chain disclosure and foreign end-user verification, enabling it to map out foreign industrial supply chains and identify future leverage.[20]

Figure 1: China's Increasing Use of Export Controls, 2010–2025



Note: *2025 is as of October 10. The number of export control events refers to individual restrictions. Export restriction refers to limits of exports over time (for example, Chinese manufacturers limited sales of drone components to the United States and Europe in December 2024). By contrast, export prohibition refers to a complete ban (for example, of certain materials like gallium, germanium, antimony, and superhard materials to the United States in the same month).
Source: Various.[21]

China's export control regime has evolved from an ad hoc response to foreign policy actions Beijing views as unfavorable to a more potent tool of retaliation and even proactive deterrence aimed at constraining other countries' policy choices. In the past two years, China has developed and employed a more formalized export control regime against the United States (see Table 1). In response to U.S. restrictions on advanced semiconductors and semiconductor manufacturing equipment in October 2022, China introduced a licensing regime for gallium, germanium, and graphite exports, subsequently banning gallium and germanium exports to the United States.[22] Further flexing its leverage over the critical mineral supply chain, China required licensing for seven REEs and other key minerals following U.S. tariffs in February and April, which Beijing used as leverage during trade negotiation with the United States.*[23] In Oc-

*Before placing export licensing requirements on seven REEs and related magnets in retaliation for U.S. tariffs in April 2025, Beijing circulated a draft for public comment in February to improve its REE traceability system. The policy, which went into effect on July 28, attempts to strengthen central oversight of the REE industry and improve Beijing's ability to enforce the export controls on REEs. It may also aim to enhance Beijing's ability to use the controls as a deterrent. China's Ministry of Industry and Information Technology, 稀土开采和稀土冶炼分离总量调控管理暂行办法 [Interim Measures for the Regulation and Management of Rare Earth Mining and Rare Earth Smelting and Separation], July 28, 2025; China's Ministry of Industry and Information Technology, 工业和信息化部公开征求《稀土开采和稀土冶炼分离总量调控管理办法（暂行）（公开征求意见稿）》《稀土产品信息追溯管理办法（暂行）（公开征求意见稿）》的意见 [The Ministry of Industry and Information Technology Is Soliciting Public Opinion on the "Administrative Measures for the Total Amount Control of Rare Earth Mining and Smelting and Separation (Interim) (Draft for Public Comment)" and the "Administrative Measures for the Information Traceability of Rare Earth Products (Interim) (Draft for Public Comment)"], February, 25, 2025.

tober 2025, it expanded controls to encompass five additional REEs, REE processing technologies, and items related to lithium batteries, cathodes, and anodes (see Table 1).[24]

China's use of export controls, however, is not solely retaliatory but can also be proactive.[25] For example, in the summer of 2025, China imposed controls on battery technology and related mineral processing technologies—a move that does not appear to be solely driven by a reaction to any particular U.S. policy (see Table 1). These controls may reflect a desire to retain advantages in these sectors, as well as greater leverage in trade negotiations with the United States.[26]

Table 1: China's Expanded Export Controls and Corresponding Rationale, 2023–2025

Date	Export Control	Reason
Announced Jul. 2023. Effective Aug. 2023.	Required licenses for gallium and germanium exports.	Retaliation for October 2022 U.S. semiconductor controls.
Announced Oct. 2023. Effective Dec. 2023.	Required licenses for graphite exports.	Retaliation for October 2023 U.S. semiconductor controls.
Dec. 2023	Expanded restrictions and bans on exporting REE processing and gallium extraction technology.	Longstanding restrictions on REE processing equipment and to maintain gallium extraction price advantages.
Announced Aug. 2024. Effective Sep. 2024.	Required licenses for antimony exports. Banned antimony processing technology exports.	Likely a response to U.S. efforts in May and June 2024 to enhance global cooperation on semiconductor manufacturing equipment export controls.
Dec. 2024	Banned antimony, gallium, germanium, and "super-hard" exports. Required stricter licensing for graphite exports.	Retaliation for December 2024 U.S. semiconductor controls.
Jan. 2025	Proposed restrictions on battery technology and gallium and lithium processing technologies.	Unknown; either signaling how China could retaliate against trade measures in the future or related to government efforts to keep advanced intellectual property from leaving China.
Effective Feb. 2025	Required licenses for certain bismuth, indium, molybdenum, tellurium, and tungsten products.	Retaliation for February 2025 U.S. tariffs.
Apr. 2025	Required licenses for seven REEs (dysprosium, gadolinium, lutetium, samarium, scandium, terbium, yttrium) and related materials, including magnets.	Retaliation for April 2025 U.S. tariffs.

Table 1: China's Expanded Export Controls and Corresponding Rationale, (2023–2025)—*Continued*

Date	Export Control	Reason
Jul. 2025	Restricted export of battery technology and gallium and lithium processing technologies.	Unknown; either retaliation to enhance Chinese leverage in trade talks with the United States or related to government efforts to keep advanced intellectual property from leaving China.
Oct. 2025	Required licenses for five medium-heavy REEs (holmium, erbium, thulium, europium, and ytterbium) and superhard materials; for related technology for extracting, processing, smelting, manufacturing, and recycling REEs; for Chinese persons to provide substantive assistance related to REEs; for lithium battery-related items; and for cathode and anode materials and related items. License for REE exports used in advanced chips subject to case-by-case review. Prohibited exports for military and related end-uses.	Retaliation for U.S. "50 percent rule" that expanded end-user export controls to organizations at least 50 percent owned by firms on the Entity List as well as strategic leverage in U.S.-China trade negotiations.

Source: Various.[27]

Limitations of China's Economic Toolkit

China faces different degrees of constraint across various sectors in its ability and willingness to leverage its supply chain dominance for economic coercion. The Party-state faces enforcement challenges from coordination between various agencies and levels of government as well as control over Chinese suppliers. China's General Administration of Customs (GAC) has a hands-on role in stopping illegal smuggling, but both GAC and its local customs agencies have long struggled to allocate resources to administer effectively and implement technical guidance from the Ministry of Commerce (MOFCOM) and the Ministry of Public Security.[28]

The Party-state's ability to enforce its export controls effectively depends on the market structure of the industry in question. Chinese officials generally exert greater control in domestic industries, such as the REE industry, that are highly concentrated in a few, state-owned firms. However, their oversight and enforcement capacity may be weaker in more competitive markets with numerous non-state-owned producers.[29] For example, MOFCOM proposed export controls on photovoltaic wafer technology in a 2022 catalogue and opened the proposal for public comments, but it rolled back the proposed controls.[30] Bai Chong'en, a Chinese scholar and member of the Chinese People's Political Consultative Conference raised concerns about growing industry competitiveness in the United States and Europe.[31] Markets with numerous, often smaller producers (including pharmaceuticals and PCBs)

may also make it easier to evade and circumvent export restrictions. Industries in China involving foreign-owned or invested companies, such as PCBs, may face foreign investors' backlash both from impacts to their revenue in China and countervailing pressure from their home governments.

China also faces challenges in enforcing its controls in third countries. Similar to the U.S. export control regime, MOFCOM now asserts jurisdiction over foreign-manufactured items that use or contain China-origin items. For example, in December 2024, China's prohibition of antimony, gallium, germanium, and superhard materials to the United States was the first time China used a provision in its Export Control Law to prohibit the export of products from third countries that contain Chinese-controlled content, similar to the U.S. Foreign Direct Product Rule.*[32] To enforce the control, MOFCOM warned South Korean manufacturers of power transformers, batteries, electric vehicles (EVs), and other electronics that violating China's export controls could lead to major sanctions, including penalties and market access restrictions.[33] Although these South Korean companies are under immense pressure to comply, other firms in other sectors might not.[34] The October 2025 expansion of controls on REEs included far broader extraterritorial provisions, requiring companies in other countries to obtain licenses from Chinese authorities to export products that derive more than 0.1 percent of their value from China-sourced REEs or use of Chinese processing technologies.[35] As more Chinese firms move production abroad, China may need to gain more insights into Chinese and foreign companies' supply chains and assert extraterritorial jurisdiction to enforce its export controls.[36] While Chinese factories, wherever located, are more likely to comply with the Party-state's directives, China is likely to experience resistance from foreign companies and third countries if they are forced to choose between compliance with U.S. or Chinese export controls.[37]

Beijing's weaponization of its supply chain dominance also could create collateral damage to China's economy and reputation. Beijing's economic coercion to date has mostly targeted vulnerabilities that minimize its own economic costs while still achieving its political objective. Restricting exports risks direct economic costs for China, especially when U.S. demand is high and alternative markets are limited. Chinese firms may also face reputational costs worldwide, undermining Xi Jinping's narrative of a "responsible major country."[38] Such reputational costs may vary by sector—for instance, the costs would likely be higher for pharmaceuticals and medicines since they are typically exempt from sanctions because of humanitarian concerns.[39] China could risk being labelled a bully and untrusted trade partner.[40]

*This authority mimics the U.S. Foreign Direct Product Rule, but given that China's authority is still in its infancy, the two countries' ability to enforce extraterritoriality should not be conflated.

China's Capacity to Weaponize Supply Chain Vulnerabilities Threatens U.S. Economic and National Security

The United States' existing and growing dependence on Chinese supply chains heightens its exposure to China's economic coercion in sectors critical to U.S. national security and economic competitiveness. Yet it will be difficult to develop effective risk mitigation strategies in areas vulnerable to Chinese pressure when the U.S. government at this juncture does not even have full transparency into the scope of the problem. Across the four sectors examined in this chapter, U.S. reliance on China for critical minerals presents the most immediate challenge, while the dependence on China's raw pharmaceutical ingredients such as APIs and KSMs indicates a deep though not fully understood vulnerability. In PCBs, China is a leading—if not dominant producer—across most segments in the market, but leveraging this as a chokepoint presents significant challenges for Beijing. Meanwhile, for foundational semiconductors, China's massive state-led overinvestment in the sector signals potential future dominance and underscores the need for a forward-looking, proactive strategy to build resilient supply chains not reliant on Beijing's good graces.

Case Study #1: The Immediate Chokepoint Challenge: Critical Minerals

The United States is dependent on critical minerals for a wide variety of industries and defense needs. The minerals deemed "critical" are not fixed, and their criticality is determined by the U.S. Geological Survey (USGS) under the authority of the Energy Act of 2020, which defined critical minerals as those that are essential to the U.S. economic or national security and vulnerable to disruption.[41] The USGS's 2025 Critical Minerals List includes 54 mineral commodities, used in a range of sectors of the U.S. economy from energy infrastructure, advanced technology manufacturing, and aerospace engineering to medical equipment.[42] For example, REEs discussed earlier contain 17 elements used in various sectors, including health care, transportation, power generation, petroleum refining, and consumer electronics.[43]

The United States is Dependent on China for Key Critical Minerals

The United States' dependency on China for critical minerals is twofold. First, China has a larger volume of commercially viable reserves for a greater number of minerals than the United States. Second, and more importantly, mineral processing and refining is heavily concentrated in China, creating a greater supply chain chokepoint than raw ore mining given that mines controlled by the United States and other third countries continue to send raw materials to China for processing. These points of leverage pose acute risks to the United States: many critical minerals have applications in the defense sector (e.g., yttrium used in lasers) and in essential commercial goods (e.g., gallium and germanium in engine control units in automobiles). While U.S. policymakers have long been aware of the vulnerability caused by heavy reliance on China for

critical minerals, steps to mitigate the risks have been limited, and insufficient to offset deepening dependence on China.

China dominates production and processing of critical minerals, as well as the manufacturing of key components that make use of them. USGS had sufficient information available to make reliable estimates as to the countries that led production of 44 of the critical minerals; in 2024, China was the leading producing country of 30 of them.[44] China is the top source of 15 out of the 32 critical minerals for which the United States is heavily reliant on imports (i.e., for which imports accounted for more than half the minerals the United States consumes; see Figure 2). The country's dominance in processing critical minerals has deepened U.S. dependency, as it controlled 96 percent of global processing for battery grade graphite, 91 percent of magnet REEs, and 70 percent of indium in 2024.*[45] China's control of manufacturing of components that rely on key critical minerals also creates further vulnerabilities for the United States. China controls 90 percent of the global supply of permanent magnets made from REEs, and it leveraged this position to impose export restrictions on these magnets in April 2025.†[46] (For more on the critical mineral supply chain, see Appendix I; for China's dominance in the global EV and lithium battery supply chain, see Chapter 10, "Power Surge: China's Electrification Drive and Push for Global Energy Dominance.")

Even where critical mineral resources are located outside of China, the United States may still be exposed to Chinese leverage, given China's extensive ownership and operation of overseas mines and processing facilities. For instance, although the United States does not rely on direct imports of lithium and cobalt from China, it remains vulnerable to China's leverage, having imported more than half of its lithium from Argentina and Chile where Chinese state-owned enterprises (SOEs) own major stakes in the countries' mining and processing facilities (see Figure 2). These include a 46.7 percent stake in Argentina's Caucharí-Olaroz, one of the world's most productive lithium salt flats, and 22 percent of Chile's Sociedad Quemíca y Minera de Chile S.A., the world's biggest lithium producer, allowing China to account for 72 percent of global lithium processing capacity.[47]

*The International Energy Agency's Executive Director Fatih Birol stated that China's share in the refining of all critical minerals is over 70 percent. Kim Jaewon, "IEA Chief Expresses Concern over China's Dominance in Strategic Minerals," *Nikkei Asia*, August 27, 2025.

†Beijing also told foreign companies not to stockpile rare earths and derived products such as magnets used in electric motors or risk getting cut off. Joe Leahy and Ryan McMorrow, "China Cracks Down on Foreign Companies Stockpiling Rare Earths," *Financial Times*, August 14, 2025.

Figure 2: Critical Minerals with U.S. Net Import Reliance Greater than 50 Percent, China as a Leading Import Source, and Industry Application

Critical mineral	Share from all import sources	China* as a leading import source (2020-2023)	Key Industries		
			Defense	Telecom & Electronics	Energy
CESIUM	100	✓	✓	✓	✓
FLUORSPAR	100	✓		✓	✓
GALLIUM, metal	100	✓	✓	✓	✓
GRAPHITE (NATURAL)	100	✓	✓	✓	✓
INDIUM	100		✓	✓	✓
MANGANESE	100		✓		✓
NIOBIUM (COLUMBIUM)	100		✓		✓
RUBIDIUM	100	✓	✓	✓	✓
SCANDIUM	100	✓	✓	✓	✓
TANTALUM	100	✓	✓	✓	✓
YTTRIUM, compounds	100	✓	✓	✓	✓
TITANIUM, sponge metal	>95		✓	✓	
POTASH	93				✓
BISMUTH, metal, alloys, and scrap	89	✓	✓	✓	✓
TITANIUM MINERAL CONCENTRATES	86			✓	
ANTIMONY, metal and oxide	85	✓	✓	✓	✓
PLATINUM	85			✓	✓
RARE EARTHS, compounds and metals	80	✓	✓	✓	✓
CHROMIUM, all forms	77		✓		✓
COBALT, metal, oxides, and salts	76		✓	✓	✓
BARITE	>75	✓			✓
MAGNESIUM METAL	>75		✓		✓
TIN, refined	73		✓	✓	
ZINC, refined	73		✓	✓	✓
RHENIUM	65			✓	✓
SILVER	64			✓	✓
Alumina	59		✓		✓
MAGNESIUM COMPOUNDS	52	✓	✓		✓
GERMANIUM	>50	✓	✓	✓	✓
LITHIUM	>50		✓	✓	✓
TUNGSTEN	>50	✓	✓	✓	✓
SILICON, metal and ferrosilicon	>50			✓	

Note: *China is one of the top four sources of U.S. critical mineral imports.
Source: Various.[48]

The U.S. Department of Defense (DOD) relies heavily on Chinese critical minerals for components used in its weapon systems. According to a 2025 defense data analytic firm's report, 78 percent of components in DOD's weapons systems contain critical minerals sourced from China.[49] Among the six military services, the U.S. Navy is particularly dependent on China for critical minerals with nearly 92 percent of weapons systems impacted.[50] For instance, Virginia-class submarines use 4,200 kilograms (kg) of REEs, while Arleigh Burke-class destroyers use 2,360 kg of REEs for their radar, munitions, and other technologies.[51] The U.S. Air Force's predator drones and other advanced radar systems all rely on REE magnets for propulsion, targeting, and guidance systems.[52]

U.S. telecommunications and electronics and energy sectors also depend heavily on China for critical minerals (see Figure 2). For the

manufacturing of semiconductors, gallium, germanium, and REEs are essential to the production of wafers, while scandium is used in transistors and diodes, critical for controlling the flow of electronic current.[53] The U.S. energy industry is especially reliant as all of the 15 critical minerals for which the United States depends on China (see Figure 2). New and traditional energy products such as EVs, batteries, and solar panels depend on graphite, gallium, and REEs as well as lithium sourced from China-controlled mines in Chile and Argentina. (For more on how China dominates in the new energy sector, including energy-related critical minerals and products, see Chapter 10, "Power Surge: China's Electrification Drive and Push for Global Energy Dominance.")

Challenges in Reducing U.S. Dependence on Chinese Critical Minerals

Following China's REE export restrictions on Japan in 2010, the United States began examining numerous, fragmented policy options to reduce reliance on REEs from China.[54] These include U.S. Department of Energy-led efforts to find alternative means of obtaining REEs and other critical minerals, including through recycling used electronics and developing domestic mining and processing.[55] Executive orders from 2017, 2020, and 2021 mandated the development of strategies to reduce U.S. reliance on critical minerals.[56] In 2022, the Defense Production Act was used to increase domestic production of minerals, including through investments in graphite projects.[57] In early 2024, DOD's Defense Advanced Research Projects Agency (DARPA) launched the Open Price Exploration for National security research and development (R&D) program to better understand component-based pricing information and supply and demand for a range of critical commodities.[58] In 2025, multiple executive orders targeted the expansion of U.S. critical mineral supplies—including declaring a national energy emergency, establishing a National Energy Dominance Council, and authorizing agencies to use the Defense Production Act to increase domestic production—and a Section 232 investigation has been initiated into the national security risks posed by reliance on critical mineral imports.[59]

However, U.S. reliance on China for critical minerals persists, due to a number of factors. First, there are financial, technical, and operational hurdles the United States would need to overcome to establish sufficient domestic capacity to extract and refine critical minerals, even where it has significant proven reserves. Capital expenditure requirements are substantial, margins are slim, and environmental standards are costly to meet.[60] Even with favorable prospects, most investments would not become profitable for over a decade due to the volatility of global prices—at times due to China's price manipulation—and the long development phases, on average 16.5 years from discovery to production.[61]

As noted above, even if U.S. firms increase their mining capacity, limited processing and refining capability—including difficulty in scaling these operations—means they still may need to send raw materials to China. For example, the Mountain Pass (MP) Rare Earth Mine shipped 98 percent of the extracted REEs to China in 2019 due to the lack of processing capacity.[62] Although the company is working to modernize its ability to process and refine minerals in

the United States, and in April 2025, it halted all of its REE oxide shipments to China, it still can process and refine only about half of its mining output domestically.[63] To support this shift, DOD invested $400 million in MP's shares in July 2025, aiming to help scale up the company's processing and magnet production capacities.*[64] DOD also established a ten-year price floor commitment with MP Materials for neodymium and praseodymium (NdPr), rare earths used in permanent magnets, guaranteeing a $110/kg floor. By comparison, in August 2025, NdPr was selling for $88/kg in China.[65]

In today's mineral markets, U.S. firms struggle to compete as Chinese companies benefit from decades-long policies to dominate in all phases of the supply chain. Chinese industrial policy has long prioritized support for extraction and processing technologies, including through an array of subsidies and other fiscal support.[66] The Chinese government also sets annual quotas on extraction and refining, such as for REEs, to control domestic and international markets and prevent mineral depletion.[67] Notably, China has restricted the export of REE extraction and separation technologies to maintain its monopoly.[68] The government has also focused on cultivating geological talent, having established 38 mineral processing schools and 44 mining programs to train next-generation engineers.[69] These investments appear to have paid off: In 2021, Chinese entities filed for more REE technology patents than the rest of the world combined, and firms such as Huawei are horizontally integrating into advanced mining technology.[70] Moreover, in the long term, Chinese-subsidized operations are taking advantage of Western divestments to rapidly increase production capacity and actual output, suppressing mineral prices.[71] For example, between 2022 and 2023, the price of cobalt fell from $40 to $15 a pound, the result of intense price competition from dominant Chinese producers, which drove the only U.S.-based cobalt mine, Jervois, to close in 2023 and enter into bankruptcy in 2025.[72] China's actions to manipulate global mineral markets—pressuring existing mines to close and deterring investment in new projects—could also exacerbate U.S. vulnerability to China.[73]

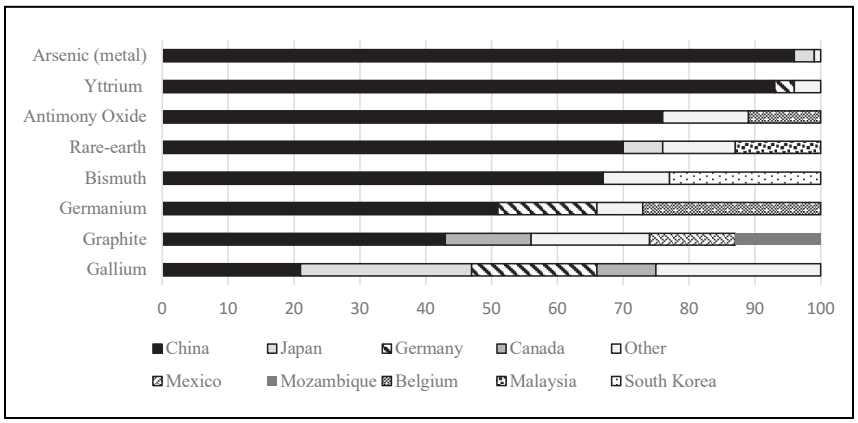
Second, many critical minerals have limited substitutability due to unique chemical and physical properties that make them ideal for specific functions.[74] For example, the Department of Energy designated lithium as not substitutable, and it designated cobalt and copper as minerals with limited substitutability.[75] Researching promising substitutes, like iron nitride magnets as a replacement for rare earth magnets, and determining how to commercialize them also involve long-time horizons, and are risky as many such R&D efforts may never be successful.[76] A 2022 Government Accountability Office (GAO) report found that industry stakeholders lack financial incentives to conduct basic scientific R&D to develop substitutes.[77] While national labs and academia have carried out such research, these institutions are poorly placed to bring initial results to market.[78] Although there have been some recent successful efforts to cultivate alternative supply sources, for instance through Ames Lab-

*In 2024, DOD invested $45 million in MP Materials as part of its "mine-to-magnets" initiative, which aims to build capability at multiple stages of the rare earth supply chain. C. Todd Lopez, "DOD Looks to Establish 'Mine-to-Magnet' Supply Chain for Rare Earth Materials," *Department of Defense Manufacturing Technology Program*, March 11, 2024.

oratory's successful tests in recycling REEs, these projects are far from operating at a commercially viable scale.[79]

Recognizing that some raw materials are not abundant in the United States and that processing here may not be cost competitive, the United States has also turned to allies and partners to diversify sourcing, but they also face similar challenges.[80] Although U.S. allies such as Japan, Germany, and Canada are key exporters of germanium, gallium, and graphite they are often similarly dependent on China across numerous stages of the critical mineral supply chain (see Figure 3).* Other key partners such as Argentina, Brazil, India, Indonesia, Namibia, Saudi Arabia, South Africa, Vietnam, and Zambia are among important mineral-producing countries.[81] These sources form a potential alternative to China in many critical minerals, but their mining and processing operations remain subject to market dynamics while scale and state support position China to retain dominance.

Figure 3: Share of U.S. Imports of Select Critical Minerals by Country



Source: U.S. Department of the Interior, U.S. Geological Survey, *Mineral Commodity Summaries 2025*, March 2025, 34, 36, 46, 74, 80, 84, 144, 198.

China Weaponizes its Dominance in Critical Mineral Supply Chains to Harm U.S. Economic Competitiveness and National Security

China's use of export controls on critical minerals signals broader economic risks to the United States if China chooses to dial up pressure and fully sever U.S. access to key inputs. Should the United States continue to rely on China for critical minerals, conflict scenarios for the United States could involve China: (1) placing all critical minerals on its export control lists to damage the U.S. economy and constrain U.S. policy options and (2) immediately restricting exports during a conflict to impact U.S. warfighting capabilities.†

*For instance, despite over a decade of efforts to reduce its dependence, Japan is still reliant on China for 60 percent of its REE consumption.

†The assessment of potential worst-case scenarios is not a prediction of China's coercive action against the United States as other factors can come into play.

Export Controls on Critical Minerals to Harm U.S. Economy and Constrain U.S. Policy Options

The most immediate economic coercion scenario is one in which China places controls on critical minerals on which the United States depends to try to force concessions or get the United States to back down from its preferred policy choices. The United States already faces this situation. Between April and June 2025, China approved only an estimated 25 percent of license applications, including from U.S. firms.[82] Mineral shortages resulting from Beijing's actions have led to price surges and factory closures, with Ford temporarily shutting down a plant in Chicago due to disruption to the REE supply chain.[83] China has more tools available to ratchet up the pressure. It currently restricts exports of minerals including seven REEs; antimony, gallium, germanium, bismuth, indium, molybdenum, tellurium, and tungsten; and related extracting, processing, smelting, manufacturing, and recycling technologies.[84] It can more strictly enforce existing controls, for instance banning all exports or tightening license requirements. China could also expand controls to an even wider range of minerals and related downstream products.

Immediate and Escalatory Export Bans in a Conflict

A scenario whereby China blocks all critical mineral exports would be highly escalatory and might only become likely during a broader conflict with the United States. Critical mineral shortages from a total export ban by China would shut down large swaths of the U.S. economy. The existing controls on REEs and related products have already resulted in factory shutdowns in the United States, Europe, and Japan that manufacture automobile and defense equipment.[85] A total export ban by China would also severely erode defense industrial base resilience and sustainment across all services, degrading U.S. warfighting capabilities. As noted earlier, the U.S. defense sector heavily relies on China for critical minerals to manufacture components for DOD. Suppliers for the defense sector already delayed their production after China imposed REE export controls because they only hold less than a year's—or sometimes even a few months'—supply of critical minerals in stockpile.[86]

While provocative, leveraging critical mineral dominance during a geopolitical conflict is hardly unprecedented. During World War II, Germany placed export restrictions on copper and sulfate, while Canada banned copper in certain circumstances, creating supply constraints on the U.S. military, even when it had strategic reserves established by the 1939 Strategic and Critical Materials Stock Piling Act.[87] Today, the United States is in a worse position than it was during WWII given the deeper dependence on foreign-sourced critical minerals and the declining stockpile of mineral inventories since the 1950s.[88]

Case Study #2: Prolonged Vulnerability: Generic APIs and KSMs

China's dominance of key chokepoints in the pharmaceutical supply chain has many parallels to U.S. vulnerabilities on critical minerals. Although the United States only imports 3 percent of oral doses and 9 percent of injectables from China, it is substantially more

exposed to Chinese raw pharmaceutical ingredients, including APIs and KSMs—biologically inactive chemical compounds that are purified into APIs. Nearly a quarter of APIs in U.S. generic drugs are potentially sourced from China, with India as a major intermediary, although the poor data visibility makes it difficult to determine the exact proportion. Supply chain visibility into KSMs in U.S. generics is even worse, with anywhere from one-quarter to one-half of U.S. generic drugs containing APIs developed from Chinese KSMs, often in India. While China has not formalized an export control regime for pharmaceuticals as it has for critical minerals, and global reputation costs may constrain it from doing so, the country could increase efforts to restrict pharmaceutical exports, including generic drugs as well as APIs and KSMs to the United States. (For more on the pharmaceutical supply chain, see Appendix I.) Such an action impacting even a small share of drugs used in the United States could have drastic consequences for the U.S. healthcare system, causing supply shocks that would result in loss of lives and force hospitals to make tough choices in allocating insufficient supply.

U.S. Dependency on China for Generic Drugs and Pharmaceutical Ingredients

The United States has become increasingly dependent on China as a source of raw pharmaceutical ingredients for generic drugs. Generic drugs, primarily oral doses, make up 90 percent of prescriptions filled in the United States, with the rest from brand-name drugs.[89] In 2024, the United States manufactured 22 percent of its generic oral dose drugs while importing 60 percent from India and 3 percent from China.[90] India as a major supplier of generic oral dose drugs to the United States also depends heavily on China for pharmaceutical ingredients in the upstream. While the United States is the biggest manufacturer of its injectable generics due to the complexity of production and transportation cost, it still sources 9 percent of injectable generics* from China.[91] The United States also depends heavily on China for pharmaceutical ingredients in the upstream.

Poor Data Transparency in Pharmaceutical Supply Chains and Challenges in Measuring U.S. Reliance on China

Poor data transparency in the pharmaceutical supply chain makes it challenging to accurately measure U.S. reliance on China for pharmaceutical ingredients. Most methodologies to calculate U.S. dependence on APIs from China rely on the Food and Drug Administration's (FDA) list of Drug Master File (DMFs)—applications submitted to the FDA by third-party API or KSM manufacturers for drug production.†[92] DMFs include the manufacturing capacity at facilities making the drug—but

*For the remainder of this subsection, references to "generics" with APIs sourcing from China are intended to refer to generic oral doses and injectables.

†Drug Master Files (DMFs) are confidential submissions to the FDA that detail facilities, processes, or materials used in drug manufacturing, allowing companies to reference the information without disclosure. DMFs include information about chemistry, manufacturing, and controls (CMC) for the API or its KSMs. DMFs indicate manufacturing capacity, not the actual volume used for pharmaceutical manufacturing. U.S. Food and Drug Administration, *Drug Master Files*

Poor Data Transparency in Pharmaceutical Supply Chains and Challenges in Measuring U.S. Reliance on China—*Continued*

not figures on actual volume, meaning methodologies that rely on DMFs to estimate exposure are considering potential rather than actual reliance.[93] As Janet Woodcock, director of the Center for Drug Evaluation and Research at the FDA noted in testimony before the House Committee on Energy and Commerce Health Subcommittee in 2019, the FDA does not have information on the actual volume of API imports from foreign countries or the portion of U.S. drug consumption that is dependent on foreign APIs. This lack of data makes it difficult to assess the true degree of U.S. dependency on China and India—and therefore the ultimate resilience of the U.S. pharmaceutical manufacturing base.[94]

Aside from limitations in using data from DMFs as a proxy for reliance, assessing U.S. dependence on China through India is difficult because of conflicting or inadequate data on India's own reliance on China. A commonly-cited Indian government report states that "India depends on China for around 68 percent of the APIs/Drug intermediates (DI) [or KSMs] that it uses in pharmaceutical manufacturing."[95] However, this statistic came from a 2020 KPMG India report that noted India's import dependency on China, not its overall dependency on Chinese APIs for India's pharmaceutical manufacturing.[96] India is also a large manufacturer of APIs used in its pharmaceutical production, and an Indian credit rating agency affiliated with Moody's reported that imported APIs accounted for 35 percent of its API requirements in 2024.[97] While India manufactures APIs, its KSM manufacturing capacity is limited, and the Indian government reported in 2023 that India heavily relies on China for "most" of the KSMs used in its API and drug manufacturing.[98] It is crucial to not conflate these two distinct phases of the pharmaceutical supply chain.[99] Data on U.S. reliance on China directly and via India for KSMs is even less extensive than data relating to APIs.[100]

Even with sufficient data, alternative approaches to measuring reliance can yield differing assessments of U.S. exposure to China. Calculations based on value will bias the results toward more expensive drugs; conversely, calculations based on volume may overemphasize inexpensive, commonly used drugs.[101] Volume measurements also vary by how a drug is consumed—through oral doses or injections.[102] Among various metrics, daily dose, defined by the World Health Organization as the average adult dose for a drug's main therapeutic use, offers a clearer view of a national healthcare system's consumer reliance on a drug type.[103]

(DMFs); Marta E. Wosińska and Yihan Shi, "U.S. Drug Supply Chain Exposure to China," *Brookings Institution*, July 28, 2025.

Based on daily dosage, an estimated 24.6 percent of the U.S. generic drug supply contains APIs originated from China, including 13 percent directly and 11.6 percent indirectly via India (see Figure 4).*[104] Additionally, there is evidence that the share of U.S. generics with APIs from China is growing, given that Chinese API manufacturers filed 219 DMFs with the FDA in 2023, surging 63 percent from 2021.[105]

The 24.6 percent of U.S. generics with Chinese APIs encompass a wide range of therapeutic categories, and exposure to Chinese APIs varies widely within each category, with some containing exclusively APIs originating from China. An analysis by the Brookings Institution identified 36 drugs where all currently in-use API DMFs are from China (see Appendix II for the list of drugs and their therapeutic uses).[106] These drugs include seven on the FDA's essential medicines list† (e.g., baloxavir marboxil used for pandemic influenza) and four cancer treatment drugs.[107] For a number of anticoagulants and antibiotics, the United States is wholly reliant on APIs from China. For example, dalteparin sodium and heparin sodium crude, used as active ingredients for the production of certain anticoagulants (blood thinners) appear to be solely sourced from China.‡ While there are over 100 antibiotics in use, a few appear to rely solely on APIs manufactured in China; for instance, the antibiotic lincomycin is used to treat serious bacterial infections for patients that have an allergy to penicillin.§[108]

The high concentration of APIs sourced from China poses significant risks to U.S. consumers that rely on such medications, should disruption occur. For example, a 2016 explosion at a Chinese API factory caused a global shortage of the antibiotic piperacillin, a drug used to treat bacterial infections such as pneumonia, and thus with potential life or death implications.[109] The COVID-19 pandemic also shut down many API and drug intermediate factories in China, halting production of APIs and generic drugs.[110] Even when some sites reopened, ongoing staffing shortages and raw material delays continued to disrupt global pharmaceutical supply chains, caus-

*These estimates are based on calculations of Chinese contents embedded in India's pharmaceutical supply chain. Because India relies on imports to meet 35 percent of its API needs for pharmaceutical manufacturing, and China accounts for 70 percent of India's overall API imports, Chinese APIs then account for 24.5 percent of India's APIs required for drug production. Because India accounts for 47.2 percent of U.S. APIs for generics, U.S. reliance on China via India is 11.6 percent. However, without precise data on the flow of Chinese APIs in India's pharmaceutical production exported to the United States, any estimate assumes an even distribution of Chinese APIs across India's drug manufacturing—even though India's reliance on Chinese APIs likely varies significantly by drug.

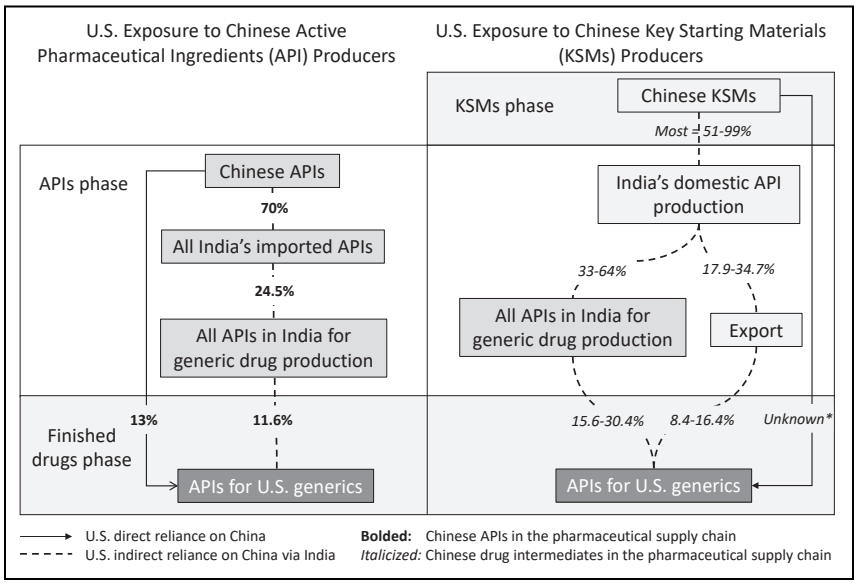
†The FDA's essential medicine list includes 86 drugs that are medically necessary to have available at all times in an amount adequate to serve patient needs and in the appropriate dosage forms, under the directive of the 2020 Executive Order 13944 on "Ensuring Essential Medicines, Medical Countermeasures, and Critical Inputs Are Made in the United States." U.S. Food and Drug Administration, *Executive Order 13944 List of Essential Medicines, Medical Countermeasures, and Critical Inputs*, May 23, 2022.

‡There are many different types of anticoagulants, and research did not establish how many of them were reliant in part on APIs from China.

§Antibiotics shortages could have long run consequences on U.S. and global public health by worsening antimicrobial resistance (AMR)—when pathogens change to become less responsive to medicine—making antibiotics ineffective against treatable diseases. The more patients use low doses of antibiotics or ineffective alternatives, the more antimicrobial organisms grow resistance to drugs. According to a 2016 U.S. Emerging Infections Network survey, the 2011 drug shortages forced 78 percent of the surveyed physicians to use different antimicrobial agents, and more than half of them believed that this action had adverse effects on their patients. World Health Organization, *Antimicrobial Resistance*, November 12, 2023; William G. Powderly, "Letter to Robert Califf Re: Survey Data on Anti-Infective Drug Shortages, Infections Diseases Society of America," November 14, 2016, 1.

ing shortages of antiretroviral drugs for HIV/AIDS and artemisinin-based combination therapy for malaria, among other lifesaving drugs.[111]

Figure 4: U.S. Direct and Indirect Reliance on China in the Pharmaceutical Supply Chain



*No known estimates.
Note: Because the Indian government only reports that it relies on China for "most" of its KSMs, the chart provides the maximum potential range for Chinese dependence at each step. See footnotes on the previous and current page for the discussion of the methodology used to generate this figure.
Source: Various.[112]

India also domestically produces a large portion of the APIs it uses in pharmaceutical manufacturing, but it relies heavily on China for KSMs, including those used in generic drugs and APIs it exports to the United States.[113] Many analyses cited by the Indian government note that China is often a single supplier of many of India's KSMs but provide no comprehensive estimates of such reliance.[114] One government report noted that "raw materials for most of the API intermediates are currently not produced in India [and] key starting materials (KSMs) for most APIs are still sourced from China."[115] Assuming the widest range possible—that anywhere from 51 to 99 percent of India's KSMs originate from China—between 24 and 46.8 percent of generic daily doses distributed in the United States that use APIs from India rely on Chinese content. This figure includes Chinese KSMs in generics from India, which account for anywhere between 15.6 and 30.4 percent of generics distributed in the United States; it also includes APIs from India used to manufacture generics consumed in the United States, which account for anywhere from 8.4 to 16.4 percent of APIs (see Figure 4).*[116] There

*Given the lack of precise information on India's reliance on China for KSMs, the estimates in this chapter assume 51 percent for the minimum likely reliance and 99 percent for maximum likely reliance. These estimates are based on calculations of Chinese contents embedded in In-

is evidence that India's reliance on China for KSMs is significantly higher for certain drugs; for example the Indian government reported that India's production of dexamethasone, used to treat inflammatory and autoimmune conditions, relies on key chemicals such as diosgenin, which is no longer available in India and has to be imported, presumably from China.[117]

In addition to its generics imports, the United States imports brand-name drugs from Europe, which sources more than half of its APIs from China.[118] Both the Indian government and the EU are aware of their dependency on China for APIs and KSMs and claim to be working to reduce such dependency, but as noted by both governments, progress remains glacial.[119]

Foreign pharmaceutical manufacturers struggle to compete with Chinese firms, as China's industry has benefited from financial subsidies that have driven down costs of API and KSM production, decades of market entry barriers, intellectual property theft, and lax environment regulation. Industrial policy support for pharmaceutical industry development dates back to at least 2005 with the Medium and Long-Term Plan for Science and Technology Development (2006–2020), and it continued under Made in China 2025 with support for more advanced biopharmaceuticals—drugs developed from living organisms rather than chemical synthesis.[120] Aside from long review times and a complex regulatory approval process for foreign drug makers seeking to sell into China, the Chinese government has also required foreign businesses to disclose sensitive technical information in drug formulations, which would later get leaked to local competitors.[121]

As the industry moves to more complex biopharmaceuticals, Chinese API manufacturers have further reduced production costs through extensive buildout of Chinese contract development manufacturing organizations offering critical intermediate steps in biopharmaceutical production supply chains. For example, Wuxi AppTec and other related companies reportedly have been involved in the development of one-fourth of all drugs in the United States.[122] As discussed extensively in Chapter 6, China is also a global leader in fermentation capacity used to cultivate genetically engineered cells for synthetic biology (for more see Chapter 6, "Interlocking Innovation Flywheels: China's Manufacturing and Innovation Engine").[123]

If China Leverages its Dominance in the API and KSM Supply Chains, It Could Cause Severe Harm to the United States

As noted above, global reputational constraints may limit China's willingness to exercise leverage over pharmaceutical APIs and KSMs. Having worked for years to expand its role in global pharmaceutical supply chains, however, China is increasingly in a position to use its dominance as leverage against the United States. Although China has not yet taken steps to weaponize its control over

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dia's pharmaceutical supply chain. Because India's domestic production of APIs accounts for 65 percent of its APIs needed for drug production, Chinese KSMs then account for 33–64 percent. Because India accounts for 47.2 percent of U.S. APIs for generics, U.S. reliance on Chinese KSMs via India is 15.6–30.4 percent. Given that India exports 35 percent of its domestically produced APIs, Chinese KSMs embedded in exported APIs then account for 17.9–34.7 percent, resulting in 8.4–16.4 percent of U.S. reliance on Chinese KSMs via India.

As noted in the previous textbox, DMFs indicate manufacturing capacity, not the actual volume used for pharmaceutical manufacturing.

pharmaceutical supply chains, some Chinese policy commentary has signaled awareness of China's leverage and interest in potentially employing it coercively. A few Chinese scholars have publicly suggested using China's control of APIs to retaliate against the United States, although the degree to which these scholars have direct policy influence is unclear. Several Chinese state media outlets reprinted a 2020 editorial noting if China places "strategic control of pharmaceutical products and prohibit exports to the United States, then the country would be trapped in the vast ocean of COVID-19."[124] A Chinese economist at Tsinghua University also urged the use of export restrictions on vitamins and antibiotic raw materials to halt global medical systems.[125] In spring 2025, some Chinese commentary on bilateral trade negotiations with the United States included a suggestion to restrict API exports as leverage.[126] Should Beijing succeed in effectively imposing export restrictions, U.S. dependence on China for many generic drugs would present a direct threat to its economic competitiveness, national security, and public health.

Findings from the Commission's 2019 Annual Report to Congress on U.S. API Supply Chain Vulnerability to China Prior to the COVID-19 Pandemic

The Commission first raised the issue of U.S. dependence on China in API supply chains in its hearing and 2019 Annual Report, before the world faced a severe global health crisis and disruption in the pharmaceutical supply chains during the COVID-19 pandemic.[127] The 2019 Annual Report chapter found the United States is heavily dependent on drugs sourced from China or drugs that include APIs sourced from China. The lack of regulation and oversight on the pharmaceutical industry in China exposes the United States to potential drug shortages and contamination. The Commission recommended a series of legislative actions to Congress, including requiring the FDA to compile a list of drugs and corresponding APIs that are foreign-sourced, critical to health and safety, and exclusively produced in China.

Since then, Congress has introduced a number of bills to address this concern. The Senate introduced the Medical Supply Chain Security Act in 2020 to give the FDA the authority to require manufacturers to notify the agency when they become aware of potential shortages.[128] The House introduced similar legislation in 2022.[129] Earlier this year, the Senate also introduced the Medical Supply Chain Resiliency Act to strengthen U.S. medical supply chains through strategic trade agreements with trusted trade partners.[130] However, none of these bills have been signed into law, and the risks from U.S. dependency on China's drugs and pharmaceutical ingredients persist. Additionally, after Congress passed the Coronavirus Aid, Relief, and Economic Security Act (CARES Act) in 2020, the FDA established the Office of Supply Chain Resilience to encourage manufacturers to create a contingency plan to mitigate disruption. However, the legislation established reporting requirements but did not create binding obligations for manufacturers or grant FDA authority to ensure full industry compliance.[131]

Conflict Scenario: API and KSM Supplies Could Be Cut Off

In a conflict scenario, China could cut off exports of generics, APIs, and KSMs directly and/or indirectly to the United States. First, Beijing could cut off direct exports to the United States of its generic drugs, APIs, and KSMs. This would result in the United States losing access to 3 percent of generic drugs consumed through oral doses and 9 percent through injection, as well as 13 percent of the APIs used to make generic drugs domestically.

Second, Beijing could further escalate by attempting to restrict exports of APIs used to make drugs shipped to the United States from India—essentially introducing a "foreign direct product rule" on Chinese content in pharmaceuticals. Such a restriction could potentially cut off an additional 11.6 percent of U.S. generic drugs, but even a more targeted application—such as to the 36 drugs which appear to have no known alternative API sources—could cause severe disruptions to healthcare provision.

China could further devastate the U.S. healthcare system by seeking to control access to KSMs used in APIs and generics production for the United States, both directly and through India, threatening nearly one-quarter to one-half of U.S. generics. Whether China would be able to pressure India to comply with extraterritorial restrictions on its re-export of Chinese content is an open question, but China could attempt to employ tactics like limiting exports to India to only meet domestic demand or demand for a limited volume of exports, forcing the country to decide whether or not to sell to the United States. Such a threat could be costly to India as the country exports $15 billion of generic drugs to more than 200 countries, with the industry contributing nearly 2 percent of the country's gross domestic product (GDP).[132]

Generic drug shortages in the United States pose significant public security and economic harms to the country. An immediate drug shortage would severely undermine the U.S. public health system. Christopher Priest, then–Acting Deputy Assistant Director for Health Care Operations and Tricare for the Defense Health Agency, testified before the Commission in 2019, "Should China decide to limit or restrict the delivery of APIs to the U.S. it would have a debilitating effect on U.S. domestic production and could result in severe shortages of pharmaceuticals for both domestic and military uses."[133] A 2014 GAO report found that the 2011 record-high drug shortage caused serious health consequences or death as providers had to cancel or delay procedures because of high costs, difficulties finding alternative drugs, and reduced time for patient care.[134] For example, the U.S. norepinephrine shortage in that year correlated with increased mortality rate in septic shock patients by 3.7 percent.[135] Even a small disruption can lead to devastating shortages due to unavailability of one API source and long delays from the FDA having to approve new source of raw materials.[136] Additionally, the U.S. generic drug industry has a projected market size of $143.1 billion in 2025, and the outright lack of raw materials as well as other market disruptions caused by any Chinese export controls could halt production and/or sale of many generic drugs, potentially causing significant economic harm.[137]

U.S. Defense Sector Is at Risk of China's Weaponization of the API and KSM Supply Chain

DOD is vulnerable to disruptions in its API and KSM supply chains with China. In its 2023 *Report on the Department of Defense Pharmaceutical Supply Chain Risks*, DOD conducted a supply chain analysis by examining the 211 pharmaceuticals on the FDA's Essential Medicines and Medical Countermeasure list.[138] Based on that analysis, DOD designated 27 percent of the analyzed drugs as very high risk, including 5 percent of essential drugs made with an API sourced from China and 22 percent sourced from an unknown country, which could include China.*[139] The unknown country of origin in this analysis further highlights the challenges in tracking DOD pharmaceutical supply chains critical for the health and safety of service members.[140] An additional 26 percent of the pharmaceuticals had an API sourced from India.[141] In total, DOD has identified that 54 percent of the DOD pharmaceutical supply chain is considered either high or very high risk, with dependency on non-Trade Agreement Act (TAA) compliant suppliers, sourcing from China and India, or unknown countries.[142]

Drug shortages could pose significant risks to DOD operations and military readiness.[143] If the United States were to be cut off from access to pharmaceuticals with APIs sourced from China, DOD would see access to certain critical medicines curtailed.† DOD identified 46 drugs it used that relied upon Chinese APIs for certain specific formulations or dosages, accounting for 684 National Drug Codes (NDCs), seven of these (accounting for 20 NDCs, including certain formulations and dosages of insulin and doxycycline) relied on China entirely for their APIs.‡[144] DOD did not characterize the impact of losing access to the drugs identified as being reliant upon China, nor did it examine the viability of alternative suppliers. In a conflict scenario, losing access to even a small volume of critical drugs could affect combat readiness.

DOD has contingency plans in-place for the disruption of medications during military operations.[145] For example, DOD's Administration for Strategic Preparedness and Response manages the Strategic Active Pharmaceutical Ingredient Reserve, which is supposed to maintain two years' worth of supply, but as of March 2024, it only maintained reserves at 1 percent of that level.[146] DOD also administers the Shelf-Life Extension Program to evaluate and extend shelf life of certain federally stockpiled medical

*While DOD used the word "drugs" in its November 2023 *Report on the Department of Defense Pharmaceutical Supply Chain Risks*, its analysis is focused on National Drug Codes (NDCs), which list drugs based on dosage and delivery mechanism. Therefore, a single "drug" could have multiple NDCs. In fact, the Department identified 211 drugs, which accounted for 12,917 separate NDCs. U.S. Office of the Under Secretary of Defense for Acquisition and Sustainment, *Report on the Department of Defense Pharmaceutical Supply Chain Risks*, November 2023, 8.

†Although advances in biomanufacturing may ultimately enable the U.S. military to produce APIs and precursors on site, the technology remains nascent, with its effectiveness and scalability still under testing.

‡The 684 drugs based on NDC the Department identified as reliant on Chinese APIs amounted to about 5 percent of the NDCs (formulations/dosages) in the DOD report; the 20 drugs entirely reliant on Chinese APIs amounted to 0.15 percent. U.S. Office of the Under Secretary of Defense for Acquisition and Sustainment, *Report on the Department of Defense Pharmaceutical Supply Chain Risks*, November 2023, 8.

U.S. Defense Sector is at Risk of China's Weaponization of the API and Chemical Precursors Supply Chain—*Continued*

materials.[147] However, stockpiling is reserved for certain operations. For routine operations, DOD relies on the "just-in-time" ordering concept and does not keep or store additional generic drug products.[148] Therefore, if there are supply disruptions, including transportation delays or intentional adversarial actions, drug shortages might impact operations.[149]

Case Study #3: Latent Vulnerability: China's Control over Printed Circuit Board Manufacturing

U.S. electronics supply chains hinge on access to PCBs, a majority of which are produced in China. Although PCBs may appear to be a simple technology, they are in fact precision-manufactured components that constitute the infrastructure for other electronic parts. PCBs serve as both the bedrock that holds componentry in place and the electrical highways that link them together to form a functional device. Most electronics cannot be manufactured without one, if not multiple, PCBs (for more on the PCB supply chain, see Appendix I).

China produces more than half of the world's PCBs and leads a market estimated to be worth around $90 billion in 2025.[150] China accounted for 51 to 55 percent of global PCB production in 2023.[151] Its share exceeded 60 percent in specialized segments of the PCB market, including a 67 percent share in high-density interconnect (HDI) PCBs, which are complex, multi-layer boards that allow components to be stacked closer to meet the performance needs of advanced electronics ranging from artificial intelligence (AI) chips to electronic wearables such as fitness watches.[152] By comparison, the United States has only a handful of firms with the technology to produce HDI PCBs.[153] To further consolidate its lead, China has targeted the development of high-end electronic components, with a 2021 action plan channeling support into high-density and high-frequency PCB production.[154]

China may be able to exert significant leverage by targeting export restrictions to disrupt U.S. high-tech sectors, including AI and data center infrastructure. Targeted export controls on HDI PCBs may provide China such an option given its significant share in global production and the technology's importance to advanced computing applications.[155] If China prevented U.S. companies operating anywhere from accessing its HDI PCB production—for example, prohibiting sales to a company like Nvidia,* which reportedly sources PCBs from Chinese producers—it could slow the expansion of AI data centers and other high-performance computing infrastructure using U.S. technology both in the United States and overseas.[156] This in turn could make reliance on non-U.S. alternatives more attractive. Over time, U.S. companies may be able to switch to non-

*Nvidia has not reported details on its suppliers, and it is unclear which Nvidia graphics processing units used in AI applications are made using PCBs from Chinese firms.

China-based suppliers, but this switch could take some time due to the uniqueness and highly customized nature of each PCB.*[157]

China, however, would face challenges wielding its PCB manufacturing capacity to inflict broad-based harm to the United States. While a large share of PCBs is imported directly into the United States from China, this trade flow does not provide Beijing meaningful leverage over the United States as the level of domestic production that depends on unassembled PCBs is miniscule. China remains the largest single source of direct U.S. PCB imports used as inputs in domestic production, though its share has declined since 2018, when Section 301 tariffs were imposed on most PCB products from China. In 2024, the United States directly imported $786 million in PCBs from China, accounting for 30.3 percent of total imports—down from 46 percent in 2018.†[158] However, domestic U.S. production that depends on PCBs is limited; the value of PCB inputs used by U.S. producers amounted to 0.1 percent of GDP.‡[159] This volume of PCBs could likely be met through non-Chinese PCB suppliers, such that even if China implemented restrictions on direct PCB sales to the United States, the disruption would be localized and short-lived.

Most Chinese PCBs enter the U.S. market preassembled or embedded in electronic devices, posing immense challenges and costs for Beijing in trying to weaponize this dependence. While there are not readily available estimates of the percentage of U.S. electronics imports that contain Chinese PCBs, China is the United States' largest source of electronic product imports, accounting for $140.5 billion in imports in 2024, or 20.9 percent of the total.[160] Given China's over 50 percent share in global PCB production, a substantial portion of U.S. electronics likely contain made-in-China PCBs. Although this share likely exceeds a threshold that could damage the U.S. economy if Beijing restricted Chinese PCB content to U.S. end users, practical barriers limit its ability to impose a broad embargo. Since many Chinese PCBs are processed and assembled inside China, an effective ban would necessitate end-use checks across China's diverse electronics manufacturing sector, exponentially increasing the enforcement and monitoring challenge. Moreover, instituting a ban that severs China's electronics exports to the United States would pose high economic costs to China, given the importance of the U.S. market as a source of demand.

Case Study #4: The Future Chokepoint: Foundational Chips

China is seeking to replicate its supply chain dominance strategy in foundational semiconductors, which underpin almost all of modern technology. While the AI boom has sent the market value of leading-edge semiconductor companies soaring, AI chips account for less than 1 percent of nearly one trillion chips sold globally.[161]

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*PCBs are typically purpose-built for every electronics application, making each board unique. For more, see Appendix I.

†After China, the next five largest sources of U.S. bare PCB imports in 2024 were Taiwan (29.2 percent), Japan (6.5 percent), South Korea (5.5 percent), Canada (5.3 percent), and Thailand (4.1 percent).

‡This refers to the total value of output in 2017 from the printed circuit assembly industry—including fabrication, assembly, and other activities—that was used as an input in other U.S. production.

The vast majority of semiconductors are lower-cost components that are nonetheless crucial to virtually all electrically powered devices, including as key components embedded in AI processors themselves.[162] Foundational chips (sometimes misleadingly called legacy chips, see textbox) are typically defined as chips manufactured on a 28-nanometer (nm) or larger process node,* and the classification encompasses an array of different chips with distinct functions and utility (for an overview of the foundational chip industry, see Appendix I). Foundational chip fabs—highly specialized manufacturing facilities that produce the semiconductors—are largely concentrated in Taiwan, Japan, Europe, and the United States, meaning that U.S. exposure to Chinese production of these vital inputs is currently limited. However, Beijing has made establishing domestic semiconductor capabilities a top industrial policy priority for more than a decade, including within its Made in China 2025 plan, which called for achieving international competitiveness in both foundational and cutting-edge chips. Fueled by massive government support, China's production capacity in this market is expanding at breakneck pace, threatening global incumbents. Left unaddressed, the United States may soon depend on access to China's chip industry for producing even the most mundane electronic devices, creating a new point of strategic leverage for the CCP.†

Foundational Chips Are the Core of the Modern Economy, Not Legacy Technology

As foundational chips are often produced on long-established process nodes and with older-generation equipment, they are sometimes called "legacy" or "mature" chips, but these terms can be misleading, downplaying their importance and obscuring ongoing technological advances.[163] As Sarah Stewart, chief executive officer and executive director at Silverado Policy Accelerator, testified before the Commission, "These are chips that, in many cases, are quite innovative, and they are fit for a purpose, whether it is heat tolerance or moisture tolerance. They are not necessarily outdated or legacy."[164] Practically every electronic device contains anywhere from one to hundreds of foundational chips; the average vehicle contains over 1,700 foundational chips.[165] Even AI processors, which are powered by advanced semiconductors, rely on numerous foundational chips in order to operate properly.

*The process node generally refers to the feature size of transistors etched on the semiconductor. Node size does not necessary reflect how advanced or state of the art a foundational chip is, since the optimal feature size varies depending on the application and use case. This contrasts with advanced logic chips below the 28-nm threshold, where node shrinkage generally yields faster and more efficient chips but requires more complex manufacturing processes. Today's cutting-edge chips used in AI and other compute-intensive applications are made using 3-nm and 5-nm process nodes. Bryan Moyer, "Legacy Process Nodes Going Strong," *Semiconductor Engineering*, July 23, 2024.

†The United States launched two trade investigations into imports of Chinese-made foundational chips in the past year, including one under Section 301 of the Trade Act of 1974 initiated in December 2024 and the other under Section 232 of the Trade Expansion Act of 1962 in April 2025. Both investigations are still ongoing as of October 10, 2025. U.S. Department of Commerce, Bureau of Industry and Security, "Notice of Request for Public Comments on Section 232 National Security Investigation of Imports of Semiconductors and Semiconductor Manufacturing Equipment," 90 Fed. Reg. 15950 (April 16, 2025); U.S. Trade Representative, "Initiation of Section 301 Investigation; Hearing; and Request for Public Comments: China's Acts, Policies, and Practices Related to Targeting of the Semiconductor Industry for Dominance," 89 Fed. Reg. 106725 (December 30, 2024).

Foundational Chips Are the Core of the Modern Economy, Not Legacy Technology—*Continued*

According to the Semiconductor Industry Association's estimates, foundational chips enabled $10.8 trillion in economic activity in the United States in 2023.[166] Because foundational chips are ubiquitous across sectors such as automotive, industrial machinery, consumer electronics, military equipment, and medical devices, disruptions in their supply could cascade rapidly through the broader economy.[167]

The technology underlying some foundational chips is still advancing. Emerging foundational chip technologies include compound semiconductors—which are made by combining multiple elements, whereas most chips today are made primarily from a single element, silicon. For instance, silicon carbide (SiC) semiconductors have enabled EV manufacturers to adopt higher-voltage battery systems, increasing range and reducing charging times.[168] Gallium nitride (GaN) semiconductors have higher speed and lower resistance, offering reduced power consumption and smaller device sizes than traditional silicon-based semiconductors.[169]

Foundational chips are critical to the economy. The downstream products they enable—such as vehicles, industrial machinery, and medical devices—cannot function without them. The foundational chip shortage that began during the COVID-19 pandemic in 2020 exposed how an inability to source these components can halt entire production lines and cascade into a widespread economic disruption. The shortage stemmed from a sharp supply-demand imbalance driven by multiple factors, including fab slowdowns due to pandemic controls and automakers canceling orders in anticipation of weaker demand than actually materialized.[170] In addition, the global shift to work-from-home drove demand for consumer electronics, which contributed to demand for chips reaching historic highs—128 percent of available foundational wafer fabrication capacity in 2022.[171] The impact of the shortage was most visible in the auto sector.[172] Though many of the chips needed by the auto industry only cost a few dollars, those chips were necessary for producing systems throughout a car. North American automakers were forced to delay delivery of entire vehicles and cut production by over 4.3 million vehicles in 2021 and 2022 due to foundational chip shortages.[173] According to one estimate, the chip shortage led to over $210 billion in lost revenue for the global auto industry in 2021.[174] In addition to autos, the shortage disrupted production and created inflationary pressures across virtually every chip-using industry, which collectively account for roughly 40 percent of U.S. manufacturing output.[175]

U.S. Position in Foundational Chip Supply Chains

The United States has a substantial domestic foundational chip manufacturing sector that accounts for a large share of the global market, but it still relies heavily on overseas foundries. In 2023, the United States was home to 12 percent of global foundational chip production. Major companies include Texas Instruments, Global Foundries,* and onsemi.[176] U.S.-based production only makes up a portion of total domestic sales of foundational chips, estimated at $72 billion in 2023, and the United States therefore relies heavily on imports from other economies.†[177] The United States has awarded over $1.7 billion in funding under the CHIPS Act to support investment in domestic foundational chip capacity.[178]

U.S. producers earn significant revenue in other markets.[179] Chinese customers made up 19 percent and 25 percent of Texas Instruments' and onsemi's revenues, respectively, in 2024.‡[180] These customers include not only Chinese original equipment manufacturers (OEMs) serving the domestic market but also its export manufacturing sector.§

U.S. semiconductor firms not only operate sizable domestic fabs but also are major users of overseas capacity. In the key 20–45 nm process nodes,¶ U.S. "fabless" chip firms—companies that specialize in chip design and outsource production to other facilities—are heavily reliant on contract manufacturing with foreign facilities, including those located in Taiwan and, to a more limited degree, China.[181] However, U.S. (and global) manufacturers have significant reliance on Chinese facilities for the final stages of chip production—assembly, testing, and packaging (ATP)—where the United States held just 4 percent of global capacity compared to China's 30 percent in 2022.[182]

The United States Risks Deepening Reliance on Chinese Chips

The United States currently has a relatively low level of *direct* exposure to Chinese foundational chip production. The globalized nature of semiconductor supply chains makes it difficult to track the origin of chips entering the U.S. market, but most available metrics suggest that Chinese chips make up only a small share of direct imports. In the first half of 2025, the United States sourced 9.4 percent of its total integrated circuit imports from China on a volume

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*Global Foundries is majority owned by a United Arab Emirates sovereign wealth fund.

†No comparable number is publicly available on the value of U.S.-made foundational chips used domestically, but available data suggest U.S.-based production is substantially smaller than total U.S. chip demand. The 2022 U.S. Economic Census reports that sales in the semiconductor manufacturing industry, including all types of chips, totaled $48.2 billion that year. U.S. Census Bureau, "*Economic Census: EC2200NAPCSPRDIND | Selected Sectors: Products by Industry for the U.S.: 2022*," 2025.

‡onsemi reports this revenue as coming from Hong Kong.

§In 2023, Kurt Sievers, CEO of Dutch foundational chip firm NXP Semiconductor, estimated that, of the 38 percent of revenue attributed to Chinese customers, roughly half was tied to chips that were processed and re-exported as part of assembled electronics. Conor Humphries, "NXP CEO Applauds EU Chips Act, Seeks Clarity on China Restrictions," *Reuters*, April 19, 2023.

¶The 20–45 nm process nodes are widely used for microcontrollers, which are versatile mini-computers that perform specific tasks in a wide range of electronics and industrial applications.

basis.* Similarly, U.S. fabless chip firms use Chinese manufacturers for only a portion of their fabrication needs. According to a survey conducted by the Department of Commerce's Bureau of Industry and Security (BIS) in January 2024, U.S. semiconductor firms outsourced just 1.5 percent of their total chip output to China-based foundries, which provide contract manufacturing services for other companies.[183] Semiconductor Manufacturing International Corporation (SMIC) and Hua Hong Group, China's two largest foundries, accounted for a majority of chip production outsourced to China by U.S. companies.†[184] One of the primary reasons respondents cited for sourcing from China was a lack of alternative suppliers that were willing to produce those chips at the same cost, underlining how non-Chinese foundries are particularly vulnerable to losing market share in lower-value market segments to state-supported Chinese competitors.[185]

Despite the limited direct sourcing of Chinese foundational chips, Chinese-made chips are present in most products sold by U.S. companies, although the number of such chips in each product is frequently unknown. While China-fabricated chips account for a small share of overall chip usage, they are used consistently across many products. According to the January 2024 BIS survey, just 2.8 percent of the number of foundational chips used by surveyed manufacturers come from Chinese-owned foundries, and most of these chips are sourced from U.S. or European-based chip designers.[186] At the same time, over two-thirds of respondents' products contained at least one chip from a China-based foundry, indicating that U.S. manufacturers' use of Chinese chips is pervasive but typically limited in scale.[187] Alarmingly, the true level of Chinese chips in U.S. products is unclear, with more than 44 percent of U.S. companies indicating that they lacked sufficient visibility to determine whether semiconductors from China-based foundries were present in their products.[188] Similarly, the full number of Chinese foundational chips entering the U.S. market embedded in finished goods is unknown, but this trend is almost certain to accelerate as Chinese chip production surges.

Chinese-made chips are present in U.S. defense supply chains, creating a vulnerability that exposes critical military systems to po-

*Import data largely reflect where chips are finalized, which can differ from where the fab is located due to outsourcing of assembly, testing, and packaging (ATP) to specialized firms. In other words, chips fabricated in China but finished in offshore facilities would not be recorded as China-origin in U.S. trade data. Additionally, U.S. data on imports from China capture non-Chinese chips finalized inside China, which is home to roughly one-third of global ATP capacity. Notably, alongside Taiwan's share of U.S. chip imports (21.8 percent), other major U.S. sources were Malaysia (21.9 percent) and Thailand (9.7 percent), which account for a large share of global ATP capacity but have limited chip manufacturing capabilities. U.S. Census Bureau, *USA Trade Online*, August 19, 2025; Raja Varadarajan et al., "Emerging Resilience in the Semiconductor Supply Chain," *Boston Consulting Group and Semiconductor Industry Association*, May 2024, 10, 21.

†Chinese companies have continued to have access to many types of semiconductor manufacturing equipment used for foundational chips. While SMIC was placed on the Entity List in 2020, subjecting exports to license requirements, the rules exempted mature-node production. Hua Hong is not on the Entity List. Hua Hong had been listed as a Validated End-User, which meant exports of controlled items were allowed under a general authorization. However, its designation was removed in December 2024, meaning exports now require individual license reviews, though not under a presumption of denial as with many Entity List companies. Reva Goujon and Ben Reynolds, "Slaying Self-Reliance: US Chip Controls in Biden's Final Stretch," *Rhodium Group*, December 9, 2024; U.S. Department of Commerce, Bureau of Industry and Security, "Additions and Modifications to the Entity List; Removals from the Validated End-User (VEU) Program," 89 Fed. Reg. 96830 (December 5, 2024); Reva Goujon and Jan-Peter Kleinhans, "All In: U.S. Places a Big Bet with October 17 Controls," *Rhodium Group*, November 6, 2023.

tential disruption, compromise, or strategic leverage by Beijing. The BIS survey found that, while products with known use in defense production contained lower levels of known China-origin chips, a majority of those products likely still contained at least one chip that was manufactured in Chinese facilities.[189] However, the agency reports that "most companies providing defense products had no visibility into the location of fabrication," and the actual extent of Chinese semiconductors could be higher.[190] Other studies point to greater upstream exposure to Chinese companies. A 2024 report by AI supply chain analytics company Govini estimated that more than 40 percent of the chips used in U.S. military systems are produced by chipmakers that source components, equipment, or services from Chinese companies.[191] It found that Chinese companies were present in supply chains for over 6,500 chips in Ford-class aircraft carriers, underscoring the exposure of even the most advanced military systems to Chinese suppliers. In addition to raising the risk of a supply disruption that stalls U.S. defense production, foundational chips sourced from Chinese foundries may provide Beijing the opportunity to tamper with and introduce vulnerabilities into U.S. critical systems. Although the United States has restricted government and defense procurement of Chinese chips,* the presence of Chinese chips in the broader U.S. market is projected to grow.

China Positioning for Dominance in Foundational Chip Production

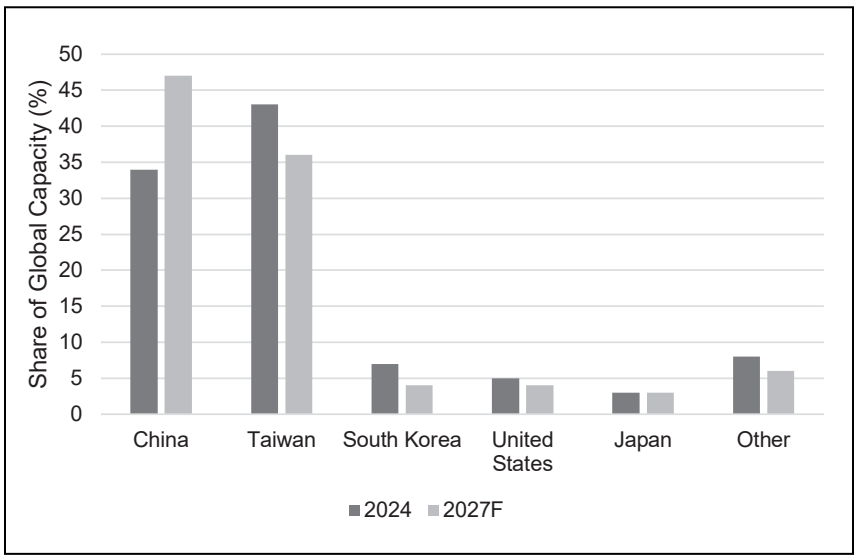
While China's current position in semiconductors does not at first blush suggest impending dominance, China is making massive investments in new capacity completely divorced from market dynamics, a trend likely to create significant supply distortions that could upend profitability for existing companies, undercutting their ability to compete and substantially strengthening China's market position. China's investments in the foundational chip sector are outpacing the rest of the world and will likely lead to overcapacity. In 2024, China's planned investments in new foundational wafer capacity exceeded the rest of the world combined, making up 55 percent of planned investments.[192] If all this production comes online,† China's share of global production is projected to rise from 34 percent in 2024 to 47 percent by 2027 (see Figure 5). Its share may even exceed 50 percent by 2030.[193] Although Chinese foundational chipmakers do not currently exhibit signs of overcapacity—in its simplest form defined as high levels of unused production capacity—this massive

*To combat Chinese foundational chip usage in defense supply chains, the FY23 National Defense Authorization Act § 5949 prohibits the U.S. government from sourcing chips made by SMIC as well as memory companies ChangXin Memory Technologies (CXMT) and Yangtze Memory Technologies Corp (YMTC)—as well as any product that contains such chips—starting in 2027. However, ensuring compliance with Section 5949 may prove challenging given defense suppliers' limited visibility. Tina D. Reynolds, "Key Takeaways from the Federal Government's Proposed Rule Banning Certain Chinese-Origin Semiconductor Technology," *Morrison Foerster*, May 16, 2024.

†These projections are based on announced investments, but semiconductor companies may adjust the pace of supply expansion based on various factors. For instance, SMIC stated in November 2024 that it is avoiding initiating new investment projects due to projected softness in chip demand. In addition, the performance of China's existing facilities varies widely, and it is possible new fabs fail to achieve their projected productivity levels. Andreas Schumacher, "China's Mature Semiconductor Overcapacity: Does It Exist and Does It Matter?" *Center for Strategic and International Studies*, November 19, 2024; "SMIC Sees Prolonged Chip Glut, Signals Cautious Expansion Outlook," *Reuters*, November 7, 2024.

influx of new production capacity driven by China's industrial policy rather than market forces will likely lead to high levels of excess capacity in the near future.*

Figure 5: Foundational Foundry Capacity by Location, 2024 and 2027 (Forecast)



Source: Analysis of TrendForce data by Lin Yu-Jou, "紅鏈逼近! 中國殺價拚擴產, 台灣成熟製程晶圓廠如何突圍?" [The Red Supply Chain Closes In! As China Slashes Prices to Expand Capacity, How Can Taiwan's Mature-Node Foundries Break Through?], *TechNews*, February 11, 2025.

As an initial step, China's chip buildout threatens to displace foreign chipmakers in its domestic market. A majority of China's planned capacity expansion is occurring in foundational nodes for low-power Internet of Things chips and microcontrollers.† [194] These components are widely used by China's immense electronics manufacturing sector, which purchases nearly a quarter of the world's foundational semiconductors.[195] Domestic OEMs already account for a majority of Chinese chipmakers' revenue—up to 85 percent in 2024 in SMIC's case—and the domestic manufacturing sector will likely absorb most of China's capacity expansion, at the expense of sales by non-Chinese firms.[196]

To ensure demand for its chip companies, China is implementing import substitution policies, including discriminatory procurement policies and explicit and implicit guidance to SOEs to purchase indigenously made chips.[197] In line with these efforts, a group of Chinese industry associations urged companies to exercise caution in purchasing U.S. chips in December 2024, warning that U.S. chip supplies can no longer be considered "safe and reliable" due to risks from U.S. export control policies.[198] Amid U.S.-China trade tensions, China's MOFCOM announced

*SMIC and Hua Hong have largely maintained capacity utilization rates that exceed the global average up through 2023. Reva Goujon, Jan-Peter Kleinhans, and Laura Gormley, "Thin Ice: US Pathways to Regulating China-Sourced Legacy Chips," *Rhodium Group*, May 7, 2024, 5.

†Specifically, China is investing heavily in production capacity at the 20–40-nm process nodes.

on September 13, 2025, an anti-dumping investigation into U.S. shipments of certain analog chips, which could impact the sales of U.S. chip companies.[199] Combined with looming overcapacity, these policy actions may make it increasingly challenging for non-Chinese firms to retain market share inside China, enabling Chinese firms to capture the domestic market.* This could allow them to attain greater scale and grow globally competitive, further placing foreign firms at a disadvantage. As ST Microelectronics' CEO Jean-Marc Chery highlighted, ceding market share in China means "the Chinese players [will] dominate their market… and their domestic market is so huge, it will be a fantastic platform for them to compete in other countries."[200]

Chinese capacity expansion is already pushing down prices and forcing competitors to exit from segments of China's market, as Chinese foundries win customers away from non-Chinese manufacturers.[201] Taiwan Semiconductor Manufacturing Company (TSMC) is reportedly terminating its gallium nitride (GaN) chip production due to a price war (see textbox below).[202] Similarly, Taiwan's Powerchip Semiconductor Manufacturing Corporation announced that it was pivoting into new, AI-related product lines due to competition from Chinese chipmakers.[203] As below-cost Chinese chips flood both domestic and global markets, price pressures are expected to persist, with even SMIC's co-CEO Zhao Haijun cautioning that growing production capacity in China could trigger price wars among foundries competing over limited orders.[204] The surge in production capacity in excess of expected market demand is likely to weigh further on prices, cutting into the profitability and financial performance of non-Chinese chip companies.

Loss of market share in China may force further global consolidation in the industry. According to Global Foundries, "China's decision to build capacity for China, to be sourced primarily from indigenous suppliers, will likely have the dual effect of limiting the Chinese market for other global suppliers like us and significantly increasing the competition we face globally."[205] Western semiconductor companies are unlikely to be squeezed out uniformly or all at once, and some market segments are more vulnerable to nonmarket competition. For instance, in the automotive industry where automotive chips must meet exacting operational specifications, carmakers tend to establish relationships with chip suppliers that span decades, rather than years, making it highly costly to switch to a new supplier.[206] In contrast, many chips used in consumer electronics are sold as commercial off-the-shelf products that are interoperable and interchangeable. For example, when certain microcontrollers were in short supply during the COVID-19 pandemic, the Chinese chipmaker GigaDevice introduced a "pin-compatible clone" of a microcontroller made by ST Microelectronics, rapidly gaining market share and tripling its revenue.[207]

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*Chinese officials are increasingly employing similar tactics to curb purchases of leading-edge foreign chips. In September 2025, the Cyberspace Administration of China effectively blocked several Chinese companies from buying Nvidia RTX Pro 6000D graphics cards. For more, see Chapter 1, "U.S.-China Economics and Trade Relations (Year in Review)." Mackenzie Hawkins and Luz Ding, "China Tells Companies to Stop Buying Nvidia Chip with AI Uses," *Bloomberg*, September 17, 2025.

To date, the massive increase in spending on foundational chip manufacturing equipment has not been accompanied by public commentary in China explicitly identifying the strategic benefits that dominance in foundational chipmaking could provide as a tool of influence.[208] An article published in February 2025 by Peking University scholar He Pengyu is among the first to articulate the strategic advantages of China's chip buildout. He argued that "establishing a competitive edge in traditional chips is not only a strategic countermeasure against the U.S. 'stranglehold' over advanced chips, but also a critical step toward building domestic industrial chains and developing indigenous technologies."[209] He argued that China should consider restricting market access to U.S. chip companies to further erode their role within China's market.[210]

China Invests in Overlooked Chip Segments with Significant Military Value

China is seeking to leapfrog the United States by gaining a first-mover advantage in emerging compound semiconductor technologies, particularly in wide band-gap semiconductors.* This class of semiconductors include gallium nitride (GaN) and silicon carbide (SiC), which have wide-ranging applications from efficient power chips for EVs to chips with higher power density used in the next generation of military radar systems that are able to track targets at farther distances with higher resolution.[211] China set a goal of leading technological breakthroughs in wide band-gap chips within its 14th Five-Year Plan released in 2021.[212] China refers to these as "third-generation semiconductors," intentionally implying that wide band-gap chips represent a step change in semiconductor technology.[213] Strong state support, combined with dominance in upstream raw materials for compound semiconductor wafers, has fueled the rapid expansion of its domestic industry and helped Chinese firms undercut foreign competitors. These efforts enabled Chinese suppliers to offer unfabricated SiC wafers for as low as $500 a piece, relative to the $1,500 cost of wafers from the global leader in SiC technology, U.S.-based Wolfspeed.†[214] Increased competition from China contributed to a decline in Wolfspeed's global market share, which fell from 62 percent in 2021 to 33 percent in 2023.[215] In GaN chips, China's Innoscience has already established a market-leading position.[216] China has placed export controls on gallium and related materials since mid-2023 (see Table 1), creating barriers to U.S. production of military systems that rely on gallium and GaN chips.[217]

*Wide band-gap refers to a special class of compound semiconductors whose properties enable devices to operate at higher voltages, temperatures, and frequencies. "Wide Bandgap Semiconductors (SiC/GaN)," *Infineon*.

†In June 2025, Wolfspeed filed for Chapter 11 bankruptcy. A U.S. court approved its restructuring plan in early September, and it exited Chapter 11 bankruptcy on September 30. "Wolfspeed Shares Rally after Chipmaker Exits Chapter 11 Bankruptcy," *Reuters*, September 30, 2025; "Wolfspeed's Shares Surge as US Bankruptcy Court Approves Restructuring Plan," *Reuters*, September 9, 2025.

Consequences of China Establishing and Leveraging Dominance over Foundational Chip Supply Chains

In the absence of a response by the United States and like-minded countries, the current surge of Chinese chipmaking capacity risks a scenario where an increasing share of foundational chips used in U.S. production—which the Semiconductor Industry Association estimated at $72 billion in 2023—are sourced from China-based fabs.[218] As non-Chinese competitors are forced out of market segments by heavily subsidized Chinese competitors, this could force U.S. manufacturers to rely on Chinese suppliers for essential components, exposing them to potential disruption or coercion in times of geopolitical tension. Given the ubiquitous nature of foundational semiconductors in all electronics, the economic damage would be profound; a wide swath of U.S. manufacturing could be ground to a halt, including manufacturing necessary for defense needs, critical infrastructure, healthcare, and more. As illustrated by the COVID-19-era chip shortage, China may need to exercise effective control over only a portion of the United States' chip imports to inflict multiple years of economic pain. Because they are complex, multi-billion-dollar facilities, establishing new fabs to replace embargoed capacity would likely take years, giving Beijing a chokepoint it could exploit to inflict prolonged costs on the United States.

The United States Needs a Coherent Long-Term Commitment to Reduce China's Supply Chain Leverage

The status quo of U.S. supply chain exposure to China presents unacceptable risks to U.S. economic and national security. This strategic failure persists in large part because U.S. policymakers still lack transparency around the scope of these vulnerabilities as well as a broader appreciation of what could happen if Beijing ever chose to weaponize these economic dependencies in a conflict scenario. Without a coherent long-term strategy supported by consistent implementation with necessary resources, and likely requiring cooperation with allies, these vulnerabilities will deepen as China expands its dominance in additional sectors.

Any effective strategy to insulate the U.S. economy from Chinese economic coercion requires adaptive, forward-looking prioritization of which supply chain vulnerabilities to address. Moving to zero reliance on Chinese production is neither a realistic nor necessary objective. Rather, the United States must focus its efforts on supply chain dependencies based on a full estimate of the risks and dynamics in the sector. Analysis must identify supply chains where the United States has a high degree of dependence on Chinese production (or could develop a dependence based on clear trends); focus on products or inputs critical to U.S. economic and/or national security; and evaluate constraints on China's ability to weaponize the supply chain, including practical enforcement challenges, economic costs to China, and risks from reputational impact and escalation. China's control over critical minerals poses a significant economic threat to the United States without parallel costs on China, which

has enhanced its enforcement capacity, but other sectors will have different profiles that must be carefully assessed.

Addressing Gaps in the Current Approach to Supply Chain Resiliency

Several critical gaps must be addressed to align U.S. government and private-sector efforts toward the goal of resiliency against Chinese economic coercion, including: limited data on supply chain vulnerabilities, a misaligned incentive structure that leads to underinvestment by the private sector in resiliency, insufficient surge production capacity, and coordination problems with U.S. allies and partners.

- *Challenges to supply chain analytics and data:* The U.S. government's ability to identify supply chain vulnerabilities has improved in recent years, but insufficient data and analytic capabilities means it continues to lack a complete and dynamic picture of dependencies on China. While the U.S. government has made greater use of commercially available supply chain datasets and analytic software, these are often insufficient to map key supply chains because many critical pieces of information needed by decision-makers, such as a supplier's production capabilities or upstream sourcing vulnerabilities, are not captured.[219]

  Prior to 2020, supply chain assessments were largely focused on identifying risks to defense supply chains and were often undertaken on an ad hoc basis. These included industrial base assessments conducted by the U.S. Department of Commerce under Section 705 of the Defense Production Act and annual reports by DOD on risks to the defense industrial base.*[220] In recent years, in-depth supply chain reviews prompted by COVID-19-related disruptions, as well as the recently established Supply Chain Center in the Commerce Department (see textbox below), have provided policymakers with much more detailed insight into supply chain risks. Nonetheless, visibility remains inadequate to provide up-to-date analysis of many critical sectors.

  As Monica Gorman, former Special Assistant to the President for manufacturing and industrial policy and now managing director at Crowell Global Advisors, assessed in testimony before the Commission, the U.S. government "lacks a systemic view of the U.S. industries and products most at risk" because it lacks detailed-enough data to analyze specific dependencies.[221] Supply chain analytics is hampered by two key challenges: insufficient data collection—whether due to the government's difficulties gathering it or the absence of viable proprietary providers—and institutional barriers that hinder sharing and using data in analysis.[222]

  The U.S. government's visibility into pharma supply chains exemplifies these challenges. The U.S. Department of Health and

*Efforts to monitor risks in manufacturing supply chains without a direct defense nexus also existed, such as the USGS's annual Mineral Commodity Summaries, the U.S. Department of Energy-funded Clean Energy Manufacturing Analysis Center, established in 2015, and a 2017 executive order mandating a review of U.S. manufacturing capabilities essential to national security.

Human Services assessed in the White House's 2021 100-Day Supply Chain Review that "the data currently available to FDA are not sufficient to build a system that allows for optimal, timely predictions or action."[223] The FDA does not collect data on KSMs, which, as discussed earlier, makes it extremely difficult to assess U.S. reliance on Chinese inputs in API production.[224] It also lacks data that may contribute to assessment of supply chain risks, such as whether a drug manufacturer is fully reliant on a single upstream supplier for a specific input or how much time it takes manufacturers to scale production to meet demand surges.[225] Further, much of the data the FDA collects is siloed or otherwise unavailable for use by other agencies to support supply chain mapping efforts.* Similar challenges are present throughout the U.S. government.[226] Moreover, many agencies, including the FDA, lack legal authority to compel firms to share critical data; by contrast, Executive Order 13603 delegated Defense Production Act authorities to the Department of Commerce that enable it to require firms within its jurisdiction to provide data on U.S. defense industrial capabilities.†[227]

Supply Chain Dependencies Identified by the Commerce Department's Novel SCALE Tool

In 2023, the Commerce Department established the Supply Chain Center with the aim of integrating industry expertise and data analytics to monitor and identify supply chain vulnerabilities. The center developed a novel tool called SCALE, which aims to provide the U.S. government a whole-of-economy analysis of U.S. supply chains and promises to create a "heat map of risk and assess industries from highest to lowest risk."[228] Since 2024, SCALE analysis revealed that more than 38 percent of U.S. industries source over half their imports from two adversarial nations, China and Russia, and 71 different industries are at least 70 percent reliant on these nations for most of their imports. Moreover, nearly 38 percent of industries are reliant on single-country-sourced products.[229] The center has used this analytical tool

*Statutory limitations, such as Section 311(j) of the Food, Drug, and Cosmetic Act, restrict the FDA from providing data collected for regulatory purposes to other U.S. agencies to conduct supply chain analytics. The FDA's approach to data collection and storage may pose additional challenges, as data gathered primarily for regulatory purposes may not be organized for analytical use. Stephen Schondelmeyer, a professor of pharmaceutical management and economics at the University of Minnesota, testified before the Commsision that the data the FDA collects on drug products are "generally not structured to permit systematic, market-wide assessment of the drug supply chain within a given agency, let alone across agencies." Stephen W. Schondelmeyer, written testimony for U.S.-China Economic and Security Review Commission, *Hearing on Dominance by Design: China Shock 2.0 and the Supply Chain Chokepoints Eroding U.S. Security*, June 5, 2025, 7; U.S. Senate Committee on Homeland Security and Government Affairs Majority, *Short Supply: The Health and National Security Risks of Drug Shortages*, March 2023, 38; National Academics of Sciences, Engineering, and Medicine, *Building Resilience into the Nation's Medical Product Supply Chains* (National Academies Press, 2022), 166.

†The Defense Production Act of 1950 grants the President broad authority to obtain information "as may be necessary or appropriate, in his discretion, to the enforcement of the administration" of the act, including to conduct assessments of the U.S. defense industrial base. Executive Order 13603 delegated this authority to the Commerce Department, in cooperation with the Departments of Defense and Homeland Security. Alexandra G. Neenan, "The Defense Production Act of 1950: History, Authorities, and Considerations for Congress," *Congressional Research Service* (Report No. R43767), October 6, 2023, 15; White House, "Executive Order 13603 of March 16, 2012: National Defense Resources Preparedness," 77 Fed. Reg 16651 (March 22, 2012); Defense Production Act of 1950 § 705, codified at 50 U.S.C. § 4555.

Supply Chain Dependencies Identified by the Commerce Department's Novel SCALE Tool—*Continued*

to perform feasibility assessments. For instance, SCALE analysis found that the buildout of AI data centers is highly vulnerable to disruptions in the supply of backup generators, PCBs, cooling technologies, networking equipment, and semiconductors.[230] However, experts have noted that the tool is limited by the data available to the U.S. government. For instance, trade data used in the analysis are limited by the product grouping under the Harmonized Tariff Schedule, which is not granular enough to track the origin of specific inputs or components.[231] Lacking such micro-level data, the tool itself is unable to reveal dependencies on suppliers vital to U.S. production. The center continues to rely on qualitative analysis to compensate for the limitations of SCALE's quantitative findings, with the tool acting as part of a three-legged stool, alongside the agency's in-house industry expertise and engagement with business and subject matter experts.[232] Improved data could enhance the type of insights it can provide.*

- *Lack of incentives for U.S. industry to invest in supply chain resiliency:* Various market-based factors and policy changes incentivized U.S. industry to offshore production, contributing to supply chain vulnerabilities. The market continues to underprice the risks of supply chain fragility. Dr. Gorman noted in testimony that "companies do not routinely 'stress-test' supply chains against various risk scenarios, even though the frequency and severity of supply chain disruptions has been increasing over time."[233] Addressing supply chain risks will require U.S. policy to create market signals that incentivize firms to de-risk and enhance resiliency.
- *Limited surge capacity and stockpiling:* The United States lacks the manufacturing industrial base to surge many critical needs to meet demand in a crisis. Numerous recent crises have demonstrated the consequences of insufficient surge production, including U.S. vulnerability to China's critical minerals controls; bottlenecks in producing munitions used by Ukraine; the 2021 and 2022 semiconductor shortage; and the supply of ventilators during the COVID-19 pandemic, which ramped up only after the peak had passed.[234] Stockpiling critical inputs and goods provides greater time and flexibility to respond to supply disruptions, but current U.S. strategic stockpiles are insufficient for a prolonged supply disruption and would be rapidly depleted in a high-intensity conflict.[235] A series of wargames run by the Center for Strategic and International Studies found that "the United States would likely run out of some munitions—such as long-range, precision-guided munitions—in less than one week in a Taiwan Strait conflict."[236] The limitations of stockpiling, in-

*In June 2025, the Senate passed the Promoting Resilient Supply Chains Act of 2025. If passed by the House and signed into law, the Act would create new reporting requirements on supply chain risks, which would likely be completed by the Supply Chain Center. Promoting Resilient Supply Chains Act of 2025, S.275, introduced January 27, 2025.

cluding the difficulty of accurately predicting crisis-time needs, mean it is only viable as part of a larger strategy to prepare for demand surges and supply disruptions.[237] A more comprehensive approach requires the U.S. government to view surge production capacity as a collective good and ensure a level of domestic manufacturing capacity beyond what the market ordinarily supports.

- *Challenges in coordinating with allies and partners:* China's dominance in a supply chain will often create parallel risks for U.S. allies and partners. Building enduring supply chain resilience requires cooperation with like-minded and similarly vulnerable countries to secure access, diversify sources, ensure scale for alternative suppliers, and stabilize global markets. The United States and its allies and partners will need to overcome challenges in information sharing and coordinating policy responses.[238] Without international collaboration, the United States may risk implementing fragmented, costly, and ultimately ineffective efforts in countering China's weaponization of supply chain vulnerabilities.

Implications for the United States

China's drive to control strategic chokepoints across numerous key industries threatens to expand the scope of U.S. supply chain insecurity. **Despite the risks of reliance on China for inputs like critical minerals and APIs being long acknowledged, U.S. policy has not meaningfully moved at scale to fortify against potential coercion.** The status quo approach is also failing to prepare for China's emerging dominance in foundational chips and other critical sectors.

Whether it is critical minerals, APIs and other critical inputs in the pharmaceutical supply chain, or PCBs, the vulnerabilities of the American economy in both peacetime and wartime are staggering. New vulnerabilities, like potential dependence on Chinese foundational chips, will make the problem worse. **Without a deliberate U.S. strategy—either unilateral or coordinated with allies and partners such as Europe, Japan, South Korea, and India—the United States is on track to face an enduring strategic vulnerability that China can exploit for decades to come.** The implications go beyond physical supply disruptions.

Deep economic dependence creates not only the risk of supply disruption but also the risk of decision paralysis—where U.S. policymakers avoid necessary action for fear of Chinese retaliation. This chilling effect on U.S. decision-making can weaken deterrence in both economic and security domains, undermining the credibility of U.S. commitments to allies and partners.

Addressing persistent supply chain vulnerabilities requires a sustained and comprehensive effort across the U.S. government. These vulnerabilities are the direct result of decades of market decisions that were allowed to be shaped by China's nonmarket practices. Undoing these networks will require the U.S. government to create alternative market signals and reshape the incentives facing U.S. firms through carefully coordinated and targeted use of tariffs, subsidies, procurement, and other industrial

policy instruments. Identifying where the United States needs to deploy these policy tools is key. However, the U.S. government lacks sufficient information on supply chains to act, largely because it lacks the necessary legal authorities, has underutilized the authorities it does have, or keeps key datasets trapped behind bureaucratic siloes.

Supply chain security does not entail zero reliance on Chinese producers. Rather, it involves an end state where, if China severs supply chain access to U.S. companies, the economy can continue to meet its critical needs. **However, the United States has yet to define the contours of this end state, let alone propose an economic strategy to realize it.** Any such approach will require a blend of policies, such as implementing industrial policies that expand U.S. domestic production, providing U.S. businesses incentives or support to diversify supply relationships away from sole reliance on China, investing in capabilities like surge production capacity to mitigate the damage from supply disruptions, and pursuing other measures targeted at critical supply chain vulnerabilities.

Building and maintaining this resilience will be an ongoing process. U.S. efforts have at best focused on today's vulnerabilities, not tomorrow's chokepoints. The emergence of new technologies and China's perpetual pursuit of manufacturing dominance will create new vulnerabilities. Beijing is already positioning itself to control supply chains of the future, including synthetic biology (for more, see Chapter 6, "Interlocking Innovation Flywheels: China's Manufacturing and Innovation Engine"). **Without proactive monitoring and effective interventions, the United States may repeat the pattern of reacting too passively and too late while allowing China to maintain critical leverage over key U.S. supply chains.**

Recommendations

The Commission recommends:

- Congress build U.S. pharmaceutical supply chain resilience by increasing visibility into the supply chain, as well as tracking and reducing U.S. direct and indirect dependence on Chinese active pharmaceutical ingredients (APIs) and related key starting materials (KSMs), through legislation that:
  - Amends section 3112(e) of the Coronavirus Aid, Relief, and Economic Security (CARES) Act to expand the authority of the U.S. Food and Drug Administration (FDA) to require drug manufacturers to report volume and ultimate origin of APIs and KSMs used in drugs consumed in the United States, including sourcing of Chinese content through third countries. Based on this information, the FDA should:
    - Produce a confidential report analyzing U.S. vulnerabilities to Chinese APIs and KSMs. The report should identify the proportion of U.S. drug consumption that is dependent on foreign APIs and KSMs, determine vulnerabilities, and track trends over time, including anonymized aggregates of increases or decreases in U.S. dependency on China.

- Directs the FDA to identify regulatory authorities and deficiencies to support or incentivize the use of APIs and KSMs from sources with no China origin.
- Directs the Centers for Medicare and Medicaid Services (CMS) to explore the use of procurement and reimbursement authorities to protect the U.S. and allies' API and KSM markets, which could include price floor commitments in support of U.S. industry to protect investments against nonmarket practices and price manipulation.

- To support the U.S. Department of Commerce's Supply Chain Center in addressing the lack of sufficiently fine-grained, real-time data on U.S. dependence on China for materials and intermediate goods, the relevant committees of Congress should hold hearings on the activities of the Center, the adequacy of its funding, and the ways in which its work might be improved through the incorporation of data and techniques being developed in the private sector. The Supply Chain Center should then be required to provide an annual report identifying a set of goods and materials deemed critical to national defense and/or the functioning of the civilian economy, detailing trends in U.S. dependence on China for those goods and materials, and reporting on the status of policies and programs intended to limit that dependence.
- Congress expand and modernize applicable lending, investing, and grantmaking authorities for the U.S. International Development Finance Corporation, Export-Import Bank of the United States (EXIM), and other strategic financing vehicles established by the U.S. government to ensure these financing entities are adequately positioned to utilize significant portions of their funding to prioritize critical U.S. needs in geostrategically relevant sectors ("strategic projects"), including:
  - Supply chains for critical and emerging technologies and related enabling inputs (e.g., critical minerals, critical minerals processing, semiconductors, artificial intelligence, biotechnology, quantum information sciences, digital technology, etc.);
  - In sectors where reliance on supply chains based in China poses serious economic or national security risk to the United States, as determined by the President, in consultation with Congress; and
  - In countries of geostrategic importance to U.S.-China competition as determined by the President, in consultation with Congress, for projects relevant to such competition.

  Congress should also ensure that current limits applicable to each of these entities, including EXIM's 2 percent default cap, content requirements, and limits on types of recipients, do not unduly constrain U.S. entities from funding or advancing strategic projects.

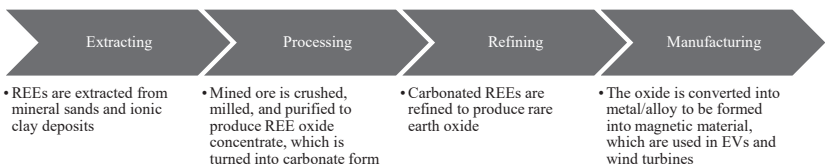
Appendix I: Understanding the Supply Chains of Select Sectors

Background on the Critical Mineral Supply Chain

Many critical mineral supply chains require capital and time-intensive processes and use specialized equipment to go from extraction to the use of refined minerals in manufacturing (see Figure 6).

- *Exploration:* Critical mineral supply chains start with mineral exploration for commercially viable reserves.[239]
- *Extraction*: For some minerals, ore is primarily found underground, and extraction requires mining; in other cases, such as for REEs, ores are often on the earth's surface but require chemical separation from other elements.
- *Processing and refining:* After extraction, ore is refined into oxides and processed into metals. For REEs, processing involves multiple steps of cracking and leaching to break down the REEs into individual elements and separate them from other impurities and each other.[240] Then, the processed elements are refined to produce rare earth oxide and smelted with other raw materials.
- *Manufacturing:* Finally, in the downstream, processed metals are used to manufacture components, and those components are integrated into a finished good. For instance, REE oxides are smelted into metals or alloys used in permanent magnets found in EV batteries and wind turbines.

Figure 6: Rare Earth Elements Supply Chain



Source: Adapted from Jared Cohen, "Resource Realism: The Geopolitics of Critical Mineral Supply Chains," *Goldman Sachs*, September 13, 2023.

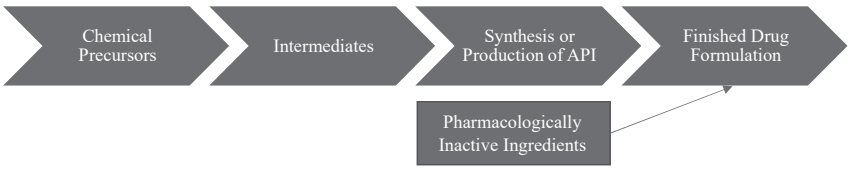
Background on the Pharmaceutical Supply Chain

The pharmaceutical manufacturing process* is complex, often crossing several borders as chemical precursors are synthesized into APIs—the part of the drug that provides the intended therapeutic effect—and combined with inactive substances into a final dosage (see Figure 7). APIs are initially developed from chemical precursors, often simple commodity petrochemicals. Precursors are then refined into more complex but still biologically inactive compounds through complex chemistry processes, for instance to make compounds more stable or reactive in later steps. In synthesis, the resulting intermediaries are further purified into active compounds with pharmacological effects—APIs. The APIs are then combined

*The full pharmaceutical value chain also encompasses drug discovery, trials, regulatory approval, manufacturing, and distribution, as well as in the downstream where the finished drugs are transported and distributed to patients.

with inactive substances called excipients that act as carriers of the API into the finished drug formulation, such as a tablet or a capsule.[241] Excipients have a number of functions to support a medication's effectiveness, ranging from preserving the drug's chemical stability and shelf life to improving the patient's ability to absorb the drug or making it easier to administer.[242]

Figure 7: Simplified Graphic Representation of the Pharmaceutical Manufacturing Supply Chain



Source: Patrícia Véras Marrone et al., "Decision Criteria for Partial Nationalization of Pharmaceutical Supply Chain: A Scoping Review," *Economies* 11, no. 25 (2023): 1–21.

Background on PCB Supply Chains

PCBs form the digital backbone upon which all electronic devices are built. Every electronics device requires at least one PCB, from the humble toaster to the most advanced AI processor. PCBs are also vital to U.S. critical infrastructure and virtually all defense systems. PCBs are sheets of resin or other non-conductive material onto which copper lines or traces are etched. These boards hold but also electrically connect integrated circuits and other electrical components that are mounted on them. They function as maps that route signals and power to electronic devices and back out into external systems. PCB fabrication refers to the process of layering and etching copper traces onto the board itself. In the PCB assembly stage, electrical components—ranging from packaged semiconductors* to basic hardware like capacitors—are mounted on the fabricated board. Every PCB is designed to hold a set of components and to serve a particular purpose. PCB manufacturers produce boards according to design files submitted by the customer placing the order, such as an OEM. The complexity of the PCB depends on its application. The growth in small form-factor electronics (i.e., wearable devices and Internet of Things devices), as well as the high-speed performance requirements of leading-edge chips, are driving demand for advanced PCB technologies like flexible PCBs and high-density interconnect (HDI)—complex, multi-layered PCBs that enable higher component density and faster signal transmission needed in advanced computing applications.[243]

The United States relies heavily on overseas production in PCBs. Over the past three decades, U.S. manufacturing capabilities in PCB production have been offshored to East Asia, and today China is the world's leading PCB manufacturer. The number of U.S. PCB

*Although semiconductor supply chains also contain an "assembly" stage, this is an unrelated process. Within chip fabrication, the assembly and packaging stages of ATP involve cutting individual chips from a wafer, mounting them onto a substrate, and encasing the dies within protective packaging that contains connectors for interfacing with the rest of the device. Abiola Ayodele, "OSAT Semiconductor Services: The Backbone of Outsourced Chip Assembly & Testing," *Wevolver*, March 17, 2025.

manufacturers declined from over 2,000 in the 1990s to just 145 today.[244] The United States produces 4 percent of global PCBs, falling from 30 percent 25 years ago.[245] U.S. producers mainly focus on low-volume specialty boards used in industrial, medical, defense, and aerospace products, with many heavily dependent on defense contracts for continued operations.[246] According to David Schild, executive director of the Printed Circuit Board Association of America, the defense industry accounts for around 40 percent of demand for domestic PCB production.[247]

Foreign offshoring helped establish China's prominence in PCB supply chains, and foreign-owned facilities still account for a significant share of the country's PCB output. Cost-cutting pressure combined with Chinese government subsidies for plant construction and equipment, low labor costs, and proximity to material inputs drove offshoring and outsourcing of production to China.[248] Consequently, despite China's large share of the market, many of the top PCB manufacturers are non-Chinese; only two of the top ten PCB manufacturers by revenue were Chinese in 2023.*[249] According to estimates by the Taiwan Printed Circuit Association and the Industrial Technology Research Institute, two-fifths of China's PCB production came from foreign-invested firms in 2023, meaning that Chinese-funded companies alone accounted for 30.5 percent of the global market.†[250] Outside of China, Taiwan is the largest PCB manufacturing hub. Southeast Asia, and particularly Thailand, is emerging as a new production center as U.S. tariffs since 2018—as well as competitive pressures to co-locate with Southeast Asia's growing electronics manufacturing base—are driving manufacturers to relocate to the region.[251] Though Chinese companies are also establishing facilities in Thailand, its share of PCB manufacturing remains small and appears unlikely to substantially challenge China for market share.[252]

Upstream, China is one of the largest suppliers of inputs for PCB manufacturing. China produces over 75 percent of the world's copper-clad laminate, a material that accounts for roughly 30 percent of PCB production costs.[253] However, China's production is concentrated in lower-value copper-clad laminates, whereas China holds only 7 percent of the market for high-speed and high-frequency variants needed by more advanced computing applications.[254]

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*China's two largest PCB firms are DSBJ, with 2023 revenues of $3.3 billion, and Shennan Circuits at $1.9 billion. Compared to $23.0 billion in revenue for Chinese-owned PCB manufacturers in 2023, these two companies made up over one-fifth of Chinese-owned production. The remainder of China's industry is divided between dozens of smaller players. Out of the 134 companies that earned over $100 million in 2023, 59 firms were Chinese. "AI伺服器和車用電子助攻, 預估2024年陸資PCB將成長至267.9億美元" [Boosted by AI Servers and Automotive Electronics, Mainland Chinese-Funded PCBs Are Projected to Grow to $26.79 Billion in 2024], *Taiwan Printed Circuit Association*, November 18, 2024; Hayao Nakahara, "Can Thailand Pad Its PCB Gains?" *Printed Circuit Engineering Association*, October 2024.

†After Chinese firms, Taiwan-owned facilities are the largest contributors to China's PCB output. Industry analyst Hayao Nakahara estimated that Chinese firms accounted for 60 percent of output in 2021, Taiwan-owned firms were 29 percent, and the remaining 11 percent came mainly from Austria's AT&S, the United States' TTM International, and other firms headquartered in Japan or Southeast Asia. Hayao Nakahara, "NTI: The Unsinkable, Unstoppable PCB Market," *Printed Circuit Design & Fab*, July 28, 2022.

U.S. Government Demand Signals May Be Insufficient to Revive Domestic Industry

Recent U.S. government actions have expanded the market for domestic PCB production. In March 2023, the Biden Administration authorized the use of the Defense Production Act to support the U.S. PCB industry.[255] Also, as of 2023, DOD is prohibited from procuring PCBs manufactured in China, Russia, North Korea, or Iran, in accordance with the FY 2021 National Defense Authorization Act.[256] At the same time, however, U.S. industry may face challenges in scaling production. Mr. Schild stated that "zero new facilities for defense [PCB] manufacturing have been established in the past twenty plus years in the United States."[257] The economics of PCB manufacturing require scaling production to achieve profitability; the defense industrial base, with its small market size relative to the wider electronics industry, cannot provide sufficient demand on its own.[258] Many U.S. firms struggle to match overseas competitors on cost, and industry advocates state that a lack of capital to invest in new manufacturing equipment has left them lagging in technological advancements in PCB production.[259]

Background on Foundational Semiconductor Supply Chains

Foundational chips are the workhorse components that drive the modern economy and a modern military. As a category, foundational chips encompass a vast set of devices that are manufactured on a 28-nm or larger process node, which generally refers to the feature size of transistors etched on the semiconductor. They are ubiquitous in any product with electronics and are critical to wide swaths of economic activity. While often discussed as a single market, the foundational chip industry includes a wide range of components, including microcontrollers, power chips, and Internet of Things sensors that each have distinct technologies, applications, and market dynamics.

The semiconductor supply chain—both for foundational and leading-edge chips—is highly globalized, involving hundreds if not thousands of different production steps.[260] Despite the diversity within the foundational chip industry, production follows three broad stages:

- *Design:* Chip designers utilize electronic design automation tools and work closely with a specific fab to develop, verify, and simulate chip designs tailored to particular use cases. Chips are designed according to the fabrication process of a given chip manufacturer, meaning that switching to another manufacturer may require redesigning the chip.[261]
- *Fabrication:* Fabrication, also known as front-end manufacturing, is the core production step for chips—transferring chip designs onto wafers inside fabrication plants (also called "fabs") through various processes, including deposition, photoresist coating, photolithography, and etching.[262] Fabrication depends on upstream inputs that are typically sourced externally, in-

cluding dozens of specialty chemicals and the high-purity crystals used to make raw wafers.

- *Assembly, test, and packaging (ATP):* Also known as back-end manufacturing, ATP is where individual chips are cut from finished wafers, tested, and packaged in preparation for placement on a PCB and final assembly.

In addition, the semiconductor industry operates under two main business models. The integrated device manufacturer (IDM) model entails a single company vertically integrating all three stages of production—design, fabrication, and ATP. In contrast, the fabless-foundry model separates these functions, with fabless firms focusing on chip design and outsourcing fabrication to pure-play manufacturing companies called foundries. Foundries are fabs that typically source production contracts from several fabless companies, providing greater flexibility in maintaining sufficient levels of end demand.[263]

Semiconductor production is a business that relies heavily on scale for profitability. Chip design and fabrication involve massive upfront costs—particularly fabs, which can cost billions of dollars to construct.[264] These costs remain constant regardless of the production volume. Typically, the first few years of production occur at a net loss and profits are only earned in later stages of production.[265] Maintaining a high-production volume is crucial to recouping the substantial fixed costs of building a fab and justifying investments in new fabs.[266] When capacity is underutilized, these high fixed costs are spread across fewer unit sales, increasing the per-unit cost and reducing profitability. The industry is, consequently, highly demand driven, with profit-oriented firms aiming to avoid underutilized fab capacity.

Compared to the high concentration of leading-edge chip fabrication in Taiwan, foundational chip production is more geographically dispersed and involves a broader set of market players. Whereas Taiwan held nearly 70 percent of global production capacity for chips in advanced nodes in 2023, it accounted for only 44 percent for nodes at 28 nm and above.[267] The United States, Europe, Japan, Korea, and China each maintain a sizeable share of production capacity for foundational chips.[268] Because foundational chip manufacturing relies on mature processes and does not require continual investment in cutting-edge machinery, many established foundries have fully depreciated their assets, allowing them to operate at lower cost and remain profitable, even in low-margin segments.[269]

Backed by heavy state support, China has emerged as a global hub for foundational chip fabrication over the past decade, driving much of the world's capacity growth at mature process nodes. Since 2014, and with specific targets set in Made in China 2025, Chinese industrial policy accelerated efforts to position China as a leader in the chip industry and establish self-sufficiency in these critical components. Extensive state support has driven the expansion of China's chipmaking capabilities, with likely over $150 billion in state-led investment since 2014, including from the China Integrated Circuit Industry Investment Fund, a government-led investment

vehicle that is also known as the Big Fund.*[270] China's foundational chip production capacity rose 250 percent from 1.2 million wafers per month in 2015† to 3.0 million in 2023, driving 72 percent of global capacity growth during that time.[271] In 2024, 34 percent of global wafer fabrication capacity for foundational chips was located in China, according to Taiwan market research firm TrendForce.[272] Moreover, while some of this production reflects the China-based operations of foreign firms,‡ most of China's foundational production capacity is concentrated in three state-supported firms: SMIC,§ Hua Hong Group, and Nexchip. These companies now rank in the top ten global foundries.[273] Combined, they earned 9 percent of global foundry revenue in Q4 2024.[274]

*In May 2024, the Big Fund closed its third funding round, raising another $47.5 billion in capital. If fully invested in the chip industry, this new funding could bring total state-led investment since 2014 to nearly $200 billion, including central and provincial government support. Ryan McMorrow and Cheng Leng, "China Raises $47bn for Chip Industry in Drive for Self-Sufficiency," *Financial Times*, May 27, 2024; "China Boosts State-Led Chip Investment," *Economist Intelligence Unit*, March 13, 2024.

†This refers to wafer starts per month, or the number of wafers that enter production in a fab. It takes on average 12 weeks to produce a finished semiconductor wafer. "Chipmakers Are Ramping Up Production to Address Semiconductor Shortage. Here's Why that Takes Time," *Semiconductor Industry Association*, February 26, 2021.

‡According to one study of China's share in the foundational logic chip segment, China-headquartered firms accounted for 83 percent of China's capacity. Will Kirkman, Graham Newell, and Dan Brown, "Current- and Future-State Legacy Semiconductor Manufacturing Capacity," *MITRE*, May 2024.

§SMIC also manufactures leading-edge chips. Notably, it produces the Kirin line of system-on-chips for Huawei's flagship phones on a 7-nm process node. However, leading-edge chips account for only a portion of SMIC's sales, and industry experts estimate that 75 percent of its production capacity is dedicated to foundational nodes, although the company does not disclose revenue by node size. "SMIC's U.S. Revenue Share Climbs to Nearly 13% in Q1; Warns of 4–6% Q2 Sales Dip," *TrendForce*, May 9, 2025.

Appendix II: U.S. Pharmaceutical Drugs with Potential Sole Reliance on China's APIs

Drug Name	Therapeutic Category	FDA Essential Drug List
Abemaciclib	Cancer Treatment	
Acarbose	Diabetes treatment	
Acetylcysteine	Acetaminophen overdose	X
Baloxavir marboxil	Pandemic influenza	X
Cefoperazone sodium	Antibiotics	
Chlortetracycline hydrochloride	Antibiotics	
Colistimethate sodium	Antibiotics	
Dalteparin sodium	Anticoagulant/blood thinner	
Dirithromycin	Antibiotics	
Dobutamine hydrochloride	Cardiac	X
Famciclovir	Antiviral	
Gentamicin sulfate	Antibiotics	
Glucosamine sulfate potassium chloride	Symptomatic slow-acting drugs	
Heparin sodium crude	Anticoagulant/blood thinner	X
Iodixanol	Cardiac; radiology	
Iopamidol	Radiology	
Ipratropium bromide	Pulmonary	X
Isoflurane	Anesthetic	X
Kanamycin sulfate	Antibiotics	
Lincomycin hydrochloride	Antibiotics	
Miglitol	Diabetes treatment	
Mitotane	Cancer Treatment	
Nesiritide citrate	Cardiac	
Niraparib tosylate monohydrate	Cancer Treatment	
Nitrofurazone	Antibiotics	
Paroxetine mesylate	Anxiolytics	
Pilocarpine hydrochloride	Oral and eye care	
Polidocanol	Dermatological agent; venous disease	

Drug Name	Therapeutic Category	FDA Essential Drug List
Streptomycin sulfate	Antibiotics	
Tazobactam sodium	Antibiotics	X
Telavancin hydrochloride	Antibiotics	
Tobramycin	Antibiotics	X (ophthalmic solution only)
Tobramycin sulfate	Antibiotics	
Vinorelbine tartrate	Cancer Treatment	
Ziconotide acetate	Analgesic	
Zidovudine	HIV-1 Treatment	

Note: The list only includes currently active DMFs submitted between 2013 and 2024.

Source: Derived from underlying data supplied by Marta Wosińska and used in Marta E. Wosińska and Yihan Shi, "U.S. Drug Supply Chain Exposure to China," *Brookings Institution*, July 28, 2025; U.S. Food and Drug Administration, *Drug and Biologic Essential Medicines, Medical Countermeasures, and Critical Inputs for the List Described in Section 3(c) of the Executive Order 13944*, October 30, 2020.

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CHAPTER 10: POWER SURGE: CHINA'S ELECTRIFICATION DRIVE AND PUSH FOR GLOBAL ENERGY DOMINANCE

Executive Summary

China's "electrification" strategy is increasing its influence in the global energy sector, which carries a number of risks for the United States. China's economy is rapidly electrifying, adding more hydro, nuclear, solar, and wind power generation in 2024 than Germany's annual total power consumption. Through massive state support and other forms of market distortions, China has become a dominant manufacturer of certain types of equipment at each stage of power generation and consumption. Building on decades of energy infrastructure construction abroad, China's role in global energy systems continues to expand through exports of low-carbon energy technologies and electricity grid components and investment in electric vehicle (EV) and battery factories abroad. The appeal of China's energy technology exports and investments is particularly strong in developing countries, where—aside from offering cheap solutions—China's technologies may mitigate developmental challenges like rural electrification in areas with weak grid infrastructure. The massive scale of China's production and investment across all stages of the electric power system has shifted the trajectory of global markets in a direction that benefits Chinese manufacturers.

The risks for the United States arising from China's expanding exports and investments include supply chain vulnerabilities—given high U.S. reliance on certain materials and products sourced from China—and cybersecurity threats to U.S. critical infrastructure. China supplies over half of the United States' imports of battery energy storage systems and low-voltage transformers, and it is a leading refiner of almost all the critical minerals necessary for the energy sector. Beijing began the process of weaponizing U.S. dependence on Chinese critical mineral refiners in July 2023 and could potentially use its manufacturing capacity in other critical products and materials as economic leverage. The extensive use of Chinese components in the U.S. power grid creates risks for cyber espionage and sabotage—which are significant in light of China's stated strategy and known activities like People's Republic of China (PRC)-sponsored Volt Typhoon's efforts to pre-position assets in U.S. critical infrastructure. Additionally, China's role in international energy systems expands its geostrategic influence, potentially giving it leverage over U.S. allies and partners or third countries that also depend on China for energy imports or even allow Chinese investment in their energy systems.

Key Findings

- China's government-supported dominance in key "new energy" sectors and growing footprint in global energy systems more generally raise numerous national security concerns for the United States and other countries. These risks include dependency on Chinese exports and technology, with associated leverage accruing to Beijing. Chinese components and systems also raise cybersecurity-related risks to critical infrastructure, which are acute in light of PRC malign efforts like Volt Typhoon.
- China's restrictions on critical mineral exports to the United States demonstrate its willingness and ability to leverage control of energy technology supply chains for economic coercion. Beijing could use similar tactics to undermine U.S. diplomatic objectives and negotiations with third countries. In 2025, firms across North America, Europe, and Asia faced mounting delays and demands for sensitive data during China's mineral export license reviews—turning supply chain chokepoints into instruments of coercion and corporate surveillance.
- China's burgeoning role in global energy systems is occurring through multiple channels: its firms are involved in the construction and operation of energy infrastructure globally, its components are embedded in power systems throughout the world, and its manufacturers are increasingly investing in overseas factories to boost market share abroad.
- China's national energy strategy has been focused on using government policy to grow "electrification" as a means of reducing its reliance on fossil fuel imports, boosting energy efficiency, and reducing pollution and carbon emissions. While it is still the world's leading consumer of fossil fuels, China has made significant progress toward its electrification goals, including by continuing to build coal-fired power plants.
- In light of global trends in favor of reduced carbon emissions, Beijing saw electrification as having benefits not only for its energy policy but also for its goals to become a global manufacturing superpower and grow its geostrategic power. China leveraged access to its market and its industrial policy toolset to become a dominant producer of key "new energy" technologies, including EVs, batteries, solar panels, and core wind turbine components. Its policies have already wiped out solar panel makers in the United States and EU, and similar dynamics threaten foreign producers of EVs, wind turbines, and other low-carbon technologies, undermining efforts to de-risk supply chains. China is also a major producer of key equipment used in energy storage, transmission, and distribution.

Introduction

In May 2023, U.S. cybersecurity agencies, allied and partnered agencies, and Microsoft announced that they had discovered a Chinese state-sponsored cyber actor—Volt Typhoon—targeting critical infrastructure in the United States. Since at least 2021, Volt Typhoon has infiltrated the U.S. power system, oil and gas pipelines, and other critical infrastructure. This cyber espionage allowed Volt Typhoon to collect operational insights into the electric grid, identify chokepoints with outsized control over grid operations, and pre-position cyber assets to potentially disrupt grid operations.

A disruption of a key power station or substation could have caused a national crisis on the scale of the power outage across Spain and Portugal in April 2025, which shut down their transportation, communication, water, grocery, and financial systems for 18 hours. While the Iberian outage was not caused by an adversarial actor, Chinese hackers' targeting of civilian infrastructure through groups like Volt Typhoon and Salt Typhoon make it important to understand the role China plays in U.S. and global energy markets, products, and infrastructure. China's "electrification" energy strategy has made it a dominant supplier of "new energy" technologies, and the Belt and Road Initiative has helped it grow its investments and influence in energy systems all over the world. This rapid scale-up has been driven by industrial policy—not market demand—and is generating overcapacity across electrification value chains, a dynamic that is distorting global markets and deepening dependency on Chinese supply. These developments create risks for the United States and its allies and partners around supply chains, cybersecurity, and Beijing's leverage and influence.*

China's Domestic Energy Strategy Increases Control of Key New Energy Sectors

China Is Rapidly Electrifying

China's domestic economy is rapidly electrifying, and China is now a global leader in manufacturing and installing many products and inputs used in electrification.† Electricity consumption growth in China has outstripped its real gross domestic product (GDP) growth since 2020 (see Figure 1).[1] Roughly half of that growth has been driven by manufacturing, with production of electric technologies like solar panels, batteries, and EVs accounting for over a third of industrial electricity demand growth.[2] In the first six months of 2023, China exported 114 gigawatts (GW) of solar panels, more than the total installed solar

*This chapter draws on the Commission's April 2025 hearing on "China's Domestic Energy Challenges and Its Growing Influence over International Energy Markets," consultations with experts, and open source research and analysis.

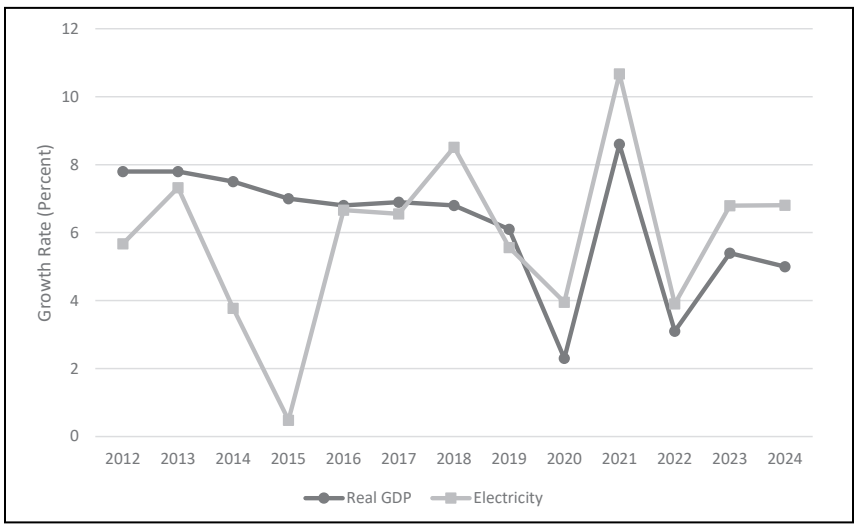
†Electrification is the expansion of electricity use in final energy consumption by converting energy-consuming devices, systems, and sectors from non-electric sources of energy to electricity. This can involve moving away from consumable, heat-based power sources like fossil fuels to non-consumable, electric technologies like solar, wind, and nuclear and can be incentivized by global environmental regulations and carbon taxation frameworks that penalize carbon-intense industrial processes. However, electrification does not require reducing fossil fuel use, and China demonstrates that a power system can generate most of its electricity from fossil fuels even as it promotes electrification. U.S. Department of Energy, *What Is Electrification?* accessed July 15, 2025; U.S. Energy Information Administration, *China*, May 19, 2025; Sam Boocker and David Wessel, "What Is a Carbon Border Adjustment Mechanism?" *Brookings Institution*, July 8, 2024.

capacity of the United States at that time, and China produced enough batteries in 2023 to meet all of global demand.[3]

Electricity consumption in China has also been driven by the widespread adoption of high-speed rail and electric passenger vehicles, trucks, and buses alongside an increased use of electric air conditioning and heating in homes and businesses.[4] Almost half the cars sold in China in 2024 were EVs, and there were more EVs sold in China alone in 2024 than were sold globally in 2022.[5] Data center power consumption has also contributed to China's electricity demand, more than doubling from 60–70 terawatt-hours (TWh) in 2019 to 166 TWh in 2024 and accounting for 1.7 percent of total electricity consumption.[6] Chinese data center power consumption is projected to rise to between 300 and 600 TWh by 2030, accounting for at most 4.6 percent of China's total electricity consumption.*[7]

To meet the growing demand for electricity, China has made massive power generation additions, and its power grid capital expenditures outpace its economic growth.[8] In 2024, China's new electric power generation from low-carbon sources alone (i.e., hydro, nuclear, solar, and wind) was greater than Germany's annual total power consumption.[9]

Figure 1: Real GDP and Electricity Growth Rates in China, 2012–2024



Source: Various.[10]

Beyond transforming China's domestic energy system, the massive scale of China's production across all stages of the electric pow-

*This projection of data centers' share of China's total electricity consumption is based on an S&P Global projection that China's total power consumption will exceed 13,000 TWh by 2030. While this projection may seem small compared to projections that data centers could consume up to 9 percent of U.S. electricity by 2030, the United States' four leading tech companies have outspent China's seven leading tech companies on capital expenditures by a factor of 8.5:1 over the last five years, suggesting that data center power demand in the United States will grow faster than in China. U.S. Department of Energy, *Clean Energy Resources to Meet Data Center Electricity Demand*, accessed August 26, 2025; Jeffrey Ding, "ChinAI #323: The AI Deflation of China's Tech Giants," *ChinAI Newsletter*, August 11, 2025; "Restructuring and Evolution: Key Drivers in China's Power Demand Surge," *S&P Global*, May 27, 2025.

er system has shifted the trajectory of global markets in a direction that benefits Chinese manufacturers (see Table 1). Fewer than one million EVs were sold annually around the world before 2017; in 2024, 17.3 million EVs were sold, 62 percent of which were Chinese-branded vehicles.[11] The China-led expansion of the global EV market reoriented upstream supply chains in favor of Chinese producers, with the lithium-ion battery market growing tenfold since 2016 and leading Chinese battery maker Contemporary Amperex Technology Co., Limited's (CATL) favored low-nickel lithium iron phosphate (LFP) chemistry winning out over alternative approaches from South Korean and Japanese rivals LG, SK On, and Panasonic.[12] Falling upstream prices and supply chain integration have driven Chinese EV prices lower, allowing Chinese manufacturers to price their EVs below competitors' in emerging markets.[13]

Table 1: China's Influence in Global Power Systems*

Stage of Power Production and Consumption	China's Leading Positions
Power Generation—Converting primary energy (e.g., heat, renewables) into electricity	China leads the world in installed capacity of renewable power generation, particularly solar, wind, and hydropower. It is also the dominant exporter of solar panels and wind turbine parts and is constructing a number of dams overseas. China leads the world in coal-fired power plant and nuclear reactor construction.
Storage—Storing generated power for future use (e.g., batteries)	China is the leading producer of lithium-ion batteries, including batteries used for energy storage by power stations and industrial end users.
Transmission—Sending electricity over long distances from generators to substations	China is a leading producer of many key components used for long-distance electricity transmission, including transformers, inverters, and rectifiers. It is also the dominant builder of ultra-high-voltage transmission lines used in a few countries.
Distribution—Sending electricity from substations to end users	In spite of its struggles with reliability in its own transmission and distribution system, China is a leading deployer of smart grid equipment and technologies as it tries to resolve physical barriers to grid modernization and use its electricity generation resources more efficiently.†
Consumption—Using electricity for residential, commercial, industrial, or transportation uses	China is the world's largest supplier of hybrid and fully electric vehicles and their batteries.

Source: Various.[14]

*For a more detailed discussion of the stages of electric power production and consumption, see Appendix I, "Electric Power Systems."

†In September 2025, China released the first plan implementing its "AI Plus" strategy—"AI Plus Energy." This plan lays out how Beijing plans to use artificial intelligence and related technologies to improve grid security and efficiency, particularly to better manage "fluctuating and intermittent" new energy sources. For more on China's AI Plus strategy, see "U.S.-China Tech Competition and Policy" in Chapter 1, "U.S.-China Economic and Trade Relations (Year in Review)." China's National Development and Reform Commission, "推进'人工智能+'能源高质量发展的实施意见" [Implementing Opinions on Promoting the High-Quality Development of "AI Plus" Energy], September 4, 2025.

This pattern of upstream dominance and downstream price leadership reflects the same state-directed industrial overcapacity dynamics that experts warned in testimony could be used to crowd out global competitors and make foreign markets dependent on Chinese inputs.[15] Chinese policy support for other emerging energy technologies could further shape global energy developments. In 2021, China shifted support to research and development (R&D) and logistics infrastructure for hydrogen, a nascent industry both globally and in China, expanding its control of global green hydrogen production capacity (i.e., electrolyzers that produce hydrogen from water) from 8 percent in 2020 to almost 70 percent in 2024.[16] China now has the most annual hydrogen commercial vehicle sales and the largest market for hydrogen as an industrial and transportation fuel.[17]

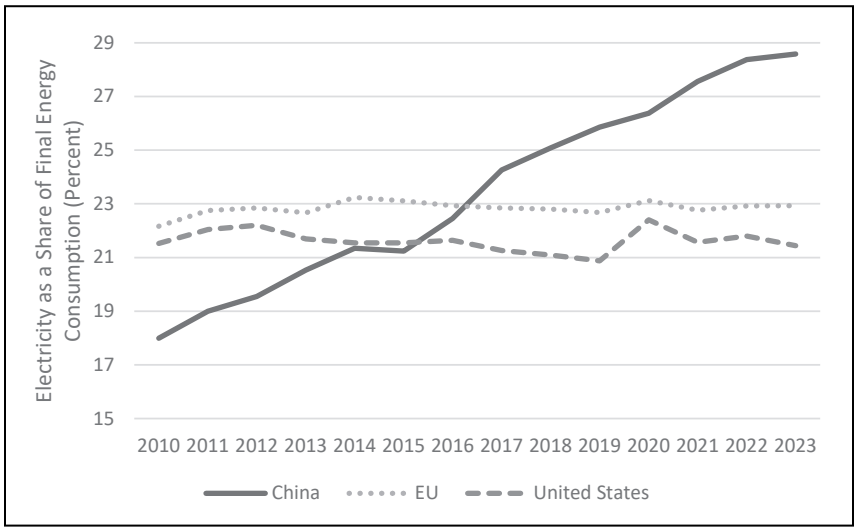
China's Domestic Energy Strategy Focuses on Electrification

Electrification is core to China's energy strategy.* In its 14th Five-Year Plan for a Modern Energy System, China aimed for electricity to make up 30 percent of final energy consumption by 2025.†[18] Now at 29 percent, electricity's share in China is higher than in the United States (21 percent) and the EU (23 percent), economies where electricity's share of final energy consumption has remained stable over the last 15 years (see Figure 2).[19] China's electrification strategy supports five overarching goals: energy security, energy efficiency, innovation and industrial upgrading, environmental improvement, and international influence.[20] As experts testifying before the Commission noted, over time, China's electrification strategy has resulted in geostrategic benefits, giving China global leverage in multiple segments of the electrification value chain, particularly for energy storage technologies.[21]

*For more on China's energy strategy, see U.S.-China Economic and Security Review Commission, Chapter 2, Section 3, "China's Energy Plans and Practices," in *2022 Annual Report to Congress*, November 2022, 234–290.

†China's five-year plans consist of an outline with hundreds of sub-plans. The 14th Five-Year Plan for a Modern Energy System was a sub-plan that fleshed out the energy objectives in the 14th Five-Year Plan Outline. China's National Energy Administration, "十四五"现代能源体系规划 ["14th Five-Year Plan" for a Modern Energy System], accessed July 10, 2025, 1; Oliver Melton, written testimony for U.S.-China Economic and Security Review Commission, *Hearing on China ahead of the 13th Five-Year Plan: Competitiveness and Market Reform*, April 22, 2015, 3.

Figure 2: Electricity's Share of Final Energy Consumption in China, the EU, and the United States, 2010–2023



Note: Final energy consumption measures the energy sources directly consumed by end users as opposed to the unprocessed energy sources produced in or imported into a country. Most energy sources must be refined or transformed into products usable for consumption (e.g., crude oil refined into gasoline, coal burned to generate electricity). Some energy content is lost through those processes. Since electricity is often generated by burning fossil fuels and some initial energy content is lost between the production/import and final consumption stages, it is best to analyze electricity consumption as a share of final energy consumption. "China," *International Energy Agency*, accessed October 6, 2025.
Source: Various.[22]

Electrification Supports China's Energy Security Goals

China has long sought to increase its energy security by reducing reliance on imports. China is the world's largest consumer of fossil fuels and has remained focused on reducing dependence on seaborne fossil fuel imports vulnerable to a blockade, particularly oil and gas from the Middle East and Africa transiting the Malacca Strait.[23] However, natural gas and oil have grown as shares of China's energy supply, and China's import dependency on both oil and gas has risen since Xi Jinping became General Secretary of the Chinese Communist Party (CCP) in 2012 (see Figures 3 and 4).*[24]

Electrification helps China slow the growth of and ultimately reduce its dependence on imported oil and gas.† Electrification of transportation and residential heating—two of the top uses of oil and natural gas—decreases the amount of petroleum and gas consumed.[25] China's consumption of gasoline and diesel has already

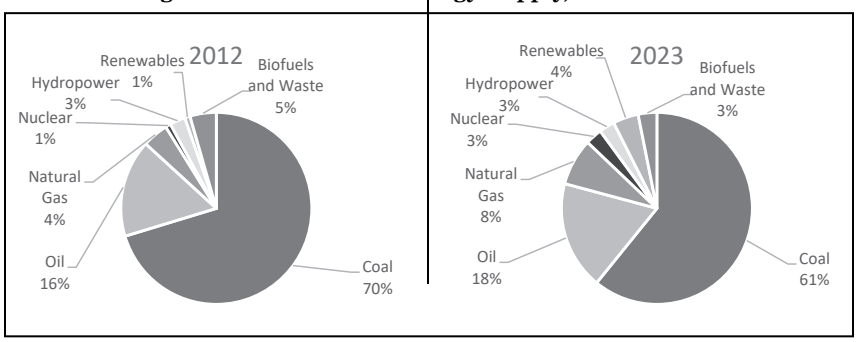
*China began importing pipeline gas from Russia and Central Asia in 2010, so 40 percent of China's natural gas is now imported over land. Energy Institute, "2025 Statistical Review of World Energy—*Gas: Inter-Regional Trade (from 2000)*," July 3, 2025.

†In 2024, 55 percent of China's electricity was generated by coal power and 36 percent by hydro, solar, nuclear, and wind power. Only 2 percent was generated by natural gas, and almost none was generated by oil. Although China imports some coal for cost reasons, it does not depend on coal imports because it has enough domestic coal production to meet its coal consumption. U.S. Energy Information Administration, *China*, May 19, 2025; David Fishman, written testimony for U.S.-China Economic and Security Review Commission, *Hearing on China's Domestic Energy Challenges and Its Growing Influence over International Energy Markets*, April 24, 2025, 8–9.

likely peaked due to increased EV use.[26] In the future, electrification of industrial sectors that are major users of oil and natural gas could also decrease the amount of imported energy consumed.[27] For example, in the steel industry, multiple Chinese producers are investing in low-carbon steel production, including electric arc furnaces, and provincial governments permitted only electric steelmaking projects in H1 2024.[28] This shift toward electricity as the energy source for industrial production reduces China's exposure to maritime chokepoints like the Malacca Strait but also strengthens its ability to weather future energy sanctions or supply disruptions in a geopolitical crisis.

Notably, electrification does not necessarily mean using fewer fossil fuels. While China is increasing the percentage of its energy needs that come from renewables, it is also expanding its capability to convert coal into electricity to improve its energy security, given its large coal reserves.[29] China's continued buildout of coal-fired power plants alongside renewables—despite an average coal plant utilization rate of 55 percent—demonstrates how China is pursuing energy security by increasing the supply of electricity, whether generated by coal or renewables.[30]

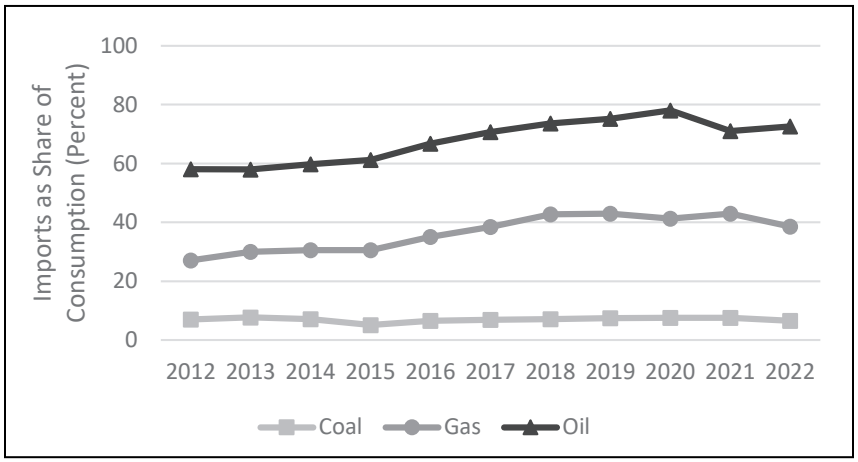
Figure 3: China's Total Energy Supply, 2012 vs. 2023



Note: When the Commission last examined the change in China's energy mix over time in its *2022 Annual Report to Congress*, it used data from BP's "Statistical Review of World Energy." In 2025, the Energy Institute updated the methodology of the "Statistical Review" to align with other organizations, including the International Energy Agency, because the previous methodology calculated how much fossil fuel energy was displaced by renewables, not the amount of energy renewables supplied. For a historically consistent dataset, the Commission's 2025 Annual Report is using data from the International Energy Agency. "About the Statistical Review," *Energy Institute*, accessed July 18, 2025.

Source: "Evolution of Total Energy Supply in China since 2000," *International Energy Agency*, accessed July 18, 2025.

Figure 4: China's Fossil Fuel Import Dependencies as a Share of Total Consumption, 2012–2022



Source: Various.[31]

Electrification Drives Energy Efficiency

Electrification could help China expand its manufacturing base and boost exports by reducing costs. Among other benefits, consuming electricity rather than heat-based sources for production can reduce input costs in manufacturing.[32] As China's labor costs have risen, energy efficiency could help offset cost pressures and preserve its global price competitiveness.[33] China succeeded in reducing the energy intensity of its economy by roughly 15 percent from 2015 to 2020.[34] That effort has since stalled, however, falling only 2 percent from 2020 to 2023 as energy consumption growth outpaces GDP growth partly because China's economic growth has relied more on energy-intensive industrial sectors following COVID-19.[35] China will likely miss its 2025 energy intensity reduction target of 13.5 percent.*[36] Nevertheless, by electrifying production and driving down the cost of low-carbon energy inputs, China is positioning itself to remain dominant in global manufacturing even as markets shift toward decarbonization.[37]

China has invested in modernizing its coal-fired power plants and lower-emissions steel production in an attempt to hit energy efficiency targets while retaining industrial capacity. New coal plants in China burn at least 45 percent less coal per kilowatt-hour (kWh) than the average U.S. plant.[38] In 2022, Chinese industrial and environmental regulators set a goal of at least 15 percent of steel production using electric arc furnaces by 2025, though the target had not been reached when China suspended permitting for new facilities in mid-2024 to address overcapacity concerns.[39] Nonetheless, China's emissions from steel production have declined steadily

*China redefined "energy intensity" in February 2024 to make it easier to meet its target by excluding renewable and nuclear energy from its energy intensity data. This will also make it difficult to compare China's energy intensity going forward to historical or global statistics. Lauri Myllyvirta, "How China Completely Redefined a Key Energy Target," *Dialogue Earth*, March 19, 2024.

as the government has forced industry consolidation toward larger firms with cleaner operations.[40] China claims that these modernizations not only improve efficiency but also make its industrial supply chains "clean" or "green," potentially reinforcing their appeal to international buyers and embedding Chinese firms in the future of low-carbon manufacturing.[41]

China's Focus on Electrification Supports Its Industrial Policy

Electrification goals dovetail with China's technology ambitions. Industrial policies dating back to the mid-1990s have sought to position China as a dominant innovator, producer, and exporter of low-carbon technologies, particularly technologies Chinese government officials dubbed in 2023 the "new three" export industries: EVs, solar, and batteries.[42] China's breakout success in EVs fulfills a vision articulated in the 2006 National Medium- and Long-Term Program for Science and Technology Development and repeated in Made in China 2025, which aimed to leapfrog U.S., German, and Japanese automakers dominant in internal combustion engine vehicles.[43] China met its Made in China 2025 target for three million new energy vehicle sales four years early, in 2021, and its target for 1,200 GW of solar and wind generation capacity six years early, in 2024.*[44]

China continues to incentivize innovation in energy technologies, with government-supported "national demonstration projects" that include solar thermal, geothermal, hydrogen-fed steel production, and energy-saving manufacturing processes.[45] Through these parallel efforts, China has cemented a global lead across certain electrification value chains, enabling it to set de facto standards in the industry and shape the future of energy competition in ways favorable to Beijing.[46]

Electrification Supports China's Environmental Goals

China's energy strategy is tied to its environmental goals. With many cities plagued by smog from surrounding factories and power plants, reducing air pollution has become a quality of life imperative for the CCP. Xi Jinping has championed the concept of an "ecological civilization"—conserving resources, curbing pollution, and balancing environmental concerns with economic growth—adding it to the Party's constitution in 2012.[47]

Electrification can help reduce pollution emissions when it enables low-carbon power generation to displace coal consumption as industry shifts from heat-based (like coal-fired steel production) to electricity-based processes (like electric arc steel furnaces).[48] Electrification's impact on pollution may be muted in China, since its reliance on coal for electricity generation means that its electricity is more carbon intense—and thus more pollution intense†—than

*For more on China's progress toward its Made in China 2025 targets, see Daniel Blaugher, Benton Gordon, and Matthew Dagher-Margosian, "Made in China 2025: Evaluating China's Performance," *U.S.-China Economic and Security Review Commission*, November 2025.

†Some major pollutants are closely linked to industrial activity and fossil fuel combustion, so reducing fossil fuel consumption or burning fossil fuels in cleaner and more efficient ways can reduce pollution levels. Chengcheng Qiu, "China's Air Pollution Shifts West: Industrial Relocation Outpaces Clean Energy Transition—China Q1 2025 Air Quality Briefing," *Centre for Research on Energy and Clean Air*, June 4, 2025, 4; U.S. Energy Information Administration, *Coal Explained: Coal and the Environment*, April 17, 2024.

the global average.[49] That could change, however, as David Fishman, principal at the Lantau Group, testified before the Commission that China's most advanced coal plants are significantly more efficient than previous generations and due to their role in backup and load-smoothing for renewables can "[make] just as much of a contribution to trimming emissions as replacing coal with renewable power."*[50] Average air quality in China has generally improved under Xi but remains below the World Health Organization and China's own air quality standards, and it continues to worsen in more heavily industrialized northeastern, southern, and western China.[51] While pollution control remains a domestic priority, the CCP also uses environmental policy as a strategic narrative—branding Chinese energy technologies as "green" for export markets, even as lifecycle emissions and embedded supply chain risks often tell a different story.[52]

China's emissions targets have similarly achieved mixed results amid conflicting incentives and priorities. In 2021 as part of the 14th Five-Year Plan, China shifted its focus from pollution to climate goals and energy transition.[53] China's total carbon dioxide emissions began falling in March 2024.[54] In the first half of 2025, they fell 1 percent year-over-year, largely due to increases in solar, wind, and nuclear electricity generation outpacing growth in electricity demand for the first time and moderate improvement in coal-fired power plant efficiency.[55] As with pollutants, while China's overall emissions have begun falling, its industrial emissions continue to rise.[56]

It is unclear if this decline represents peak emissions or a temporary plateau. In the first half of 2025, China's solar installations more than doubled year-over-year as developers rushed to take advantage of expiring subsidies, with more installations in May alone than the United States installed in 2023 and 2024 combined.[57] In September 2025, Xi announced China's new Nationally Determined Contribution for 2035 under the Paris Agreement, including commitments to lower greenhouse gas emissions by 7 to 10 percent below peak levels, for non-fossil fuel energy consumption to make up at least 30 percent of total energy consumption, and to increase wind and solar power capacity by six times over 2020 levels.†[58] While this suggests a continued decline in emissions, solar and wind power was increasingly rejected from the power grid in the first half of 2025, and some planned renewable energy projects were canceled.‡[59]

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*These "ultra-supercritical" coal plants use high-efficiency boilers to get more energy out of the same amount of coal, reducing emissions. Additionally, they can ramp output up or down within hours, enabling them to serve as flexible backup and load-smoothing assets in China's electricity system. In most other economies, natural gas plants fulfill this function, facilitating renewable integration while ensuring energy demand continues to be met. David Fishman, oral testimony for U.S.-China Economic and Security Review Commission, *Hearing on China's Domestic Energy Challenges and Its Growing Influence over International Energy Markets*, April 24, 2025, 89–90; David Fishman, written testimony for U.S.-China Economic and Security Review Commission, *Hearing on China's Domestic Energy Challenges and Its Growing Influence over International Energy Markets*, April 24, 2025, 17.

†These commitments are significantly lower than those of other countries. For example, Brazil committed to reducing emissions by at least 59 percent, and the EU is planning at least a 66 percent reduction by 2035. Valerie Volcovici and Yukun Zhang, "China Leads Nations with New Climate Plans, Defying U.S. Climate Denial," *Reuters*, September 25, 2025.

‡In power generation, "rejected" renewable energy refers to curtailment, or the deliberate reduction of a generation resource's output below what it could produce. China has particularly high curtailment in renewables, as its electricity grid often cannot accept all of the energy generated by solar and wind farms. Oversupply of renewables may occur due to a number of factors,

Moreover, long-run trends continue to favor coal, including long-term coal power purchase agreements and mandates for baseload coal generation.[60] Over 80 percent of global coal-fired power plants under construction are based in China—despite the average coal plant in China having a below-global-average 55 percent utilization rate.[61] China has also weakened incentives to integrate renewable power onto electrical grids.[62] Taken together, these contradictions suggest that China's climate commitments—while outwardly ambitious—remain tightly coupled to industrial policy, fossil fuel entrenchment, and a desire to preserve strategic flexibility rather than drive deep decarbonization.

China Seeks to Expand International Influence through Electrification

China seeks to position itself as a leader in renewable energy, gain strategic access to global energy resources, and grow its geopolitical influence. For at least 30 years, over 190 countries have become parties to international agreements committing to reducing greenhouse gas emissions.[63] By establishing itself as a leader in electrification and renewables, China gains two types of international benefits.

First, China seeks to enhance its reputation among countries for helping to address risks from climate change. This is an important messaging strategy in China's diplomacy, as China is the world's largest annual emitter of greenhouse gases, has emitted more carbon historically than the entire EU, and has accounted for 90 percent of global growth in carbon emissions since it signed the Paris Agreement in 2015.[64]

Second, foreseeing the growth in demand for renewable energy production, China invested heavily in developing manufacturing capacity in these sectors both to expand its manufacturing sector in an area of global growth and to increase its global leverage in an area in which many countries would have demands.[65] As will be discussed below, China's significant subsidies and other policy support resulted in a leading role in key low-carbon energy sectors. In addition, the energy sector has accounted for almost 40 percent of China's Belt and Road Initiative (BRI) loans and investments by value.[66] These projects often serve strategic aims, with the highest concentration of BRI energy infrastructure investments in Central Asia and the Middle East coinciding with efforts to increase cooperation to secure oil and gas supplies.[67] BRI energy projects—described further in "China Continues BRI Investments in Overseas Energy Generation Infrastructure" later in this chapter—also give China a foothold in global energy supply chains and allow Chinese firms to install digital control and data collection systems in energy systems around the world.[68]

Chinese policy indicates China has a long-term strategy of encouraging participation in international standards-setting organizations to influence standards development and leverage market

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including weather patterns such as peaking sunlight during midday or strong winds during a storm. Curtailment also results from local grid companies choosing not to purchase renewable energy from local generators due to existing contracts or a preference for energy generated from coal. "China's Record Renewables Buildout Is Wasting Power as Grid Lags," *Bloomberg*, August 4, 2025; Anders Hove, "Trends and Contradictions in China's Renewable Energy Policy," *Columbia University Center on Global Energy Policy*, August 28, 2020; "Impacts of Renewable Energy on Grid Operations," *California Independent System Operator*, May 2017.

share to set de facto standards. In its 14th Five-Year Plan for a Modern Energy System, China aims to "actively participate in setting international energy standards and speed up the international integration of China's energy technology and standards."[69] Experts have previously testified before the Commission that China believes there are both market and geostrategic advantages from promoting international standards.[70] Successful promotion of standards developed by Chinese firms can create lock-in effects, making it costly to switch suppliers, particularly for infrastructure like telecommunications and grid equipment.[71] Under these efforts, China's leadership roles in technical committees within multiple standards-setting organizations have increased rapidly in the past 15 years and now rival those of major advanced economies.[72] China holds a number of leadership positions in technical committees and subcommittees within the International Electrotechnical Commission (IEC), a global standards-setting body headquartered in Europe that develops standards for all electrical technologies. These include technical committees and subcommittees on power electronics for transmission and distribution systems, nuclear instrumentation, and electrically powered transport devices (e.g., charging stations, unmanned delivery vehicles).[73] China has also pushed for the creation of new technical committees in fields it dominates, like ultra-high-voltage transmission lines.[74] China's State Grid and other state-owned entities have also initiated a number of standards adopted by the International Organization for Standardization (ISO), the IEC, and the Institute of Electrical and Electronics Engineers (IEEE) Standards Association, including standards related to "smart energy" control and management.[75]

Collectively, China now has a variety of levers to exert influence over global energy systems, including a dominant role in manufacturing certain energy technologies and equipment, the capacity to influence technical standards through standards development organizations, the market share to set de facto standards for some technologies, and multiple tools to affect energy infrastructure investment, construction, and operation around the world.

China's Hydropower Buildout Harms Tibetans and Creates Geopolitical Leverage

Although China regularly experiences droughts and is demolishing hydropower dams in other parts of the country to protect fisheries and increase downstream water flow, it continues to invest in dams that harm communities in Tibet and increase its control over South and Southeast Asian water flows, giving it geopolitical leverage and threatening downstream ecologies, fisheries, and agriculture.[76]

Since 2000, China has built 54 dams across six rivers in Tibet, with another 66 under construction or in preparatory stages and 73 more planned.[77] These dams exacerbate the risk of earthquakes, landslides, and mudflows; create flood risks if damaged by earthquakes; and relocate hundreds of thousands of Tibetans while destroying their villages and religious sites.[78] In July 2025, China began construction on the Motuo Hydropower Station in

China's Hydropower Buildout Harms Tibetans and Creates Geopolitical Leverage—*Continued*

Tibet, located on the Yarlung Tsangpo, also known as the Brahmaputra River in India.[79] At $168 billion for 300 TWh of annual electricity production, it is expected to be the world's largest hydropower dam, almost five times the cost and producing over three times the electricity of the Three Gorges Dam.[80] Due to relatively lower energy needs in Tibet and existing energy surpluses in neighboring Sichuan and Yunnan Provinces, the project will also require a $7 billion ultra-high-voltage transmission line to export its energy to Guangdong, Hong Kong, and Macau.[81] Tibetans have protested against dam construction, and in response the Chinese government has detained hundreds of protesters (injuring some), increased surveillance of Tibetans, and enforced a communications blackout, preventing Tibetans in areas where protests occurred from communicating with the outside world.[82]

China's domestic dam construction impacts the ecosystems of Tibet and those of countries with rivers that originate in Tibet, particularly the Mekong River in Southeast Asia and the Brahmaputra River in South Asia. Over half of the dams on the main branch of the Mekong are in China.[83] Nineteen percent of fish species in the Mekong—a major global fishery—are heading toward extinction due to hydropower development, and Chinese-built dams have blocked nutrient-rich sediment from reaching tens of thousands of farms, reducing arable land in Vietnam's Mekong River Delta.[84] Dams on the Brahmaputra also restrict water flow and prevent nutrient-rich sediment from traveling downstream to India and Bangladesh.[85] The Motuo Hydropower Station will not have a large reservoir but will divert a portion of the river's water through four tunnels to a downstream portion of the river, reducing water flow in an ecologically diverse part of the river.[86]

China's hydropower expansion could also enable it to manipulate water flows in downriver countries, providing a coercive tool to disrupt vital water resources and related energy generation in neighboring states.[87] As roughly one-third of India's water comes from Tibet, Indian officials are concerned the Motuo dam could enable China to unexpectedly release water flows and flood parts of northeastern India.*[88] India is expressing its opposition to Chinese dams by building its own dams near its de facto border with China.[89]

China's Overlapping Energy and Industrial Strategies Create Overcapacity and Global Dependence on China

China's long-term industrial policies, especially direct grants, subsidies, and demand-side incentives, have led to overcapacity and the dumping of underpriced energy products on global markets (see Ta-

*On the Brahmaputra River, where China's Motuo Hydropower Station is being constructed, Tibet accounts for 25 percent of India's water. Combined with the dam's reservoir-free design, this limits China's ability to reduce or increase India's water supply because most of the Brahmaputra's flow comes from monsoon rains in India. Amber Zhang, "Why China Is Building the World's Largest Hydropower Station in Tibet," *Baiguan*, July 30, 2025.

ble 2). (For more on how Chinese industrial policy created overcapacity in a variety of industries, see Chapter 8, "China Shock 2.0.") Rhodium Group found that from 2015 to 2023, direct grants to power generation, battery, and EV firms grew faster than those to any other sector, and the Kiel Institute found that, especially for low-carbon energy industries, China's subsidies were three to nine times greater than OECD countries'.[90] Demand-side incentives included exempting new energy vehicles from certain taxes, providing rebates and subsidies for EV purchases, fast-tracking vehicle registrations, and directing local governments to buy fleets of electric buses, electric taxis, and supporting charging infrastructure.[91]

These policies incentivized multiple firms to enter new industries, and as unsustainable numbers of firms competed on innovation, scale, and supply chain integration, continued subsidies enabled companies to invest in more capacity than the market demanded and to sustain unprofitable competition on price.[92] For example, subsidy-fueled solar panel manufacturing capacity in China is now twice global market demand, and China's seven publicly listed solar panel manufacturers reported an aggregate net loss in 2024.[93] This overcapacity also accelerates price collapses across global low-carbon technology sectors—displacing international competitors and reducing incentives for alternative suppliers to scale, even as losses mount inside China.[94]

Table 2: Chinese Overcapacity and Dumping in Global Energy Markets, 2023*

Technology	China's Global Production Share (by quantity)†	China's Share of Global Production Capacity	Overcapacity, Dumping, and Other Concerns
Batteries	Components: 92 percent of anodes 81 percent of cathodes 77 percent of cells Finished Products: 65 percent of EV batteries	84 percent (2.5 times global demand)	In May and July 2025, the U.S. Department of Commerce announced preliminary affirmative determinations in anti-dumping and countervailing duty (AD/CVD) investigations of active anode material from China, with final determinations to be announced in December 2025. Government subsidies to CATL and other battery makers continue to rise. Since August 2025, the U.S. Forced Labor Enforcement Task Force has prioritized enforcing presumptive prohibitions on importing lithium, a key battery input, from Xinjiang.

*All data are from 2023 except where noted.

†This represents the share of production located in China, including foreign-branded products made in China. Battery component quantities are measured in gigawatt-hours, EV and EV battery quantities are measured in units, and green hydrogen, solar panel, and wind turbine quantities are measured in gigawatts.

Table 2: Chinese Overcapacity and Dumping in Global Energy Markets, 2023—*Continued*

Technology	China's Global Production Share (by quantity)*	China's Share of Global Production Capacity	Overcapacity, Dumping, and Other Concerns
Electric Vehicles	72 percent (2024)	Data not available	In October 2024, the European Commission imposed countervailing duties on battery EVs from China. While China phased out an EV consumer rebate, China has increased spending on the sales tax exemption and introduced a trade-in subsidy for EVs.
Green Hydrogen	Components: 71 percent of electrolyzers	59 percent (six times global demand)	In September 2024, the EU imposed limits on the amount of Chinese content in hydrogen grant recipients' projects.
Solar Panels	Components: 92 percent of polysilicon 97 percent of wafers 89 percent of cells Finished Products: 83 percent of modules	82 percent (two times global demand)	In September 2024, the U.S. International Trade Commission maintained AD/CVD orders on solar cells and modules from China that were imposed in 2012. Since June 2022, the U.S. Forced Labor Enforcement Task Force has prioritized enforcing presumptive prohibitions on importing polysilicon, a key solar panel input, from Xinjiang.
Wind Turbines	Components: 66 percent of blades 71 percent of nacelles	64 percent (2022)	In October 2024, the U.S. International Trade Commission maintained AD/CVD orders on utility-scale wind towers from China that were initially issued in February 2013.

Note: The United States has also imposed Section 301 tariffs on Chinese batteries, EVs, and solar components in response to China's unreasonable and discriminatory technology transfer, intellectual property, and innovation policies. U.S. Trade Representative, "Notice of Modification: China's Acts, Policies and Practices Related to Technology Transfer, Intellectual Property and Innovation," 89 Fed. Reg. 76581–76614 (September 18, 2024).
Source: Various.[95]

China's central government has publicly called for companies to address overcapacity in the solar and auto sectors, but these exhortations have been largely ineffective as conflicting incentives perpetuate dynamics that have oversaturated China's domestic market. Since 2024, a common pattern has played out with central government agencies pressuring firms to cut production and new investment. Firms have at best made and broken promises, with a number

*This represents the share of production located in China, including foreign-branded products made in China. Battery component quantities are measured in gigawatt-hours, EV and EV battery quantities are measured in units, and green hydrogen, solar panel, and wind turbine quantities are measured in gigawatts.

of solar firms reneging on agreements to reduce production, observe a price floor, and delay new factory investments.[96] EV maker BYD earned a public rebuke from regulators after cutting prices to razor-thin margins to sell down excess inventory.[97] After a growing chorus of criticism by Chinese regulators for excessive price cutting, as well as an August 2025 statement from Xi urging provincial governments to diversify support away from EVs and a small group of industries, a group of Chinese agencies issued measures intended to address excessive competition on price.*[98]

Aside from facing a prisoner's dilemma of not wanting to lose market share from reducing capacity or maintaining higher prices, firms also face pressure from local governments to maintain operations in their jurisdiction, boosting local GDP. Such pressures likely explain state-owned Chang'an Automobile and Dongfeng calling off a merger aimed at consolidating operations even though both operate at less than half capacity.[99] This tension between central directives and local growth mandates underscores a structural contradiction at the heart of China's industrial policy: firms are politically incentivized to expand capacity, even when doing so undermines long-term market stability and global trust in Chinese supply chains.[100]

Chinese companies' overcapacity has increasingly created global dependence on Chinese production in "new energy" sectors, in part by driving out foreign competition. Before 2005, Chinese solar firms controlled hardly any global market share, but a central government push to support strategic emerging industries led local governments to tell banks to direct more lending toward solar firms and even ask other industries to give up land without compensation to support the construction of new solar panel factories.[101] In 2011, by which point Chinese firms held almost 60 percent of global solar production capacity, three major U.S. solar firms announced bankruptcies after being undercut by Chinese competitors with access to cheap loans from state-owned banks, low-cost electricity, low-cost or free land from local governments, tax breaks, and low-cost labor.[102] Chinese companies then acquired bankrupt U.S. solar and battery rivals and transferred their intellectual property (IP) and production to China.[103]

China's photovoltaic cell production is concentrated in Xinjiang, from which between one-third and one-half of the world's polysilicon used in solar panels is sourced, as well as where abundant cheap coal in part reduces production costs.[104] In June 2021, the U.S. Department of Labor announced Chinese polysilicon as its first-ever out-of-cycle addition to a list of goods produced with suspected forced labor, and U.S. Customs and Border Protection issued a withhold release order on polysilicon from Xinjiang-based manufacturer Hoshine Silicon Industry Co. Ltd. due to concerns it was produced

*In September 2025, four Chinese agencies jointly announced that licenses would be required for battery EV exports starting in January 2026. Internal combustion engine and hybrid vehicles are already subject to these requirements, indicating that this is a response to low-quality EV exports, not an export control regime like those imposed on critical minerals. For more on export controls, see "China's Dominance in Energy-Related Critical Mineral Refining Creates Supply Chain Vulnerabilities" later in this chapter. China's Ministry of Commerce, 公布对纯电动乘用车实施出口许可证管理 [Announcement Regarding the Management of Battery Electric Passenger Vehicles Export License Implementation], September 26, 2025; "China to Require EV Export Permits to Safeguard Chinese Brand Image Overseas," *Reuters*, September 26, 2025.

with forced labor.*[105] The Department of Homeland Security also included silica-based products, including polysilicon, in its list of high-priority enforcement items for its strategy to implement the Uyghur Forced Labor Prevention Act.†[106]

Chinese wind turbine firms have also caused European wind turbine manufacturer Siemens Gamesa to pull back from African and Latin American markets by undercutting the competition with low pricing not supported by market fundamentals.[107] China's price competition further extends to upstream supply chains like raw materials and processed metals.[108] Due to these government subsidies and aggressive pricing strategies, Chinese firms now play a leading role across the upstream and downstream segments of many new energy technology supply chains, and the world is increasingly dependent on China to provide new energy solutions.[109] This dependency—built through industrial policy, strategic acquisitions, and systematic price undercutting—gives Beijing long-term leverage over the clean energy transition in both developed and developing economies.

China's International Energy Footprint Is Growing

China is transforming the future of energy production and consumption beyond its borders through a number of channels, including: increasing exports of new energy technologies, ramping up production and exports of critical minerals as new energy inputs, expanding global greenfield investment to manufacture new energy products, and funding BRI projects in new energy generation infrastructure. Given the current market direction, the world is set to become more dependent on China for these new energy products and related inputs. While many of these trends are focused on global responses to risks from climate change, China's dominance of these sectors comes with risks of its own, including dependency and vulnerability in critical infrastructure.

China Dominates in New Energy Product Exports

As discussed above, China's supply-side industrial policy distortion and export-driven economic model have driven surges in exports of new energy products (see Figure 5). In 2024, Chinese firms exported $182.2 billion of low-carbon energy technologies, including $66 billion of solar panels, $61.7 billion of lithium battery technologies, $47.8 billion of EVs, and $6.4 billion of wind turbines.[110] China's rapid export surges are most evident in its EVs and lithium batteries, which rose 1,500 percent and 287 percent in trade value, respectively, from 2020 to 2024.‡[111] The trade value of solar panel

*On the same day, the U.S. Department of Commerce's Bureau of Industry and Security added several polysilicon producers to the Entity List for their connection to forced labor in China. Since at least 2017, the Chinese government has been using forced labor of tens of thousands of Uyghurs and other ethnic and religious minority groups in detention centers in Xinjiang. Other products from Xinjiang, including cotton and tomatoes, were previously subject to withhold release orders. U.S. Department of Commerce, Bureau of Industry and Security, "Addition of Certain Entities to the Entity List," 86 Fed. Reg. 33119–33122 (June 24, 2021); U.S. Department of Labor, *Shining a Light on Exploitation in the Solar Supply Chain*.

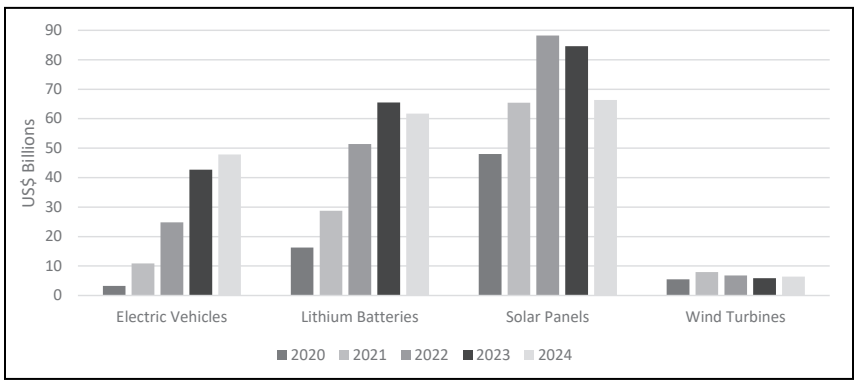
†The Uyghur Forced Labor Prevention Act (Pub. L. No. 117-78) went into effect in June 2022 and prohibits imports of items from Xinjiang unless the importer can provide clear and convincing evidence they were not produced with forced labor.

‡The surge in export value was not a product of price increase. EVs and lithium batteries' trade volume also rose 920 percent and 70 percent, respectively, from 2020 to 2024.

exports, on the other hand, may appear to be decreasing, but falling prices disguise a 3 percent increase in export volume in gigawatts in December 2024 from the previous year.* [112]

The export surges in new energy products resulted from China's growing overcapacity in these sectors in recent years. As discussed earlier, Chinese industrial policies encouraged firms to enter new energy sectors while providing sustained investment and subsidies, which fueled overcapacity and unprofitable price competition far beyond domestic demand. To stay in business, loss-making firms have turned to exports, seeking higher profit margins on their new energy products than they earn from domestic sales. For example, BYD sells the Atto 3, a compact EV, in Germany for more than twice the price it charges in China and remains competitive in the German market.[113] In effect, Chinese firms are exporting the economic consequences of overcapacity—propping up domestic sectors by seeking profitability abroad while distorting international markets in the process.

Figure 5: China's Exports of New Energy Products, 2020–2024



Source: UN Comtrade and China's General Administration of Customs.[114]

Developing countries are absorbing China's export surges of low-carbon energy technologies. For example, China's exports of EVs to emerging markets such as Southeast Asia and Latin America overtook those to Europe in 2024.[115] China has positioned its energy approach as a more efficient, cheaper, and "greener" alternative to carbon-intensive energy products. Some countries welcome China's low-cost new energy products to replace their unreliable, expensive grid infrastructure.[116] For China, this increase in demand worldwide serves as an opportunity to expand its reach into new markets and lock in its products in other countries' energy infrastructure. For instance, with an energy grid made costly and unreliable by earlier Chinese infrastructure investments, Pakistan recently turned to Chinese new energy solutions, becoming the third-largest importer of China's solar panels.† This example illustrates how China ap-

*Solar panel product codes have different units, such as kilograms and number of items, and cannot be aggregated.

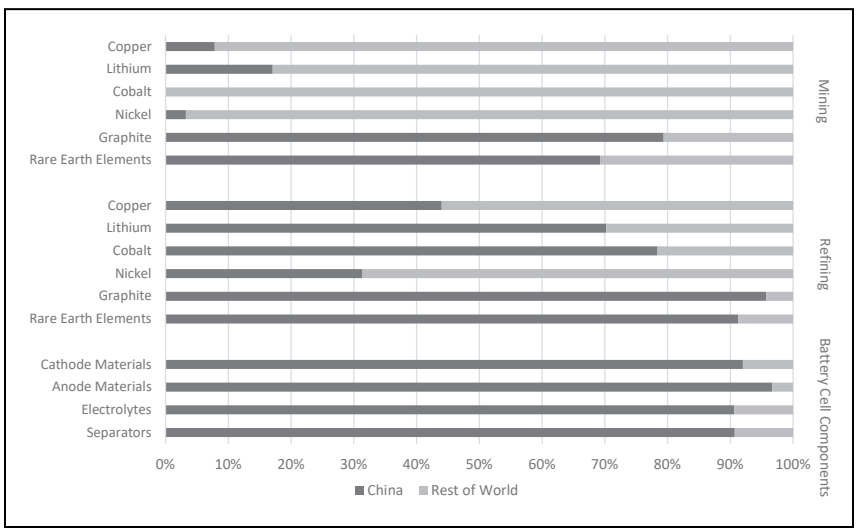
†Ironically, Pakistan's unreliable and expensive grid challenges originated in part from Chinese infrastructure investments, prompting it to increase its demand for Chinese solar panels. Humza Jilani, "Chinese Solar Panel Boom Threatens Pakistan's Debt-Ridden Grid," *Financial*

pears to be using legacy infrastructure ties to deepen energy dependence—positioning itself as both the partial cause of past bottlenecks and the provider of future fixes.

China Controls Critical Minerals—Key Inputs in New Energy Sectors

Not only does China dominate the manufacturing of new energy products as final outputs, it also controls critical minerals as key inputs that power these sectors. China is the leading refiner of 19 out of 20 energy-related critical minerals such as lithium, cobalt, graphite, and rare earth elements (REEs) (see Figure 6).[117] In 2024, China maintained near monopolistic control over both the global mined production and processing of graphite—used in core energy transition products such as lithium-ion batteries and solar panels (see Figure 6).[118] Chinese firms also own large shares of mines for energy-related critical minerals with proven reserves found mostly or entirely outside of China, such as lithium and cobalt, respectively.[119] Control over extraction supports Chinese firms' dominance in processing.[120]

Figure 6: China's Share of Output Across the Global EV and Lithium-Ion Battery Supply Chains, 2024



Note: Statistics for 2024 mining and battery components are estimated and projected. The International Energy Agency is not responsible for the derived work.
Source: U.S. Geological Survey, International Energy Agency, and Yano Research Institute.[121]

China's global monopolistic position is particularly pronounced in REEs, a subset of critical minerals that includes 17 elements with unique properties like strong magnetism. While REEs are abundant and dispersed globally, most major miners ship them to China for refinery due to financial and environmental costs. Chinese firms now account for 60 percent of extraction, 85 percent of processing, and

Times, September 17, 2024; Azeem Azhar and Nathan Warren, "Is Distributed Solar Energy a Game-Changer for Emerging Economies?" *World Economic Forum*, October 9, 2024.

over 90 percent of permanent magnet production.[122] As a result, the United States relies on China for 70 percent of its rare earth compounds and metals imports, increasing U.S. vulnerability to China's potential to weaponize this dominance in the supply chains during periods of geopolitical tension.[123] To maintain China's state control over REE supply chains, the State Council issued the Rare Earth Management Regulations in 2024 to guide further development and use of rare earth resources and create a new REE supply chain traceability system.[124] Since 2022, China has also poured more than 100 billion renminbi (RMB) ($13.8 billion) annually into geological exploration, including on REEs.[125]

For minerals not abundant at home, Chinese state-owned enterprises (SOEs) invest in mining and processing operations overseas. In Latin America, Chinese companies have invested in the "Lithium Triangle"—Argentina, Bolivia, and Chile—which together comprise nearly half of the world's lithium reserves.[126] China's Ganfeng Lithium acquired a majority stake in Argentina's Caucharí-Olaroz to operate the lithium brine mine, which produced 25,400 tons of lithium carbonate in 2024, exceeding initial production forecasts.[127] While such partnerships with Chinese lithium miners offer a pathway for Argentinean firms to benefit from Chinese expertise in mining, processing, and refining and to become more integrated in the global lithium market, they also risk giving China effective control over Argentina's mining infrastructure. Even when China does not own the mines, it can control offtake rights at some U.S.-owned mines.[128] For example, the Minerals Security Partnership, a U.S.-led initiative, supported Brazil's Serra Verde rare earth mine that is currently contracted to ship rare earths to China for processing at least until 2027.[129] (For more on U.S. dependency on China's critical minerals, see Chapter 9, "Chained to China: Beijing's Weaponization of Supply Chains.")

China Expands Overseas Greenfield Investments in New Energy Product Manufacturing

China's growing investment in overseas manufacturing of new energy products also positions it to control an ever-larger share of these new energy sectors globally. Chinese firms are expanding their production of new energy products overseas by ramping up greenfield foreign direct investment (FDI) in developing countries.* According to Climate Energy Finance, China's announced and confirmed greenfield FDI in new energy factories was estimated to reach $33.8 billion in 2024, a 42 percent increase from 2023.[130] These greenfield investments are focused on constructing wind, solar, batteries, and new energy vehicles, with more than half going to battery plant construction.[131] Chinese investments in new energy product manu-

*There are existing challenges in collecting FDI in an accurate and timely manner, in part because announced transactions may take several years to materialize or not at all. For example, BYD announced an EV factory greenfield investment in Mexico in 2023 but later cancelled its plans amid uncertainties stemming from the Chinese government's tech transfer concerns and Mexico's tariff talks with the United States. Tomohiro Ichihara and Shizuka Tanabe, "Mexico Blocks BYD EV Factory, Putting US Tariff Talks First," *Nikkei Asia,* July 4, 2025; "China Is Withholding Approval for BYD's Mexico Plant Due to Tech Concerns," *Mexico Daily,* March 19, 2025; Leonard Lara, "BYD Shelves Plans to Build Major Mexico Car Plant Over Trump's Trade War," *Bloomberg*, July 2, 2025.

facturing are spread across emerging economies such as in Eastern Europe, Southeast Asia, and the Middle East.[132]

To circumvent U.S. trade barriers on Chinese solar panels in the early 2010s, Chinese solar firms shifted their manufacturing to Malaysia, Vietnam, Thailand, and Cambodia, and in August 2023, the U.S. Department of Commerce imposed AD/CVD orders on certain solar cells and modules from those four countries for circumventing orders on China.[133] In June 2025, the Department of Commerce issued additional CVD orders on solar products from those countries after finding solar manufacturers imported subsidized components and received subsidized BRI loans from China.[134] For EVs, Chinese firms turn to key countries to enter and dominate the automotive markets in each region. In Thailand alone, several Chinese automakers such as BYD, SAIC, and Great Wall Motors announced 13.9 billion RMB ($1.94 billion) in greenfield FDI, turning the country into a regional EV manufacturing hub.[135] Chinese battery giant CATL announced a 7.34 billion euro ($8.2 billion) battery plant in Hungary in 2022, set to begin production this year, calling it a major step in its global expansion in Europe.[136]

Chinese firms have been ramping up their investments in new energy manufacturing overseas, in part due to emerging economies' pushback against China's global overcapacity dumping and desire for Chinese new energy knowhow. After Chinese automakers accounted for 85 percent of Brazil's EV market in 2024, the Brazilian government reintroduced a 10 percent tariff on EV imports and filed an antidumping case against BYD and Great Wall Motors.[137] At the same time, Brazil has encouraged more Chinese investments, with Great Wall Motors announcing a 10 billion Brazilian real ($1.83 billion) investment over the next decade.[138] Turkey also threatened to impose a 40 percent tariff on China's EVs in June 2024 and forced importing EV companies to invest in the country as BYD was considering a $1 billion FDI for EV production.[139]

While developing countries hope for technology transfer, capacity building, and more local employment from Chinese FDI, they do not always receive these benefits. China's Ministry of Commerce has begun instructing Chinese automakers to protect their EV knowhow when localizing their manufacturing abroad.[140] Additionally, Chinese firms sometimes rely on imported Chinese labor. For example, a BYD contractor reportedly brought Chinese workers to Brazil to work as cheap labor, often through arrangements that disrupted the local labor economy and violated labor laws.[141]

China Continues BRI Investments in Overseas Energy Generation Infrastructure

China's BRI continues to support energy generation infrastructure worldwide, distinct from its investments in manufacturing facilities (discussed above) or its growing ownership of host-country grid infrastructure (discussed below). First, BRI lenders have shifted from policy banks to commercial state-owned banks since 2021, in part due to China's domestic fiscal pressure and political backlash against Beijing's lending habits.[142] Between 2013 and 2020, China's policy banks lent an average of $14.8 billion in energy-related projects annually.[143] For example, Chinese firms own and have

been operating the Las Bambas copper mine in Peru since a $6.96 billion acquisition financed by Chinese policy banks in 2014.[144] In 2018, China Development Bank and South Africa's state-owned energy utility company signed a $2.5 billion loan contract to build the 4,800 megawatt Kusile coal-fired power plant.[145]

However, China's policy banks' lending activity in the energy sector slowed dramatically between 2021 and 2024, financing only a small fraction compared to the amount of loans during the 2013–2020 period.[146] On the other hand, China's state-owned commercial banks—such as Bank of China and Industrial and Commercial Bank of China—have overtaken its policy banks as lenders for energy projects since 2018.[147] Energy-related construction and investment deals reached $123.3 billion in the first half of 2025, twice the value of the first six months of the previous record in 2024.[148]

Second, China is working to promote BRI lending in "greener" energy sectors, but progress is slow as investments in carbon-intensive energy generation infrastructure continue to soar. In 2021, Xi Jinping delivered a speech at the UN General Assembly, promising that "China will step up support for other developing countries in developing green and low-carbon energy, and will not build new coal-fired power projects abroad."[149] Deals in low-carbon energy sectors such as solar, wind, and waste-to-energy were at their highest in 2024, accounting for 30 percent of China's total BRI lending.[150] For example, China engaged closely with Uzbekistan in low-carbon energy sectors, having built multiple solar and wind energy plants.[151] To improve Uzbekistan's energy security, for instance, the Uzbek Ministry of Energy entered a contract with CEEC Energy China, Huaneng Renewables Corporation, and Poly Technologies in 2023 to build $4 billion worth of solar photovoltaic power plants.[152] However, in the first half of 2025, BRI lending in oil and gas accounted for nearly 70 percent of BRI lending in energy-related projects.[153] One of the largest construction deals was Nigeria's $20 billion Ogidigben Gas Revolution Industrial Park, aimed at becoming Africa's largest gas processer.[154] China has also continued constructing coal-fired power plants abroad "in direct violation of the 2021 pledge."[155]

China's Growing Role in Global Energy Systems Creates Supply Chain and Cybersecurity Risks

There are several risks to the United States from China's growing role in global energy markets and systems (see Table 3 for a summary of this section's analysis). First, China's dominant position in certain sectors and components of electricity generation and transmission technologies, including critical minerals, means the United States may have growing dependence on China for these products, especially as artificial intelligence data center investments stimulate increased demand for electricity. Second, Chinese ownership and operation of energy infrastructure abroad enhances China's ability to put at risk critical energy infrastructure in other countries. Finally, both of these phenomena exacerbate China's capacity for cyber-enabled surveillance and sabotage of critical infrastructure. Together, these dependencies increase the risk that Beijing could coerce, disrupt, or destabilize U.S. and allied energy systems during a future crisis.

Table 3: Risks from China's Growing Role in Global Energy Systems

Risk	Level of Risk	Level of Existing Information on the Extent of the Risk	Risk to United States or Other Countries?
Dependence on Chinese Exports	High (over 50 percent dependent): Batteries and Low-Voltage Transformers Medium (over 20 percent dependent): Inverters and Rectifiers Unknown (imported via third countries): Solar Panels and Wind Turbines	High*	Both
Dependence on Chinese Critical Minerals	High	High	Both
Chinese Ownership and Operation of Energy Infrastructure	Medium	Low	Primarily to Other Countries
Cyber-Enabled Surveillance and Sabotage	High	Medium	Both

Note: Customs data can provide useful information on dependence on Chinese finished exports and some components, but such data may obscure where components in finished goods imports are sourced from.

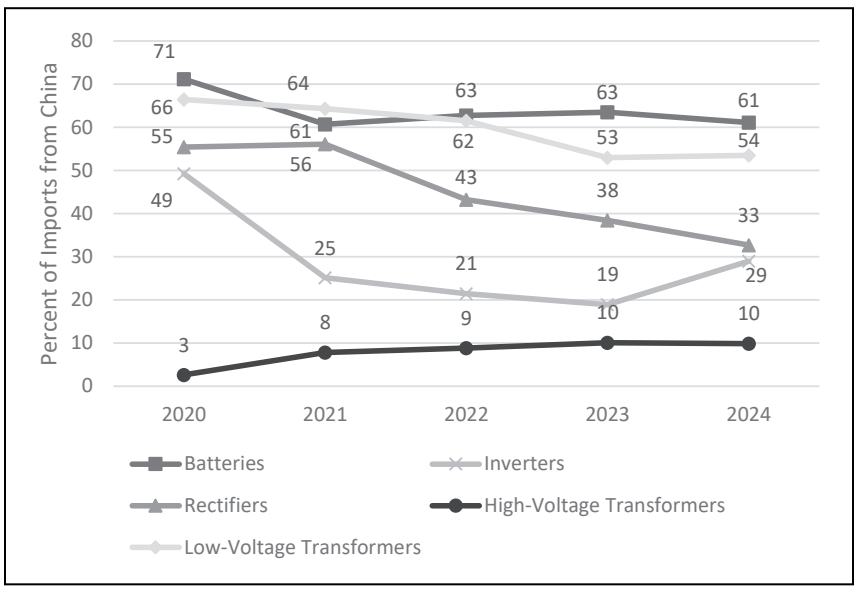
Dependence on Chinese Energy Exports Gives China Leverage

U.S. reliance on Chinese imports for many products and components used to generate, transmit, and distribute electricity could be used as geopolitical leverage by Chinese policymakers. As shown above in Table 2, "Chinese Overcapacity and Dumping in Global Energy Markets," China dominates global solar power manufacturing with over 80 percent of global market share across the supply chain. Raw import data disguise U.S. reliance on China for solar panel imports. Due to various trade remedy duties—as well as forced labor bans—imposed on Chinese solar imports, Chinese-made solar equipment is generally not imported into the United States from China, Hong Kong, or Macau but rather transshipped through third countries.[156] Chinese solar firms ship parts and components from their operations in China to third countries, where they assemble their solar panels and then export them to the United States.[157] Additionally, since Chinese manufacturers dominate numerous elements of the solar energy supply chain, even non-Chinese suppliers not focused on tariff evasion likely rely on Chinese components. According to the International Energy Agency, 50 percent of silicon wafers and 71 percent of solar cells used for solar panels in Europe come from China.[158]

The United States is especially reliant on China for power transmission and distribution equipment, including battery energy storage systems (BESS) (see Figure 7). BESS are technologies used both to store electricity for later use and to smooth out grid operations during peak load times. Sixty-one percent of imported non-EV lithium-ion batteries came from China in 2024.[159] When narrowed down to BESS and their components, S&P Global found that approximately half of the United States' imports since 2021 have come from China.[160]

The United States also depends on China for transformers, inverters, and rectifiers—products that convert electric currents for various purposes, including to transmit electricity over long distances and convert electricity distributed by substations into electricity usable by electronic devices. Fifty-four percent of imported low-voltage transformers were sourced from China in 2024, and while high-voltage transformer imports are low, they increased from 3 percent in 2020 to 10 percent in 2024.[161] The United States depends on China for 29 percent of inverters and 33 percent of rectifiers.[162] Energy management systems, smart meters, and advanced metering infrastructure used for smart grid management are also increasingly being sourced from Chinese vendors.[163]

Figure 7: U.S. Dependencies on Chinese Power Transmission Equipment, 2020–2024



Source: Various.[164]

U.S. and third-country electricity generation, transmission, and distribution equipment manufacturers also source critical components from China, although these indirect dependencies are more difficult to track. One example is nacelle modules, the main power-generating component and essentially the engine room of wind turbines.[165] While only 8 percent of wind turbine components im-

ported directly to the United States come from China, the use of Chinese components in imported finished wind turbines hides the true level of U.S. dependence on China.[166] The three largest installers of wind turbines outside of China—Vestas, Siemens Gamesa, and General Electric—have increasingly sourced nacelles from their factories in China, in some cases making China the primary source.[167] Siemens Gamesa, the second-largest installer of wind turbines outside of China, now relies almost exclusively on China for permanent magnets and related REE inputs.[168]

Power grids also rely on industrial control systems with Chinese components to synchronize, monitor, and control the flow of electricity through thousands of substations across the country.[169] These control systems rely on power electronics, chips, programmable logic controllers, and other digital technology.[170] Over 90 percent of all power electronics, battery technology, control components, and electronic sensors contain at least one critical component sourced from China, and at least 70 percent are fully made in China.*[171]

These various dependencies could be used by China as leverage against the United States. China has a history of economic coercion, including restricting the export of minerals like graphite and REEs to Europe, Japan, and the United States during political disputes.[172] China has already begun to use its exports as a tool of geopolitical leverage. In October 2024, China used its export control regime to cut off U.S. drone firm Skydio's access to batteries produced by the China-based subsidiary of a Japanese company because Skydio sells drones to Taiwan's fire agency.[173] Skydio responded by rationing batteries, sending one per drone instead of three as it searched for new suppliers.[174] U.S. imports of Chinese transformers are especially concerning because there is a global transformer shortage, with lead times for delivery of the largest transformers up to three to five years.[175] This shortage is already delaying U.S. power grid recoveries from natural disasters and slowing attempts to build data center infrastructure to support artificial intelligence development. Shortages could grow worse if China weaponized U.S. reliance on those imports.[176] A disruption to BESS or transformer imports during a crisis could severely impair grid recovery, delay emergency response, and increase the risk of prolonged blackouts.[177]

China Controls Key Components of Nuclear Fusion Supply Chains

China is investing in nuclear fusion as part of its long-term energy security and self-sufficiency strategy, explicitly prioritizing it in the 14th Five-Year Plan.[178] Unlike nuclear fission, which produces energy by splitting uranium and plutonium atoms, nuclear fusion produces energy by combining hydrogen atoms—offering the potential for cleaner, safer, and more abundant energy.[179] Fusion has the potential to generate four times more energy per kilogram of fuel than fission while producing minimal long-lived, low-level radioactive waste and no high-level radioactive waste.[180]

*Power electronics are devices that control and convert electric power. They include inverters—devices that convert DC power to AC power (e.g., electricity generated by solar panels to electricity used in power grids)—and rectifiers—devices that convert AC power to DC power (e.g., electricity used in power grids to electricity used in electronic devices).

China Controls Key Components of Nuclear Fusion Supply Chains—*Continued*

Nuclear fusion is still in an experimental stage, so it is unclear what technological approaches will work.[181] The United States and China are each responsible for key innovations in different approaches to achieving fusion.[182] In inertial confinement fusion, which uses lasers, as of April 2025 the U.S. Lawrence Livermore National Laboratory has achieved fusion ignition—producing more energy from the fusion reaction than was delivered by the lasers—eight times since 2022.*[183] In magnetic confinement fusion, which uses magnets, China set world records for the longest stable fusion reactions in 2023 and 2025, although those records were surpassed in February 2025 by a French reactor.[184]

A pressing challenge for fusion companies is that continued funding is needed to develop new fusion supply chain inputs like heat- and radiation-resistant materials, fusion fuel production methods, and powerful lasers.[185] When government and private funding are combined, the United States reportedly spends over twice as much as China on nuclear fusion projects, and U.S. firms have attracted over $7.5 billion of the almost $14 billion in equity investments made in fusion companies globally since 2010.[186] However, according to the Special Competitive Studies Project, the Chinese government has spent at least $5 billion (and likely well over $10 billion) on fusion since 2023, more than twice the $2.3 billion appropriated to the U.S. Department of Energy's (DOE) Fusion Energy Sciences program from fiscal year 2023 to 2025.†[187] U.S. private funding for fusion has fluctuated significantly, and China's government-led funding lends itself to patient, long-term capital, leading analysts to conclude that the steady pace of Chinese spending could surpass more variable U.S. spending in the long run, allowing China to invest more in critical parts and components.[188]

China already controls key inputs into fusion supply chains. In July 2025, China formally launched its first national fusion SOE—China Fusion Energy.[189] Previously, China had brought together upstream and downstream research facilities, mining and metals companies, and power utilities to invest in developing new components and materials needed for fusion, including a multi-company innovation consortium and at least one industrial park hosting fusion-related industries.[190] China leads in the

*The April 2025 experiment produced over four times the energy delivered by the lasers. However, the energy consumed by the laboratory's laser facility is roughly 100 times larger than the amount delivered by the lasers, meaning less than 5 percent of the total energy consumed was released by the fusion reaction, so these experiments "[do] not imply net energy gain from a practical fusion energy perspective." Lawrence Livermore National Laboratory, *Achieving Fusion Ignition*, accessed July 16, 2025; Charlie Osolin, "LLNL's Breakthrough Ignition Experiment Highlighted in Physical Review Letters," *Lawrence Livermore National Laboratory*, February 6, 2024.

†DOE's Fusion Energy Sciences program is the only DOE program dedicated to fusion energy commercialization. For other fusion-related programs, from fiscal year 2023 to 2025 Congress appropriated $2 billion for the National Nuclear Security Administration's Inertial Confinement Fusion program, which primarily conducts non-commercial fusion experiments, and from fiscal year 2020 to 2023 DOE's Advanced Research Projects Agency-Energy obligated $75 million to commercial fusion development. "FY2026 National Nuclear Security Administration," *American Institute of Physics*, September 4, 2025; U.S. Government Accountability Office, *Fusion Energy: Additional Planning Would Strengthen DOE's Efforts to Facilitate Commercialization*, January 2025, 4, 12.

China Controls Key Components of Nuclear Fusion Supply Chains—*Continued*

production of certain components essential for tokamaks—the reactor used for magnetic confinement fusion and the one China has publicly prioritized—including REE magnets, capacitors, and pulsed-power components.[191] China is building a range of fusion reactor designs alongside tokamaks and is investing in foundational supply chains to obtain a "first-mover advantage" in whichever design proves successful.[192] Supply of fusion components is already tight, and U.S. companies often source specialty components from China.[193] Some manufacturing of these components could be reshored; it took one U.S. fusion firm three years to import the capacitors it needed to build its prototype, and that firm is now investing in U.S.-based capacitor manufacturing for future reactors.[194]

China's Dominance in Energy-Related Critical Mineral Refining Creates Supply Chain Vulnerabilities*

As discussed above, China is the leading refiner for 19 of 20 critical minerals necessary in the energy sector, and it is weaponizing that dominance in critical mineral refining supply chains (i.e., using its control of those supply chains for "coercive political purposes") by both restricting access to minerals through export controls and flooding global mineral markets to put competitors out of business.[195] China has weaponized its control of energy-related critical minerals in the past, both for political purposes and to protect its supply chain dominance. At various times since 2010, China has flooded the global market with REEs, putting the United States' only REE mine and refinery out of business; blocked exports of REEs to Japan, the United States, and Europe during political disputes; and blocked graphite exports to Sweden to prevent the expansion of Swedish battery maker Northvolt.† [196] Since July 2023, China has subjected certain energy-related minerals technologies to formal export licensing regimes in retaliation against the United States' semiconductor export controls and tariffs.[197]

In April 2025, China subjected seven REEs and related materials to export controls.[198] This differed from earlier controls because it covered a large group of minerals with many different applications, almost none of which are processed outside of China.[199] The ensuing bureaucratic backlog, paired with hesitancy on the part of China's

*For a more extensive discussion of China's dominance in the critical minerals sector and its expanding export control regime to use the sector as leverage, see Chapter 9, "Chained to China: Beijing's Weaponization of Supply Chains." This subsection focuses on critical minerals necessary for the energy sector.

†After suspending operations in 2015, the U.S. REE mine—the Mountain Pass mine—reopened in 2018. In 2024, it resumed processing most of the material it produces. In 2025, the U.S. Department of Defense announced it would take a 15 percent stake in the company that operates the mine—MP Materials—and commit to a price floor for purchasing the mine's output. As a result, MP Materials plans to expand its processing capacity and build an REE magnet manufacturing facility. Jon Emont, "Pentagon to Take Stake in Rare-Earth Company, Challenging China's Control," *Wall Street Journal*, July 10, 2025; "MP Materials Announces Transformational Public-Private Partnership with the Department of Defense to Accelerate U.S. Rare Earth Magnet Independence," *MP Materials*, July 10, 2025; Keith Bradsher, "China Walks a Line in U.S. Trade Talks, Trying Not to Overplay Its Hand," *New York Times*, June 11, 2025.

customs and national security bureaus to license any materials that could arguably be subject to export controls, led factories in the United States, Europe, and Japan to stop or delay production of products with REE inputs, like automobiles and defense equipment.*[200]

In June 2025, after reaffirming an agreement reached between the United States and China in May 2025, China announced it would green-light shipments of REEs to commercial end users in the United States, but even as China's global REE exports returned to pre-control levels in July 2025, importers continued to report delays due in part to arbitrarily imposed chemical testing and analysis requirements and license approval processes that penalize businesses for not turning over IP and confidential business information.[201] These controls also affected other countries, in part because the United States largely imports critical minerals after they have been incorporated into manufactured components and finished products and also because China reportedly threatened to sanction companies in South Korea for re-exporting REE products from China.[202] In October 2025, Beijing expanded its export controls to include five additional REEs as well as REE processing equipment.[203] It also introduced extraterritorial provisions requiring companies in other countries to obtain a license from Chinese authorities to export products with more than 0.1 percent of their value derived from Chinese-sourced REEs and using REE processing technology.[204] These moves marked a significant escalation in China's willingness to project its dominance beyond its own borders and assert control over international downstream supply chains. (For more on China's use of export controls, see Chapter 9, "Chained to China: Beijing's Weaponization of Supply Chains.")

China's mineral export controls affect both new and traditional energy technology inputs. Affected minerals are crucial for new energy generation: REEs and molybdenum are used for wind turbines, antimony and gallium are used to manufacture solar panels, and graphite is needed for EV batteries.[205] However, these same minerals are also used in traditional energy technologies. Molybdenum is used in both coal and nuclear power plants, antimony is used to harden internal combustion engine vehicle chassis, REEs are used in a variety of other car parts from brakes to steering systems, and gallium and germanium are used to fabricate semiconductors critical to a wide variety of energy generation and transmission technologies.[206]

China's use of export controls and Chinese firms' use of their dominant global positions to flood mineral markets create risks of short-term and long-term scarcity. In the near term, export restrictions may make it difficult or impossible for U.S. companies in the energy sector to source both Chinese-refined critical minerals and components made from them (e.g., Japanese and Korean semiconductors, REE magnets, and batteries).[207] Shortages while China was ratch-

*Defense applications of REEs and other mineral exports controlled by China include energy generation and storage as well as radar, infrared lenses, armor-piercing munitions, and other crucial technologies. China's export controls do not allow these minerals to be sent to U.S. military end users. As a result, procurement costs for these minerals have increased more quickly than for other parts procured by the U.S. Department of Defense, and a drone parts manufacturer delayed orders as it searched for alternative sources of REEs. Jon Emont, Heather Somerville, and Alistair MacDonald, "China Is Choking Supply of Critical Minerals to Western Defense Companies," *Wall Street Journal*, August 3, 2025; "From Rock to Rocket: Critical Minerals and the Trade War for National Security," *Govini*, April 2025, 1, 6.

eting up enforcement before agreeing to relax restrictions led to U.S. factory closures and caused global prices to soar.[208]

Despite years of China making clear its intent to leverage its control of energy-related critical mineral refining, the United States has taken few actual steps to address this glaring point of Chinese leverage, and those that have been taken have been halting and inconsistent and involved small amounts of resources relative to the size of the threat. In the energy sector, the 2021 Infrastructure Investment and Jobs Act and 2022 Inflation Reduction Act included tax credits and funding for critical mineral projects as well as incentives for companies to incorporate non-Chinese minerals into advanced batteries and EVs.[209] The United States has also invested in multiple critical mineral firms that focus on minerals for global energy transition, including investments in TechMet through the International Development Finance Corporation in 2018 and Mountain Pass (MP) Materials through the Department of Defense in 2025.*[210]

As witnesses testified before the Commission, insufficient domestic demand, high production costs, and long development times continue to pose challenges to U.S. efforts to diversify away from China. U.S. efforts have struggled to create significant domestic production because U.S. domestic demand for minerals is not sufficient to support large-scale mining and refining.[211] Moreover, domestic producers' exports would not be able to compete with Chinese producers' lower costs and overcapacity, decreasing private investors' willingness to finance U.S. projects.[212] For now, the United States and many other countries remain heavily reliant on China for energy-related critical minerals and related components. (For more on U.S. efforts to reduce dependency on China for critical minerals and persistent challenges, see Chapter 9, "Chained to China: Beijing's Weaponization of Supply Chains.")

China Controls and Operates Energy Infrastructure around the World

Although not a significant threat in the United States, many countries have opened themselves up to risks from direct control over critical energy infrastructure by Chinese entities, often SOEs. Countries have ceded ownership of their critical electric infrastructure due to Chinese firms' advanced energy storage and transmission technology, stronger finances (often fueled by Chinese government support), and greater experience building and operating power grids.[213] Chinese firms have significant stakes in both developed and developing countries' grids (see Table 4 and Figure 8).†[214] Most recently, Chinese SOE State Grid expanded its transmission line

*The investment in MP Materials builds on earlier grants awarded to MP Materials and other rare earth and magnet firms to establish a mine, oxide production facilities, and magnet manufacturing facilities. C. Todd Lopez, "DOD Looks to Establish 'Mine-to-Magnet' Supply Chain for Rare Earth Materials," *Department of Defense Manufacturing Technology Program*, March 11, 2024.

†These investments may be motivated in part by State Grid's vision for a "Global Energy Interconnection" (GEI)—a network of ultra-high-voltage transmission lines and smart grids that would connect low-carbon electricity generators with electricity consumers across the globe. The GEI was endorsed by Xi Jinping at the UN in 2015, but since Xi has not mentioned it since 2017 and various private-sector and government actors frame it in different ways to promote their own interests, it is unclear to what extent the GEI continues to drive Chinese policy. "White Paper on Global Energy Interconnection: Development Strategy," *Global Energy Interconnection Development and Cooperation Organization*, accessed August 18, 2025, 2; Fiona Quimbre et al., "China's Global Energy Interconnection," *RAND Corporation*, December 5, 2023, 9, 14–15.

operations in Brazil, and in 2023, Italian firm Enel Perú sold its power distribution and supply businesses in Chile to Chinese SOE China Southern Power Grid.[215]

These Chinese investments in a country's critical energy infrastructure result in significant risks to the host country—including the potential for unauthorized Chinese access to industrial control systems, data transfer, surveillance of critical infrastructure, and even the threat of sabotage.[216] Such espionage can give insight into power flows, load patterns, and interconnection status, revealing information about commercial and military activities.[217] Access to industrial control systems can also be used to interfere with grid operations, leading to sabotage risks like power outages and fires.[218] (For more on risks from surveillance and sabotage, see "Embedded Chinese Components Exacerbate Risk of Cyber-Enabled Espionage and Sabotage" later in this chapter.) Aware of these concerns, some jurisdictions have begun to take measures to reduce their grids' exposure to China. Belgium, Germany, and the UK have blocked Chinese investment deals, and Czechia, Lithuania, and Romania have passed laws to block Chinese access to critical energy infrastructure.[219]

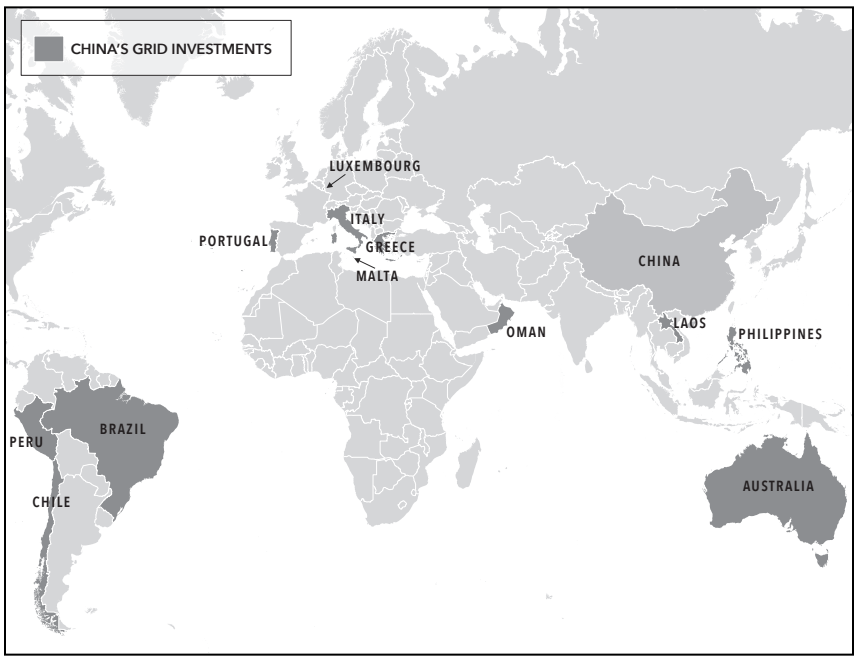
Table 4: Notable Chinese Investments in Power Transmission Grids

Country	Company with Chinese Investment	Percentage Owned by Chinese Firms
Australia	AusNet Services (Victoria), CitiPower Electricity Distribution Network Victoria (Victoria), ElectraNet Pty Ltd. (South Australia), Powercor Electricity Distribution Network Victoria (Victoria), SA Power Networks Electricity Distribution (South Australia), and SGSP (Australia) Assets Pty Ltd./Jemena (Australian Capital Territory, Victoria)	19.9 percent, 51 percent, 46.56 percent, 51 percent, 51 percent, and 60 percent
Brazil	CPFL Energia and State Grid Brazil Holding S.A.	83.71 percent and 100 percent (roughly 12 percent of national grid)
Chile	Compañía General de Electricidad S.A., Chilquinta Energía S.A., and Transelec S.A.	96.04 percent, 100 percent, and 27.79 percent (roughly 57 percent of national grid)
Greece	Independent Power Transmission Operator S.A./ADMIE	24 percent
Italy	CDP Reti SpA and Terna S.p.A.	35 percent and 29.85 percent (roughly 10–13 percent of national grid)
Laos	Électricité du Laos Transmission Company Ltd. (high-voltage transmission operator)	90 percent
Luxembourg	Encevo S.A.	24.92 percent
Malta	Enemalta	33 percent
Oman	Oman Electricity Transmission Company	49 percent

Table 4: Notable Chinese Investments in Power Transmission Grids—*Continued*

Country	Company with Chinese Investment	Percentage Owned by Chinese Firms
Peru	Luz del Sur and Pluz Energía	100 percent in more than half the country, including the capital
Philippines	National Grid Corporation of the Philippines	40 percent
Portugal	Redes Energéticas Nacionais, SGPS, S.A. and Energias de Portugal, S.A.	25 percent and 21.35 percent

Figure 8: Map of Notable Chinese Investments in Power Transmission Grids



Note: This is not an exhaustive list, and it may not reflect the full extent of Chinese investments.
Source: Various.[220]

While these risks are primarily experienced by the host country, they can affect U.S. national security interests to the extent that operation of infrastructure necessary for U.S. overseas presence and activities is subject to Chinese control. A notable case of these risks exists in U.S. treaty ally the Philippines. Chinese SOE State Grid has a 40 percent ownership stake in the National Grid Corporation of the Philippines, and State Grid's general manager is the chairman of the National Grid Corporation.[221] While most of the employees who operate the grid are Filipinos, in 2019 the president of the Philippine National Transmission Corporation, which oversees

the Philippine grid, indicated it would be possible for China to shut down the grid, and the overseer's limited access to the grid would prevent it from manually taking over until 24 to 48 hours after a shutdown.[222] A disruption during an invasion or other conflict could delay Philippine and U.S. civil defense and military responses.[223] The Philippine government acquired a 20 percent stake in the National Grid Corporation in 2025, giving it two board seats and the ability to monitor security threats, although State Grid maintains its 40 percent share, leaving uncertainty as to what could happen in a crisis.[224] The Commission heard conflicting information about continuing operational threats to the Philippine grid during its trip to Manila in 2025. (For more on risks posed by Chinese investment in Southeast Asia's critical infrastructure, see Chapter 4, "Crossroads of Competition: China and Southeast Asia.")

Embedded Chinese Components Exacerbate Risk of Cyber-Enabled Espionage and Sabotage

Chinese components, particularly internet-connected devices, create vulnerabilities for the U.S. power grid. Grid distribution systems increasingly use operational technology and industrial control systems that allow remote access for easier maintenance and more detailed data collection.[225] Every embedded internet-connected technology is a potential cybersecurity vulnerability, particularly if it cannot be self-contained or "air-gapped."[226] Unless mitigated by end users, Chinese-manufactured components with remote access capabilities could be modified or accessed by the manufacturer, creating additional vectors for Chinese surveillance and sabotage.[227] This risk is compounded by the United States' heavy reliance on China for key grid components, as discussed above.

Chinese Components May Enable Cyber Espionage

Cyber espionage uses digital systems to obtain confidential information.[228] Chinese-manufactured components can enable direct access to other parts of the grid or provide data that can be leveraged for deeper access, for example insights into grid configurations, load characteristics, and asset health that help identify targets to disrupt.[229] Successful intrusions often enable attackers to move through connected industrial control systems, gaining direct access to those systems.[230] This is how Russia compromised U.S. electric utilities from 2016 to 2018 by moving laterally via connected contractor and subcontractor systems.[231] Data collected in these attacks, such as personnel credentials, can be used to gain access to otherwise disconnected systems—for instance, through socially engineered spear phishing campaigns.[232]

This risk is not theoretical. Espionage and grid mapping were the primary functions of a Chinese intrusion into the U.S. power grid and other critical infrastructure. Since at least 2021, the Chinese state-backed cyber actor Volt Typhoon has infiltrated the U.S. power system to collect operational insights into the grid, identify chokepoints with outsized control over grid operations, and pre-position cyber assets for operational disruptions.*[233] According to reporting

*People's Liberation Army (PLA) strategists consider energy infrastructure information systems part of the "cyber electromagnetic" domain and consider one of the first requirements for

from the *Wall Street Journal*, Chinese officials tacitly acknowledged that Beijing was behind the Volt Typhoon hacks in a secret December 2024 meeting with U.S. counterparts—a rare admission of state support for cyberattacks that China's government routinely denies.[234] U.S. representatives at the meeting interpreted remarks from Ministry of Foreign Affairs cyber official Wang Lei as intending to deter U.S. involvement in a Taiwan conflict.[235] China has also compromised the energy infrastructure of other countries, most notably India. In April 2022, a cyber actor backed by China intruded into the networks of several organizations responsible for overseeing India's grid control and electricity dispatch but reportedly did not cause any damage.[236] As the cyber intrusions were concentrated in North India, analysts believe this activity may be related to China-India border disputes.[237]

Chinese Components Enable Cyber Sabotage

As demonstrated by Volt Typhoon pre-positioning for operational disruptions, China could remotely access electric grid components to sabotage the U.S. power grid. China has already used its offensive cyber capabilities to sabotage other countries' power grids. For example, in February 2021, Chinese state-backed cyber actor Red Echo infected India's power grid control systems with malware, causing a power outage in Mumbai that shut down trains and financial markets and forced hospitals, already in the midst of a COVID-19 outbreak, to turn on emergency power generators.[238]

Sabotage that brought down the grid or large parts of it could have a devastating and destabilizing impact. Although not caused by a cyberattack, the experience of Spain and Portugal in April 2025 demonstrates the havoc possible by a single substation outage that plays a vital role in the grid. Spain and Portugal's transportation, communication, payment, water, grocery, and financial systems all ground to a halt for 18 hours.[239] Unlike Spain and Portugal's more integrated grid, the U.S. grid is separated into three physical interconnections that share limited electricity, so there is not one single point of failure that could cause a nationwide outage. If one of these interconnections were to become disabled, however, it would have massive impacts on the United States.[240] More than 50 million people in the United States and Canada lost electricity in 2003 during North America's largest blackout when part of the Eastern Interconnection lost power. It is worth noting that energy management system servers and remote consoles were "key factor[s]" that made it more difficult for operators to monitor and control the power system.[241]

Even attacks targeting small portions of the grid that service military or other critical infrastructure could create disproportionate impacts on the U.S. economy or impede U.S. military responses.[242] For example, a ransomware attack on Colonial Pipeline's business systems in 2021 led them to disconnect operational systems for five

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cyber electromagnetic warfare to be "collecting wide-ranging intelligence on the enemy's network electromagnetic systems and information capabilities … especially its critical nodes and other key parts and easily exploitable weaknesses." The PLA has demonstrated its ability to act kinetically on such intelligence by simulating attacks on Taiwan's energy infrastructure. Enoch Wong, "PLA Takes Aim at Taiwan's Coastal Fuel Depot in Strait Thunder 2025A War Games," *South China Morning Post*, April 3, 2025; Xiao Tianliang, ed., 战略学 [Science of Military Strategy], (China's National Defense University Press, 2020), 235, 238–239.

days and caused gas stations to run out of fuel in 13 states and Washington, DC, demonstrating the outsized effect of an attack on one critical energy company.[243]

Inverters and battery energy storage systems are particularly vulnerable to cyberattacks. Undocumented communication devices that could bypass utility companies' firewalls have been found in some Chinese solar power inverters as well as some Chinese batteries.[244] Additionally, inverters are increasingly internet connected, providing users with real-time data collection and remote access.[245] In November 2024, a number of solar power inverters—devices that convert direct current from solar panels into electricity usable by households—installed at U.S. homes were disabled by the Chinese manufacturer, Ningbo Deye Technology.[246] The inverters in question were not authorized for sale in the United States and were either disabled remotely or shut down by an authorization verification mechanism installed on the inverters.[247] Although the incident was intended to enforce an exclusive commercial distribution agreement and not an act of sabotage, it nonetheless shows that Chinese-made internet components in the U.S. power system can be remotely manipulated by the manufacturer or come installed with internet-connected software that will disable them under certain conditions—a vulnerability with serious national security implications.[248] A cyberattack on solar inverters could direct them to either cut off solar power generation assets or add more power to the grid, leading to voltage and stability issues in the local distribution system, damaged and tripped equipment, and possibly a power outage.[249]

Battery energy storage systems pose a special risk to the U.S. electric grid because faulty batteries may cause not only outages but also fires near other grid infrastructure, with the potential for wide-ranging consequences.[250] In January 2025, one especially high-profile battery fire took place at a grid storage facility in Moss Landing, California—the second-largest grid-scale storage facility in the world.[251] A failure in one of the facility's fire suppression systems forced 1,700 people to evacuate, closed part of a highway, and may have caused damage to the environment and nearby residents' health.[252] Although that fire was not the result of a cyberattack, "thermal runaway events" in batteries can be caused by malicious firmware, making battery systems a potential vector for grid sabotage.[253]

U.S. Power Grid Regulatory Environment Poses Cybersecurity Challenges

The fragmented nature of regulatory authority over the U.S. power grid poses challenges to creating and implementing effective, uniform cybersecurity regulations. The interstate "bulk power system" is regulated by federal agencies, while local distribution and retail sale are regulated by state and local entities.*

*There are three primary types of distribution utilities: investor owned, publicly owned, and cooperatives. Investor-owned utilities are overseen by state public utility commissions; publicly owned utilities are overseen by local city councils or by elected or appointed boards; and cooperatives are private, member-owned utilities (often rural) that are overseen by their members. U.S. Government Accountability Office, *Electricity Grid Cybersecurity: DOE Needs to Ensure Its Plans Fully Address Risks to Distribution Systems*, March 2021, 6–7.

U.S. Power Grid Regulatory Environment Poses Cybersecurity Challenges—*Continued*

Some legislation and executive actions have sought to improve the reliability and cybersecurity of the power system, but Chinese components remain embedded in the U.S. power grid.

At the federal level, the main players in U.S. power grid regulation are the Federal Energy Regulatory Commission (FERC) and the North American Electric Reliability Corporation (NERC). The Federal Power Act gives FERC jurisdiction over interstate transmission and wholesale sales of energy (often called "the bulk power system").[254] FERC is responsible for grid reliability in the United States.[255] Since the U.S. bulk power system is connected to the grids in Canada and Baja California (Mexico), NERC—a North American-wide reliability organization—is needed to develop and enforce mandatory reliability standards in all three countries.[256] NERC is an industry-led organization that FERC has designated as the United States' Electric Reliability Organization.[257] Thus, FERC relies on NERC to issue reliability standards—including cybersecurity standards—although FERC can direct NERC to issue standards and revise its proposed standards.[258] NERC standards are not mandatory until approved by FERC.[259] The U.S. Department of Energy (DOE) also plays a role in the U.S. power grid through the bulk power transmission assets operated by its Power Marketing Administrations and by coordinating industry, state, and federal responses to cybersecurity incidents and providing technical assistance to the energy sector as the Sector-Specific Agency for critical energy infrastructure cybersecurity.[260]

FERC and NERC do not have jurisdiction over local distribution or retail sale, which is regulated by state and local entities (typically known as Public Utility Commissions, or PUCs).[261] Federal agencies cannot mandate compliance from PUC-regulated utilities—many of them privately owned—but they do work with other federal agencies to coordinate cybersecurity information-sharing efforts through the Electricity Information Sharing and Analysis Center (E-ISAC), issue cybersecurity standards and frameworks, and perform exercises and evaluations that utilities can use to assess their cybersecurity (such as the biennial GridEx exercise).[262]

The United States' two-tier, decentralized approach to grid regulation can limit the effectiveness of federal action and the deployment of cybersecurity best practices.[263] Federal action is limited to the bulk power system, leaving almost 3,000 distribution utilities outside federal jurisdiction.[264] Some local distribution systems regulated by PUCs are operated by small, independent utilities.[265] In testimony before the Commission, one witness noted that smaller utilities typically have lower funding and lower cyber defenses.[266] As other U.S. government reports have noted, small businesses in the energy sector with limited cybersecurity capabilities may be particularly vulnerable to the advanced persistent threat of state actors.[267] The Cyberspace Solarium Commission identified similar systemic risks in the water sector in

U.S. Power Grid Regulatory Environment Poses Cybersecurity Challenges—*Continued*

its 2020 report, recommending federal coordination, continuity of the economy planning, and secure infrastructure design to defend against foreign cyber intrusion and sabotage.[268] These recommendations remain highly relevant in the context of China's embedded footprint in U.S. and global energy systems.

Some legislation and executive actions have directed improvements to protect the U.S. power grid from risks posed by Chinese components and cyberattacks, but most have taken a broader approach to the security of critical infrastructure. Pursuant to a May 2020 Executive Order (EO), DOE issued a "Prohibition Order" preventing the sourcing of certain bulk power grid equipment from Chinese-influenced entities for specified infrastructure serving "critical defense facilities."[269] The same EO ordered an interagency examination of approaches to mitigate risk from existing bulk power equipment sourced from foreign adversaries but stopped short of directing actions such as replacing Chinese components.[270] In April 2021, DOE's Prohibition Order was revoked and DOE announced a "100-day plan" to enhance the cybersecurity of electric utilities and secure energy sector supply chains.[271] Subsequent EOs and National Security Memoranda encouraged the deployment of industrial control system cyber monitoring technologies and directed federal agencies to standardize cybersecurity incident response procedures, provide technical assistance, enhance information sharing, and deploy existing authorities to encourage private-sector compliance with security and resilience requirements for the critical infrastructure sectors under their purview.[272] The 2021 Infrastructure Investment and Jobs Act directed FERC to establish incentives to encourage investments in advanced cybersecurity technology and participation in cybersecurity threat information-sharing programs beyond what mandatory standards require, and the 2022 Cyber Incident Reporting for Critical Infrastructure Act mandated bulk power grid entities to report cybersecurity incidents and ransomware payments.[273]

The division of labor between federal, state and local, and private entities makes it difficult to address the risk posed by Chinese components already installed in the U.S. power grid. Given the scale of existing Chinese components in U.S. electricity infrastructure, rip-and-replace measures may be very expensive because utilities are entitled to recover a reasonable rate of return on investments in transmission and distribution systems, which can include regulatory costs incurred due to federal action, a cost that is then passed on to consumers.*[274] Rip-and-replace measures in the telecommunications sector have been impeded by lack of funding.[275] This suggests other mitigation efforts may be needed. Other solutions that have been suggested in lieu of broad rip-and-replace orders include targeted rip-and-replace measures for the most critical equipment and locations; hardware, firm-

*Federally regulated transmission utilities are allowed to recover "all prudently incurred costs necessary to comply with mandatory reliability standards" issued under Section 215 of the Federal Power Act. Energy Policy Act of 2005 § 1241, Pub. L. No. 109–58, codified at 16 U.S.C. § 824s.

U.S. Power Grid Regulatory Environment Poses Cybersecurity Challenges—*Continued*

ware, and software replacement for existing equipment; isolating and monitoring vulnerable equipment to ensure it is not acting abnormally; and ensuring that future installations adhere to cyber-informed engineering principles that physically prevent cyberattacks from having system-wide effects.*[276]

Implications for the United States

China's electricity-centric energy strategy and its investments in new and emerging electricity generation and transmission technologies are shaping the global energy system. Chinese companies in the energy sector seek to maintain their competitive edge over U.S. companies through subsidized, aggressive pricing strategies and the Chinese government's formal and informal curbs on technology transfer.

China's focus on electrification may reduce its dependence on imported energy sources, particularly imported fossil fuels for transportation. The massive scale of low-carbon energy installations and widespread adoption of electric technologies in China may have begun chipping away at its oil consumption. In its *2024 Annual Report to Congress*, the Commission analyzed China's large stockpiling efforts around oil, indicating China feels a significant vulnerability around this dependency. **If China succeeds in reducing its reliance on imported oil and gas, it may affect the extent to which China views this vulnerability as a constraint on more disruptive activity.** (For more on China's efforts to stockpile energy resources and reduce its reliance on imported oil and gas, see U.S.-China Economic and Security Review Commission, Chapter 7, "China's New Measures for Control, Mobilization, and Resilience," in *2024 Annual Report to Congress*, November 2024, 458–539.)

The United States is exposed to leverage from China's dominant role in inputs to and components used in the energy sector. The United States has been targeted by China's export controls on critical minerals, many of which are vital to the energy sector. The United States also relies on China for key technologies and components in the energy sector. The United States currently lacks the capability to rapidly scale production of critical energy components such as transformers, inverters, and grid-scale batteries. **Absent a coherent surge strategy, any disruption to these supply chains could leave the U.S. grid dangerously exposed in a contingency.**

The United States has yet to adequately address risks inherent in allowing connected Chinese components into U.S.

*Cyber-informed engineering principles focus on designing power grids with manual overrides, isolated and segmented systems, and operational redundancies that limit the potential impact of cyberattacks. In testimony before the Commission, one witness described how cyber-informed engineering in the water sector could look like making the pipes that deliver chlorine to the water system so small that it would be physically impossible for a cyberattack to dump excess chlorine into U.S. drinking water. Patrick Miller, oral testimony for U.S.-China Economic and Security Review Commission, *Hearing on China's Domestic Energy Challenges and Its Growing Influence over International Energy Markets*, April 24, 2025, 112, 173.

energy infrastructure. The United States is particularly at risk from its reliance on Chinese-manufactured battery energy storage systems, inverters, transformers, and other high-impact components with remote access capabilities. The Volt Typhoon attack demonstrates the possibility that connected Chinese components may provide vectors for China to sabotage key portions of the bulk power and distribution systems as a means of leverage or during a conflict. Federal authority to mandate mitigation measures is currently limited, and addressing this risk will require greater coordination between federal and state and local authorities.

Further exacerbating the cyber risks from Chinese-connected components in U.S. energy infrastructure, pre-positioning cyber campaigns like Volt Typhoon often evade detection for months or years. This visibility lag creates windows in which U.S. response options are constrained or delayed. **Unaddressed cyber vulnerabilities increase the risk that China could disable or disrupt portions of the power grid before U.S. operators even become aware of the threat—especially in the early stages of a contingency or crisis.**

The U.S. Armed Forces and other assets stationed overseas may rely on power grids that are controlled or influenced by Chinese entities, creating opportunities for Beijing to conduct surveillance or disable power to critical facilities during a crisis, conflict, or other contingency. Even temporary outages could degrade mission-essential functions—such as command and control, logistics coordination, and air defense—particularly in contested or austere environments. Many facilities supporting U.S. and allied operations depend on host-nation infrastructure with limited backup capacity, compounding operational vulnerabilities. These risks are especially acute in strategically important regions such as the Indo-Pacific, where Chinese firms maintain a significant footprint in grid operations and infrastructure development across multiple allied and partner nations.

China's leverage in international energy markets could also have implications for the United States. **A third country may be less willing to align with the United States when U.S.-China interests diverge if the country is concerned such action will expose it to threats of economic coercion from China—whether relating to access to critical minerals needed for manufacturing or Chinese operation of energy infrastructure.** China's significant capabilities in low-carbon energy also provide it an important tool for "green diplomacy" to the extent third countries continue to prioritize reducing carbon emissions and otherwise take actions to enhance resilience of their energy systems, reduce reliance on imported energy sources, and reduce risks from climate change.

China is also increasingly active in international standards-setting bodies for energy systems, and its dominance in certain market segments and overseas investments provide it de facto global influence over certain energy sector-related standards. **Given that standards in the energy sector may have implications for competitiveness, surveillance, and cybersecurity, the United States should ensure it remains an active participant in relevant international standards-setting efforts.**

Recommendations

The Commission recommends:

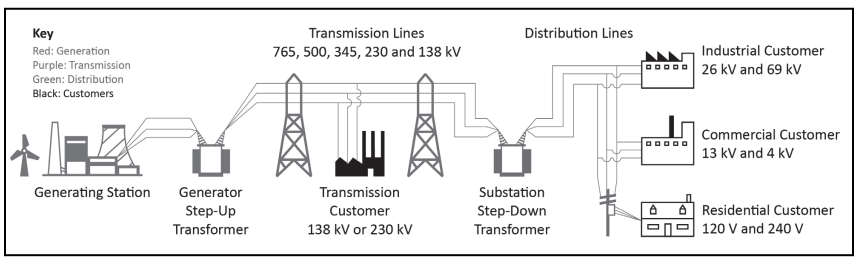
- To protect the U.S. power grid from the economic and cybersecurity threats posed by Chinese-made components, Congress should:
  - Prohibit the import of energy storage systems with remote monitoring capabilities that are manufactured by or made with technology licensed from Chinese entities.
  - Allocate additional funds to the U.S. Department of Energy for grid expansion, modernization, and cybersecurity grant and loan programs and prohibit the use of those grants and loans to purchase goods or services or license technology from entities that pose a cybersecurity risk to the U.S. power grid to be designated by the Secretary of Energy, in coordination with the Secretary of Defense, Secretary of Homeland Security, the Director of the National Security Agency, and the heads of other federal departments and agencies, as the Secretary determines appropriate.
  - Direct the Department of Energy and Federal Energy Regulatory Commission to strengthen supply chain risk management requirements for interstate electric transmission utilities by:
    - Requiring utilities to identify all Chinese-origin components within their high- and medium-impact bulk electric system and protected cyber assets;
    - Developing requirements to prohibit the installation of or mitigate the cybersecurity risk posed by those components;
    - Requiring that future procurement of such cyber assets come with full software, firmware, and hardware bills of materials;
    - Mandating that interstate transmission utilities report on their use of Chinese-origin components to their distribution utility customers; and
    - Coordinating with the U.S. Department of Homeland Security and other relevant agencies to provide technical assistance to implement these requirements.
- To support the adoption of nationwide cybersecurity standards and tools to protect the U.S. power grid from Chinese state-backed cyber actors, Congress should:
  - Require the Federal Energy Regulatory Commission (FERC), in consultation with the Secretary of Energy, the North American Electric Reliability Corporation, the Electricity Subsector Coordinating Council, and the National Association of Regulatory Utility Commissioners, to conduct a study and report on transmission and distribution utilities' adoption of minimum cybersecurity standards established pursuant to National Security Memorandum 22 or existing mandatory FERC requirements.

- Direct the U.S. Department of Energy to further authorize and fund projects at the National Laboratories to produce digital twins (virtual replicas of physical systems) for the power grid, leverage artificial intelligence to detect and patch vulnerabilities across the grid, and incorporate digital twins and artificial intelligence into cybersecurity simulations and exercises.
- Require the National Laboratories, U.S. Department of Justice, and Federal Bureau of Investigation to issue a joint report and briefing to Congress on known cybersecurity threats within the United States related to energy critical infrastructure.

Appendix I: Electric Power Systems

Electric power systems broadly consist of five stages: power generation, storage, transmission, distribution, and consumption (see Figure 9).* Most primary energy in the United States is consumed directly by end users in the form of petroleum-based fuel for transportation and petroleum and natural gas for industry.†[277] About one-third of U.S. primary energy is used for electric power generation and flows through the power system to residential, commercial, and industrial end users.‡[278] The power generation stage converts primary energy sources like natural gas, nuclear, coal, and wind into electricity.[279] This electricity can be stored in an energy storage system (e.g., batteries) for later use or sent long distances through the bulk power transmission system to substations.[280] Those substations then distribute power to end users.[281] Electricity can also be produced by distributed generators—end users that generate their own electricity—such as when a home's rooftop solar panels generate electricity consumed by that household or send electricity into the power system.[282]

Figure 9: Basic Elements of the Power System



Note: 161 kV and 115 kV transmission voltages and 46 kV, 34.5 kV, 23 kV, and other distribution voltages exist. U.S. Department of Energy, *Grid Engineering Practices and Standards: Defining Distribution, Sub-Transmission, Transmission, and the Bulk System for Interconnection*, August 2, 2023, 8.

Source: "Understanding the Grid," *North American Electric Reliability Corporation*, September 2025, 1.

*This breakdown excludes the extraction and refining of fossil fuels used for power generation. Some schemas combine generation and storage as well as distribution and consumption.

†Primary energy refers to energy sources in their first usable state after extraction from nature (i.e., petroleum, natural gas, renewables, nuclear, and coal). Morgan Smith, "How Is Primary Energy Defined and Used?" *Congressional Research Service* (Report No. R48270), November 19, 2024, 1, 4.

‡While roughly one-third of U.S. primary energy is used to generate electricity, due to energy losses in each stage of the power system, electricity only makes up roughly one-fifth of U.S. final energy consumption. U.S. Energy Information Administration, *U.S. Energy Consumption by Source and Sector, 2024*, April 2025.

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PART V

TAIWAN AND HONG KONG

CHAPTER 11: TAIWAN

Executive Summary

We have entered a crucial phase in Beijing's longstanding efforts to impose sovereignty over Taiwan. China is rapidly advancing toward its goal of being prepared to take Taiwan by force—while Taiwan and the United States strive to maintain the capacity to deter a Chinese invasion. China's persistent military activities near Taiwan, combined with new capabilities such as large amphibious assault ships and mobile piers, have enhanced China's capacity to blockade or launch an invasion of Taiwan with little advance warning. Beijing has also continued to escalate its multifaceted pressure campaign targeting Taiwan through military threats, economic coercion, and malign influence activities. Over the past year, Beijing has focused much of its information warfare activities on exacerbating domestic political divisions in Taiwan and driving a wedge between Taiwan and the United States. Moreover, China has continued its efforts to isolate Taiwan in the international arena by pressuring other countries to adopt Beijing's preferred positions and language regarding Taiwan.

In response to China's escalating pressure campaign, Taiwan has made progress enhancing its military deterrence and social resilience through larger and more realistic military exercises, efforts to accelerate the acquisition of new asymmetric defense capabilities, and new measures to counter Chinese malign influence. Taiwan has also continued to leverage its crucial role in technology supply chains—particularly its dominant position in advanced semiconductor manufacturing—to hasten economic diversification away from China. The United States has continued to support Taiwan through weapons sales and security assistance while working with Taiwan to enhance economic ties and build secure supply chains.

Key Findings

- Beijing is attempting to exploit domestic divisions in Taiwan by continuing its two-pronged approach to cross-Strait relations. On the one hand, Beijing has issued harsh threats against Taiwan's Democratic Progressive Party (DPP)-led government, which it accuses of promoting Taiwan indepen-

dence. On the other hand, Beijing has also stepped up efforts to court opposition leaders, business interests, and youth in Taiwan through promises of economic benefits and cross-Strait exchange programs.

- In light of China's near-constant military training activities and maneuvers near Taiwan, as well as the People's Liberation Army's (PLA) improved military hardware and operational readiness, U.S. and Taiwan military officials have warned that the PLA could implement a blockade within "a matter of hours" and would potentially need only "minimal conversion time" prior to an attack on Taiwan.[1]
- In addition to intensifying its military pressure on Taiwan, Beijing has also expanded a multifaceted campaign to weaken Taiwan's will to resist through economic coercion and inducements, espionage, information warfare, and undersea cable sabotage. Chinese propaganda has focused especially on attempting to sow doubt about the U.S. commitment to Taiwan by fomenting uncertainty surrounding U.S. policies on Ukraine, tariffs, and semiconductors.
- Taiwan has made progress improving military readiness, enhancing societal resilience, and diversifying its economy. Nevertheless, bureaucratic inertia in the military as well as political gridlock between the DPP-controlled executive branch and the Kuomintang (KMT)-controlled legislature have cast uncertainty around efforts to speed up the modernization of Taiwan's defenses.
- Despite rising tensions with China, Taiwan's economy continued to perform strongly, driven by insatiable global demand for semiconductors and electronics. Taiwan's continued leadership in technology manufacturing processes coupled with efforts to diversify its trade and investment partners have begun to shift dependence away from China, limiting the sting of Beijing's economic pressure campaign.
- Taiwan is now among the United States' top ten trading partners, with goods exported to the United States overtaking those to China for the first time in over two decades. Taiwan's chip manufacturers have pledged record levels of foreign direct investment (FDI) to build semiconductor manufacturing facilities in the United States. As China pursues a strategy of technological and manufacturing dominance, Taiwan's companies will be important partners to prevent over-reliance on Chinese supply chains.

Introduction

The daily drumbeat of news surrounding tensions in the Taiwan Strait can create the illusion that China is only slowly ratcheting up the pressure on Taiwan. Yet a broader perspective illustrates the remarkable rapidity with which Beijing has escalated its multidimensional pressure campaign against Taiwan:

- Over the past five years, PLA incursions into Taiwan's air defense identification zone (ADIZ) have increased dramatically—from only 20 in 2019 to 3,075 in 2024.[2]
- Over the past four years, PLA aircraft crossing the de facto median line in the Taiwan Strait have increased 6,591 percent—from only 22 instances in 2020 to 1,472 in 2024.[3]
- Over the past four years, the number of people charged with espionage against Taiwan on behalf of China has increased 967 percent, from six cases in 2020 to 64 in 2024.[4]
- Over the past two years, the number of countries that have signed on to statements endorsing Beijing's "One China principle" has increased by 133 percent—from 51 countries in February 2023 to 119 countries as of January 2025.[5]

These stark statistics show that China's pressure campaign against Taiwan has transitioned to a new phase, and the window of opportunity to ensure the continued effectiveness of deterrence from Taiwan and the United States is shrinking.*[6]

Beijing Continues to Escalate Its Pressure Campaign against Taiwan

On April 2, 2025, Chinese officials hosted the vice chair of Taiwan's main opposition party for a meeting in China and promised to "strengthen cross-Strait exchange and cooperation" to "bring benefits" to the people of Taiwan.[7] The meeting overlapped with the second day of the PLA's Strait Thunder-2025A military exercises, large-scale drills encircling Taiwan that Beijing framed as a "stern warning" to Taiwan "separatist" forces.[8] The split screen of Chinese officials making friendly overtures to opposition leaders while simultaneously carrying out aggressive military drills encapsulates the two-track strategy of inducements and threats that has been a hallmark of Beijing's Taiwan policy in recent years.

Taiwan's Domestic Political Divisions Have Deepened, but Large Majorities Continue to Oppose Unification with China

The two main political parties in Taiwan—the DPP and KMT—have very different visions for how to manage cross-Strait relations. The DPP has been more forceful than the KMT in criticizing China's pressure campaigns against Taiwan.[9] The DPP's overarching strategy for countering Chinese pressure has focused on increasing defense spending and improving asymmetric defense capabilities to deter a Chinese invasion, enacting stringent new measures to counter Chinese malign influence activities, and leveraging Taiwan's key role in technology supply chains to reduce its economic dependence on China.[10] In contrast, the KMT has advocated for maintaining productive cross-Strait dialogue to reduce tensions and lower the possibility of a miscalculation.[11] The KMT has defined its approach

*This chapter's findings are based on meetings with the Taiwan Economic and Cultural Representative Office; the KMT Representative to the United States; the American Institute in Taiwan; and the Research Institute for Democracy, Society, and Emerging Technology as well as open source research.

to managing cross-Strait relations as a "2D Strategy" (defense and dialogue) of enhancing Taiwan's defense capabilities while also maintaining communication channels with Beijing.[12]

Taiwan's domestic politics in 2025 have been defined by division and gridlock between the two major parties. Since Taiwan's January 2024 elections, the DPP has controlled the executive branch under President Lai Ching-te, while the KMT has held control over the legislature. In January 2025, the opposition-controlled legislature imposed significant cuts and froze a portion of the Lai Administration's budget request, including cutting approximately $280 million (1.3 percent) of the defense budget and freezing an additional $3 billion (14 percent).[13] DPP leaders have criticized the KMT for hampering efforts to improve Taiwan's defense capabilities, while the KMT has criticized the Lai Administration for recklessly provoking Beijing and using Chinese infiltration as a pretext to violate the civil liberties of people who disagree with DPP policies. Civil society groups aligned with the DPP filed dozens of recall petitions targeting KMT legislators in an attempt to reestablish a DPP majority and smooth the way for implementing President Lai's desired policies on defense and national security. However, recall elections held on July 26 and August 23, 2025, failed to unseat any opposition lawmakers, likely ensuring that Taiwan's government will remain divided until the next presidential and legislative elections in 2028.[14]

Yet despite Taiwan's political divisions and Beijing's relentless propaganda and pressure campaigns, opinion polling suggests the majority of people in Taiwan continue to reject China's positions and remain willing to fight to defend Taiwan against a potential Chinese invasion. According to polling from June 2025, only about 6.4 percent of Taiwan's population supported eventual unification with China.[15] An opinion survey conducted on behalf of Taiwan's Mainland Affairs Council in April 2025 showed that 84.4 percent of respondents opposed "one country, two systems," 82.5 percent opposed the statement "Taiwan is a part of China's territory, and Taiwan has never been a country," and 80.6 percent opposed China's "One China principle."[16] The March 2025 results of a long-running survey found that 63 percent of respondents said they were willing to resist a Chinese invasion "at all costs."[17]

Beijing's Rhetoric Aims to Exacerbate Domestic Divisions in Taiwan and Justify a Potential Future Invasion

Beijing's recent official statements have sought to exacerbate political divisions within Taiwan by reiterating violent threats against the DPP-led government (which Beijing accuses of promoting "Taiwan independence") while also promising to confer benefits on opposition political leaders, the business community, and Taiwan's youth. Recent speeches by top Chinese officials have repeated China's calls for "resolutely striking" Taiwan independence forces and proclaimed that "Taiwan independence separatists who play with fire will only burn themselves."[18] On March 13, Chen Binhua, the spokesperson for Beijing's Taiwan Affairs Office, declared that Taiwan separatists would have their "bodies smashed to pieces and their bones ground to powder."[19]

Yet the most noticeable shift in Beijing's rhetoric on Taiwan over the past year has been a greater emphasis on courting elements of Taiwan's society by promising material benefits to people and groups in Taiwan perceived as friendly toward Beijing. At the February 2025 Taiwan Work Conference, Wang Huning, Beijing's top official in charge of Taiwan policy, introduced the new concept of "shaping the inevitable reunification of the motherland," referring to actions China can take to create the conditions for unification with Taiwan. In his speech, Wang called for "letting Taiwan compatriots share in the opportunities and fruits of Chinese-style modernization and development" by supporting Taiwan businesspeople in China and creating opportunities for youth from Taiwan to "pursue and fulfill their dreams" in China.[20] Likewise, the only significant new language on Taiwan in Chinese Premier Li Qiang's *2025 Government Work Report* called for "improving systems and policies to promote cross-Strait economic and cultural exchanges and cooperation."[21]

While Chinese statements aimed at international audiences have denied any imminent plans to invade Taiwan and reiterated Beijing's preference for "peaceful unification," Beijing's messaging directed at its own citizens has struck a more urgent tone and articulated potential justifications for invasion.[22] In English-language publications, leading Chinese scholars with close ties to Beijing have claimed that China does not have a timetable for unification with Taiwan and remains optimistic about the prospects for peaceful unification.[23] For example, in a December 2024 article in *Foreign Affairs*, Yan Xuetong, one of China's most influential foreign policy thinkers, wrote that China and the United States were "unlikely to go to war" over Taiwan in the next four years and that "China is not about to draw up a timetable for reunification with Taiwan when it is concerned primarily with its own GDP [gross domestic product] growth."[24] However, China's Taiwan Affairs Office referred to Dr. Yan's article as only "the personal opinion of an academic" and later said that China would take "decisive measures" if Taiwan's "provocations" "crossed the red line."[25] In contrast, when writing for domestic audiences, Chinese academics have stated that "the unification of the motherland cannot keep being postponed" and have called for instilling Chinese society with the notion that "unification could happen at any time."[26] Recent commentaries published in Chinese state-run media have employed some of Beijing's most aggressive rhetoric to date, referring to Taiwan's President Lai as an "utterly evil creator of war."[27] For example, an April 2025 commentary in the *People's Daily* accused President Lai of promoting "Taiwan independence" and stated that "Taiwan independence means war," articulating a potential justification for invading Taiwan and blaming it on Lai.[28] In August 2025, a *People's Daily* editorial accused the DPP of a "dangerous inclination toward increasing Nazification"—echoing the rhetoric Russia's President Vladimir Putin used to justify his invasion of Ukraine.[29]

Does Beijing Have a Timeline for Taking Taiwan?

In discussions regarding whether Beijing has a timeline for taking Taiwan, analysts have most frequently pointed to three dates for a potential Chinese invasion: 2027, 2035, and 2049.[30] These dates are based on public reports about U.S. intelligence assessments as well as Beijing's own statements regarding Taiwan and the PLA's military modernization ambitions.[31] Nevertheless, Beijing has never publicly acknowledged a specific deadline for taking Taiwan, and General Secretary of the Chinese Communist Party (CCP) Xi Jinping reportedly denied having plans to invade Taiwan in 2027 or 2035 during his November 2023 meeting with then–U.S. President Joe Biden.[32] Xi has said on two occasions, however, that the Taiwan issue "should not be passed down generation after generation," which has been interpreted by some to indicate Xi's intent to "solve" the issue during his lifetime.[33]

2027: Beijing's date for being prepared to invade Taiwan

According to public reports about U.S. intelligence assessments, Xi instructed the PLA to be capable of conducting a successful invasion of Taiwan by 2027—a deadline intended to accelerate the development of the PLA's capabilities, but not necessarily a target invasion date.[34] The year 2027 is significant in that it will mark the 100th anniversary of the founding of China's PLA, and Xi has announced the goal of accelerating the "mechanization, informatization, and intelligentization" of China's military by that date.[35]

2035: Beijing's date for complete military modernization and constructing a high-speed railway to Taiwan

Analysts have also pointed to 2035 as a potential deadline for China to take Taiwan.[36] Beijing has stated its aim to "basically complete the modernization of national defense and the military by 2035."[37] Moreover, China has also announced plans to complete a high-speed railway connecting Taiwan to China by that date. In 2023, China opened a high-speed rail line along the Taiwan Strait in Fujian Province and announced that it had built an "integrated multidimensional transportation network" that would make it "technically possible" to create a high-speed transport passage linking the province with Taiwan.[38] However, as officials in Taiwan have dismissed the high-speed rail project, it is likely Beijing could only achieve this goal if it had already gained control over Taiwan.[39]

2049: Beijing's date for realizing "the great rejuvenation of the Chinese nation"

Beijing has clearly indicated its goal to "unify" with Taiwan prior to the 100th anniversary of the founding of the People's Republic of China (PRC) in 2049. Xi has long called for completing the "rejuvenation of the Chinese nation" by 2049, and in his report to the CCP's 20th National Party Congress in 2022, Xi stated that "solving the Taiwan question" is an "inevitable requirement for realizing the great rejuvenation of the Chinese nation."[40] Xi has also set the goal of making the PLA a "world-class" military by mid-century.[41]

Beijing Has Escalated Military Pressure on Taiwan and Enhanced Its Capabilities for an Invasion

In addition to its harsh rhetoric and economic pressure campaign against Taiwan's government, Beijing has continued to escalate military pressure on Taiwan both through near-daily military operations near Taiwan and large-scale exercises designed to rehearse invasion and blockade scenarios. On April 9, 2025, Commander of the U.S. Indo-Pacific Command (USINDOPACOM) Admiral Samuel Paparo testified to the House Armed Services Committee that "the PLA escalated military pressure against Taiwan by 300 percent in 2024, through activities such as Air Defense Identification Zone (ADIZ) entries and centerline crossings."[42] As of October 10, 2025, there have been 3,056 PLA incursions into Taiwan's ADIZ this year, up 33 percent from 2,301 incursions during the same period in 2024.[43] In addition to the near-daily menace of PLA aircraft crossing into Taiwan's ADIZ, the PLA has also continued to stage large-scale military drills encircling Taiwan, framing them as punishment for the supposed provocations of Taiwan's government. In his April 2025 testimony, Admiral Paparo stated that these "aggressive maneuvers around Taiwan are not just exercises—they are dress rehearsals for forced unification."[44] On April 1–2, 2025, the PLA conducted the Strait Thunder-2025A military exercises encircling Taiwan, which were similar in scope to the Joint Sword drills conducted in 2023 and 2024. Over the course of the two-day exercise, the PLA deployed 135 aircraft, 38 naval vessels, and 12 other official vessels in the areas surrounding Taiwan.[45] Like previous large-scale military exercises around Taiwan, the Strait Thunder-2025A drills involved the PLA's Shandong aircraft carrier group as well as participation by coast guard vessels.[46] PLA military experts stated that the April 2025 drills focused on occupying key maritime chokepoints to simultaneously cut off Taiwan's energy imports, the support lines of foreign militaries, and Taiwan's exit routes to the outside world.[47]

Besides highly publicized named military exercises, Beijing has also conducted increasingly large-scale unannounced exercises designed to normalize PLA activity near Taiwan, making it more difficult to detect if China is preparing for an actual blockade or invasion and potentially dramatically reducing the time Taiwan and the United States would have to respond. In December 2024, the PLA deployed nearly 90 ships in waters stretching from the East China Sea to the South China Sea in its largest military drills near Taiwan in almost 30 years.[48] Unlike other exercises focused on encircling Taiwan, the December 2024 exercises focused on anti-access/area denial across the entire first island chain.[49] Beijing did not announce the exercises in advance, and China's Ministry of Foreign Affairs declined to answer questions pertaining to the drills.[50] On February 26, 2025, the PLA launched additional drills off the coast of Taiwan without prior warning, which China's Ministry of National Defense later called "routine exercises."[51] China also conducted unannounced military exercises near Taiwan on March 17, 2025, which China's Foreign Ministry later framed as punishment for the U.S. decision to remove language that the United States "does not support Taiwan independence" from its factsheet on U.S.-Taiwan relations.[52]

Beijing Has Enhanced Its Military Capabilities for a Potential Invasion of Taiwan

In addition to China's near-constant military activities near Taiwan, the PLA has also made progress toward improving its military hardware and operational readiness for a potential amphibious invasion of Taiwan.

- In January 2025, reports emerged that China had developed new self-propelled landing barges that could enable the PLA to overcome many of the logistical challenges to an amphibious invasion of Taiwan by allowing it to transport large volumes of heavy combat equipment quickly over difficult terrain along Taiwan's western coastline.[53] In March 2025, China conducted practice maneuvers in which three of the new barges linked together via extendable bridges, creating a 2,700-foot mobile pier that could reportedly be used to unload hundreds of armored vehicles in a day.[54] Military analysts have concluded that the barges "significantly improve the PLA's ability to conduct over-the-shore logistics in a Taiwan invasion scenario."[55]
- On December 27, 2024, the PLA unveiled its new Type 076 warship, which analysts have described as "the world's largest amphibious assault ship" and "the world's first drone aircraft carrier."[56] The Type 076 warship can launch manned fighter jets and drones in addition to helicopters, which Chinese military analysts have claimed could facilitate a faster amphibious invasion of Taiwan.[57]
- At a September 3, 2025, military parade in Beijing commemorating China's WWII victory, the PLA unveiled new weapons that could be used to support an invasion of Taiwan, including hypersonic anti-ship missiles that could target U.S. warships, new combat drones to help navigate mountainous terrain, and lighter tanks designed to better survive drone strikes.[58]
- China unveiled its J-35A fifth-generation stealth fighter jet in November 2024, which analysts have argued would likely fly over Taiwan's eastern coast to assist with an amphibious invasion or help enforce a no-fly zone if Beijing attempted to impose a blockade or quarantine of Taiwan.[59]
- In January 2025, Fujian Province announced reforms aimed at professionalizing its militia forces, which would likely play a key role in a military conflict with Taiwan.[60] While in the past, the militia unit has been poorly trained and compensated, the new reforms enhanced the financial and reputational rewards for those serving in the militia—and particularly its most elite members.[61]

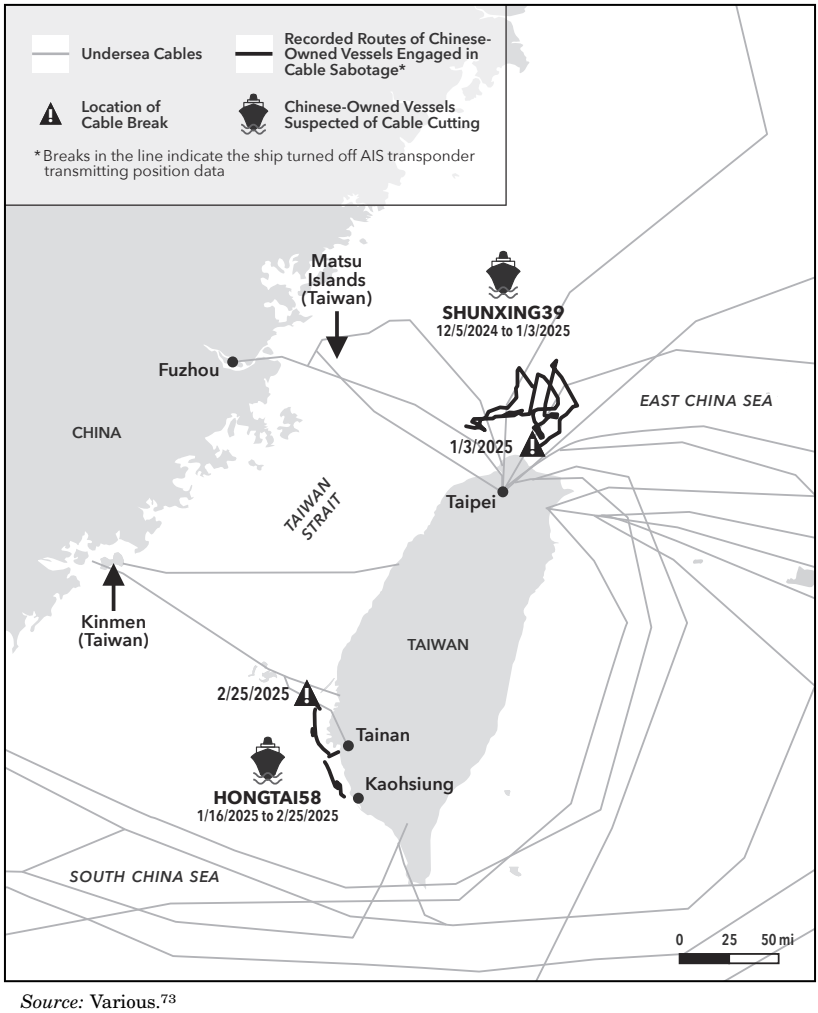
China-Linked Vessels Suspected of Sabotaging Taiwan's Undersea Cables as a Form of Gray Zone Pressure

Military analysts have long warned that China could attempt to sever Taiwan's undersea cables to cut off its communications during an invasion.[62] Taiwan is highly vulnerable to undersea cable sabotage, as it relies on 24 undersea cables to handle more than 99 percent of its internet traffic and external communications.[63] In 2021, researchers gained access to a Chinese database of strategic "points of interest" in Taiwan, which included numerous undersea cable landing stations.[64] Moreover, for at least the past 15 years, Chinese scientists at research institutions with ties to the PLA have actively researched new techniques for cutting undersea cables, acquiring numerous patents for technologies designed to cut deep-sea cables cheaply and efficiently.[65] In February 2025, Chinese scientists affiliated with the China Ship Scientific Research Center—which is under U.S. sanctions for supporting the PLA—published a new design for an "electric cutting device for deep-sea cables" reportedly capable of severing armored cables at depths of more than 13,000 feet.[66] If China successfully severed all of the undersea cables serving Taiwan, it would have devastating consequences, paralyzing government and military communications and costing Taiwan's economy an estimated $55.6 million per day.[67]

China has already deployed undersea cable sabotage as a gray zone tactic to intimidate Taiwan. Taiwan has suffered cable disruptions with particularly high frequency in recent years—at least 27 incidents between 2019 and 2023—some of which the Taiwan government has attributed to sabotage by China-linked vessels.[68] In many cases, Taiwan's cables have been damaged by a "shadow fleet" of dilapidated Chinese-owned vessels that conduct little legitimate business and typically operate under flags of convenience.[69] There have already been multiple such incidents in 2025. On January 3, a Chinese-owned, Cameroon-flagged vessel damaged an undersea cable near Taiwan's port of Keelung while engaging in highly irregular movement patterns.[70] The ship appears to have been operating under a fake name linked to a separate automatic identification system (AIS) transponder at the time it damaged the cable.[71] In a suspiciously similar case the following month, a Chinese-owned, Togo-flagged ship damaged an undersea cable connecting Taiwan and its outlying island of Penghu after loitering near Taiwan for several days while ignoring radio messages from the Taiwan Coast Guard asking it to leave. The vessel was carrying the AIS transponder for a ship on Taiwan's shadow fleet blacklist, but the ship identified itself to Taiwan's Coast Guard under a different name and was using an International Maritime Organization (IMO) identifier number linked to yet another vessel.[72]

China-Linked Vessels Suspected of Sabotaging Taiwan's Undersea Cables as a Form of Gray Zone Pressure—*Continued*

Figure 1: Incidents of Chinese Vessels Sabotaging Undersea Cables near Taiwan in 2025



Source: Various.[73]

Beijing Seeks to Weaken the Taiwan People's Will to Resist through a Multifaceted Campaign to Infiltrate, Destabilize, and Isolate Taiwan

In addition to escalating its military pressure against Taiwan, Beijing has also continued to increase efforts to intimidate Taiwan and exacerbate its internal divisions through gray zone pressure

that has included a wide range of malign influence activities and coercive tactics.

Efforts to Intimidate and Infiltrate Taiwan's Government and Society

Taiwan government reports have indicated that Beijing has continued to increase malign influence activities aimed at infiltrating and destabilizing Taiwan's society. According to an April 2025 report by Taiwan's National Security Bureau, cases of Taiwan citizens conducting espionage for China have increased sharply over the past several years. In 2024, Taiwan charged 64 people with spying for China—a very significant increase from an average of about 11 cases per year in 2020–2022.[74] In total, prosecutors have charged 159 people with spying for China since 2020, about 60 percent of whom were active-duty or retired military personnel.[75] A separate January 2025 analysis by Taiwan's National Security Bureau found that China has focused in particular on targeting military personnel with large personal debts and used the promise of financial assistance to pressure them to turn over sensitive information and participate in united front work.[76]

In addition to espionage, China has continued to expand its use of cyberattacks and information warfare targeted at Taiwan's government and society. Since the beginning of 2024, Taiwan government websites have suffered an average of approximately 2.2 million cyberattacks per day, the vast majority of them from China.[77] As of April 2025, Taiwan intelligence agents had already collected 510,000 examples of propaganda disseminated this year by Chinese agents via Facebook, TikTok, Dcard, and other social media platforms popular in Taiwan.[78] Taiwan's intelligence agents have concluded that China has been using internet trolls, bots, and generative artificial intelligence (AI) tools to shape online discourse on controversial topics like Taiwan Semiconductor Manufacturing Company's (TSMC) investments in the United States as part of a coordinated cognitive warfare campaign designed to stoke social divisions.[79] Chinese united front organizations have also offered financial rewards for social media influencers in Taiwan to integrate pro-CCP messaging into their content.[80]

Beijing has also stepped up efforts to intimidate people it labels "Taiwan separatists." In at least one instance, Beijing has threatened the safety of a high-level Taiwan official traveling overseas. In June 2025, Czech military intelligence officials revealed that when Taiwan's then–Vice President-elect Bi-Khim Hsiao (whom Beijing has labeled a "separatist") visited the country the previous year, Chinese officials plotted to cause a car crash involving her vehicle.[81] Beijing has also threatened to enforce its laws criminalizing support for Taiwan independence extraterritorially. In 2024, Beijing revised its Anti-Secession Law to make promoting Taiwan independence a crime punishable by up to death.[82] As the law does not specify that it is only applicable to citizens of Taiwan, it could theoretically apply to anyone regardless of citizenship.[83] According to intelligence gathered by Taiwan, during China's February 2025 Taiwan Work Conference, a senior Chinese official provided instructions to state security units to "implement" these new guidelines overseas in coun-

tries friendly to China, raising fears that someone could be arrested on vague charges of promoting Taiwan independence while traveling in countries such as Cambodia and Laos that maintain close security ties with China.[84] In April 2025, Cambodia complied with a request by Beijing to deport 180 Taiwan citizens to China who had been detained in Cambodia for allegedly engaging in cyber crime. Under pressure from the Chinese government, Cambodia refused even to provide Taiwan with the names of its citizens who were sent to China.[85] While it is unclear how Beijing will enforce these measures, China has already set up the legal mechanisms to arrest someone in a third country on charges of promoting Taiwan independence, extradite them to China, and punish them with up to the death penalty.

At the same time, Beijing has sought to strengthen pro-China sentiment in Taiwan by continuing to invite opposition political leaders to visit China and organizing highly politicized cross-Strait exchange programs targeted at youth groups in Taiwan.

- In April 2025, KMT Vice Chair Andrew Hsia led a delegation to China to meet with the Director of China's Taiwan Affairs Office Song Tao and visit Henan Province to worship the legendary Yellow Emperor, a symbol of Chinese cultural identity.[86]
- Former President Ma Ying-jeou visited China in June (his fourth trip to China over the past several years) to attend the Straits Forum, an annual meeting devoted to cross-Strait exchange, alongside top CCP leaders including Wang Huning.[87]
- A former chairperson of the KMT, Hung Hsiu-chu, as well as KMT veterans of WWII, attended a September 3 military parade in Beijing commemorating China's WWII victory at the invitation of the Chinese government.[88] In the leadup to the parade, Chinese state media asserted that Taiwan's "return" to China was among the "fruits of victory in WWII" and an "important component of the postwar international order."[89]
- In addition to courting opposition political leaders, China has continued to promote heavily subsidized trips aimed at inculcating youth in Taiwan with Beijing's preferred narratives. In December 2024, the Xinjiang Provincial Federation of Taiwan Compatriots, a Xinjiang-based united front organization, advertised a heavily subsidized nine-day tour to Xinjiang for Taiwan youth, which critics have called an attempt to distract Taiwan's young people from large-scale human rights abuses in the province.[90]
- The Ma Ying-jeou Foundation has also supported several youth trips to China during the past year. In December 2024, the Foundation led a group of Taiwan youth on a tour of China that attempted to inculcate shared historical memory by visiting sites associated with Japanese atrocities against China during WWII.[91] In February 2025, the foundation led another youth group on a trip to Beijing to visit cultural sites like the Forbidden City and locations such as a Xiaomi electric car factory intended to create an impression of China as a high-tech land of opportunity.[92]

Beijing Has Convinced Numerous Countries to Adopt Its Preferred Language on Taiwan

Beijing has made extraordinary progress over the past two years in convincing countries to adopt positions and make statements containing its preferred language on Taiwan. As of February 2023, only 51 countries had adopted statements explicitly recognizing Beijing's position that the PRC is the legitimate government of all of China and that Taiwan is a part of China.[93] As of January 2025, 119 countries (62 percent of UN member states) had signed on to statements endorsing Beijing's "One China principle" and PRC sovereignty over Taiwan—an additional 68 countries in just the past two years alone.[94] According to an analysis by the *Economist*, 70 countries have adopted statements supporting "all" measures by China to achieve national unification. While it remains unknown how different countries understand the meaning of such statements, Beijing would likely claim that they constitute support for its right to take Taiwan by force.[95]

Beijing Expanded Its Sophisticated and Well-Resourced Propaganda Campaign to Sow Uncertainty about the U.S. Commitment to Taiwan

In the context of its broader global campaign to isolate Taiwan, Beijing has attempted to drive a wedge between Taiwan and the United States by promoting propaganda encouraging people in Taiwan to be skeptical of U.S. support. Authoritative Chinese scholars with close ties to Beijing have claimed that the Trump Administration is less committed to Taiwan's defense and more likely to "make a deal" over Taiwan than previous U.S. administrations.[96] In June 2025, Xiamen University Professor Wei Leijie argued that the Trump Administration's "transactional approach" to great power relations presented Beijing with a "once-in-a-century opportunity" to strike a deal over Taiwan.[97] Chinese academics have also argued that perceptions of U.S. President Donald Trump as being less committed to Taiwan will help fuel skepticism toward the United States within Taiwan. A recent report by the Shanghai Institute for International Studies evaluating the influence of the 2024 U.S. presidential election on Taiwan argued that President Trump's past statements on Taiwan provide evidence for "America skepticism" in Taiwan and the notion that the United States might "abandon" Taiwan.[98]

Beijing has also actively sought to foment "America skepticism" in Taiwan through state-produced propaganda regarding TSMC's investments in the United States, U.S. tariffs, and U.S. policy toward Ukraine. In February 2025, China's Taiwan Affairs Office claimed that Taiwan's DPP government was "selling out the interests and well-being of Taiwan's people and businesses" by "giving away Taiwan's semiconductor industry as a souvenir" to the United States.[99] After TSMC announced an additional $100 billion investment in the United States, China's Taiwan Affairs Office claimed the United States was "squeezing Taiwan dry" and that people in Taiwan should fear "Taiwan Semiconductor Manufacturing Company" would become "America Semiconductor Manufacturing Company."[100]

In outreach to Taiwan's business community, Beijing has attempted to exploit uncertainty about U.S. tariffs to present itself as a

more reliable economic partner. On April 18, 2025, Song Tao, head of China's Taiwan Affairs Office, participated in a meeting with Taiwan businesspeople in Nanjing in which he denounced the "tariff war launched by the United States," vowed that China would "increase its support" for Taiwan businesses, and called for both sides of the Taiwan Strait to "join hands in resisting external risks and challenges."[101] As part of China's broader wedge strategy to sow discord between the United States and Taiwan, Chinese state media has also amplified criticisms of the DPP's response to U.S. tariffs by local media and academics in Taiwan.[102]

Chinese state media has also referenced U.S. policy toward Ukraine in propaganda about Taiwan. A March 14, 2025, Xinhua article stated: "U.S.-Russia negotiations and Zelensky being humiliated in the White House have given people in Taiwan an acute and shocking lesson: once the United States and the West had finished using Ukraine as a 'vanguard of resistance against Russia and frontline of democracy,' they abandoned it."[103] Chinese officials and state media have begun regularly stating that Taiwan is likewise fated to become an "abandoned chess piece."[104]

Since Beijing has increased its propaganda efforts aimed at destabilizing U.S.-Taiwan ties, public opinion polling in Taiwan has shown significant decreases in the percentage of respondents that viewed the United States as a trustworthy partner.[105] According to a poll conducted in February–April 2025, only 37 percent of respondents thought it was likely the United States would help "if China and Taiwan go to war" (down from 45 percent in 2024).[106] Moreover, only 33.5 percent of respondents stated that they had a "positive" perception of the United States—a decline of more than 20 percentage points from the year prior.[107] A separate poll conducted in April 2025 found that 82 percent of respondents believed the United States' "new tariff policies" were "unreasonable."[108]

China Uses Carrots and Sticks to Pressure Taiwan Economically

Beijing's use of economic pressure against Taiwan intensified in the lead up to the 2024 presidential election and continued during the first year of the Lai Administration. Yet actual punitive measures have fallen far short of threatened action, signaling China's caution and concerns about hurting its own industries. As in other domains, China has sought to use economic levers to both entice and pressure Taiwan's leadership and populace to integrate with China.

China's Long Campaign to Attract Investment and Talent from Taiwan Fizzles

Chinese authorities continue to roll out incentives to attract investment and workers from Taiwan in the face of a steady exodus of Taiwan's companies and citizens from China. In early 2025, the Provincial Government of Fujian, located directly across the Strait from Taiwan, announced the latest round of policies seeking to attract workers from Taiwan.[109] They included a special residence permit, annual cash subsidies of 50,000 renminbi (RMB) ($6,900) for those with a bachelor's degree or above, housing subsidies up to 50 percent, and additional incentives for skilled workers in certain high-tech industries.[110] Uptake from the people of Taiwan has been

limited, however, with those who do relocate reporting a difficult business environment amid China's ongoing economic slump and stiff competition from Chinese companies.[111] The latest figures from 2022 show 177,000 Taiwan passport holders resided in China, down from 404,000 in 2018.[112]

According to reporting in January 2025, Taiwan's authorities are increasingly concerned about a special residence permit that China has been promoting to Taiwan's public that grants access to financial services and social benefits in China.[113] Taiwan authorities believe Beijing hopes to use the program to convince Taiwan citizens to apply for China's national citizen identification card and to swap their passports for those issued by Beijing. Taiwan authorities fear that, after those individuals return to Taiwan, China could justify a future intervention as necessary to "protect Chinese citizens" in Taiwan.[114]

Punitive Trade Measures Have Thus Far Been Targeted and Limited

Beijing has utilized both threatened and actual punitive economic measures to punish and coerce Taiwan by inflicting economic harm on exporters reliant on the Chinese market. Beijing's favored tool in recent years has been the imposition of tariffs. In December 2023, less than a month before Taiwan's presidential election, China raised tariff rates on 12 petrochemical products from Taiwan.[115] In 2024, China raised tariffs on wider sets of products.* On May 31, 2024, China announced it would suspend preferential tariff rates on 134 products, raising the effective tariff rate on some textile, bicycle, and chemical items anywhere from 1 to 12 percent.[116] China's Taiwan Affairs Office said the move came in response to President Lai's refusal to recognize the "1992 Consensus" in his inaugural address.[117] Taiwan's Ministry of Economic Affairs downplayed the actual economic impact of these tariffs, stating the value of exports subject to them ($9.8 billion) made up only 2 percent of Taiwan's total exports in 2023.[118] Most recently, in September 2024, China announced it would raise tariffs on 34 agriculture and aquaculture products from Taiwan.[119]

China's unwillingness to target semiconductors or information communication technology (ICT) supply chains demonstrates its limitations in taking actions that would truly damage Taiwan's economy. China is reliant on ICT inputs from Taiwan for finished products and is home to downstream semiconductor processes like assembly, packaging, and testing.[120] Therefore, Beijing has likely

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*Cross-Strait economic and trade ties peaked during the last KMT administration under Ma Ying-jeou (2008–2016), with the signing of a preferential trade agreement, the Economic Cooperation Framework Agreement (ECFA). A follow-on proposed investment deal—the Cross-Strait Services Trade Agreement (CSSTA)—sparked the Sunflower Movement mass protests in 2014 by those who feared that further cross-Strait economic integration would lead to unacceptable leverage. The backlash in Taiwan culminated with the election of Tsai Ing-Wen and the DPP's return to power a year later and a breakdown of formal communications with the CCP. The KMT still advocates for increased economic integration with China as a way to promote stability across the Strait. The KMT's 2024 presidential candidate Hou Yu-ih said on the campaign trail that he would revive the CSSTA, and former President Ma Ying-jeou has repeatedly called for further economic and people-to-people ties during visits to China. (For more on the ECFA and Sunflower Movement, see U.S.-China Economic and Security Review Commission, Chapter 5, Section 2, "Taiwan," in *2023 Annual Report to Congress*, November 2023, 612–616.) Zichen Wang, "Ma Ying-jeou's Speech at 17th Straits Forum in the Mainland," *Pekingnology*, June 15, 2025; Xiaoqing Bu, YuXuan Jia, and Zichen Wang, "Ma Ying-jeou's Latest Speech on Cross-Taiwan Strait Relations," *Pekingnology*, August 23, 2024; David Sacks, "Taiwan's 2024 Presidential Election: Analyzing Hou Yu-ih's Foreign Policy Positions," *Council on Foreign Relations*, December 26, 2023.

assessed that tariffs on Taiwan's core industries will probably hurt China as much as—if not more than—Taiwan.

Limited Benefit for China in Capturing Taiwan's Semiconductor Facilities

Taiwan's indispensable semiconductor industry also factors into CCP decision-making around the use of military force, though the enormous economic cost of an invasion is unlikely to be the deciding factor. Estimates indicate that military action in the Taiwan Strait—whether in the form of a limited blockade or a full-scale invasion—would wipe out trillions of dollars from the global economy, on par with the 2008 financial crisis.[121] Some argue that the PRC might accrue economic benefit through seizing semiconductor manufacturing facilities in Taiwan, accelerating China's high-tech development and gaining a key leverage point in the global economy.[122] In all likelihood, however, China would not be able to continue production at TSMC facilities—even if they were captured intact—due to their reliance on production processes involving numerous highly specialized inputs made by sole suppliers in the United States, Japan, and other presumably uncooperative countries.[123] Furthermore, reporting from May 2024 indicated that TSMC and ASML—the Dutch maker of extreme ultraviolet lithography machines necessary to produce the most advanced semiconductors—maintain the capability to remotely disable manufacturing equipment used in Taiwan fabs in the event of an invasion.[124] Accordingly, CCP calculations as to whether to take military action against Taiwan must factor in economic costs and the extent to which China's domestic semiconductor industry can provide adequate substitutes for lost production from Taiwan, the United States, and allies.[125]

Taiwan Has Made Efforts to Enhance Deterrence and Resilience despite Political Gridlock

While China has raced forward with its multifaceted pressure campaign against Taiwan, Taiwan has also continued to make progress toward increasing both military deterrence and social resilience. The Lai Administration has sought to enhance deterrence both by improving military preparedness and by accelerating efforts to build the capabilities necessary for an asymmetric defense posture—which involves acquiring large quantities of small, mobile, and inexpensive systems to counter an airborne or amphibious invasion.[126] The Lai Administration has also expanded efforts to build "whole-of-society-resilience," which it conceptualizes as increasing society's ability to resist and withstand Chinese aggression by introducing new measures to counter Chinese infiltration and gray zone pressure and continuing to diversify Taiwan's economy away from dependence on China.[127]

Taiwan Accelerates Efforts to Enhance Military Preparedness

The Lai Administration's approach to deterrence has focused on increasing defense spending and enhancing asymmetric capabilities

to ensure Taiwan could inflict significant damage on a Chinese invasion force.[128] In a speech on February 14, 2025, President Lai vowed to use special budgets to increase Taiwan's defense spending to 3 percent of GDP—approximately $27 billion.[129] In an opinion essay published by Bloomberg, President Lai reminded readers that Taiwan had secured $18 billion in arms deals with the United States during President Trump's first term and stated that Taiwan would continue to "pursue additional arms procurements that are vital to our self-defense."[130] Taiwan's *Quadrennial Defense Review*, published in March 2025, specifically called for developing greater asymmetric capabilities by acquiring defense items such as portable anti-armor weapons and drones capable of conducting precision strikes.[131] In July 2025, Taiwan's government announced plans to purchase nearly 50,000 locally produced drones over the next two years, which it specified must not include any components made in China.[132]

However, disputes between the Lai Administration and the opposition-controlled legislature have created uncertainty around some of the government's plans for bolstering Taiwan's defenses. While the government requested a defense budget of 647 billion New Taiwan Dollars (NTD)* ($19.7 billion) for 2025, Taiwan's opposition-controlled legislature cut approximately $280 million (1.3 percent) from the defense budget request and froze about $3 billion (14 percent).[133] The spending freezes included half of the proposed funding for an indigenous submarine program as well as 30 percent of funding for an industrial park aimed at creating a drone supply chain free of Chinese inputs.[134] KMT representatives have pointed out that even after the cuts, the 2025 defense budget is still the largest in Taiwan's history and a 5.2 percent increase over the previous year.[135] KMT officials have stated that they would unfreeze defense funds and offer "unwavering support" for a larger defense budget as soon as the government provided an "effective spending plan."[136]

Taiwan has also taken new steps to continue improving military preparedness. The 2025 *Quadrennial Defense Review* articulated numerous steps for enhancing military readiness, including bolstering reserve forces, optimizing logistical support, and improving morale.[137] In March 2025, President Lai announced increases in allowances for military personnel designed to bolster the desire of young people to serve in the military.[138] After extending mandatory military service from four months to one year in 2024, Taiwan's military announced that the number of conscripts performing the full year of service would increase by 41 percent in 2025—albeit from a relatively small base of 6,956 to 9,839.[139] Taiwan's most recent military exercises have focused on preparing to respond to a sudden Chinese invasion. In March 2025, Taiwan held its first-ever "immediate combat readiness drills" designed to simulate Taiwan's response if China were to pivot quickly from gray zone pressure to an actual invasion.[140] In April 2025, Taiwan conducted the first phase of its annual Han Kuang military exercises, which consisted of 14 days of

*Taiwan's currency is the New Taiwan Dollar (NTD). The exchange rate used throughout this chapter is $1 = 30 NTD, unless stated otherwise.

computerized wargames, up from eight days in the previous year. As with the immediate combat response drills, this year's Han Kuang wargames simulated a scenario in which the PLA unexpectedly shifted from a military exercise into an actual attack on Taiwan.[141] The second phase of the Han Kuang exercises, held from July 9 to 18, involved ten days of live-fire drills—double the five days conducted in previous years. Designed to test the armed forces' "joint operation planning and execution" and "emergency response capabilities," the unscripted exercises integrated newly acquired weapons systems from the United States, including M1 Abrams tanks, High Mobility Artillery Rocket System (HIMARS) rocket launchers, and Harpoon anti-ship missiles.[142] Nevertheless, military analysts have argued that "deeply ingrained bureaucratic inertia" in Taiwan's military remains a significant impediment to improving readiness.[143]

New Measures to Build Whole-of-Society Resilience

In addition to efforts to deter a Chinese invasion by improving military capabilities, Taiwan has taken steps to improve societal resilience to combat China's gray zone pressure and malign influence activities.

Recent Efforts to Develop Resilience against China's Sabotage of Undersea Cables

In light of repeated incidents of undersea cable sabotage, Taiwan has taken numerous steps to enhance its digital resilience. For example, over the past two years, Taiwan's government and its largest telecommunications operator, Chunghwa Telecom, have invested in microwave bandwidth and satellite systems as backup sources of connectivity on Taiwan's outlying Matsu Islands, which have a history of cables being disrupted by Chinese vessels.[144] After a February 2023 outage, the islands were almost entirely without internet service for several weeks while waiting for the cables to be repaired.[145] When the two cables connecting Matsu were damaged again in January 2025, the newly installed microwave and satellite systems enabled most public services and businesses to continue functioning while the cables were repaired.[146]

Taiwan has also adopted several new measures to deter cable sabotage and further increase digital resilience. In 2024, the Ministry of Digital Affairs designated ten undersea cables as "critical infrastructure" and implemented increased security measures.[147] In January 2025, Taiwan drew up a blacklist of 52 Chinese-owned "shadow fleet" ships that it will proactively monitor in an effort to prevent future incidents of cable sabotage.[148] On June 12, 2025, a Taiwan court sentenced the Chinese captain of the Togo-registered *Hong Tai 58* ship—the vessel that severed an undersea cable linking Taiwan and Penghu in February 2025—to three years in prison for deliberately sabotaging the cable.[149] Taiwan legislators have also proposed further measures, including greater investments in low Earth orbit satellites that can provide internet service, adding redundancy to undersea cable systems, and empowering the coast guard to use drones and planes to monitor ships detected on an abnormal path near undersea cables.[150]

The Lai Administration's Proposed Measures to Counter Chinese Infiltration Have Encountered Criticisms for Government Overreach, but Most Have Public Support

The Lai Administration has proposed a raft of more stringent measures to counter Chinese infiltration and united front activities. On March 13, 2025, President Lai declared that China qualifies as an "external adversarial force" under Taiwan's Anti-Infiltration Act and proposed 17 new strategies for responding to the threat China poses to Taiwan's security.[151] These strategies included:

- Restoring the military tribunal system for active-duty military personnel accused of treason.[152]
- Requiring public disclosure and government approval of all trips to China by elected officials, imposing restrictions on Chinese individuals with ties to united front work coming to Taiwan, and ensuring that people-to-people exchanges are not subject to "Chinese political interference."[153]
- Requiring greater inspection of Taiwan citizens applying for identification documents in China.[154]
- Enhancing scrutiny of individuals from China applying for residency in Taiwan.[155]

Two days after President Lai introduced the 17 proposals for countering Chinese infiltration, KMT lawmakers accused the DPP of using "national security" as an excuse to impose "authoritarianism" and "quasi-martial law."[156]

Public opinion polls conducted by the National Chengchi University Election Study Center and the Taiwan Public Opinion Foundation show that while Taiwan's society is divided on labeling China an "external adversarial force," large majorities support measures to combat Chinese malign influence. According to polling conducted in April 2025, 49 percent of respondents agreed with President Lai's characterization of China as an adversary, compared with 43 percent who disagreed.[157] The same poll found that 65.3 percent supported the proposal to bring back military tribunals.[158] Another April 2025 poll showed that 73.7 percent believed "Chinese Communist infiltration of Taiwan has worsened in recent years," and 70.9 percent would favor requiring government approval for elected officials to travel to China.[159]

Taiwan's Economic Diversification Progresses with AI Boom

Despite China's harsh rhetoric and escalating pressure campaign, Taiwan's economy has outperformed those of most countries across various metrics over the past five years. The engine of its export-oriented economy is a highly developed technology manufacturing sector with unparalleled capacity in fabrication of advanced semiconductors. Thus, Taiwan has been a major beneficiary of the AI boom, as seen in the staggering revenue and valuation growth of national champion TSMC.* The accrued national wealth and influence from

*TSMC's market capitalization closed above $1 trillion for the first time in October 2024, and in doing so it joined the ranks of only nine other companies globally. As a percentage of Taiwan's total stock exchange, TSMC has risen from 15 percent in 2015 to 38 percent in 2024, with the second highest, Hon Hai (aka Foxconn), accounting for 3 percent. For comparison, the combined market capitalization of the "magnificent seven" (Apple, Microsoft, Nvidia, Alphabet, Amazon,

being an ever more important technology hub serve as a counterweight to pressure from China.

Taiwan's Overall Economic Picture Remains Strong with Continued Growth

Taiwan's economy remains relatively healthy and, barring an exogenous shock, is poised to continue recent trends of growth, expanding investment, and low inflation and unemployment through 2025. Overall growth has closely tracked global demand for ICT and electronics over the past five years. In 2024, real GDP grew 4.6 percent year-over-year to NTD 25.6 trillion ($795.6 billion) and according to official projections is set to grow 3.1 percent in 2025.[160] As of September 2025, unemployment has continued to tick downward to 3.5 percent, and inflation remained relatively low with the consumer price index (CPI) and producer price index (PPI) at 1.3 percent and -3.7 percent change year-over-year, respectively.[161]

Even though Taiwan maintains a vibrant and well-balanced domestic economy, trade with the rest of the world continues to be a significant driver of prosperity, especially the export of high-value manufactured goods. In 2024, the total value of exports equated to 63.3 percent of GDP, placing it well above the global average (29 percent) and far ahead of other East Asian economies with significant export sectors in their own right, such as South Korea (44 percent), Japan (21.9 percent), and China (20 percent).[162] Even on a net export basis, Taiwan relies heavily on global trade, accounting for 13.1 percent of GDP.[163] Consumption accounted for 60.2 percent of GDP by expenditure in 2024, and investment accounted for the remaining 26.7 percent.*[164]

Rapid Currency Moves Rattle the Financial Industry

Over a two-day period in May 2025, Taiwan's historically stable currency appreciated 8 percent against the dollar, presenting a potential drag on exports and raising concern about systemic risk from overexposure to dollar-denominated holdings.[165] Currency traders have bet that the appreciation of NTD relative to the dollar will continue because an overall global capital rotation away from U.S. assets observed in early 2025 boosted Asian currencies.[166] Also, traders suspect Taiwan's government may favor currency appreciation as a means to redress the trade imbalance with the United States.[167] However, there is a real downside risk from continued appreciation in the short term for Taiwan's economy. A stronger NTD would make Taiwan's exports more expensive, a dynamic that—if persistent—could impede economic performance in the latter half of 2025.[168] Taiwan's central bank maintains some of the largest foreign exchange reserves in the world ($593 billion), over 80 percent of which is held in U.S. Treasury bonds.[169] Perhaps most concerning, life insurers on the island hold over $700 billion in U.S. Treasuries,

Meta, and Tesla) made up 35 percent of the S&P 500 at the end of 2024. TSMC's total revenue in 2024 was $88.3 billion, equivalent to 11.1 percent of Taiwan's GDP. Derek Saul, "'Just the Beginning' for AI Demand Surge as Big Chip Stocks Gain $250 Billion," *Forbes*, October 17, 2024; "Taiwan Stock Exchange 2025 Fact Book," *Taiwan Stock Exchange Corporation*, 2024; "S&P 500 Market Cap (I:SP500MC)," *YCharts*.

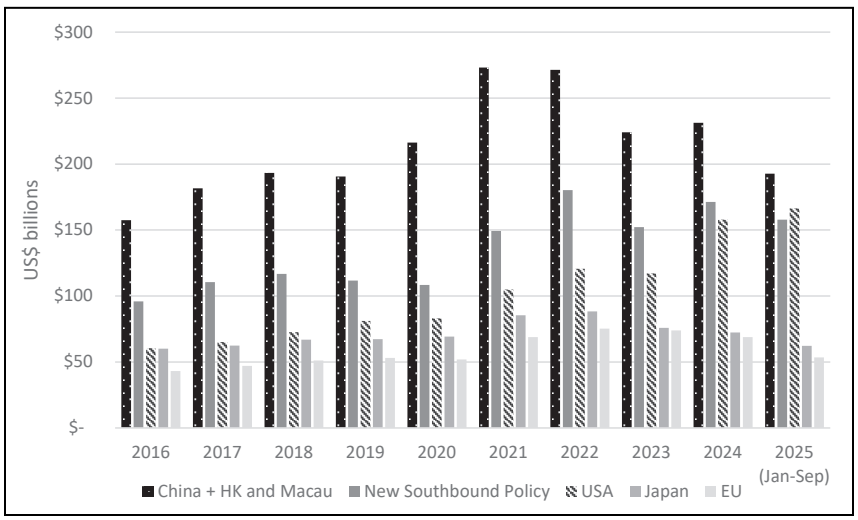
*Consumption includes that by both the private and public sectors. Private consumption's share of GDP was 46.9 percent, while public consumption accounted for 13.3 percent. Taiwan's Directorate General of Budget, Accounting and Statistics via Haver database.

leaving an industry valued at 1.5 times Taiwan's GDP open to large losses if there is a sustained drop in the dollar's value.[170]

Taiwan Continues to Diversify Its Trade and Investment Partners

While China remains Taiwan's largest trade partner, cross-Strait trade and investment trends appear to have peaked as Taiwan diversifies to reduce dependence on China. China grew to become Taiwan's top trading and investment partner soon after cross-Strait commerce was reestablished in 2001, given proximity, complementary industries, and business and family relations that span the Strait.[171] Trade with China (including Hong Kong) as a percentage of Taiwan's total hit a high-water mark in 2020 at 34.3 percent of total trade turnover, regressing to 26.6 percent in 2024.[172] In absolute terms, total trade with China grew 3.1 percent year-over-year to $231 billion in 2024 but is still 15.4 percent below the 2021 high of $273 billion (see Figure 2).[173]

Figure 2: Taiwan's Total Trade with Top Trading Partners, 2016–September 2025

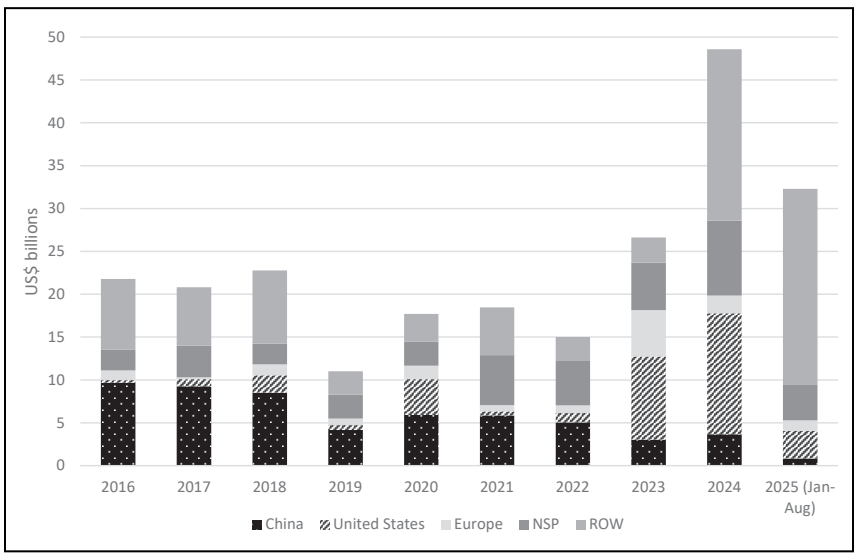


Source: Taiwan's Ministry of Economic Affairs, International Trade Administration, *Trade Statistics*.
Note: The New Southbound Policy countries are Australia, Bangladesh, Bhutan, Brunei, Burma (Myanmar), Cambodia, India, Indonesia, Laos, Malaysia, Nepal, New Zealand, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, and Vietnam.

Taiwan's trade with the United States has grown significantly over the past five years despite a slight reduction in 2023, driven by high demand for consumer electronics and advanced semiconductors. Total two-way trade rose from $83.1 billion in 2020 to $158.1 billion in 2024, an over 90 percent increase.[174] The United States overtook China in 2024 as the top market for Taiwan's exports—the first time this has occurred in over 20 years.[175] Last year, Taiwan's exports to the United States surged 46.2 percent year-over-year, growing from $76.2 billion in 2023 to $111.4 billion in 2024, in large part due to U.S. demand for advanced AI chips from TSMC.[176]

On the investment side, as Taiwan's FDI has expanded globally, China's portion of new FDI has been reduced dramatically (see Figure 3). Taiwan's FDI expansion is largely attributable to TSMC, which has registered tremendous growth and is now by far one of the most important firms to both Taiwan's economy and global technology supply chains.[177] TSMC has announced planned investments to build production facilities in the United States, Japan, Germany, and across Southeast Asia. (For more on Taiwan's investments in the United States, see "United States Expands Defense and Economic Cooperation with Taiwan" later in this chapter.) Further, the Lai Administration has adopted and expanded upon the New Southbound Policy (NSP), a cornerstone program of his predecessor's foreign policy initiated in 2016.[178] The NSP seeks to build economic, cultural, and people-to-people ties with 18 countries in the Indo-Pacific region. Taiwan's companies are increasingly looking to increase investment in NSP countries like India and Vietnam as they dial back investment in China.[179]

Figure 3: Taiwan's Approved Outbound Investment by Region, 2016–August 2025



Source: Taiwan's Ministry of Economic Affairs.
Note: NSP stands for New Southbound Policy; ROW stands for rest of world.

Though shifts in Taiwan's trade and investment patterns have become more discernable in the data, Taiwan remains heavily intertwined economically with China. Taiwan-headquartered firms like Foxconn, Acer, and others have sizable fixed capital stock in China after years of investment. This, combined with the vast network of suppliers and business relationships built upon shared language and cultural ties, means China will continue to have a magnetic pull for Taiwan's companies beyond even the forces inhibiting the drawdown of other multinational companies with substantial operations in China.[180]

United States Expands Defense and Economic Cooperation with Taiwan

The United States Continues to Support Taiwan's Self-Defense Capabilities while Working to Build International Support for Taiwan

The United States maintained its support for the development of Taiwan's defense capabilities in 2025 despite brief interruptions to funding streams. In February, the Trump Administration temporarily suspended all foreign assistance for review but ultimately exempted $870 million in security assistance for Taiwan.[181] The United States has continued to carry out defense sales and deliveries to Taiwan, including the finalization of the sale of three National Advanced Surface-to-Air Missile Systems (NASAMS) in February 2025.[182] U.S. officials have indicated that the Trump Administration will continue increasing weapons sales to Taiwan and that U.S. arms sales to Taiwan will likely exceed the $18.3 billion approved during the first Trump Administration.[183] Taiwan's military reportedly planned to increase procurement of U.S.-made Switchblade 300 and Altius-600M drone systems while also developing four types of its own indigenous drones, aligning with the United States' strategy to prepare unmanned aerial and amphibious vehicles as a defense mechanism in the Taiwan Strait.[184]

The large backlog of arms Taiwan has purchased from the United States continues to be a significant issue, however. As of September 2025, Taiwan has paid $21.54 billion for U.S. weapons systems that have not yet been delivered, some ordered as far back as 2021.[185] While traditional systems such as F-16s and M1 Abrams tanks account for more than half of the value of the backlog, asymmetric capabilities—including Harpoon coastal defense systems and HIMARS rocket launchers—account for nearly 39 percent.[186] This backlog in weapons delivery is due to a number of factors. Limited production capacity and increased global demand for F-16s, Stinger missiles, and other exports partially account for the backlog.[187] The addition of new proposed defense procurements from Taiwan's Ministry of Defense as part of bilateral trade negotiations, along with the Trump Administration's goal of increasing sales, will likely further add to the overall backlog unless efforts are made to speed production timelines or prioritize Taiwan's needs over those of other regions.[188] In July 2025, the Senate Appropriations Committee approved a defense spending bill that would allow the Trump Administration to provide $1 billion in military aid to Taiwan by using Presidential Drawdown Authority to transfer arms from existing stockpiles, bypassing the slower Foreign Military Sales (FMS) program.[189]

The United States has also continued to collaborate with Taiwan to bolster its defense readiness and integrate whole-of-society resilience into its defense architecture.[190]

- In July 2024 and February 2025, the United States sponsored exchanges between Taiwan and numerous countries to discuss best practices for bolstering whole-of-society resilience, including lessons learned from the Ukraine War.[191]

- In accordance with the Taiwan Enhanced Resilience Act, which directed the U.S. Department of Defense to create training programs to improve Taiwan's defenses, there were over 500 U.S. military personnel in Taiwan conducting training as of May 2025.[192]
- The United States has also collaborated with Taiwan to develop tabletop exercises and live drills to identify gaps in its defense readiness, including playing an advisory role in the development of Taiwan's July 2025 Han Kuang 41 military exercise.[193]

The United States Continues to Enhance Its Capacity to Deter a Potential Chinese Military Action against Taiwan

The United States has also taken steps to enhance its own capacity to deter China from using force or coercion to unilaterally change the status quo in the Taiwan Strait as required by the Taiwan Relations Act.[194] An internal guidance memo signed by U.S. Secretary of Defense Pete Hegseth in March 2025 called for the U.S. military to make deterring a potential Chinese invasion of Taiwan a top priority.[195] The United States has continued to modernize its own capabilities in the Indo-Pacific, conduct freedom of navigation operations (FONOPs), and expand military exercises with Indo-Pacific allies and partners.

- The U.S. Department of Defense continues to advance its Replicator Initiative, launched in 2023, which aims to work closely with the commercial autonomy sector to rapidly procure "large masses of uncrewed systems" to deter a Chinese invasion of Taiwan by—in the words of the Commander of the U.S. Indo-Pacific Command, Admiral Paparo—demonstrating the capability to "turn the Taiwan Strait into an unmanned hellscape."[196] In September 2024, the Department of Defense launched a second phase of the Replicator Initiative aimed at fast-tracking the development of counter-drone capabilities.[197]
- The U.S. Pacific Fleet routinely conducts maritime air patrols and naval FONOPs in contested airspace and waters between China and Taiwan, asserting the right to access those regions under international law.[198] In the summer of 2025, the U.S. Navy deployed multiple aircraft carriers in the Indo-Pacific region as a response to China's deployment of the *Liaoning* and *Shandong* aircraft carriers into the Pacific's First Island Chain, which comprises Taiwan, Japan, and the Philippines.[199]
- The United States maintains regional military installations to enable rapid response capabilities and pre-position weapons and other supplies that could be deployed rapidly in a Taiwan contingency.[200]
- The United States has also expanded joint exercises with regional allies and partners focused on responding to a military contingency in the Taiwan Strait. From July 10 to August 8, 2025, the U.S. Pacific Air Forces, along with multinational and joint partners, conducted Resolute Force Pacific (REFORPAC

2025), the Air Force's largest military exercise to date aimed at responding to a military contingency in the Pacific.[201] From July 13 to August 4, 2025, the United States and Australia held the largest-ever version of their biennial Talisman Sabre military exercises, which involved more than 40,000 personnel from 19 nations and included large-scale amphibious operations with forces from the United States, Australia, France, Japan, and Korea.[202]

U.S. Department of State Changed Official Language Relating to Taiwan

In February 2025, the U.S. Department of State changed its U.S.-Taiwan Relations Factsheet to remove the statement that the United States "does not support Taiwan independence," but it retained language that the United States "oppose[s] unilateral changes to the status quo from either side."[203] In an official statement, Taiwan's Foreign Minister Lin Chia-lung "welcomed the support and positive stance" represented by the change in language.[204] China's Ministry of Foreign Affairs, on the other hand, urged the United States to "correct its mistakes" and abide by the "One China principle."[205] This attempt to change language on the U.S.-Taiwan factsheet was not unprecedented. In May 2022, the State Department similarly removed the phrase "does not support Taiwan independence."[206] However, just a few weeks later, the Department reinstated the language after diplomatic complaints and pressure from China.[207] As of June 2025, the State Department has removed the entire Taiwan factsheet from its website—along with virtually all other factsheets—for content review. However, the language on the "U.S.-Taiwan Relations" fact page on the American Institute in Taiwan's website continues to omit the statement on Taiwan independence, reflecting this change.[208]

The United States has also coordinated increased support for Taiwan through official G7 statements. In March 2025, the G7 Foreign Ministers released a statement that "emphasized the importance of maintaining peace and stability across the Taiwan Strait," "encouraged the peaceful resolution of cross-strait issues," and explicitly stated "opposition to any unilateral attempts to change the status quo by force or coercion."[209] This statement drew media attention for its omission of language reaffirming "One China" policies, such as the November 2024 statement that promised "no change in the basic position of the G7 members on Taiwan, including stated One-China policies."[210]

U.S. Lawmakers and Officials Show Continuity in Support for Taiwan

Despite Beijing's escalating pressure campaign, U.S. lawmakers and officials continued to meet with Taiwan's government to discuss measures to strengthen economic and security ties. In April 2025, Senators Pete Ricketts, Ted Budd, and Chris Coons met with President Lai to underscore "the United States' commitment to its partnership with Taiwan" and reaffirm "our shared commitment to strengthening a Free and Open Indo-Pacific."[211] The following month, a House delegation and Senator Tammy Duckworth sepa-

rately visited Taiwan and met with President Lai to discuss critical areas of bilateral cooperation.[212] In July 2025, a bipartisan U.S. congressional delegation led by Chairman of the House Committee on Financial Services French Hill met with Taiwan's Ambassador to Paraguay José Han to discuss shared economic interests.[213] Members of Congress have also introduced various pieces of legislation to support Taiwan, including bills to assist Taiwan's Latin American and Caribbean diplomatic partners and require the Department of Defense "to establish a formal partnership with Taiwan to enhance joint defense industrial capabilities and counter the rapidly growing threat of Chinese military tech."[214] At the end of August, U.S. Acting Assistant Secretary of Defense for the Indo-Pacific Jed Royal and Taiwan's Senior Advisor to the President at the National Security Council Hsu Szu-chien met in Alaska to discuss security concerns—a meeting that had originally been scheduled to be held at the ministerial level in Washington in June.[215] These high-level meetings and policy proposals signaled enduring bipartisan support for a strong U.S.-Taiwan relationship.[216]

The New Pope Balances Relations with Taiwan and China

The absence of Taiwan's President Lai Ching-te from Pope Leo XIV's inauguration in May 2025 called renewed attention to the delicate balancing act the Vatican maintains to preserve official diplomatic relations with Taiwan and continued access to the 12 million Catholics living in China.[217] Over the past several decades, Beijing has intensified its pressure on the Vatican to weaken or fully cut diplomatic ties with Taiwan.[218] Although Taiwan's government lobbied for President Lai to attend Pope Leo XIV's inauguration in May 2025, the Vatican instead invited Taiwan's former Vice President Chen Chien-jen, who had attended Pope Francis's funeral earlier in the year.[219] Beijing has also long pressured the Vatican to avoid criticizing China's violations of religious freedom and to allow the CCP to control its domestic Catholic population's leadership and religious practices.[220] In 2018, the Vatican and China reached an agreement, most recently renewed in October 2024, in which the Vatican granted Beijing a role in the appointment of bishops in China and agreed to accept bishops previously appointed by Beijing without the pope's consent.[221] Pope Leo XIV used his first public address as Pope to call for the unity of the Chinese Catholic Church and made his first appointment of a Chinese bishop in consultation with Chinese authorities.[222] Based on these early actions, it is likely that Beijing will continue to pressure the Vatican to cut ties with Taiwan as part of its larger strategy for isolating Taiwan on the world stage. (For more on the Papacy, Taiwan, and China, see Chapter 2, "U.S.-China Security and Foreign Affairs (Year in Review).")

Taiwan's Indispensable Position in Semiconductor Supply Chains

Taiwan continues to be the single most important producer of semiconductors and is instrumental in ensuring continued access to non-Chinese supply chains for both leading-edge and foundational semiconductors.

U.S.-Taiwan Cooperation in Leading-Edge Semiconductor Production Accelerates

Taiwan has maintained the largest share of fabrication capacity of leading-edge semiconductors used in state-of-the-art technology such as iPhones and processors to train AI models. As of 2022, the only manufacturing facilities capable of producing sub-10 nanometer (nm) chips were in Taiwan and South Korea, with 69 percent and 31 percent of fabrication capacity, respectively.[223] Much of the push to diversify and onshore manufacturing in the United States has focused on leading-edge logic chips, with industry estimates showing that 70 percent of all capital expenditure by the semiconductor industry globally from 2024 to 2032 will go toward building advanced node facilities.[224] This is despite the fact that, as of 2023, only 4 percent of global production was for cutting-edge chips below 5 nm, while 69 percent was for foundational chips* 28 nm and above.[225] According to projections by Boston Consulting Group, by 2032, Taiwan and South Korea's shared production capacity for leading-edge semiconductors will drop to 56 percent, while 28 percent will be fabricated in the United States and 2 percent in China.[226]

Investment by Taiwan's leading semiconductor firms is central to U.S. efforts to reshore leading-edge chip production. In early 2025, TSMC announced an additional $100 billion investment in semiconductor manufacturing facilities in Arizona on top of $65 billion in existing commitments made since May 2020.[227] Already the largest foreign greenfield investment in U.S. history, the initial planned investment would construct three new fabrication facilities outside Phoenix that would produce advanced chips below 4 nm node. With the additional investment, TSMC plans to build three more fabs, two advanced packaging facilities, and a major research and development (R&D) center to vertically integrate production at the industrial cluster.[228] Production of 4 nm logic chips at the first facility began in late 2024.[229] Once production starts in the second facility in 2028 and the third before 2030, TSMC expects to manufacture 30 percent of its most advanced chips in the United States.[230] In a reversal of previous policy, in January 2025, Taiwan's Ministry of Economic Affairs lifted restrictions on investing in state-of-the-art chip production in the United States, clearing the path for production of cutting-edge 2 nm and A16† technology at the Phoenix fabs.[231]

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*Often referred to as "legacy" or "mature node" chips, these are older generations of semiconductors with higher node size (currently considered above 28 nm). However, the term "legacy" is misleading, given that older generation chips are continuously applied in novel ways and are key inputs in a vast number of products.

†A16 is TSMC's next iteration below 2 nm node, which uses new power delivery methods to increase speed and efficiency. Production is expected to begin in late 2026 with the first customers likely to be AI chip companies rather than smartphone makers. "A16 Technology," *Taiwan Semiconductor Manufacturing Company*; Stephen Nellis, "TSMC Says 'A16' Chipmaking Tech to Arrive in 2026, Setting Up Showdown with Intel," *Reuters*, April 24, 2024.

Previously, Taiwan's government had restricted overseas factories to production of semiconductors two generations behind the state of the art in Taiwan.[232]

Early indicators from operations at the first fab have been positive despite a number of ongoing concerns about achieving cost-effective production. In October 2024, the president of TSMC's U.S. division announced that early production yields were 4 percent higher than in comparable fabs in Taiwan.[233] This indicator of "success rate" is determinant in chip companies' calculations about their ability to recoup upfront fixed capital investment.[234] However, the cost of production may be elevated by supply chain gaps and labor costs that are higher than those in Taiwan. In January, TSMC CEO and Chairman C.C. Wei said construction at the Arizona sites faced delays from state and local regulation, a shortage of construction labor, and difficulty finding a skilled workforce.[235] Key factors in the long-term viability of semiconductor production in the United States will be establishing an ecosystem of suppliers and ancillary companies as well as training and developing a skilled workforce of engineers and technicians to staff these complex manufacturing facilities.

Taiwan's Role in Preventing Chinese Dominance of Foundational Chips

While much of the policy discussion has focused on cutting-edge chips in recent years, much of the demand is still for less sophisticated foundational chips that enable functions in a wide variety of products. For example, foundational chips account for 95 percent of semiconductors used by the U.S. auto industry. While advanced chips are imperative to maintaining an edge in state-of-the-art defense applications like high-performance computing, foundational chips make up 99.5 percent of semiconductors the U.S. Department of Defense uses in mission-critical systems.[236]

China's rapid buildup of its foundational chip production capacity is already threatening revenue streams of Taiwan's semiconductor firms. Taiwan maintained 40 percent of the global production capacity for mature node logic chips in 2022 as well as 20 percent of dynamic random-access memory (DRAM) chips.[237] However, Chinese competitors have begun to undercut foreign foundries on price in these lower-margin product segments due to massive and sustained government subsidies. (For more on how China seeks to establish control over foundational semiconductors, see Chapter 9, "Supply Chain Leverage.") While the Boston Consulting Group projects China's global market share of foundational chip production capacity above the 28 nm node size will reach 37 percent by 2032, other estimates project it will capture nearly 50 percent by 2030, potentially surpassing Taiwan's production as early as 2027.[238] According to the Research Institute for Democracy, Society, and Emerging Technology (DSET), a think tank in Taiwan, aggressive price suppression made possible by large government subsidies has already enabled China to capture 80 percent of the market share of foundational semiconductors used in solar panels, 56 percent in mobile phones, 73 percent in electric vehicles, and 66 percent in display panels.[239] In response,

many of Taiwan's firms have elected to pivot away from foundational chips or focus on niche specializations, reducing viable avenues for non-Chinese supply chains.[240]

Taiwan Further Aligns Export Controls with the United States

Given the threat from China, Taiwan has taken steps to tighten export controls to prevent transfer of dual-use technology items. Though not a member of multilateral export control regimes, Taiwan's Ministry of Economic Affairs maintains an export control list of Strategic High-Tech Commodities (SHTC) in line with guidelines of the Australia Group, Missile Technology Control Regime, Nuclear Suppliers Group, and Wassenaar Arrangement.[241] On June 15, 2025, Taiwan added Huawei and Semiconductor Manufacturing International Corporation (SMIC) to the SHTC Entity List, requiring companies to obtain an export permit to sell to these companies.[242] In September 2025, Taiwan subjected semiconductor shipments to South Africa to pre-approval requirements in response to South Africa's capitulation to Chinese pressure to move Taiwan's representative office from the capital city of Pretoria to Johannesburg—the first time Taiwan has used export controls on semiconductors to push back against Chinese coercion.[243]

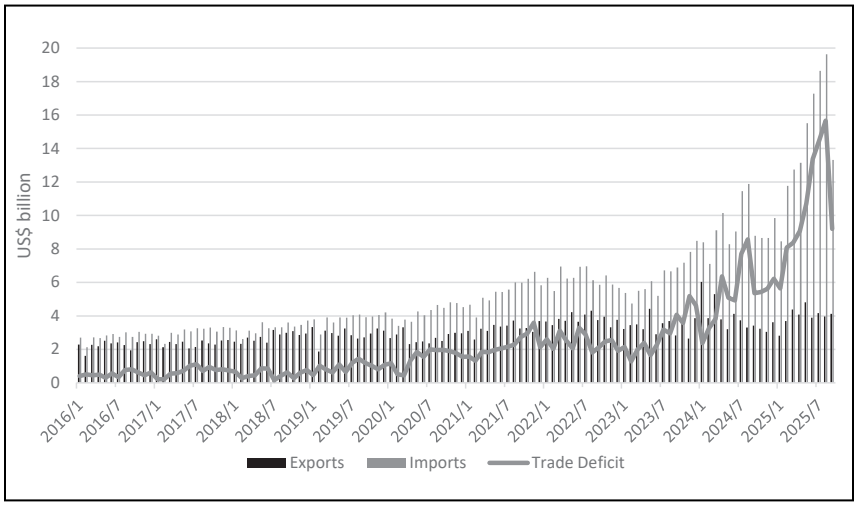
Trade and Investment with the United States Hit Record Levels

Taiwan's commercial ties with the United States expanded substantially in 2024 on the back of technology-driven trade and investment and the strong performance of both economies. Taiwan's exports to the United States have continued to surge in 2025 as companies front-loaded orders to avoid potential tariffs in the second half of the year. In March, TSMC announced $100 billion in additional investment in Arizona, the largest-ever single outlay by a foreign company in the United States.[244]

U.S.-Taiwan Trade and Investment Continues to Climb

Taiwan climbed three spots to become the tenth-largest overall trading partner of the United States in 2024 and the seventh-largest goods trade partner behind South Korea and ahead of Vietnam.[245] The United States imported $116.3 billion worth of goods from Taiwan in 2024 and exported $42.3 billion, leaving a goods trade deficit of $73.9 billion.[246] By value, the top imports from Taiwan in 2024 were machinery and mechanical appliances (80 percent of which were computers) and electrical equipment (mainly integrated circuits), while top U.S. exports to Taiwan were mineral products (natural gas), machinery and mechanical appliances (jet engines and semiconductor manufacturing equipment), and agricultural products.[247] The goods trade deficit has grown more than threefold since before the pandemic in 2019, when the merchandise trade deficit was $22.5 billion.[248] U.S. services exports to Taiwan in 2024 totaled $13.4 billion, while services imports were nearly equivalent at $13.2 billion.[249]

Figure 4: U.S. Bilateral Goods Trade with Taiwan (Monthly), 2016–September 2025



Source: Taiwan Ministry of Finance, Customs Administration.

According to the U.S. Department of Commerce's Bureau of Economic Analysis, U.S. FDI stock in Taiwan was estimated to be $21.0 billion in 2024, while Taiwan's FDI stock in the United States was $14.8 billion.*[250] Taiwan's Ministry of Economic Affairs reported record-breaking approved outbound investment to the United States of $9.7 billion in 2023, followed by $14.1 billion in 2024.[251]

Taiwan's Rebalanced Energy Mix Favors Natural Gas; Vulnerability to Import Disruption Continues

Taiwan is almost entirely reliant on imported energy, a point of concern both because of recent instances of strained power grids that support manufacturing and because of concerns over a potential future blockade or invasion scenario. Taiwan has set the goal of generating 50 percent of its energy from natural gas by 2030 and is in the process of building liquified natural gas (LNG) terminals, storage facilities, and pipelines necessary to increase from 42 percent in 2024.[252] Taiwan expects to meet the other half of its energy needs in 2030 from coal (20 percent) and renewables (30 percent).[253] In May 2025, Taiwan shut down its last nuclear power plant.[254] Nuclear energy has been a point of contention on the island for years, with concerns over potential earthquake-related accidents (especially after the 2010 Fukushima disaster in Japan) outweighing nuclear's value as a domestic power supply that can mitigate risk of disruptions to imports.[255] A referendum held in August 2025 that posed the question of whether the last shuttered plant should be restarted failed to meet the threshold of eligible voters required for passage.[256]

*The Bureau of Economic Analysis figure for Taiwan's direct investment stock in the United States does not include investment routed through Hong Kong or offshore tax havens. Karen M. Sutter, "U.S.-Taiwan Trade and Economic Relations," *Congressional Research Service* (Report No. IF10256), August 18, 2025.

On March 20, 2025, Taiwan's government-owned oil company, CPC Corporation, signed a letter of intent to invest in a proposed Alaska LNG pipeline that would supply six million tons of LNG annually.[257] Taiwan imported 20 million tons of LNG in 2023 with leading suppliers Australia (40.2 percent), Qatar (27.9 percent), and the United States (9.8 percent).[258] The increased reliance on natural gas does not address the island's vulnerability to a blockade scenario, given that it only has storage capacity to hold 20 days' worth of stockpiles.[259] As Taiwan moves to phase out coal-fired power plants, it is reportedly increasing coal stockpiles and is exploring the viability of keeping decommissioned plants ready to be turned back on in a crisis.[260] Coal stockpiles in early 2025 were estimated to last 42 days at regular consumption, which could be extended dependent on rationing.[261]

Trade Negotiations Are Underway to Reduce the Trade Imbalance

As part of the April 2, 2025, "Liberation Day" rates, the Trump Administration announced a 32 percent reciprocal tariff rate on Taiwan, which was subsequently lowered to 20 percent in August.[262] Semiconductors and other electronic goods that comprise 64 percent of Taiwan's total exports to the United States were temporarily exempted from all tariffs.[263] However, these products may be subject to tariffs that result from the ongoing Section 232 trade investigation.[264] Taiwan's average most-favored-nation-applied tariff rate was 6.5 percent in 2023, and U.S. concerns persist around market access barriers in agriculture, digital services, biotechnology, medical devices, and energy.[265]

Taiwan has been proactive in trade negotiations with the United States since the April 2 reciprocal tariff announcement. President Lai was quick to proclaim his Administration's intention to reduce the trade imbalance with the United States through increasing purchases of U.S. energy, agriculture products, and defense articles; reducing non-tariff trade barriers; and seeking further opportunities for investment by Taiwan companies in the United States.[266] Like other economies with high proposed reciprocal tariff rates, exports from Taiwan to the United States hit a record level in May ($15.5 billion), up a staggering 90 percent year-over-year as companies frontloaded orders to avoid potential future tariff hikes (see Figure 4).[267]

In recent years, the United States and Taiwan have pursued closer trade and investment ties through a number of initiatives to reduce tariff and non-tariff barriers and that could lay the groundwork for a free trade agreement (FTA). In 2022, the United States and Taiwan began negotiations on the U.S.-Taiwan Initiative on 21st Century Trade, a bilateral agreement meant to mirror the Indo-Pacific Economic Framework for Prosperity (IPEF) negotiations, which did not include Taiwan. In December 2024, the first agreement under the Initiative went into effect, covering issues pertaining to anti-corruption, regulatory practices, and small and medium-sized enterprises.[268] In June 2025, U.S. Trade Representative Jamieson Greer assessed that Taiwan had implemented the agreed-upon provisions and was thus far in full compliance with the agreement.[269] The

United States and Taiwan have also engaged in negotiations for a second agreement focused on agriculture, environment, labor, and dispute settlement issues; it is not clear whether these negotiations will continue or be subsumed into the "reciprocal trade" negotiations.[270]

Congress passed legislation approving the first agreement under the U.S.-Taiwan Initiative on 21st Century Trade in August 2023.[271] The law also requires various transparency measures for negotiations over a further agreement with Taiwan and requires congressional approval (via enacted legislation) before any further agreement may go into effect.[272] It is unclear if this law applies to the "reciprocal trade" negotiations.

Legislation Pending to Resolve Double Taxation Issue

The lack of formal diplomatic relations precludes the United States from entering into an income tax treaty with Taiwan similar to those it maintains with many countries.[273] As a result, business activity between the United States and Taiwan is subject to a more complicated tax situation, sometimes including double taxation. Companies in both jurisdictions advocate for a tax agreement similar to other U.S. tax treaties to alleviate this added burden, stating that such an agreement would spur further two-way investment.*[274]

In January 2025, the U.S. House of Representatives passed H.R. 33 by a 423-1 vote, which takes a two-pronged approach to settling the issue by including two previously proposed pieces of legislation. First, the U.S.-Taiwan Expedited Double-Tax Relief Act would amend the Internal Revenue Code of 1986 to include new rules on taxation of certain Taiwan residents with income in the United States.[275] Amendments to the U.S. tax code would reflect treaty-like benefits the United States extends to other jurisdictions, with provisions such as reductions in withholding taxes, application of permanent establishment rules, and rules for determining eligibility for Taiwan businesses and persons.[276] Enactment is contingent upon reciprocity from Taiwan for U.S. businesses and persons. Also included was the U.S.-Taiwan Tax Agreement Authorization Act, which would empower the president to negotiate a tax agreement with Taiwan pending Senate approval.[277] Such a tax agreement would need to be in line with standard bilateral tax agreements and follow provisions in the U.S. Model Tax Treaty.[278] The accompanying Senate bill (S. 199) has been introduced by leadership of the Senate Foreign Relations Committee and the Senate Finance Committee.[279]

*As flows of FDI from Taiwan to the United States have increased over the past year, so too have those from Taiwan to Caribbean tax havens. According to official data from Taiwan's government, FDI to the British Virgin Islands shot up 2,283 percent from $344 million in 2023 to $8.2 billion in 2024. So far in 2025, another $10.3 billion has been recorded. Taiwan's Ministry of Economic Affairs, 雙邊投資統計 [Bilateral Investment Statistics].

Implications for the United States

Taiwan remains the most significant potential flashpoint for military conflict between the United States and China. Beijing is continuing to rapidly modernize its military capabilities with the goal of being able to take Taiwan by force if necessary. The PLA's around-the-clock military activities near Taiwan—along with its introduction of new platforms designed to support an amphibious attack—have enhanced China's ability to launch a blockade or invasion of Taiwan with almost no advance warning. Moreover, the widening divergence between China's international and domestic propaganda is concerning. While Beijing's English-language rhetoric aimed at global audiences continues to downplay the possibility of an invasion, Chinese-language propaganda circulated domestically has suggested that Taiwan's "provocations" could justify military action in the near future. While there is no indication that China is planning an imminent attack, the United States and its allies and partners can no longer assume that a Taiwan contingency is a distant possibility for which they would have ample time to prepare. **The United States must enhance its own military capabilities in the Indo-Pacific to ensure continued compliance with the Taiwan Relations Act, which requires the United States to "maintain the capacity" to "resist any resort to force or other forms of coercion" that would jeopardize the security of Taiwan.**

In addition to enhancing its military capabilities, Beijing is operating a well-resourced and sophisticated pressure campaign aimed at exacerbating Taiwan's domestic divisions and sowing doubt in Taiwan about the United States' commitment to its defense and prosperity. The ultimate goal of Beijing's pressure campaign is to convince Taiwan to surrender without a fight—both by eroding the Taiwan people's will to resist and by convincing them that the United States is unlikely to come to their defense in the event of a war. **In order to reinforce deterrence and neutralize the effectiveness of China's propaganda and gray zone pressure tactics, the United States and Taiwan will need to continue deepening cooperation on issues like military procurement, building secure defense industrial supply chains, bolstering digital infrastructure, and enhancing civilian resilience.**

Securing Taiwan's undersea cables against Chinese sabotage should be an especially high priority for collaboration between Taiwan, the United States, and other like-minded partners in the Indo-Pacific. If China successfully severed the undersea cables serving Taiwan, it could have devastating consequences, paralyzing government and military communications and costing Taiwan's economy an estimated $55.6 million per day.[280] **In order to guard against Chinese vessels sabotaging undersea cables near Taiwan as a gray zone pressure tactic and potential tool of war, the United States and like-minded countries should work with Taiwan to improve the resiliency of its undersea cables, build the capacity to quickly repair damaged cables, and increase access to backup sources of connectivity such as low Earth orbit satellites.**

Taiwan continues to play a central role in advanced semiconductor manufacturing and global technology supply chains, making it a key partner in ensuring China does not gain a dominant technological advantage in AI and advanced computing. **Taiwan's companies are also instrumental in foundational semiconductor production and will remain important to U.S. efforts to ensure China does not come to dominate production of lower-end chips that have wide-ranging applications.**

China is racing forward with its efforts to develop the capacity to take Taiwan by force or through coercion. A war over Taiwan would be cataclysmic for the global community. Taiwan's role in the advanced technology ecosystem and the abrupt severing of broader trade and supply chains in a conflict would cause severe economic harm—wiping out as much as 10 percent of global GDP—with ramifications on par with the 2008 Global Financial Crisis. A conflict would also trigger an acute risk of nuclear escalation and raise the threat of Chinese geographic expansion in the Indo-Pacific. **The United States, Taiwan, and the global community must make it a priority to ensure continuing effective deterrence against Chinese aggression.**

Recommendations

The Commission recommends:

- Congress direct the U.S. Department of Defense, in coordination with the U.S. Indo-Pacific Command (USINDOPACOM), to produce a report in both classified and unclassified form assessing its compliance with the legal requirement established by Congress in the Taiwan Relations Act "to maintain the capacity of the United States to resist any resort to force or other forms of coercion that would jeopardize the security, or the social or economic system, of the people on Taiwan." The report should include:
  - An assessment of U.S. capacity to respond to a Taiwan contingency;
  - An assessment of U.S. capacity to respond to other forms of coercion being used by China to threaten the security of Taiwan (e.g., China's gray zone tactics in and around Taiwan); and
  - An assessment of U.S. capacity to comply with the Taiwan Relations Act in scenarios where the United States is also engaged in responding to aggression by Russia, Iran, or North Korea in other regions.

  In each case, the report should identify any gaps that currently exist or will exist based on likely trajectories of resources and capabilities.
- Congress direct the U.S. Department of State to work with Taiwan to open a Foreign Military Sales (FMS) case for non-weaponry support services to advance regional U.S. posture initiatives that would enhance the U.S. deterrence capacity around Taiwan.

  - The case should specifically bolster existing U.S. initiatives, such as the U.S.-Philippines Enhanced Defense Cooperation Arrangements (EDCA) on the Luzon and Palawan Islands as well as efforts in the southwestern Japanese island chain and on the Pacific Islands that recognize Taiwan.
  - Under this program, Taiwan would fund projects in third countries, ultimately benefiting its own security.
- Congress pass legislation affirming strong, bipartisan support for the Vatican-Taiwan diplomatic relationship. The legislation should:
  - Recognize that the Vatican is one of Taiwan's most significant diplomatic partners, providing essential international legitimacy and support to the people of Taiwan;
  - Express opposition to Chinese government pressure on the Holy See to sever ties with Taipei;
  - Endorse the establishment of a trilateral mechanism with Taiwan and the Vatican to advance religious freedom and human rights globally; and
  - Encourage Members of Congress to underscore U.S. support for the Vatican-Taiwan diplomatic relationship in all engagements with Vatican officials.

Appendix I: U.S. Military Sales to Taiwan, October 2024–October 2025

Date of State Department Approval*	Content of Purchase	Value
October 25, 2024[281]	National Advanced Surface-to-Air Missile System and related equipment	$1.16 billion
October 25, 2024[282]	AN/TPS-77 and AN/TPS-78 Radar Turnkey Systems and related equipment	$828 million
November 29, 2024[283]	Spare Parts and Support for F-16 Aircraft and Active Electronically Scanned Array Radars and related equipment	$320 million
November 29, 2024[284]	Improved Mobile Subscriber Equipment Follow-On Support and related equipment	$65 million
December 20, 2024[285]	Command, Control, Communications, and Computers Modernization and related equipment	$265 million
December 20, 2024[286]	MK 75 76 mm Gun Mounts and related equipment	$30 million

*According to the U.S. Defense Security Cooperation Agency, the FMS program is a form of security assistance authorized by the Arms Export Control Act (AECA), as amended by 22 U.S.C. 2751, et. seq., and a fundamental tool of U.S. foreign policy. Under Section 3 of the AECA, the United States may sell defense articles and services to foreign governments and international organizations when the president formally finds that to do so will strengthen the security of the United States and promote world peace. Under the FMS program, the U.S. government and a foreign government enter into a government-to-government agreement called a Letter of Offer and Acceptance. The Secretary of State determines which governments will have programs. The Secretary of Defense executes the program. Defense Security Cooperation Agency, *Foreign Military Sales (FMS)*.

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CHAPTER 12: HONG KONG

Executive Summary

Beijing has dissolved the final vestiges of Hong Kong's political freedom, eliminating the last opposition party and expanding on the draconian Article 23 Ordinance to tighten its oversight of Hong Kong's legal system under an expansive definition of "national security." Civil society and free speech have followed similar fates, as authorities have largely succeeded in intimidating Hong Kong's citizens to discourage them from engaging in open opposition. The government has increased vigilance against so-called "soft resistance" at home while offering bounties on dissidents abroad. Nonetheless, attempts to assuage foreign businesses operating in Hong Kong appear initially successful, even as it is clear Beijing sees Hong Kong primarily as an extension of the Mainland's development objectives. Although Hong Kong officials maintain a pretense of independence in order to court international investment, the expansion of "national security" into all domains and pressure on private firms to operate in line with Beijing's political objectives make Hong Kong's system increasingly indistinguishable from the Mainland.

Key Findings

- As the Hong Kong government marked the fifth anniversary of the National Security Law, its ongoing crackdown has eliminated a once vibrant civil society and created an atmosphere of repression comparable to mainland China. The Hong Kong government continues to grant the Mainland authority and oversight of the city, passing legislation to award Beijing additional powers to intervene in local law enforcement via the Office for Safeguarding National Security (OSNS).
- Hong Kong security forces have expanded a campaign of transnational repression against leaders of the democracy movement who fled abroad, placing bounties on an additional 15 activists—including two Canadian citizens—canceling passports, and blocking access to their pensions. Authorities have also escalated harassment of activists' family members still in Hong Kong.
- After an exodus of foreign firms following China's imposition of the National Security Law in 2020, a concerted charm offensive to retain international business and rehabilitate Hong Kong's pro-commerce image appears to be bearing fruit. Many foreign firms remain in Hong Kong due to its proximity to mainland China.

- Hong Kong has emerged as an export controls and sanctions evasion hub, facilitating international transactions with and flows of restricted goods and advanced technology to Russia, Iran, and North Korea.
- Beijing's intervention to block CK Hutchison from selling its port investments, including in the Panama Canal, makes clear that Hong Kong firms are now subject to Chinese Communist Party (CCP) directives and that the Party will interfere in commercial transactions to advance its geostrategic objectives. For foreign firms and financial institutions operating in Hong Kong, this interference should be seen as an alarming precedent. Beijing could invoke the National Security Law to intervene in Hong Kong's civil proceedings, and the expanding reach of national security legislation could be used to interfere with transactions even with no mainland China or Hong Kong nexus.

Introduction

In June 2025, the Hong Kong government celebrated its half-decade crackdown on the once cosmopolitan city's democratic institutions and civil society with anti-foreign propaganda: an exhibit commemorating the fifth anniversary of the passage of the National Security Law called on citizens to be wary of "external forces" and "hostile countries." The demonization of imagined adversaries reflects an insecurity of Beijing's totality of control in Hong Kong, even as pro-democracy advocates have been silenced, put behind bars, or forced into exile, and the last remaining opposition party began to disband in April 2025. In parallel to mainland China's "securitization of everything," Hong Kong's government continues to increase the institutional scope of repression, as legislation in 2025 further strengthened the ability of the Beijing-controlled OSNS to intervene in local law enforcement.

Even as Beijing systematically eliminates any remaining vestiges of political autonomy, it seeks to continue reaping the economic and financial advantages of Hong Kong's reputation as a global commercial hub. Sustained efforts to woo foreign business back to Hong Kong coincide with continued plans to integrate the city into the Mainland's state-led regional development and industrial plans. For foreign businesses that choose to stay, the blocked CK Hutchison port deal is likely indicative of the future of the city's compromised economic autonomy. CCP interests will supersede efforts to rehabilitate the city's pro-business image as national security oversight extends to commercial transactions and civil proceedings.*

Crackdown Continues as Hong Kong Strengthens Tools for Repression

Despite years of cracking down on activism, stifling democracy, and narrowing the space for civil society, Hong Kong's government continues to see threats to Beijing's control of the city's civil dis-

*This chapter draws on roundtables and consultations with experts, activists, and business associations as well as open source research and analysis.

course and legal system. As the National Security Law passed its five-year mark, the initial wave of prosecutions under the law and Article 23 Ordinance is reaching its conclusion, with harsh sentences seeking to make examples of activists. For those in exile, Hong Kong's government has engaged in a campaign of international repression, issuing warrants and offering monetary rewards for information that leads to their arrests. Meanwhile, new legislation builds on the Article 23 Ordinance (aka the Safeguarding National Security Ordinance)* to further Beijing's oversight of Hong Kong's legal system and require compliance in investigations from local officials. Hong Kong authorities have continued to prosecute cases for previously protected political speech, including allegations of seditious online comments and graffiti and "insulting" the national anthem.[1] The number of publicized arrests has fallen since 2024, reflecting the government's success in stifling any public speech and opinion that could draw the ire of Beijing.[2]

Hong Kong Legislature Further Strengthens National Security Apparatus

To prevent the reemergence of pro-democracy sentiment and institutionalize the "securitization of everything," Hong Kong's Legislative Council further expanded Beijing's jurisdiction over national security cases via two new "subsidiary laws" to the Article 23 Ordinance. Enacted within 24 hours of introduction, the May 2025 legislation enhances the power of the OSNS, the body that functions as Beijing's secret police force in the city and whose leadership is appointed from the Mainland's internal security apparatus.[3] The first new law strengthens the OSNS's capacity to operate in secret, coerce both the private sector and Hong Kong's bureaucracy to cooperate with OSNS investigations, and take over "complex" cases with foreign involvement.[4] It also puts in place serious penalties for failure to comply with the OSNS and for divulging details of ongoing investigations, creating six new offenses in all. The second law designates six OSNS sites as "prohibited places" and penalizes trespassing. The prohibited sites include the OSNS's two new offices and four hotels totaling 1,709 rooms, suggesting the size of the security force stationed in the city is considerable.†[5] In June 2025, the OSNS carried out its first joint operation with city authorities under the new regulations, raiding one office and the homes of six individuals accused of "collusion with a foreign country or with external elements to endanger national security."[6]

Hong Kong's Legislative Council may still be considering further subsidiary laws to tighten Beijing's control of the legal system after the Court of Final Appeal (CFA), Hong Kong's highest court, overturned three activists' convictions in March 2025. The three members of a group known for holding vigils in remembrance of the

*The Safeguarding National Security Ordinance is the fulfilment of requirements under Article 23 of Hong Kong's Basic Law, essentially its mini constitution. In the vernacular, the Article 23 Ordinance is sometimes just referred to as Article 23, which was the provision of the Basic Law that required Hong Kong to pass national security rules. Ricardo Barrios, "Hong Kong Adopts New National Security Ordinance: Article 23," *Congressional Research Service* CRS IN12341, April 1, 2024; Greg Torode and Jessie Pang, "Article 23: What You Need to Know about Hong Kong's New National Security Laws," *Reuters*, March 19, 2024.

†For comparison, the entire Hong Kong police force was about 27,000 as of June 2024. Hong Kong Police Force, *Hong Kong Fact Sheet—The Police*, August 2025.

1989 Tiananmen Square massacre were convicted for refusing to provide information to the police on the group's funding and operations. Though the group had disbanded in 2021, Hong Kong's police alleged that it had links to pro-democracy organizations abroad and accused it of being a foreign agent.[7] The CFA unanimously ruled in the defendants' favor, writing that the prosecution's evidence was insufficient due to redactions, including the names of the alleged foreign connections.[8]

Hong Kong's Once Vibrant Civil Society Choked Off

Since passage of the National Security Law, Beijing has used arrests, detentions, and long sentences for civil society advocates as a way to intimidate Hong Kong's population. The initial wave of prosecutions under the National Security Law and the Article 23 Ordinance have been reaching their conclusion four years after the arrest of many prominent leaders of the Hong Kong democracy movement.[9] According to official statements, the courts have concluded 86 percent of the over 230 ongoing "national security" cases, handing down sentences ranging from four to ten years to 45 of the "Hong Kong 47," the pro-democracy advocates arrested in 2021 for attempting to organize primary elections in 2020.[10] Because the court denied bail to 35 of the individuals during this time period, many have already served considerable portions of or completed their terms, and 11 individuals have been released from prison as of July 2025.[11]

Proceedings for high-profile cases have been especially draconian. Joshua Wong, one of the most famous leaders of the democracy movement, was hit with additional charges of collusion with foreign forces in June 2025 while still serving a sentence for subversion.[12] The charges, which have a maximum sentence of life in prison, reflect the authorities' determination to keep Mr. Wong in prison past his initial 2027 release date.[13] Jimmy Lai, owner of pro-democracy newspaper *Apple Daily*, has also been charged with collusion.[14] His trial concluded in August 2025 and a verdict is expected soon.[15] The Court of Final Appeal rejected Mr. Lai's appeal to allow his preferred lawyer to represent him, on the apparent basis that the decisions of the National Security Committee cannot be legally challenged.[16]

Exodus of Foreign Judges from CFA Undermines Image of Impartiality

The Hong Kong Court of Final Appeal was established in 1997 in order to demonstrate the city's commitment to preserving the rule of law after the handover from the United Kingdom (UK) to China. The court consists of a chief justice, three permanent judges, and up to 30 non-permanent judges from Hong Kong and other common law jurisdictions.[17] However, many in the international community see the erosion of judicial independence and fundamental rights as incompatible with Hong Kong's common law tradition, prompting an exodus of judges from other jurisdictions who do not want to be seen as endorsing Beijing's control over the city's legal system. Since the imposition of the National Security Law, the number of foreign judges has dropped from 15

Exodus of Foreign Judges from CFA Undermines Image of Impartiality—*Continued*

to six, as many have resigned or not renewed their appointments so as not to tacitly endorse Hong Kong's descent into Beijing's "rule by law," leaving ten non-permanent judges in total as of August 2025.[18] Robert French, a former chief justice of Australia's High Court, left the court in April 2025, stating that the role of foreign judges has become "arguably cosmetic."[19] Other officials have used starker terms: When two British judges left the court in 2022, then–British Foreign Secretary Liz Truss stated that foreign justices' presence on the court would "risk legitimizing oppression."[20] A new foreign judge from New Zealand joined the court in May 2025 but has drawn international criticism that he is providing credibility to a court that is repressing the freedom of the Hong Kong people.[21]

Repression of Civil Society Deepens

Hong Kong is now subjected to the same degree of repression against free speech and assembly as mainland China, with the authorities on the lookout for even subtle signs of dissent—or what they refer to as "soft resistance."[22] Accordingly, the space for Hong Kong's once vibrant civil society continues to narrow.

- *Tightened regulations target public venues and trade unions:* Police Commissioner Joe Chow stated that remaining "undercurrents" require the strengthening of Hong Kong's intelligence-gathering efforts and that many people still wished to "incite others through the media, arts and culture sectors."[23] In an apparent attempt to prevent public venues such as restaurants from displaying pro-democracy imagery, city authorities have listed 20 types of businesses whose licenses will be revoked if owners, employees, or subcontractors engage in conduct that threatens "national security."[24] A new ordinance passed in June places additional restrictions on trade unions, creating penalties for trade union officers convicted of national security violations and factoring national security into the permitting of trade unions.[25]
- *Last remaining vestiges of opposition disband:* The Democratic Party—Hong Kong's oldest pro-democracy party and its last remaining major opposition party—and the Hong Kong Public Opinion Research Institute both announced plans to disband after leaders were investigated for or found guilty of subversion.[26] As the only pro-democracy party to engage in direct negotiations with Beijing's representatives, the end of the Democratic Party demonstrates that no room exists for political expression outside of strict loyalty to Beijing.[27] The Hong Kong-based non-governmental organization China Labor Bulletin—an important resource for information on the state of labor rights in China—also closed under mysterious and concerning circumstances.[28]

- *Government encourages Hong Kong citizens to inform on each other:* Hong Kong authorities have been instilling a culture of Beijing-style surveillance and citizen-informants in everyday life by encouraging people to spy on each other, with Hong Kong Chief Executive John Lee stating that "villains fill the streets."[29] The Hong Kong police claim that their official "hotline" for reporting "national security" offenses has received over 920,000 tips since November 2020, although that number cannot be independently verified.[30] The education minister announced in April that Hong Kong's teachers would be given additional training on how to identify "soft resistance" in schools.[31]
- *Remaining Hong Kong press subject to lawfare, self-censorship:* After an exodus last year by foreign press organizations, closures of domestic outlets, and convictions of Hong Kong editors accused of sedition, a survey by the Hong Kong Foreign Correspondents Club revealed that members are self-censoring or considering leaving the city due to erosion in press freedoms.*[32] Harassment of reporters and journalists has continued, with some news outlets and reporters facing repeat tax investigations that have consumed time and resources to counter. In several instances, organizations or reporters received notices alleging underpayment and requiring a provisional payment of back taxes before the investigation was concluded.[33] Hong Kong now ranks 140th out of 180 on the World Press Freedom Index, a precipitous decline from 18th in 2002 when the first index was published.[34]

Beijing Escalates Intimidation of Hong Kong Activists Overseas

Hong Kong officials have continued their campaign of transnational repression, targeting activists abroad while escalating the harassment of their families at home.[35] The officials have framed the Hong Kong activists overseas as doing the work of "hostile foreign forces" spreading "subversion" in the city.[36] The Hong Kong government has issued arrest warrants for groups of overseas activists four times, most recently for 19 individuals in July 2025 (including four individuals who were targeted with prior arrest warrants).[37] It has placed bounties of Hong Kong Dollars [HKD] 200,000–1 million ($25,600–$128,000)† on these individuals; additionally, Hong Kong has invoked powers granted under the Article 23 Ordinance to target most of these activists, including by canceling their passports and suspending their legal licenses, removing them from company directorships, and prohibiting them from conducting financial transactions in Hong Kong.[38] Among those targeted was Chloe Cheung, who had participated in protests in Hong Kong when she was 14 and was apparently targeted for continued activism in the UK; her arrest warrant included a photo of her as an 11 year old.[39]

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*For more on foreign press leaving the city, see U.S.-China Economic and Security Review Commission, Chapter 10, "Hong Kong," in *2024 Annual Report to Congress*, November 2024, 697–698.

†Unless noted otherwise, this section uses the following exchange rate throughout: $1 = HKD 7.80.

In separate cases, citizens of the UK and Australia living in proximity to overseas Hong Kong activists received anonymous letters offering rewards for information on those activists or for turning them over to the Chinese Embassy.[40] The Hong Kong government denied sending these letters, despite the fact that the letters used similar language to Hong Kong police wanted posters.[41] Hong Kong police have also continued to target the families of activists, escalating prior intimidation tactics by arresting the brother and father of overseas activist Anna Kwok in May 2025 for handling financial assets belonging to Ms. Kwok.[42]

Hong Kong's Economic Status Independent of the Mainland Continues to Shrink

As Hong Kong increasingly resembles just another mainland city, its economy is also more dependent on mainland China. In a parallel to the economic problems on the Mainland, headwinds from tepid consumption and a sustained property market downturn have deepened the city's fiscal challenges, exacerbated in Hong Kong by residual empty office buildings after an extended downturn in the city's financial sector that has only reversed this year. Meanwhile, China continues to use the city's financial infrastructure to selectively open its capital account while further integrating Hong Kong into the surrounding Pearl River Delta region. Nonetheless, Hong Kong authorities have launched a concerted messaging campaign to draw back foreign business and rehabilitate the city's image as an international financial hub. Beijing's "have your cake and eat it" approach to Hong Kong's economic autonomy is indicative of its broader strategy to the special administrative region: it seeks to cash in on the remnants of Hong Kong's status as an independent, rule of law, and pro-market jurisdiction while eliminating vestiges of independence, moving to rule by law, and ensuring its ability to intervene in and steer the commercial sphere as it does in the Mainland.

Hong Kong's Economy Falters

After rebounding from the COVID-19 pandemic, Hong Kong has since entered a prolonged slowdown that mirrors mainland China's economic challenges. (For more on the state of the Chinese economy, see Chapter 1, "U.S.-China Economic and Trade Relations (Year in Review).") Hong Kong faces slowing growth, a weak property market, and a persistent government budget deficit. These challenges stem from both the city's integration with the Mainland and the impact of Beijing's repression on Hong Kong's attractiveness to international business.

- *Slowing growth:* Hong Kong's real gross domestic product (GDP) growth slipped to 2.5 percent in 2024 from 3.2 percent the preceding year, as weak consumption dragged down growth in exports and tourism.[43] Hong Kong's economy improved marginally in the first half of 2025, driven by a boost in exports and resurgence in the city's financial sector. However, trade uncertainty is anticipated to weigh on the economy in the remainder of the year.[44] In addition to weak consumption, geopolitical tensions and mainland China's eco-

nomic slowdown have made Hong Kong's economic outlook uncertain. Foreign direct investment to mainland China via Hong Kong has slowed in recent years.[45]

- *Property market downturn:* Once among the world's most expensive real estate markets by square footage, Hong Kong's residential and commercial property prices have tumbled, erasing some HKD 2.1 trillion ($270 billion) in value from 2019 to June 2024, according to Bloomberg.[46] Residential prices were down 7.8 percent in the first quarter of 2025 from the same period the previous year and 30 percent from a 2021 peak due to higher mortgage rates, a weak overall economy, and lower demand as foreign professionals have left the city.[47] Purchases by mainland buyers, who had somewhat helped prop up prices through 2024, slowed in 2025 as the ongoing trade war introduced greater economic uncertainty.[48] Commercial real estate prices for Hong Kong's highest tier of office space have dropped 40 percent from a 2018 peak as multinational firms reduced headcount in the city.[49] Even as the exodus of foreign firms and talent stabilizes, Hong Kong faces rising challenges from regional competitors like Singapore and other cities in Southeast Asia that have constructed their own sophisticated port infrastructure and tax incentives to lure global trade, likely continuing to put downward pressure on real estate.[50]
- *Expanding budget deficit:* Tepid economic recovery and falling property prices have hurt Hong Kong's fiscal revenue, leading to persistent and growing budget deficits. At HKD 87.2 billion ($11.2 billion) and 6.2 percent of GDP, the fiscal year 2024 (ending March 2025) deficit exceeds the prior year's projections for 4.6 percent.[51] Fitch Ratings analysts anticipate Hong Kong will tap into six of its endowment funds in fiscal year 2025 to make up for the persistent shortfalls, but a one-time cash infusion will not address Hong Kong's underlying weakness in fiscal revenue.*[52] Like the Mainland, Hong Kong also has an aging population that requires increasing support from the government, worsening the outlook for Hong Kong's fiscal situation.[53]

Mainland Capital and Talent Supplants International Departures

Hong Kong and People's Republic of China (PRC) government priorities have aligned to ensure that Hong Kong's economy and its financial system increasingly serve mainland interests. Many of these priorities are supported by new regulations allowing for greater cross-border flows of capital and talent.

*The endowment funds were set up when Hong Kong ran persistent budget surpluses and include the Research Endowment Fund, Hospital Authority Public-Private Partnership Fund, Language Fund, Student Activities Support Fund, Qualifications Framework Fund, and Gifted Education Fund. Hong Kong Legislative Council, *Item for Finance Committee: Consolidation of Financial Arrangement of Six Seed Capital Funds*, April 25, 2025; Emily Hung, "Hong Kong Budget 2024–25: City Will Return to Fiscal Balance in 2 Years by Dipping into Rainy Day Future Fund, Issuing Bonds," *South China Morning Post*, February 29, 2024.

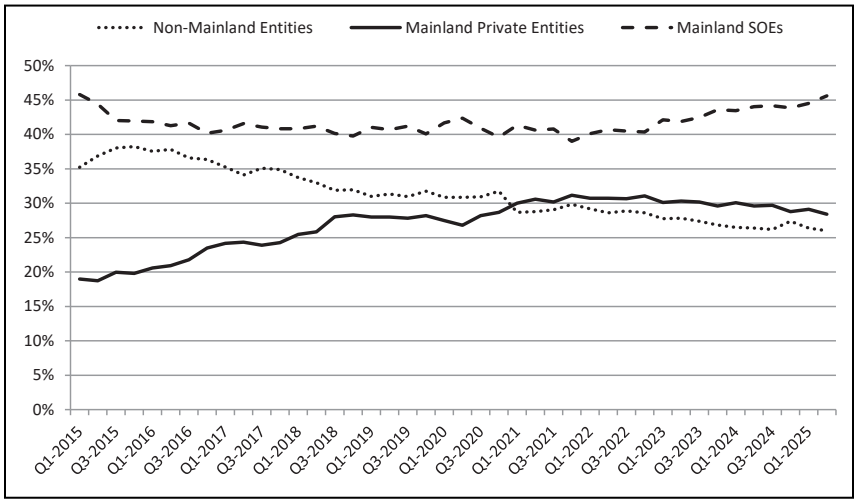
Mainland Continues to Deepen Connectivity with Hong Kong Markets

Hong Kong's financial linkages to the Mainland have deepened across the board as Chinese firms take advantage of higher valuations on the Hong Kong Stock Exchange (HKEX) and mainland borrowers look to Hong Kong banks. Each of these channels allows Beijing to selectively open its capital account where it serves its purposes, encouraging mainland Chinese to benefit from asset value appreciation in Hong Kong and more sophisticated financial markets there while maintaining controls on cross-border flows.

- *HKEX increasingly hosts initial public offerings (IPOs) and secondary listings by mainland firms, as Chinese companies forgo U.S. listings:** Hong Kong IPOs rebounded in the second half of 2024 and into the first half of 2025 by total funds raised, driven primarily by mainland Chinese firms either raising funds for international expansion or doing secondary listings.[54] Prior secondary listings in Hong Kong by Chinese firms have been interpreted as a way to reduce risk in the event they need to delist from U.S. exchanges, which has occurred in the past at the behest of both U.S. and Chinese regulators.[55] In 2024, Hong Kong's regulators streamlined the process for secondary listings for Mainland-listed firms.[56] Hong Kong's IPO applicant list reveals a strong pipeline from mainland artificial intelligence (AI), biotech, and battery companies—all strategic sectors for Beijing.[57] Chinese firms listing on the HKEX are likely to make it the best-performing exchange for IPOs in 2025 by total funds raised.[58]
- *Hong Kong lending to the Mainland increasingly serves Chinese borrowers over foreign borrowers:* Hong Kong banks' lending to mainland China grew in the first two quarters of 2025, marking the first quarters of growth since 2023.[59] Most of this growth was attributed to lending to Chinese entities, while the total volume of loans to foreign entities in mainland China continues to trend downward.[60] The percentage of total lending from Hong Kong banks to private entities in mainland China peaked at the end of 2021.[61] Since then, lending to state-owned entities has climbed to its highest percentage of total lending to the Mainland since 2015.[62]

*Listing on U.S. stock exchanges, while not impossible, has become increasingly burdensome for Chinese companies who must meet the U.S. Public Company Accounting Oversight Board's (PCAOB) stringent audit conditions and receive approval from Chinese regulators, an opaque and lengthy process. Despite this, small-cap Chinese firms continued to IPO on U.S. markets to take advantage of a closing timeframe for small listings, but there have been no blockbuster listings since ride-hailing app Didi Chuxing in 2021. George Steer, "Surge in Chinese Listings Drives Boom for US Small-Cap IPO Market," *Financial Times*, May 13, 2025; U.S.-China Economic and Security Review Commission, *Chinese Companies Listed on Major U.S. Stock Exchanges*, March 7, 2025, 1–3; Kane Wu et al., "Red Tape Clogs China's Offshore IPO Pipeline Even as Markets Recover," *Reuters*, June 2, 2024.

Figure 1: Hong Kong Loans to the Mainland by Borrower Type, Q1 2015–Q2 2025 (percent of Total Lending to the Mainland)



Source: Hong Kong Monetary Authority, "*Hong Kong: Mainland-Related Loans: Mainland State-Owned Entities, Mainland Private Entities, NonMainland Entities*," via Haver Analytics, September 3, 2025.

- *Hong Kong provides a route for mainland investors seeking to diversify concentrated onshore portfolios:* Inflows from mainland investors into Hong Kong equity markets through the Stock Connect hit a record annual high in July 2025, already surpassing full-year 2024 inflows, with mainland technology firms and new listings in particular benefiting from the inflow.*[63] The Connect programs, launched beginning in 2014, allow investors broad cross-border access to stocks and exchange-traded funds (ETFs) and have since been expanded to cover bonds and some derivatives.[64] One estimate attributes 25 percent of daily trading activity on the Hong Kong exchange to mainland Chinese investors, an increase from below 10 percent on average in 2019.[65]
- *Pilot programs and measures arranged by the Hong Kong Monetary Authority (HKMA) and People's Bank of China (PBOC) facilitate greater economic linkages between Hong Kong and the Mainland:* The HKMA has established programs promoting cross-border investment by making it easier for Mainlanders to invest via Hong Kong, easing access to credit data on mainland small businesses to facilitate credit from Hong Kong and allowing cross-border remittances for the purchase of residential real estate and other onshore services by Hong Kongers in the Greater Bay Area.[66] Other measures promulgated by the HKMA and the PBOC increase Hong Kong's role in promoting renminbi (RMB)-denominated trade and finance.[67]

*The Stock Connect links Hong Kong to mainland stock exchanges, enabling overseas investors to participate in mainland equities markets and vice versa. "Our Connect Story: A New Chapter Begins …" *Hong Kong Exchanges and Clearing Limited*, October 2022, 1–3.

Firms and Migrants from the Mainland Fill Foreign Void in Hong Kong's Workforce

As foreign firms continue to retreat, Chinese firms are providing a greater portion of professional services necessary to sustain Hong Kong's position as a financial services center. Although Western banks still lead in mergers and acquisitions, Chinese investment banks have dominated IPO underwriting since 2020.[68] Chinese banks have hired foreign professionals laid off by Western banks as they have downsized their presence in the city.[69] A similar trend is occurring in law firms, as Western law firms leave the city and mainland Chinese firms hire their lawyers.[70] Audit firm PwC has reportedly seen a wave of senior departures in Hong Kong after Chinese regulators fined the firm's Chinese affiliate and temporarily suspended its operations for earlier auditing work on now-bankrupt property developer Evergrande.[71] The loss of major client relationships by foreign firms could open an opportunity for Chinese auditors to increase their presence in the city.[72]

Hong Kong's workforce has also swelled with Mainlanders through its talent-based visa program. Over 90 percent of Top Talent visa applicants are mainland Chinese seeking work and a path to permanent residence in the city.[73] Mainland students represent a large and growing proportion of total foreign students at Hong Kong's universities, rising from 70 percent to 72 percent in the 2024–2025 schoolyear.[74] The volume of foreign students, primarily from mainland China, has driven a trend of converting underutilized hotels into student housing.[75]

Hong Kong Aligns Itself with Mainland Economic Priorities

As part of China's bid to use Hong Kong's attributes to serve the Mainland, Chinese policy seeks to integrate Hong Kong into regional development plans and dissolve distinctions between its borders and commercial environment and those of neighboring Shenzhen and the surrounding Pearl River Delta region. General Secretary of the CCP Xi Jinping stated that Hong Kong under "one country, two systems" should further the construction of a "strong country" and "national rejuvenation."[76] According to members of the Chinese People's Political Consultative Conference, Hong Kong should play a role as a "super-connector" between the Mainland and the global market, aligning regulatory environments and supporting mainland finance, trade, and shipping.[77] Notably, Hong Kong's development priorities are set by Beijing from the Hong Kong and Macau Work Office under the Central Committee, further suppressing Hong Kong's autonomy.[78]

Northern Metropolis and Greater Bay Area to Integrate Hong Kong into Surrounding Region

Like other Chinese policies, plans for Hong Kong aim to bolster the role of Chinese state-owned enterprises (SOEs) and advance technological development priorities. For example, financing from the Hong Kong government has funded billions in contracts to Chinese SOEs to develop the "Northern Metropolis," a technology hub spanning Shenzhen and Hong Kong's less developed New Territories.[79] The Northern Metropolis is a manifestation of Hong Kong's

strategic vision to build a "South-North dual engine," with Hong Kong's southern financial center serving as one engine and the under-construction "innovation and technology" metropolis serving as the second engine in the north.[80] These plans reflect Beijing's larger ambitions to use Hong Kong's status as a global financial hub to attract capital that will fund Beijing's technology ambitions.[81] The Hong Kong government is proactively quashing any criticism of the development, with the Secretary for Development stating that projects such as the Northern Metropolis are targets of "soft resistance" from environmental activists and displaced land owners and that the Development Bureau must "think from the national security perspective."[82]

The Northern Metropolis mirrors the Greater Bay Area plan, Beijing's sweeping vision launched in 2019 aiming to build an innovation cluster akin to Silicon Valley by leveraging Hong Kong's legal environment and financial markets and the technological and manufacturing capabilities of nearby mainland cities.[83] In March 2025, Hong Kong and mainland China effected an upgrade to their free trade agreement, the Closer Economic Partnership Agreement (CEPA), to deepen integration between institutions by expanding cross-border coverage to more service sectors.[84] The upgrade also extended the ability of Hong Kong-based firms and individuals in the Greater Bay Area (GBA) to use Hong Kong's legal system for mainland business, making incremental steps toward fulfilling plans for the GBA.[85]

Hong Kong's Separate Status Provides Continued Advantages for China

Despite its own internal plans and extensive efforts to integrate Hong Kong, China seeks to keep international partners from viewing them as one unit so as to take advantage of the perception of Hong Kong's separate voice. China's Ministry of Commerce has advocated for Hong Kong to maintain its separate customs status, and at least one Chinese official has called for Hong Kong to join regional trade agreements, including the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the Digital Economy Partnership Agreement (DEPA).[86] Hong Kong is also far along in discussions to join the Regional Comprehensive Economic Partnership (RCEP), a free trade agreement with mainland China, ASEAN, Japan, South Korea, Australia, and New Zealand.[87] These trade agreements do not include the United States but do include important U.S. allies and partners, which would allow Beijing to leverage Hong Kong's separate status. Hong Kong's membership in international organizations like the WTO has afforded it representation it uses to support China's agenda, effectively giving China two voices in those organizations.[88]

While the United States revoked Hong Kong's special trade status in 2020 and the European Parliament recently backed a resolution calling for the same outcome, in 2022 the WTO ruled in Hong Kong's favor in a dispute over whether it can continue labeling goods as "made in Hong Kong," even for goods shipped to the United States.[89] On Hong Kong's National Security Day, Chief Executive Lee delivered a speech that criticized the United States for imposing tariffs

on Hong Kong at the same rate as levies on mainland China, referencing Hong Kong's status as a "zero-tariff free port."[90]

Beijing Pressures Local Firms to Support Its Foreign Policy Aims, Including Turning on Hong Kong Tycoon

Twenty twenty-five may go down as the year Beijing's civil and political takeover of Hong Kong took firm hold in its economy, as well. China's State Administration for Market Regulation intervened to halt Hong Kong conglomerate CK Hutchison's sale of overseas ports on dubious antitrust grounds, then pressured the firm to include state-owned China COSCO Shipping Corp (COSCO) in the deal, highlighting the potential for further regulatory intervention by Beijing in Hong Kong's commercial sphere. In March 2025, CK Hutchison announced it had reached an agreement to sell its overseas port operations, including two ports at each end of the Panama Canal, to a group of investors that included U.S. asset manager BlackRock and a subsidiary of Italian shipping conglomerate Mediterranean Shipping Co.[91] Soon after, reports emerged that Chinese regulators were examining the sale for potential antitrust violations, despite the deal itself having no immediate nexus to either Hong Kong or mainland China.[92] While negotiations are still ongoing, Panama itself has launched legal challenges against the current contract governing the port's operations, throwing the transaction's outcome further into doubt.[93]

China's stated antitrust rationale for blocking the transaction provides thin cover for its larger strategic and political considerations. CK Hutchison is incorporated in the Caribbean, and only 12 percent of its business is in mainland China and Hong Kong; none of the ports for sale are in China.[94] U.S. officials have expressed concerns over Chinese control of ports critical to commercial shipping and in a strategic location in the case of conflict.* Statements from Chinese leaders expressed displeasure over their perception that CK Hutchison was caving to U.S. demands, but their actions appear to validate U.S. concerns that Beijing would seek to leverage control by Chinese entities of these strategic ports.[95]

China has taken further steps to retain influence over the ports. In July, the *Wall Street Journal* reported that Chinese officials had threatened to block the sale unless COSCO, China's largest shipping company, was included in the deal.[96] COSCO has reportedly requested partial ownership in the new entity and veto rights over decision-making involving the Panama ports, arguing that these rights are necessary to protect China's interests.[97] China has also ramped up pressure on the CEO of CK Hutchison, Hong Kong-based billionaire developer Li Ka-shing. After CK Hutchison announced the proposed deal, Beijing directed state-owned Chinese firms to avoid any new business transactions with the Li family; Mr. Li's son

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*Panama's ties to China have deepened since it switched recognition from Taiwan to Beijing in 2017. Although China promised extensive infrastructure investment under the Belt and Road Initiative, much of this investment was ultimately canceled, and annual U.S. investment in Panama is triple China's. However, Chinese control over key logistics hubs and port terminals has caused growing concern over the canal, which sees 40 percent of U.S. container ship traffic pass through annually. The Administration has emphasized the threat posed by Chinese influence in Panama. Associated Press, "China and the U.S. Clash at the U.N. over the Panama Canal," *NPR*, August 12, 2025; Jenny Duan, "Great-Power Competition in the Panama Canal," *International Institute for Strategic Studies*, April 15, 2025.

was in the process of applying for a license to operate his insurance business in the Mainland, but the licensing process is reportedly stalled.[98] Attacks from both mainland and Hong Kong state media have criticized Mr. Li for his lack of patriotic spirit, with one source claiming he will "go down in infamy in history."[99] While Mr. Li once had close ties to Beijing's top leaders and was welcomed for investing in the Mainland, his recent fall from favor marks a sharp reversal from how Hong Kong firms have operated for decades based on commercial incentives and free markets.[100]

Messaging to the business community from Chinese officials and Hong Kong's leaders emphasizes that firms remain free to make their own decisions, as long as those decisions support the PRC's vision for Hong Kong. In November 2024, Head of the Office for Hong Kong and Macau Affairs Xia Baolong met with members of the Hong Kong business community in Shenzhen to remind them of their role in preserving the international image of the city, among other things.[101] Mr. Xia's comment that local entrepreneurs who betrayed the national interest would "meet a grim fate and bear the curse of history" has concerned observers, who increasingly feel that Hong Kong businesses must act like mainland firms and serve the interests of the Party above profit motivations.[102] Despite Chief Executive Lee reiterating that Hong Kong's "enterprises can make their decisions," in the same breath, he made a not-so-subtle statement: "The key point is how much you love this place and how much you think you should contribute."[103] The CK Hutchison experience makes clear that moving forward, Hong Kong firms will need to more seriously consider Beijing's foreign policy priorities.

Hong Kong's Business Environment Poses Risks for U.S. and Other Foreign Firms

The decision of mainland Chinese regulators to intervene in the operations of firms based in Hong Kong over concerns related to national security and other mainland priorities raises serious questions about the integrity of Hong Kong's international business environment. While these actions have primarily impacted Hong Kong domestic firms to date, foreign firms operating in Hong Kong should be wary of relying on Hong Kong as an independent business jurisdiction with the protections of rule of law.

The Hong Kong government has launched a concerted campaign to assuage foreign business concerns over the national security regime, with some success. The city's highest-ranking officials have appeared at Hong Kong, mainland, and international business conferences to deliver the message that Hong Kong's economy is open for foreign investment.[104] A Hong Kong delegation that included Chief Executive Lee visited Qatar and Kuwait as part of efforts to encourage investment and greater linkages and participation in the GBA.[105] A blueprint for tourism development launched in December 2024 by Hong Kong's Culture, Sports, and Tourism Bureau aims to increase the number of conferences and events in the city.[106] Over the last year, a number of foreign professional services and cultural companies have expanded or set up new offices in the city, with the United States still among the largest countries of origin, according to Hong Kong's official investment promotion agency.[107]

Most U.S. businesses polled by the American Chamber of Commerce in Hong Kong (AmCham HK) indicated that they have not experienced an erosion in operating conditions due to Hong Kong's national security laws. In the 2025 Business Sentiment Survey, 70 percent of respondents reported that their companies' operations in Hong Kong had not been negatively impacted by the National Security Law, similar to the 2024 figure.[108] The proportion of respondents confident in Hong Kong's rule of law rose to 83 percent from 79 percent last year.[109] Whether or not these survey responses are skewed—as firms most impacted by the laws have left the city—is unclear. Operators of shipping vessels flagged in Hong Kong, wary of what they view as Hong Kong's potential to requisition ships for Beijing's maritime militia in case of a conflict, are leaving the city for other global flag centers like Singapore and the Marshall Islands.[110] Chinese-operated ships are replacing them.[111]

Other indicators of worsening business sentiment in Hong Kong have emerged as Hong Kong passes laws to tighten its national security regime. Thirty-three percent of respondents to AmCham HK's 2025 survey expressed doubts over Hong Kong's ability to retain its position as a competitive arbitration center due to concerns over the long-term strength of the rule of law, especially regarding the fairness of arbitration involving Hong Kong or PRC parties.[112] Hong Kong is still a favored destination for transactions involving mainland China, in particular because it allows parties to apply for interim relief for an ongoing arbitration and mutual enforcement in mainland China, which Singapore does not.[113] In a separate annual survey on the state of international arbitration, in 2025 Singapore remained in the top five seats for each of the six world regions polled, whereas Hong Kong was only in the top five for respondents in Asia.*[114] In the 2021 survey, Hong Kong was in the top five most preferred seats for five of six regions.[115]

Cyber Regulations Pose Risk for Foreign Firms

Hong Kong continues to tighten control over digital infrastructure, exposing businesses to regulatory risks as Hong Kong's digital governance converges with the Mainland's. A new cybersecurity law passed in March 2025 requires operators of critical infrastructure (CIOs) to strengthen cyber defenses on computer systems, report cybersecurity incidents, and perform security risk assessments and audits on a recurring basis.[116] The law is vague on what constitutes a CIO, subjecting firms to regulatory uncertainty and increased compliance costs.[117] The design of the law generally follows the design of China's domestic digital regulation, minus onerous data transfer restrictions.[118] Intelligence firm Control Risks assessed that the law may presage tighter controls on personal information.[119] While this new law follows many jurisdictions in tightening oversight of cybersecurity and critical infrastructure, laws that would not be concerning in "rule of law" jurisdictions can become tools of government coercion and abuse under the Mainland's "rule by law" system.

*The six regions are Africa, Asia-Pacific, Caribbean/Latin America, Europe, Middle East, and North America. "2025 International Arbitration Survey: The Path Forward: Realities and Opportunities in Arbitration," *White & Case*, 6.

Hong Kong's Connectivity Facilitates Sanctions Evasion

Hong Kong remains a center for money laundering tied to sanctions evasion, corruption, and organized crime. According to researchers at the University of Sussex, Hong Kong has become one of the world's foremost centers for money laundering, following on a long history of disguising illicit flows to and from mainland China and Macau.[120] Hong Kong's historically vibrant commercial environment and connectivity as a global financial hub, along with its reputation for high regulatory standards, have made the city a key conduit for skirting economic restrictions.[121] Moreover, Hong Kong has refused to comply with some U.S. economic restrictions, with Chief Executive Lee stating that Hong Kong would not implement U.S. sanctions on Russia in 2022.[122]

Transshipment and export control evasion through Hong Kong has supported destabilizing actions by Iran, North Korea, and Russia. In the first three quarters of 2025 alone, the United States has sanctioned 64 Hong Kong entities for helping facilitate sales of Iranian oil, including to independent refineries in China.[123] Hong Kong trade data also reveal a significant flow of dual-use electronics to Russia, including communications equipment, computers and other data processing machines, and integrated circuits.[124] Russia's Consul General in Hong Kong acknowledged the importance of the city as a trade connector for Russia and China, including the use of offshore RMB to facilitate trade.[125] While Hong Kong's total exports to Russia fell in 2024 year-over-year, exports of foundational semiconductors to Russia continued to rise and shipments of advanced chips remained elevated.[126] A report by the German Foreign Ministry found that China, including Hong Kong, was responsible for 80 percent of Russian sanctions circumvention.[127]

Cryptocurrency has played a role in the facilitation of these crimes, including by receiving funds from victims via virtual wallets that are then accessed and stolen by criminals (for more on China's regulation of cryptocurrency, see Chapter 1, "U.S.-China Economic and Trade Relations (Year in Review)").[128] Cryptocurrency has also been linked to money laundering operations by perpetrators of organized crime in Southeast Asia, creating added risks for Hong Kong's decision to pursue a role as the world's preeminent center for virtual assets.*[129]

Despite Hong Kong's central role in evading sanctions on Russia and Iran, Hong Kong authorities are cracking down on money laundering rings linked to financial crimes against Chinese citizens. Hong Kong regulators and law enforcement have coordinated with mainland authorities to uncover fraud schemes targeting mainland Chinese through Hong Kong's financial system.[130] In April 2025, the Hong Kong Monetary Authority, along with the Hong Kong Police Force and Hong Kong Association of Banks, announced new mea-

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*Hong Kong's regulators have implemented a new licensing process for digital asset exchanges as part of the city's push to expand its presence in the cryptocurrency industry. Mainland firms have received approval to provide digital currency trading services in the city, despite a ban on cryptocurrency trading in mainland China itself. Hong Kong has exhibited fast growth in the market for digital assets and has attracted interest from fintech companies seeking to raise funds. For more on Hong Kong's cryptocurrency industry, see U.S.-China Economic and Security Review Commission, Chapter 10, "Hong Kong Nascent Cryptocurrency Sector Faces Mainland Prohibitions" in *2024 Annual Report to Congress*, November 2024, 704–705. Matthew Fulco, "Hong Kong's Crypto Bet Is Starting to Pay Off," *Jamestown Foundation*, August 7, 2025.

sures to identify, halt, and prevent fraud and money laundering.[131] Hong Kong authorities' deliberate response and coordination with the Mainland on crimes targeting China stands in stark contrast to their inaction to address rampant sanctions evasion, including UN sanctions on North Korea that China claims to follow. (For more on Hong Kong's role in sanctions and export control evasion, see the Commission's staff research report on "China's Facilitation of Sanctions and Export Control Evasion.")

Implications for the United States

China has completely reneged on its promise to preserve a significant degree of autonomy for Hong Kong under "one country, two systems," leaving the remnants of rule of law and judicial independence as a thin veneer. The fate of Hong Kong less than three decades since its handover should cast doubt on any commitments China might make with regard to a similar solution for Taiwan. Because of China's complete political control over Hong Kong and its regulatory environment, U.S. firms face considerable risks by continuing to do business in Hong Kong. Although these risks have primarily affected local Hong Kong firms so far, foreign companies with Hong Kong-based subsidiaries should not assume they are immune to coercion or pressure from Hong Kong authorities. U.S. citizens based in or transiting through Hong Kong are also at risk as Hong Kong's government races to make the city as tightly controlled as the Mainland and blames any dissent on foreign infiltration.

In recent years, Congress has provided the executive branch considerable direction and authority to respond to the dismantling of Hong Kong's freedom, autonomy, and rule of law. Under the Hong Kong Human Rights and Democracy Act, the Administration in 2020 found that Hong Kong no longer maintained sufficient autonomy from the Mainland to warrant treatment as a separate territory under U.S. law. Nonetheless, the Hong Kong Economic and Trade Offices continue to exist in the same manner as when Hong Kong was considered autonomous, with their own special diplomatic privileges, exemptions, and immunities in the United States separate from the PRC.[132] The 2020 Hong Kong Autonomy Act provided additional authorities to impose sanctions on individuals and entities that materially contribute to China's failure to preserve Hong Kong's autonomy. **There is significant room for policy and coordination with allies and partners, especially the UK, to protect Hong Kong activists overseas from China's unlawful extraterritorial attempts to impose warrants on and silence its critics.** Likewise, firms operating in the city remain at risk of regulatory overreach under China's "rule by law" system, enabled by Hong Kong's outdated image as a reputable global financial center.

At the same time, Hong Kong's role as an instrument of China's geostrategic aims heightens challenges to U.S. market integrity and the efficacy of U.S. foreign policy. **Hong Kong continues to play a role in sanctions and export control evasion, serving as a lifeline for Iran and Russia and providing Beijing a tool to support revisionist autocratic regimes.** U.S. and international

firms selling controlled items to recipients or distributors in Hong Kong have limited control over where these goods end up and may be at risk of facilitating the violation of sanctions and export controls. The Chinese government is taking on major money laundering risks for Hong Kong through its efforts to transform Hong Kong into a global cryptocurrency hub.

Recommendations

The Commission recommends:

- Given Hong Kong has become a central global hub for sanctions evasion that supports Russia, Iran, and North Korea, Congress pass legislation to:
  - Condition Hong Kong's continued status as an official offshore U.S. dollar (USD) clearing center on compliance with U.S. sanctions, including by providing U.S. authorities full visibility into transactions conducted through Hong Kong's USD Clearing House Automated Transfer System (USD CHATS);
  - Direct the U.S. Department of the Treasury to assess the extent to which transactions in Hong Kong via USD CHATS are facilitating evasion of sanctions or export controls and determine the feasibility of replacing it with the Clearing House Interbank Payments System (CHIPS);
  - Authorize secondary sanctions for the facilitation of sanctions and export control violations by Chinese and Hong Kong financial institutions, including codifying authorities established by executive order to impose secondary sanctions on Chinese and Hong Kong financial institutions facilitating evasion on behalf of Russian, Iranian, and North Korean entities;
  - Direct the U.S. Department of Commerce, Bureau of Industry and Security (BIS) to require heightened due diligence for sales of any Common High Priority List (CHPL) items to China or Hong Kong, given China's role as primary provider of such items to Russia;
  - Provide additional resources, technology, and staff to BIS and the Treasury Department's Office of Foreign Assets Control (OFAC) for enforcement of export controls and sanctions related to Hong Kong; and
  - Create a new standing cross-agency enforcement task force with respect to sanctions and export control evasion through Hong Kong, including enforcement personnel relating to money laundering, financial sanctions, and export controls, to enhance overall enforcement efforts to shut down illicit evasion networks running through Hong Kong.
- Congress codify Executive Order 13936 on Hong Kong Normalization that was issued on July 14, 2020, along with the Secretary of State's 2020 certification as required under the United States-Hong Kong Policy Act, to ensure the continued implementation of U.S. policy in response to Beijing's dismantling of Hong Kong's autonomy and the erosion of fundamental freedoms. The Executive Order determined that the Special Admin-

istrative Region of Hong Kong is no longer sufficiently autonomous to justify differential treatment in relation to the People's Republic of China under U.S. law. The legislation should include the following provisions:

- Permanently authorize all provisions of the Executive Order, including sanctions on individuals and entities responsible for undermining Hong Kong's autonomy;
- Suspend Hong Kong's special trade preferences; and
- Continue reporting requirements on the status of human rights and rule of law in Hong Kong.

Codification would protect these measures from potential reversal by future administrations without congressional input, send a strong bipartisan signal of support for the people of Hong Kong, and reinforce U.S. commitment to upholding international obligations under the Sino-British Joint Declaration.

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COMPREHENSIVE LIST OF THE COMMISSION'S 2025 RECOMMENDATIONS

Part II: Efforts to Remake the World Order

Chapter 3: Axis of Autocracy: China's Revisionist Ambitions with Russia, Iran, and North Korea

The Commission recommends:

1. Congress consider legislation establishing a consolidated economic statecraft entity to address the evolving national security challenges posed by China's systematic and persistent evasion of U.S. export controls and sanctions.

   This new unified economic statecraft entity, at a minimum, should include: the Bureau of Industry and Security (U.S. Department of Commerce), the Office of Foreign Assets Control (U.S. Department of the Treasury), the Bureau of International Security and Nonproliferation's Office of Export Control Cooperation (U.S. Department of State), the Defense Technology Security Administration (U.S. Department of Defense), and other appropriate organizations across the executive branch.

   This entity should be:

   - Integrated into the Intelligence Community with enhanced access to real-time intelligence on evasion networks and real-time intelligence-sharing capabilities with industry to identify emerging evasion tactics;
   - Equipped with enforcement authorities comparable to those wielded by the Treasury Department in the financial sanctions sphere, including law enforcement authorities to pursue aggressive enforcement against violators;
   - Structured as a direct report to a single cabinet official or the President of the United States so as to ensure strategic coordination across government, unencumbered by the interagency processes; and
   - Equipped with resources for technology development, analysis, and international coordination and authority to implement robust verification systems and supply chain tracking technologies.

   This recommendation addresses the critical gap between export controls and sanctions as written and their actual enforcement, recognizing that China and Russia continue to successfully circumvent existing safeguards while U.S. technological advantages erode. Modernizing export controls and sanctions infrastructure

represents an essential evolution of U.S. economic statecraft for the strategic competition era.

The United States urgently requires modernization of its export controls and sanctions regime to counter China's systematic and persistent circumvention tactics. The current fragmented approach across multiple agencies dilutes accountability and prioritization. Consolidating these authorities under a single entity would create clear ownership, institutional incentives to prioritize enforcement, and concentrated resources dedicated to countering circumvention. Today's dispersed structure does not enable such focused effort. The Commission notes that Congress passed the Foreign Investment Risk Review Modernization Act of 2018 (FIRRMA), which strengthened the Committee on Foreign Investment in the United States. Since the passage of FIRRMA and the Export Control Reform Act of 2018 (ECRA), economic statecraft has evolved dramatically, revealing significant gaps in enforcement of export controls and sanctions. The Commission defers to congressional committees regarding the optimal organizational placement of this consolidated authority, recognizing that the primary objective is ensuring America's key offensive tools of economic statecraft are modernized, adequately resourced, and strategically coordinated to address 21st-century threats.

2. Congress direct the Intelligence Community (IC) to produce, within 180 days, an assessment of China's support for Russia's war against Ukraine. This report should examine all the various forms of Chinese assistance and sanctionable activities, including but not limited to economic, technological, military, intelligence, information, and cyber operations, and assess how such support has affected the conduct of the war. In addition to a classified report to the relevant committees of Congress, the IC should be directed to produce an unclassified version suitable for wider dissemination.

3. Congress pass legislation to create an Undersea Cable Security Initiative to counter Chinese and Russian sabotage of undersea cables. The legislation should:

   - Ban Chinese vessels from laying, maintaining, and repairing U.S.-invested cables;

   - Direct the U.S. Department of Homeland Security, in coordination with other relevant agencies, to take measures to monitor and secure critical cables, including through the use of sensors, surveillance satellites, and joint coast guard patrols with allies and partners; and

   - Direct the U.S. Department of State, in coordination with other relevant agencies, to work with allies and partners to support the development of a multinational fleet of cable repair ships to respond rapidly to incidents of sabotage.

Chapter 4: Crossroads of Competition: China and Southeast Asia

The Commission recommends:

4. Congress direct the President to create an interagency task force to combat scam centers, which are primarily operated by Chinese criminal networks in Southeast Asia and defraud Americans of billions of dollars annually. The task force should:
   - Work with the Intelligence Community to:
     - Assess the extent to which China has obtained Americans' sensitive personal data stored on computers and phones confiscated in raids on scam centers and evaluate how Beijing could use that data; and
     - Prepare a report in both classified and, if possible, unclassified form detailing the extent to which the Chinese government has ties to the individuals and criminal enterprises that run scam centers.
   - Foster cooperation with U.S. technology companies and financial intermediaries to detect and stop scams, particularly cryptocurrency investment fraud;
   - Create training programs for U.S. law enforcement on sophisticated new cyber scams and implement a national public awareness campaign;
   - Enhance law enforcement cooperation and intelligence sharing with allies and partners to dismantle scam centers, recover stolen assets, and protect victims' personal data; and
   - Implement sanctions on individuals, corporations, and foreign government officials that perpetrate and enable online scams.
5. Congress pass legislation to equip the Philippines to more effectively counter China's military aggression and malign influence and support U.S. national security goals in the region. The legislation should:
   - Support the Philippines Coast Guard (PCG) on the front lines of deterring Chinese aggression by:
     - Providing the necessary resources to the U.S. Departments of State, Defense, and Homeland Security to maintain PCG capacity-building programs funded by the Bureau of International Narcotics and Law Enforcement Affairs (INL); and
     - Ensuring the PCG is prioritized in Foreign Military Financing (FMF).
   - Enhance Philippines engagement with the Quadrilateral Security Dialogue (Quad) by directing the State Department to develop a Quad Plus dialogue and/or working group on gray zone or ICAD (illegal, coercive, aggressive, and deceptive) activities.
   - Provide the necessary resources and direct the State Department and other implementing agencies to prioritize initiatives related to:

- Cybersecurity, to counter attacks on the Philippines' government and critical infrastructure;
- Energy security and digital infrastructure, to support economic development, including near U.S. military installations, and to secure connectivity in the Indo-Pacific;
- The Luzon Economic Corridor (LEC) initiative with the United States, Japan, and the Philippines, to develop infrastructure, connectivity, and supply chains across the Luzon Island region;
- Emergency preparedness, to support disaster response and joint U.S.-Philippines defense infrastructure development; and
- Public health, in part to maintain and build goodwill with the Filipino public.

- Utilize the Quad Critical Minerals Initiative to support the Philippines' development of alternative critical minerals supply chains, including in coordination with Indonesia and other relevant ASEAN states. In coordination with partners, funding from the U.S. International Development Finance Corporation and Export-Import Bank of the United States should prioritize the development of the Philippines' domestic refining and processing capabilities and provide export credit insurance and supply chain finance solutions.
- Strengthen defense and commercial shipbuilding in the Philippines in coordination with broader efforts among Indo-Pacific allies, including South Korea and Japan, and support mechanisms to enhance maintenance, repair, and overhaul services in the Philippines.

6. Congress pass legislation to restore Radio Free Asia's (RFA) full funding and operations by providing a direct appropriation to RFA or providing funding through a grant agreement with another entity, such as the National Endowment for Democracy. The legislation should:

- Preserve RFA's ability to report on events and issues in China that are censored or unreported by Chinese state-controlled media;
- Enhance RFA's unique capacity to break through Beijing's "Great Firewall" and connect to people in China through its Mandarin, Cantonese, Tibetan, and Uyghur language services; and
- Endorse and strengthen RFA's capability to counter Chinese influence and propaganda throughout Asia by providing local-language information about China's repressive, coercive, and aggressive actions—such as incursions in the South China Sea, threats against Taiwan, and the harmful effects of Belt and Road Initiative projects.

Chapter 5: Small Islands, Big Stakes: China's Playbook in the Pacific Islands

The Commission recommends:

7. Congress pass a Pacific Islands Security Initiative bill that would:
   - Bolster U.S. Coast Guard cooperation with Pacific Island countries and provide training and resources to support Pacific Island countries' efforts to enhance law enforcement capacity, improve maritime domain awareness, and combat illegal, unreported, and unregulated (IUU) fishing;
   - Strengthen economic and security assistance to Pacific Island countries to support U.S. national security interests and the priorities of partner countries;
   - Provide dedicated funding for Voice of America and public diplomacy programs focused on investigative journalism and countering disinformation in the Pacific Islands;
   - Create rapid response teams of legal, financial, and information specialists to support efforts by Pacific Island countries to counter Chinese malign influence; and
   - Assess how to enhance U.S. deterrence in the Pacific Islands region, including the advisability of offering Compact of Free Association (COFA) agreements to additional countries.

Part III: Competition in Contested Frontiers

Chapter 6: Interlocking Innovation Flywheels: China's Manufacturing and Innovation Engine

The Commission recommends:

8. See the Commission's classified recommendation annex for a recommendation and discussion relating to U.S.-China advanced technology competition.
9. Congress establish as a strategic national objective that the United States build a resilient bioeconomy industrial base and unlock biology as a general-purpose technology before the end of the decade and support this objective through the following actions:
   - Resource the National Institute of Standards and Technology (NIST) to establish a Bio-Measurement Laboratory (BML). The BML should develop, support, and promulgate standards for biological measurements, materials, and models; advance measurement science and tools for biotechnology; and ensure U.S. standards are adopted globally as the foundation of the 21st-century bioeconomy.
   - Expand the U.S. Department of Energy's Loan Programs Office's (LPO) lending authority and capacity to include biotechnology projects. Recognizing that the biotechnology sector (outside of pharmaceuticals) faces a financing shortage that threatens U.S. competitiveness, Congress should authorize the LPO to provide loan guarantees and direct loans for bio-

technology manufacturing, infrastructure, and commercialization projects. All of these efforts should focus on scaling, not on pilot projects. This expansion should include:

- Explicit authority for the LPO to finance biotechnology projects under its other lending programs;
- Appropriations to cover the upfront costs of making biotechnology loans; and
- Faster application timelines and reduced bureaucratic requirements for biotechnology companies to obtain loans.

- Strengthen and expand the U.S. Department of Agriculture's BioPreferred program to establish the Federal Government as an anchor customer for the bioeconomy by:
  - Establishing binding multi-year procurement commitments for biobased products across federal agencies, with priority for replacing defense and infrastructure materials currently sourced from countries of concern;
  - Expanding BioPreferred program eligibility to include state, local, and tribal governments as well as universities, enabling broader adoption of biobased products;
  - Increasing appropriations for the Biorefinery, Renewable Chemical, and Biobased Product Manufacturing Assistance Program (Section 9003) loan guarantees; and
  - Directing federal agencies to set quantified targets for biobased product adoption in their supply chains and report annually on progress toward reducing strategic dependencies.

The United States currently faces a future in which it depends on China for access to the most cutting-edge biotechnology innovations, sophisticated biomanufacturing equipment, and advanced biomaterials. The coordinated investments in standards development, measurement science, and deployment financing outlined above are essential to ensure the United States leads in the transformation of biology into a general-purpose technology capable of producing up to 60 percent of physical goods in the global economy by mid-century while maintaining national security, supply chain resilience, and economic competitiveness against strategic competitors.

10. Congress strengthen the U.S. Department of Commerce, Bureau of Industry and Security's (BIS) ability to manage strategic competition with China in fast-moving technology sectors, such as leading-edge semiconductors used in artificial intelligence (AI) applications, and increase congressional oversight, including by:
    - Directing BIS to use existing authorities to require tracking technology for export-controlled advanced chips to detect and combat diversion to countries of concern;
    - Shifting the U.S. export control regime on advanced chips from a "sell" model to a "rent" model by mandating that any advanced chips above a certain threshold that are not designated as prohibited for export be accessible exclusively via

the cloud. To do this, BIS shall create a license exception in the Export Administration Regulations for renting cloud access to export-controlled AI compute infrastructure with performance capabilities above a certain threshold to entities in countries of concern:

- BIS shall determine the applicable compute threshold, with periodic adjustments as necessary to ensure the threshold adequately mitigates national security risks while keeping pace with technological developments and other trends; and
- BIS shall require licensees to implement know-your-customer (KYC) identification programs and report suspicious activity proactively to the agency when entities domiciled within or controlled by countries of concern attempt to access the cloud infrastructure outside of approved licensing procedures or when approved entities use rented cloud infrastructure for suspected military or espionage purposes.

- Directing the Administration to establish a systemic, integrated intelligence unit embedded at BIS, including analysts from the Intelligence Community, to formally integrate technical, analytic, financial, and collection expertise to improve enforcement and to report to relevant committees of Congress outlining the additional resources, authorities, capabilities, and subject matter experts needed to anticipate and counter evasion strategies;
- Directing the agency to move all items subject to a "presumption of denial" license application review standard for export to China or a Chinese entity to a "policy of denial." This would ensure the agency's policy prioritizes national security in assessing export license applications for applicable items on the Commerce Control List or for technologies provided to companies on the Entity List; and
- Establishing a whistleblower incentive program for private citizens providing information on export control violations, similar to the program available to the U.S. Department of the Treasury under 31 U.S.C. § 5323.

The recommendation seeks to address important needs in enhancing BIS's capacity to enforce export controls consistent with congressional intent in the Export Control Reform Act of 2018. It complements the Commission's economic statecraft entity recommendation in Chapter 3 for long-term strengthening of economic statecraft functions into a single entity while recognizing that implementation of such a recommendation to Congress is likely a multi-year process and BIS enforcement needs are urgent and ongoing.

11. Congress establish a "Quantum First" by 2030 national goal with a focus on quantum computational advantage in three mission-critical domains—cryptography, drug discovery, and materials science. To achieve this ambitious national goal, the Commission recommends Congress should take the following actions:

- Provide significant funding for U.S. quantum development, focused on scalable quantum computing modalities, secure communications, and post-quantum cryptography. To secure U.S. leadership, Congress should pair this funding with quantum workforce development initiatives, including expanded fellowships, talent exchange programs with allies, and dedicated curricula aligned with mission needs.
- Prioritize modernization of enabling infrastructure, including cryogenic laboratories, quantum engineering centers, and next-generation fabrication and metrology facilities. These assets are essential to converting scientific discovery into deployable systems, and many current research environments remain under-resourced or technologically outdated.
- Establish a Quantum Software Engineering Institute (QSEI) focused on developing the software foundations for scalable, secure, and interoperable quantum computing. The QSEI should also coordinate an open source ecosystem to accelerate application development and build a trusted quantum software supply chain. Modeled on the National Artificial Intelligence Research Institutes and National Manufacturing Institutes, the QSEI would ensure that U.S. quantum hardware is matched by world-class software capabilities, enabling early operational advantage across science, industry, and defense.

Whoever leads in quantum (and artificial intelligence) will control the encryption of the digital economy; enable breakthroughs in materials, energy, and medicine; and gain asymmetric and likely persistent advantage in intelligence and targeting. It is imperative that the United States treat quantum not as a research silo but as a mission-critical national capability—and act accordingly.

While the United States retains world-leading research capabilities, China has mobilized state-scale investment and industrial coordination to dominate quantum systems and standards. For the purposes of this recommendation, the Commission presumes that China is actively racing to develop cryptographically relevant quantum computing capabilities and is likely concealing the location and status of its most advanced efforts. This is a domain where first-mover advantage could yield irreversible strategic consequences, particularly given the vulnerability of current global systems that rely on public key cryptography.

The Quantum First 2030 timeline is essential to ensure the United States achieves quantum leadership before any adversary can leverage these capabilities against American interests. Quantum technologies—spanning computing, sensing, and communication—will shape the future of strategic advantage.

12. Congress enact legislation to promote investments that further three objectives: (1) continued U.S. leadership in advanced manufacturing and the associated workforce; (2) critical supply chain resilience; and (3) the security of U.S. critical infrastructure, including energy infrastructure. Such legislation should include support for programs and authorities to:

- Establish an industrial finance entity oriented toward domestic investments. Its authorities should include financing, equity investments, and demand-side mechanisms like purchase guarantees and, with respect to inputs at risk because of nonmarket practices, price floors for domestic procurement. Congress should consider a board membership structure appointed by the Speaker and Minority Leader of the House of Representatives and the Majority and Minority Leaders of the Senate;
- Reauthorize and expand, or create complementary legislation expanding, the authorities created by the CHIPS and Science Act of 2022 with respect to the three noted objectives, including:
  - Establishing funds to provide grants, loans, and loan guarantees to key strategic sectors;
  - Extending the advanced manufacturing investment tax credit to key strategic sectors;
  - Providing support to workforce development and education efforts, including the full range of skills necessary for production in the United States; and
  - Funding national hubs for research and development in key strategic sectors.
- Direct and expand procurement authorities to enable the Administration to utilize the full acquisitions toolkit to address supply chain vulnerabilities and nonmarket challenges, including by:
  - Leveraging and expanding industrial mobilization authorities;
  - Adding dual sourcing requirements to acquisition plans for key inputs, such as foundational semiconductors and printed circuit boards;
  - Providing for, where appropriate, a true-up reimbursement for U.S. manufactured products in critical sectors; and
  - Requiring services like software testing and simulation to be performed by U.S. firms on U.S.-owned servers operated in the United States.
- Procurement actions and authorities should be stated with sufficient notice and lead time to allow firms to adjust necessary supply chains, and Congress should consider a multi-step process to achieve desired outcomes with limited disruption.

The United States must continue to support sustained investment in advanced manufacturing and basic and applied research to maintain technological leadership and remain on the cutting edge of innovation. The Commission notes that China is advancing in multiple domains and continues to deploy licit and illicit means to gain a manufacturing and technological edge, which includes a coordinated and well-funded industrial policy alongside nonmarket policy distortions.

13. Congress direct the Secretary of Defense to establish a Government-Owned, Contractor-Operated Rapid Manufacturing Facility (GOCO RMF) focused on high-rate, reconfigurable production of airborne and maritime unmanned systems (both lethal and non-lethal), excluding major platforms such as ships and submarines.

    The facility should:

    - Serve as a surge-ready national asset, able to pivot between different system types based on operational need—including attritable drones, loitering munitions, autonomous surface vessels, and mission-tailored payloads;
    - Leverage modular architectures and advanced manufacturing techniques—such as additive manufacturing, robotics, and digital engineering—to enable high-mix, low-volume, or high-volume production on demand;
    - Retrain both U.S. Department of Defense personnel and the industrial workforce in the principles of rapid design, agile production, and iterative fielding, enabling a cultural shift away from long-cycle, perfect-on-paper procurement models;
    - Be operated by a competitively selected contractor or consortium with a proven track record in agile manufacturing, rapid prototyping, and defense system integration;
    - Integrate and coordinate with existing efforts—including the Defense Innovation Unit's Blue Manufacturing Initiative, the Manufacturing Innovation Institutes, and Defense Advanced Research Projects Agency (DARPA) transition partners—while serving as the unifying hub for defense-relevant production at speed; and
    - Prioritize the production of systems that can be fielded within 12 to 24 months, using iterative deployment and feedback to improve successive generations rather than deferring capability in pursuit of flawless specifications.

    In the event of conflict with China, the United States would face an adversary with an industrial base far exceeding its capacity, efficiency, and adaptability, and would confront modes of warfare that leverage China's industrial strengths and emerging capabilities in autonomy and embodied intelligence. The GOCO RMF represents an initial effort to maintain preparedness and deterrence while establishing a model for defense procurement that would better position the military services to match and exceed the pacing challenge from the People's Liberation Army.

14. Congress recognize that autonomous systems—including humanoid robots, industrial automation, and unmanned systems—represent the physical embodiment of artificial intelligence and a critical domain where the People's Republic of China is rapidly advancing. To address the challenges from China's development and deployment of autonomous systems, Congress should direct the President to establish an Interagency Task Force on Autonomous Systems, chaired by the National Security Advisor,

to coordinate federal efforts and report to Congress within 180 days with specific implementation plans requiring:

- The U.S. Department of Defense to establish a Robotics and Automation Task Force with authority to rapidly prototype and deploy autonomous systems across military logistics, maintenance, security, reconnaissance, and combat operations;
- The U.S. Department of Commerce to investigate Chinese robotics dumping under applicable trade remedy laws, lead international standards development, and expand export controls on advanced autonomous technologies to China;
- The U.S. Department of Homeland Security to assess vulnerabilities from Chinese-made autonomous systems in U.S. critical infrastructure and establish mandatory cybersecurity standards;
- The U.S. Department of Labor to launch workforce retraining programs and robotics technician certifications for workers displaced by automation;
- The U.S. Departments of Transportation, Energy, Agriculture, and Health and Human Services to accelerate regulatory approvals for autonomous vehicles, infrastructure inspection systems, precision agriculture equipment, and medical robotics;
- The U.S. Department of the Treasury to expand Committee on Foreign Investment in the United States (CFIUS) review of all Chinese investment in U.S. robotics companies and impose sanctions on Chinese robotics firms supporting the People's Liberation Army; and
- The U.S. Department of State to counter Chinese robotics exports to developing countries and lead allied coordination on autonomous weapons arms control.

China is deploying autonomous systems at scale across its economy and military while the United States remains mired in pilot programs and bureaucratic delays. These systems will transform civilian life, manufacturing, and warfare faster than current U.S. policy anticipates. Without immediate and decisive action across all departments and agencies, the United States will cede a strategic advantage that may prove impossible to recover.

Chapter 7: The Final Frontier: China's Ambitions to Dominate Space

The Commission recommends:

15. To preserve and strengthen U.S. primacy in the critical space domain as China pursues sweeping advancements across military, commercial, and civil space sectors, Congress should:
    - Increase or reallocate appropriations for the U.S. Space Force to levels necessary to achieve space control and establish space superiority against China's rapidly expanding space and counterspace capabilities.

- Direct the U.S. Department of Defense to enhance the U.S. Space Force's capacity to conduct space wargaming and develop realistic modeling and simulation of potential threats from China, including training programs for space operators on warfighting tactics, techniques, and procedures necessary for space control.
- Conduct oversight hearings and other activities to ensure the United States maintains primacy in the space domain by identifying investments in cutting-edge space technologies and assessing China's space capabilities and threats to U.S. space industrial base capacity.
- Direct the U.S. Department of Commerce, in coordination with the U.S. Departments of Defense, State, and the Treasury, to produce an unclassified report to Congress within 180 days identifying China's commercial space capabilities, the dual-use nature of Chinese space technologies, and China's commercial space industry's support to the People's Liberation Army.
- Direct the U.S. National Space Council to increase international outreach on space launch services and ensure the United States remains the partner of choice for both government and commercial space launch.
- Express support for the strategic importance of U.S. leadership in civil space exploration and direct relevant agencies to assess the progress of the Artemis Accords, evaluate risks China poses to U.S. civil space priorities, including National Aeronautics and Space Administration (NASA) programs, and ensure program delays do not undermine U.S. credibility in establishing global norms for lunar and Martian exploration.

Part IV: Exposure to China's Economic Distortions and Coercion

Chapter 8: China Shock 2.0

The Commission recommends:

16. Congress enact legislation to:
    - Establish a rebuttable "presumption of denial" with respect to foreign investment in U.S. companies that could support the acquisition by China or other foreign adversaries of the capabilities necessary to attain self-sufficiency in critical technologies or otherwise impair the economic or national security of the United States, including:
        - Investments in technology areas prioritized in China's or other foreign adversaries' industrial policies, such as Made in China 2025, and successor initiatives;
        - Investments in U.S. firms that have received funding from the U.S. Departments of Defense, Commerce, and Energy, or other U.S. government funding for projects critical to national security and competitiveness; and

- Other investments that may provide privileged access to expertise, business networks, and production methods critical to maintaining U.S. economic and technological competitiveness.

- Require the review of greenfield investments in the United States by Chinese-controlled entities to assess any potential harm to U.S. national and economic security. And, consistent with the previous provision, establish a rebuttable presumption of denial with respect to such greenfield investments if their operations would meet any of the criteria enumerated in that provision; and
- Direct the Administration to engage with allies and partners to adopt similar measures through bilateral or multilateral engagement or agreements.

The Commission has consistently provided Congress recommendations regarding the improvement of and expansion to the Committee on Foreign Investment in the United States (CFIUS), including a recommendation in 2023 and a slate of recommendations in 2017, many of which were adopted under the Foreign Investment Risk Review Modernization Act of 2018 (FIRRMA). The Commission continues to raise concerns that the current structure of foreign investment screening is insufficient to protect the United States and U.S.-developed intellectual property and that the United States needs stronger efforts to coordinate with allies and partners to guard against these emerging threats.

17. Congress develop legislation to provide for cooperation on and mutual recognition of unfair trade practices.

- The procedures could provide for a voluntary, expedited mechanism to support coordinated application of trade remedies against unfair trade practices, including but not limited to antidumping (AD) and countervailing duty (CVD) orders.
- Under this procedure, the United States and partner countries could recognize that an AD/CVD finding is a finding of an unfair foreign trade practice. The United States could then request a third-party country take action within its own market to ensure a coordinated response to the unfair trade practice, and partner countries could request similar action by the United States.

The United States and its allies and partners have multiple procedures to protect their domestic markets from unfair trade practices. Nonetheless, these procedures are lacking when the exports of domestic firms are harmed by unfair trade practices in third countries. That is, existing authorities enable the U.S. government to protect U.S. manufacturers from products dumped in their home market, but not when those same products are dumped in a third country's market. The concept of addressing unfair trade practices in third-country markets, alongside home markets, is recognized in international trade

law but, in general, has been unutilized, harming U.S. firms and the firms of U.S. allies and partners.*

18. To address the harmful consequences of the Second China Shock—the massive outpouring of subsidized, underpriced Chinese manufactured goods now flooding the world economy and threatening to undermine the prospects for industrialization and future prosperity of developing countries while denying potential markets to U.S. exporters—Congress should:

    - Direct the U.S. Department of State, in conjunction with other agencies, to prepare a report detailing the impact of China's recent export surge on the developing world, proposing U.S. and allied policies to counteract its negative effects as part of a larger strategy for blunting the growth of China's global influence, and identifying ways in which the U.S. government may employ existing statutory authorities to work with foreign countries to respond collectively to the Second China Shock; and

    - Direct the Departments of State, the Treasury, and Commerce and the U.S. Trade Representative to establish an international forum to coordinate a multilateral response to the Shock, taking into consideration issues of reciprocal market access and ensuring fair treatment for U.S. exporters in third countries.

Chapter 9: Chained to China: Beijing's Weaponization of Supply Chains

The Commission recommends:

19. Congress build U.S. pharmaceutical supply chain resilience by increasing visibility into the supply chain, as well as tracking and reducing U.S. direct and indirect dependence on Chinese active pharmaceutical ingredients (APIs) and related key starting materials (KSMs), through legislation that:

    - Amends section 3112(e) of the Coronavirus Aid, Relief, and Economic Security (CARES) Act to expand the authority of the U.S. Food and Drug Administration (FDA) to require drug manufacturers to report volume and ultimate origin of APIs and KSMs used in drugs consumed in the United States, including sourcing of Chinese content through third countries. Based on this information, the FDA should:

        - Produce a confidential report analyzing U.S. vulnerabilities to Chinese APIs and KSMs. The report should identify the proportion of U.S. drug consumption that is dependent on foreign APIs and KSMs, determine vulnerabilities, and track trends over time, including anonymized aggregates of increases or decreases in U.S. dependency on China.

*Agreement on Implementation of Article VI of the General Agreement on Tariffs and Trade 1994, April 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1A, art. 14, 1868 U.N.T.S. 201; Third-Country Dumping, 19 U.S.C. §1677k (1994); *Regulations Amending the Special Import Measures Regulations*, SOR/2023-26, *Canada Gazette*, Part II, 157, no. 5 (March 1, 2023): 396.

- Directs the FDA to identify regulatory authorities and deficiencies to support or incentivize the use of APIs and KSMs from sources with no China origin.

- Directs the Centers for Medicare and Medicaid Services (CMS) to explore the use of procurement and reimbursement authorities to protect the U.S. and allies' API and KSM markets, which could include price floor commitments in support of U.S. industry to protect investments against nonmarket practices and price manipulation.

20. To support the U.S. Department of Commerce's Supply Chain Center in addressing the lack of sufficiently fine-grained, real-time data on U.S. dependence on China for materials and intermediate goods, the relevant committees of Congress should hold hearings on the activities of the Center, the adequacy of its funding, and the ways in which its work might be improved through the incorporation of data and techniques being developed in the private sector. The Supply Chain Center should then be required to provide an annual report identifying a set of goods and materials deemed critical to national defense and/or the functioning of the civilian economy, detailing trends in U.S. dependence on China for those goods and materials, and reporting on the status of policies and programs intended to limit that dependence.

21. Congress expand and modernize applicable lending, investing, and grantmaking authorities for the U.S. International Development Finance Corporation, Export-Import Bank of the United States (EXIM), and other strategic financing vehicles established by the U.S. government to ensure these financing entities are adequately positioned to utilize significant portions of their funding to prioritize critical U.S. needs in geostrategically relevant sectors ("strategic projects"), including:

    - Supply chains for critical and emerging technologies and related enabling inputs (e.g., critical minerals, critical minerals processing, semiconductors, artificial intelligence, biotechnology, quantum information sciences, digital technology, etc.);

    - In sectors where reliance on supply chains based in China poses serious economic or national security risk to the United States, as determined by the President, in consultation with Congress; and

    - In countries of geostrategic importance to U.S.-China competition as determined by the President, in consultation with Congress, for projects relevant to such competition.

    Congress should also ensure that current limits applicable to each of these entities, including EXIM's 2 percent default cap, content requirements, and limits on types of recipients, do not unduly constrain U.S. entities from funding or advancing strategic projects.

Chapter 10: Power Surge: China's Electrification Drive and Push for Global Energy Dominance

The Commission recommends:

22. To protect the U.S. power grid from the economic and cybersecurity threats posed by Chinese-made components, Congress should:
    - Prohibit the import of energy storage systems with remote monitoring capabilities that are manufactured by or made with technology licensed from Chinese entities.
    - Allocate additional funds to the U.S. Department of Energy for grid expansion, modernization, and cybersecurity grant and loan programs and prohibit the use of those grants and loans to purchase goods or services or license technology from entities that pose a cybersecurity risk to the U.S. power grid to be designated by the Secretary of Energy, in coordination with the Secretary of Defense, Secretary of Homeland Security, the Director of the National Security Agency, and the heads of other federal departments and agencies, as the Secretary determines appropriate.
    - Direct the Department of Energy and Federal Energy Regulatory Commission to strengthen supply chain risk management requirements for interstate electric transmission utilities by:
        - Requiring utilities to identify all Chinese-origin components within their high- and medium-impact bulk electric system and protected cyber assets;
        - Developing requirements to prohibit the installation of or mitigate the cybersecurity risk posed by those components;
        - Requiring that future procurement of such cyber assets come with full software, firmware, and hardware bills of materials;
        - Mandating that interstate transmission utilities report on their use of Chinese-origin components to their distribution utility customers; and
        - Coordinating with the U.S. Department of Homeland Security and other relevant agencies to provide technical assistance to implement these requirements.
23. To support the adoption of nationwide cybersecurity standards and tools to protect the U.S. power grid from Chinese state-backed cyber actors, Congress should:
    - Require the Federal Energy Regulatory Commission (FERC), in consultation with the Secretary of Energy, the North American Electric Reliability Corporation, the Electricity Subsector Coordinating Council, and the National Association of Regulatory Utility Commissioners, to conduct a study and report on transmission and distribution utilities' adoption of minimum cybersecurity standards established pursuant to National Security Memorandum 22 or existing mandatory FERC requirements.

- Direct the U.S. Department of Energy to further authorize and fund projects at the National Laboratories to produce digital twins (virtual replicas of physical systems) for the power grid, leverage artificial intelligence to detect and patch vulnerabilities across the grid, and incorporate digital twins and artificial intelligence into cybersecurity simulations and exercises.
- Require the National Laboratories, U.S. Department of Justice, and Federal Bureau of Investigation to issue a joint report and briefing to Congress on known cybersecurity threats within the United States related to energy critical infrastructure.

Part V: Taiwan and Hong Kong

Chapter 11: Taiwan

The Commission recommends:

24. Congress direct the U.S. Department of Defense, in coordination with the U.S. Indo-Pacific Command (USINDOPACOM), to produce a report in both classified and unclassified form assessing its compliance with the legal requirement established by Congress in the Taiwan Relations Act "to maintain the capacity of the United States to resist any resort to force or other forms of coercion that would jeopardize the security, or the social or economic system, of the people on Taiwan." The report should include:

    - An assessment of U.S. capacity to respond to a Taiwan contingency;
    - An assessment of U.S. capacity to respond to other forms of coercion being used by China to threaten the security of Taiwan (e.g., China's gray zone tactics in and around Taiwan); and
    - An assessment of U.S. capacity to comply with the Taiwan Relations Act in scenarios where the United States is also engaged in responding to aggression by Russia, Iran, or North Korea in other regions.

    In each case, the report should identify any gaps that currently exist or will exist based on likely trajectories of resources and capabilities.

25. Congress direct the U.S. Department of State to work with Taiwan to open a Foreign Military Sales (FMS) case for non-weaponry support services to advance regional U.S. posture initiatives that would enhance the U.S. deterrence capacity around Taiwan.

    - The case should specifically bolster existing U.S. initiatives, such as the U.S.-Philippines Enhanced Defense Cooperation Arrangements (EDCA) on the Luzon and Palawan Islands as well as efforts in the southwestern Japanese island chain and on the Pacific Islands that recognize Taiwan.

- Under this program, Taiwan would fund projects in third countries, ultimately benefiting its own security.

26. Congress pass legislation affirming strong, bipartisan support for the Vatican-Taiwan diplomatic relationship. The legislation should:
    - Recognize that the Vatican is one of Taiwan's most significant diplomatic partners, providing essential international legitimacy and support to the people of Taiwan;
    - Express opposition to Chinese government pressure on the Holy See to sever ties with Taipei;
    - Endorse the establishment of a trilateral mechanism with Taiwan and the Vatican to advance religious freedom and human rights globally; and
    - Encourage Members of Congress to underscore U.S. support for the Vatican-Taiwan diplomatic relationship in all engagements with Vatican officials.

Chapter 12: Hong Kong

The Commission recommends:

27. Given Hong Kong has become a central global hub for sanctions evasion that supports Russia, Iran, and North Korea, Congress pass legislation to:
    - Condition Hong Kong's continued status as an official offshore U.S. dollar (USD) clearing center on compliance with U.S. sanctions, including by providing U.S. authorities full visibility into transactions conducted through Hong Kong's USD Clearing House Automated Transfer System (USD CHATS);
    - Direct the U.S. Department of the Treasury to assess the extent to which transactions in Hong Kong via USD CHATS are facilitating evasion of sanctions or export controls and determine the feasibility of replacing it with the Clearing House Interbank Payments System (CHIPS);
    - Authorize secondary sanctions for the facilitation of sanctions and export control violations by Chinese and Hong Kong financial institutions, including codifying authorities established by executive order to impose secondary sanctions on Chinese and Hong Kong financial institutions facilitating evasion on behalf of Russian, Iranian, and North Korean entities;
    - Direct the U.S. Department of Commerce, Bureau of Industry and Security (BIS) to require heightened due diligence for sales of any Common High Priority List (CHPL) items to China or Hong Kong, given China's role as primary provider of such items to Russia;
    - Provide additional resources, technology, and staff to BIS and the Treasury Department's Office of Foreign Assets Control (OFAC) for enforcement of export controls and sanctions related to Hong Kong; and

- Create a new standing cross-agency enforcement task force with respect to sanctions and export control evasion through Hong Kong, including enforcement personnel relating to money laundering, financial sanctions, and export controls, to enhance overall enforcement efforts to shut down illicit evasion networks running through Hong Kong.

28. Congress codify Executive Order 13936 on Hong Kong Normalization that was issued on July 14, 2020, along with the Secretary of State's 2020 certification as required under the United States-Hong Kong Policy Act, to ensure the continued implementation of U.S. policy in response to Beijing's dismantling of Hong Kong's autonomy and the erosion of fundamental freedoms. The Executive Order determined that the Special Administrative Region of Hong Kong is no longer sufficiently autonomous to justify differential treatment in relation to the People's Republic of China under U.S. law. The legislation should include the following provisions:

    - Permanently authorize all provisions of the Executive Order, including sanctions on individuals and entities responsible for undermining Hong Kong's autonomy;
    - Suspend Hong Kong's special trade preferences; and
    - Continue reporting requirements on the status of human rights and rule of law in Hong Kong.

    Codification would protect these measures from potential reversal by future administrations without congressional input, send a strong bipartisan signal of support for the people of Hong Kong, and reinforce U.S. commitment to upholding international obligations under the Sino-British Joint Declaration.

APPENDIX I
CHARTER

The Commission was created on October 30, 2000, by the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001, Pub. L. No. 106–398 (codified at 22 U.S.C. § 7002), as amended by:

- The Treasury and General Government Appropriations Act, 2002, Pub. L. No. 107–67 (Nov. 12, 2001);
- The Consolidated Appropriations Resolution, 2003, Pub. L. No. 108–7 (Feb. 20, 2003);
- The Science, State, Justice, Commerce, and Related Agencies Appropriations Act, 2006, Pub. L. No. 109–108 (Nov. 22, 2005);
- The Consolidated Appropriations Act, 2008, Pub. L. No. 110–161 (Dec. 26, 2007);
- The Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015, Pub. L. No. 113–291 (Dec. 19, 2014); and
- Pub. L. No. 117–286 (Dec. 27, 2022).

22 U.S.C. § 7002. United States-China Economic and Security Review Commission

(a) Purposes

The purposes of this section are as follows:

(1) To establish the United States-China Economic and Security Review Commission to review the national security implications of trade and economic ties between the United States and the People's Republic of China.

(2) To facilitate the assumption by the United States-China Economic and Security Review Commission of its duties regarding the review referred to in paragraph (1) by providing for the transfer to that Commission of staff, materials, and infrastructure (including leased premises) of the Trade Deficit Review Commission that are appropriate for the review upon the submittal of the final report of the Trade Deficit Review Commission.

(b) Establishment of United States-China Economic and Security Review Commission

(1) In general

There is hereby established a commission to be known as the United States-China Economic and Security Review Commission (in this section referred to as the "Commission").

(2) Purpose

The purpose of the Commission is to monitor, investigate, and report to Congress on the national security implications of the bilat-

eral trade and economic relationship between the United States and the People's Republic of China.

(3) Membership

The Commission shall be composed of 12 members, who shall be appointed in the same manner provided for the appointment of members of the Trade Deficit Review Commission under section 127(c)(3) of the Trade Deficit Review Commission Act (19 U.S.C. 2213 note), except that—

(A) appointment of members by the Speaker of the House of Representatives shall be made after consultation with the chairman of the Committee on Armed Services of the House of Representatives, in addition to consultation with the chairman of the Committee on Ways and Means of the House of Representatives provided for under clause (iii) of subparagraph (A) of that section;

(B) appointment of members by the President pro tempore of the Senate upon the recommendation of the majority leader of the Senate shall be made after consultation with the chairman of the Committee on Armed Services of the Senate, in addition to consultation with the chairman of the Committee on Finance of the Senate provided for under clause (i) of that subparagraph;

(C) appointment of members by the President pro tempore of the Senate upon the recommendation of the minority leader of the Senate shall be made after consultation with the ranking minority member of the Committee on Armed Services of the Senate, in addition to consultation with the ranking minority member of the Committee on Finance of the Senate provided for under clause (ii) of that subparagraph;

(D) appointment of members by the minority leader of the House of Representatives shall be made after consultation with the ranking minority member of the Committee on Armed Services of the House of Representatives, in addition to consultation with the ranking minority member of the Committee on Ways and Means of the House of Representatives provided for under clause (iv) of that subparagraph;

(E) persons appointed to the Commission shall have expertise in national security matters and United States-China relations, in addition to the expertise provided for under subparagraph (B)(i)(I) of that section;

(F) each appointing authority referred to under subparagraphs (A) through (D) of this paragraph shall—

(i) appoint 3 members to the Commission;

(ii) make the appointments on a staggered term basis, such that—

(I) 1 appointment shall be for a term expiring on December 31, 2003;

(II) 1 appointment shall be for a term expiring on December 31, 2004; and

(III) 1 appointment shall be for a term expiring on December 31, 2005;

(iii) make all subsequent appointments on an approximate 2-year term basis to expire on December 31 of the applicable year; and

(iv) make appointments not later than 30 days after the date on which each new Congress convenes;

(G) members of the Commission may be reappointed for additional terms of service as members of the Commission; and

(H) members of the Trade Deficit Review Commission as of October 30, 2000, shall serve as members of the Commission until such time as members are first appointed to the Commission under this paragraph.

(4) Retention of support

The Commission shall retain and make use of such staff, materials, and infrastructure (including leased premises) of the Trade Deficit Review Commission as the Commission determines, in the judgment of the members of the Commission, are required to facilitate the ready commencement of activities of the Commission under subsection (c) or to carry out such activities after the commencement of such activities.

(5) Chairman and Vice Chairman

The members of the Commission shall select a Chairman and Vice Chairman of the Commission from among the members of the Commission.

(6) Meetings

(A) Meetings

The Commission shall meet at the call of the Chairman of the Commission.

(B) Quorum

A majority of the members of the Commission shall constitute a quorum for the transaction of business of the Commission.

(7) Voting

Each member of the Commission shall be entitled to one vote, which shall be equal to the vote of every other member of the Commission.

(c) Duties

(1) Annual report

Not later than December 1 each year (beginning in 2002), the Commission shall submit to Congress a report, in both unclassified and classified form, regarding the national security implications and impact of the bilateral trade and economic relationship between the United States and the People's Republic of China. The report shall include a full analysis, along with conclusions and recommendations for legislative and administrative actions, if any, of the national security implications for the United States of the trade and current balances with the People's Republic of China in goods and services, financial transactions, and technology transfers. The Commission shall also take into account patterns of trade and transfers through third countries to the extent practicable.

(2) Contents of report

Each report under paragraph (1) shall include, at a minimum, a full discussion of the following:

(A) The role of the People's Republic of China in the proliferation of weapons of mass destruction and other weapon systems (including systems and technologies of a dual use nature), including actions the United States might take to encourage the People's Republic of China to cease such practices.

(B) The qualitative and quantitative nature of the transfer of United States production activities to the People's Republic of Chi-

na, including the relocation of manufacturing, advanced technology and intellectual property, and research and development facilities, the impact of such transfers on the national security of the United States (including the dependence of the national security industrial base of the United States on imports from China), the economic security of the United States, and employment in the United States, and the adequacy of United States export control laws in relation to the People's Republic of China.

(C) The effects of the need for energy and natural resources in the People's Republic of China on the foreign and military policies of the People's Republic of China, the impact of the large and growing economy of the People's Republic of China on world energy and natural resource supplies, prices, and the environment, and the role the United States can play (including through joint research and development efforts and technological assistance) in influencing the energy and natural resource policies of the People's Republic of China.

(D) Foreign investment by the United States in the People's Republic of China and by the People's Republic of China in the United States, including an assessment of its economic and security implications, the challenges to market access confronting potential United States investment in the People's Republic of China, and foreign activities by financial institutions in the People's Republic of China.

(E) The military plans, strategy and doctrine of the People's Republic of China, the structure and organization of the People's Republic of China military, the decision-making process of the People's Republic of China military, the interaction between the civilian and military leadership in the People's Republic of China, the development and promotion process for leaders in the People's Republic of China military, deployments of the People's Republic of China military, resources available to the People's Republic of China military (including the development and execution of budgets and the allocation of funds), force modernization objectives and trends for the People's Republic of China military, and the implications of such objectives and trends for the national security of the United States.

(F) The strategic economic and security implications of the cyber capabilities and operations of the People's Republic of China.

(G) The national budget, fiscal policy, monetary policy, capital controls, and currency management practices of the People's Republic of China, their impact on internal stability in the People's Republic of China, and their implications for the United States.

(H) The drivers, nature, and implications of the growing economic, technological, political, cultural, people-to-people, and security relations of the People's Republic of China's with other countries, regions, and international and regional entities (including multilateral organizations), including the relationship among the United States, Taiwan, and the People's Republic of China.

(I) The compliance of the People's Republic of China with its commitments to the World Trade Organization, other multilateral commitments, bilateral agreements signed with the United States, commitments made to bilateral science and technology programs, and any other commitments and agreements strategic to the United States (including agreements on intellectual property rights and

prison labor imports), and United States enforcement policies with respect to such agreements.

(J) The implications of restrictions on speech and access to information in the People's Republic of China for its relations with the United States in economic and security policy, as well as any potential impact of media control by the People's Republic of China on United States economic interests.

(K) The safety of food, drug, and other products imported from China, the measures used by the People's Republic of China Government and the United States Government to monitor and enforce product safety, and the role the United States can play (including through technical assistance) to improve product safety in the People's Republic of China.

(3) Recommendations of report

Each report under paragraph (1) shall also include recommendations for action by Congress or the President, or both, including specific recommendations for the United States to invoke Article XXI (relating to security exceptions) of the General Agreement on Tariffs and Trade 1994 with respect to the People's Republic of China, as a result of any adverse impact on the national security interests of the United States.

(d) Hearings

(1) In general

The Commission or, at its direction, any panel or member of the Commission, may for the purpose of carrying out the provisions of this section, hold hearings, sit and act at times and places, take testimony, receive evidence, and administer oaths to the extent that the Commission or any panel or member considers advisable.

(2) Information

The Commission may secure directly from the Department of Defense, the Central Intelligence Agency, and any other Federal department or agency information that the Commission considers necessary to enable the Commission to carry out its duties under this section, except the provision of intelligence information to the Commission shall be made with due regard for the protection from unauthorized disclosure of classified information relating to sensitive intelligence sources and methods or other exceptionally sensitive matters, under procedures approved by the Director of Central Intelligence.

(3) Security

The Office of Senate Security shall—

(A) provide classified storage and meeting and hearing spaces, when necessary, for the Commission; and

(B) assist members and staff of the Commission in obtaining security clearances.

(4) Security clearances

All members of the Commission and appropriate staff shall be sworn and hold appropriate security clearances.

(e) Commission personnel matters

(1) Compensation of members

Members of the Commission shall be compensated in the same manner provided for the compensation of members of the Trade Defi-

cit Review Commission under section 127(g)(1) and section 127(g)(6) of the Trade Deficit Review Commission Act (19 U.S.C. 2213 note).

(2) Travel expenses

Travel expenses of the Commission shall be allowed in the same manner provided for the allowance of the travel expenses of the Trade Deficit Review Commission under section 127(g)(2) of the Trade Deficit Review Commission Act.

(3) Staff

An executive director and other additional personnel for the Commission shall be appointed, compensated, and terminated in the same manner provided for the appointment, compensation, and termination of the executive director and other personnel of the Trade Deficit Review Commission under section 127(g)(3) and section 127(g)(6) of the Trade Deficit Review Commission Act. The executive director and any personnel who are employees of the United States-China Economic and Security Review Commission shall be employees under section 2105 of title 5 for purposes of chapters 63, 81, 83, 84, 85, 87, 89, and 90 of that title. [Amended by P.L. 111–117 to apply section 308(e) of the United States China Relations Act of 2000 (22 U.S.C. 6918(e)) (relating to the treatment of employees as Congressional employees) to the Commission in the same manner as such section applies to the Congressional-Executive Commission on the People's Republic of China.]

(4) Detail of government employees

Federal Government employees may be detailed to the Commission in the same manner provided for the detail of Federal Government employees to the Trade Deficit Review Commission under section 127(g)(4) of the Trade Deficit Review Commission Act.

(5) Foreign travel for official purposes

Foreign travel for official purposes by members and staff of the Commission may be authorized by either the Chairman or the Vice Chairman of the Commission.

(6) Procurement of temporary and intermittent services

The Chairman of the Commission may procure temporary and intermittent services for the Commission in the same manner provided for the procurement of temporary and intermittent services for the Trade Deficit Review Commission under section 127(g)(5) of the Trade Deficit Review Commission Act.

(f) Authorization of appropriations

(1) In general

There is authorized to be appropriated to the Commission for fiscal year 2001, and for each fiscal year thereafter, such sums as may be necessary to enable the Commission to carry out its functions under this section.

(2) Availability

Amounts appropriated to the Commission shall remain available until expended.

(g) Applicability of chapter 10 of title 5

The provisions of chapter 10 of title 5 shall apply to the activities of the Commission.

(h) Effective date

This section shall take effect on the first day of the 107th Congress.

(Pub. L. 106–398, § 1 [[div. A], title XII, § 1238], Oct. 30, 2000, 114 Stat. 1654 , 1654A–334; Pub. L. 107–67, title VI, §§ 645(a), 648, Nov. 12, 2001, 115 Stat. 556; Pub. L. 108–7, div. P, § 2(b)(1), (c)(1), Feb. 20, 2003, 117 Stat. 552; Pub. L. 109–108, title VI, § 635(b), Nov. 22, 2005, 119 Stat. 2347; Pub. L. 110–161, div. J, title I, Dec. 26, 2007, 121 Stat. 2285; Pub. L. 113–291, div. A, title XII, § 1259B(a), Dec. 19, 2014, 128 Stat. 3578.)

Amendments

2022—Subsec. (g). Pub. L. 117–286 substituted "chapter 10 of title 5" for "FACA" in the heading and "chapter 10 of title 5" for "the Federal Advisory Committee Act (5 U.S.C. App.)" in text.

2014—Subsec. (c)(2). Pub. L. 113–291 added subpars. (A) to (K) and struck out former subpars. (A) to (J) which described required contents of report.

2007—Subsec. (c)(1). Pub. L. 110–161 substituted "December" for "June".

2005—Subsec. (g). Pub. L. 109–108 amended heading and text of subsec. (g) generally. Prior to amendment, text read as follows: "The provisions of the Federal Advisory Committee Act (5 U.S.C. App.) shall not apply to the Commission."

2003—Pub. L. 108–7, § 2(b)(1)(A), inserted "Economic and" before "Security" in section catchline.

Subsec. (a)(1), (2). Pub. L. 108–7, § 2(b)(1)(B), inserted "Economic and" before "Security".

Subsec. (b). Pub. L. 108–7, § 2(b)(1)(C)(i), inserted "Economic and" before "Security" in heading.

Subsec. (b)(1). Pub. L. 108–7, § 2(b)(1)(C)(ii), inserted "Economic and" before "Security".

Subsec. (b)(3). Pub. L. 108–7, § 2(b)(1)(C)(iii)(I), which directed the amendment of introductory provisions by inserting "Economic and" before "Security", could not be executed because "Security" does not appear.

Subsec. (b)(3)(F). Pub. L. 108–7, § 2(c)(1), added subpar. (F) and struck out former subpar. (F) which read as follows: "members shall be appointed to the Commission not later than 30 days after the date on which each new Congress convenes;".

Subsec. (b)(3)(H), (4), (e)(1), (2). Pub. L. 108–7, § 2(b)(1)(C)(iii)(II), (iv), (D)(i), (ii), which directed insertion of "Economic and" before "Security", could not be executed because "Security" does not appear.

Subsec. (e)(3). Pub. L. 108–7, § 2(b)(1)(D)(iii)(II), inserted "Economic and" before "Security" in second sentence.

Pub. L. 108–7, § 2(b)(1)(D)(iii)(I), which directed the amendment of first sentence by inserting "Economic and" before "Security", could not be executed because "Security" does not appear.

Subsec. (e)(4), (6). Pub. L. 108–7, § 2(b)(1)(D)(iv), (v), which directed the amendment of pars. (4) and (6) by inserting "Economic and" before "Security", could not be executed because "Security" does not appear.

2001—Subsec. (c)(1). Pub. L. 107–67, § 648, substituted "June" for "March".

Subsec. (e)(3). Pub. L. 107–67, § 645(a), inserted at end "The executive director and any personnel who are employees of the United States-China Security Review Commission shall be employees under section 2105 of title 5 for purposes of chapters 63, 81, 83, 84, 85, 87, 89, and 90 of that title."

APPENDIX II
BACKGROUND OF COMMISSIONERS

Reva Price, Chair

Reva Price is the former Director of Outreach and Senior Advisor for former Speaker of the House Nancy Pelosi. During her more than seventeen-year tenure with Speaker Pelosi, Chair Price played a central role across the spectrum of domestic and foreign policy issues. She handled key aspects of several foreign policy portfolios with particular emphasis on China as well as the Middle East. She was also responsible for building relationships with a varied and wide segment of groups, coalitions, and non-governmental organizations, strengthening communication and awareness of the Speaker's priorities and activities to the American people. She was reappointed to the Commission by House Democratic Leader Hakeem Jeffries for a term expiring December 31, 2026.

Prior to working on Capitol Hill, Chair Price spent more than two decades working for non-profit organizations in Washington, DC engaged in both domestic and international affairs. She advocated for her organization's policy priorities to the Congress, the Administration, and International Organizations including the OSCE and the United Nations. She is a graduate of the State University of New York at Binghamton.

The Honorable Randall Schriver, Vice Chair

Mr. Randall Schriver is the Chairman of the Board of the Institute for Indo-Pacific Security (IIPS) and a partner at Pacific Solutions LLC. He is also a lecturer for Stanford University's "Stanford-in-Washington" program, is on the Board of Advisors to the Sasakawa Peace Foundation USA, and is on the Board of Directors of the US-Taiwan Business Council. Just prior, he served for two years as the Assistant Secretary of Defense for Indo-Pacific Security Affairs where he led a team of nearly one hundred professionals and was the principal advisor to the Secretary of Defense on matters related to the Indo-Pacific region.

Prior to his Senate confirmation, Mr. Schriver was one of five founding partners of Armitage International LLC, a consulting firm that specializes in international business development and strategies. He was also CEO and President of IIPS (formerly the Project 2049 Institute), a non-profit research organization dedicated to the study of security trend lines in Asia. He was also an adjunct lecturer for Stanford University's "Stanford-in-Washington" program where he taught a quarter long course on U.S. foreign policy every fall and spring for fourteen years.

Previously, Mr. Schriver served as Deputy Assistant Secretary of State for East Asian and Pacific Affairs. He was responsible for

China, Taiwan, Mongolia, Hong Kong, Australia, New Zealand, and the Pacific Islands. From 2001 to 2003, he served as Chief of Staff and Senior Advisor to the Deputy Secretary of State. From 1994 to 1998, he worked in the Office of the Secretary of Defense, including as the senior official responsible for U.S. bilateral relations with the People's Liberation Army and the bilateral security and military relationships with Taiwan.

Prior to his civilian service, he served as an active duty Navy Intelligence Officer from 1989 to 1991, including a deployment in support of Operation Desert Shield/Desert Storm. After active duty, he served in the Navy Reserves for nine years, including as Special Assistant to the Chairman of the Joint Chiefs of Staff and as an attaché at U.S. Embassies Beijing and Ulaanbaatar.

Mr. Schriver hails from Oregon and received a Bachelor of Arts degree in history from Williams College and a Master of Arts degree from Harvard University. He has won numerous military and civilian awards from the U.S. government and was recently presented with the Department of Defense Medal for Distinguished Public Service (highest civilian award). While at the State Department he was presented with the Order of the Propitious Clouds by the President of Taiwan for service promoting U.S.-Taiwan relations. He is married to Jordan Schriver, and is father to Lucas, Rory, Brody, and Mae.

Vice Chair Schriver was reappointed by Senate Republican Leader Mitch McConnell for a term expiring December 31, 2025.

Hal Brands

Dr. Hal Brands is the Henry A. Kissinger Distinguished Professor of Global Affairs at the Johns Hopkins School of Advanced International Studies (SAIS) and a senior fellow at the American Enterprise Institute. He is also a columnist for Bloomberg Opinion and a senior advisor at Macro Advisory Partners. He is the author, co-author, or editor of many books, including, *The Eurasian Century: Hot Wars, Cold Wars, and the Making of the Modern World* (2025), *The New Makers of Modern Strategy: From the Ancient World to the Digital Age*, *Danger Zone: The Coming Conflict with China* (2022), co-authored with Michael Beckley, *The Twilight Struggle: What the Cold War Teaches Us about Great-Power Rivalry Today* (2022), *The Lessons of Tragedy: Statecraft and World Order* (2019) co-authored with Charles Edel, *American Grand Strategy in the Age of Trump* (2018), *Making the Unipolar Moment: U.S. Foreign Policy and the Rise of the Post-Cold War Order* (2016), *What Good is Grand Strategy? Power and Purpose in American Statecraft from Harry S. Truman to George W. Bush* (2014), *Latin America's Cold War* (2010), *From Berlin to Baghdad: America's Search for Purpose in the Post-Cold War World* (2008), and *The Power of the Past: History and Statecraft* (co-edited with Jeremi Suri, 2015). In addition, his work has been published in *Foreign Affairs*, *Foreign Policy*, the *Wall Street Journal*, the *Washington Post*, and many other outlets.

Hal has previously served as Special Assistant to the Secretary of Defense for Strategic Planning, a member of the Secretary of State's Foreign Affairs Policy Board, and lead writer for the Commission on the National Defense Strategy for the United States. He has con-

sulted with government offices and agencies in the intelligence and national security communities.

Hal has spoken on geopolitics and foreign affairs to audiences—in government, in academia, and in the private sector—around the world.

Commissioner Brands was appointed by Senate Republican Leader Mitch McConnell for a term expiring December 31, 2026.

Aaron Friedberg

Aaron Friedberg is Professor of Politics and International Affairs at Princeton University, where he has been a member of the faculty since 1987, and is co-director of Princeton's Center for International Security Studies. He is also a non-resident senior fellow at the American Enterprise Institute and a counselor to the National Bureau of Asian Research. From 2003 to 2005 he served as a Deputy Assistant for National Security Affairs in the office of the Vice President and he was subsequently appointed to the Defense Policy Board. In 2000–2001 he was a member of a panel tasked by Congress with reviewing the CIA's analysis of China. He has conducted studies for a number of government agencies, including the Office of Net Assessment in the Office of the Secretary of Defense and the National Security Council.

In 2001–2002 Friedberg was selected as the first occupant of the Henry A. Kissinger Chair at the Library of Congress. He has been a research fellow at the Australian Strategic Policy Institute, the Norwegian Nobel Institute, the Smithsonian Institution's Woodrow Wilson International Center for Scholars in Washington, D.C., and Harvard University's Center for International Affairs. He is a member of the Council on Foreign Relations and the International Institute for Strategic Studies in London.

Friedberg is the author of several books, including *A Contest for Supremacy: China, America, and the Struggle for Mastery in Asia* (2011), *Beyond Air-Sea Battle: The Debate Over U.S. Military Strategy in Asia* (2014), and *Getting China Wrong* (2022).

Dr. Friedberg received his A.B., M.A., and Ph.D. degrees from Harvard University.

Commissioner Friedberg was reappointed by Senate Republican Leader Mitch McConnell for a term expiring December 31, 2025.

The Honorable Carte P. Goodwin

Senator Carte P. Goodwin was reappointed to the Commission by Senate Democratic Leader Chuck Schumer for a term expiring December 31, 2025.

He is an attorney with the law firm of Frost Brown Todd, LLP where he serves as the Partner-in-Charge of its Charleston office, vice chair of the Appellate Practice Group, and leader of the firm's Industry Consultants and Advisors team. Goodwin's practice includes litigation and appellate advocacy, and advising clients on government relations, regulatory matters, and commercial transactions. He currently serves as the Chair of the West Virginia Bar Appellate Committee and is a permanent member of the Judicial Conference of the U.S. Court of Appeals for the Fourth Circuit. In 2020, he was recognized by the State Bar's philanthropic association as a West

Virginia Bar Foundation Fellow, and previously served as President of the West Virginia Bar Association.

In July of 2010, then West Virginia Governor Joe Manchin III appointed Goodwin to the United States Senate to fill the vacancy caused by the passing of Senator Robert C. Byrd, where he served until a special election was held to fill the remainder of Senator Byrd's unexpired term.

From 2005 to 2009, Goodwin served four years as General Counsel to then Governor Manchin, during which time he also chaired the Governor's Advisory Committee on Judicial Nominations. In addition, Goodwin chaired the West Virginia School Building Authority and served as a member of the State Consolidated Public Retirement Board. Following his return to private practice in 2009, Goodwin was appointed to chair the Independent Commission on Judicial Reform, along with former Supreme Court Justice Sandra Day O'Connor, which was tasked with evaluating the need for broad systemic reform to West Virginia's judicial system.

Goodwin also previously worked as a law clerk for the Honorable Robert B. King of the United States Court of Appeals for the Fourth Circuit. A native of Mt. Alto, West Virginia, Goodwin received his Bachelor of Arts degree in Philosophy from Marietta College in Marietta, Ohio, in 1996 and received his Doctor of Law degree from the Emory University School of Law, graduating Order of the Coif in 1999.

Goodwin currently resides in Charleston, West Virginia, with his wife, Rochelle; son, Wesley Patrick; and daughter, Anna Vail.

Joshua Hodges

Josh Hodges is a seasoned national security and foreign policy expert with nearly two decades of experience across the White House, Congress, the executive branch, international development, and business. His career has been defined by tackling some of the more challenging problems facing national security, advancing U.S. strategy in the Western Hemisphere, and urging efforts to counter the economic and geopolitical influence of the People's Republic of China.

Hodges served as Special Assistant to the President and Senior Director at the National Security Council (NSC), where he led U.S. initiatives to expose and push back on China's malign activity across the Americas and the Caribbean. In that role, he was the U.S. government's lead on regional economic strategies designed to reduce dependency on China-backed financing until Trump left office in January 2021.

In the 118th Congress, Hodges returned to Capitol Hill as National Security Advisor to Speaker of the House Mike Johnson, holding Congress's most senior national security staff position. During his tenure, Congress played a more assertive role in foreign policy considerations and he helped shape priorities in response to multiple global crises, including support for Israel, countering expanding Russian aggression, U.S.-China strategic competition, and security threats from the southern border.

He has also served as Deputy Senior Director for Information Statecraft at the NSC, acting Assistant Administrator for Latin

America and the Caribbean at USAID, and held senior positions at the Department of Energy's National Nuclear Security Administration. He has also served at the Inter-American Development Bank on the President's executive team supporting U.S. private sector investment strategies designed to increase U.S. business opportunities and reduce dependency on China-backed financing.

With deep experience at the intersection of diplomacy, development, and defense, he is recognized for his expertise at crafting thoughtful courses of action that combat America's adversaries' ambitions and secure U.S. interests in an era of renewed great power competition.

Hodges has chaired interagency working groups, testified before Congress, and developed whole-of-government responses to emerging threats. He was raised in Mexico and is fluent in Spanish, he holds a master's degree in National Security and Strategic Studies from the Naval War College and a B.A. in International Affairs from LSU.

Commissioner Hodges was appointed by Speaker Mike Johnson for a term expiring December 31, 2026.

Michael Kuiken

Mike Kuiken is a Distinguished Visiting Fellow at Stanford University's Hoover Institution and serves as a Commissioner on the U.S.-China Economic and Security Review Commission. He is an advisor to the Special Competitive Studies Project (SCSP) and a member of Anthropic's National Security and Public Sector Advisory Council. He also consults with CEOs, boards, and senior leaders across investment, AI, defense, technology, and multinational firms globally.

Mike previously served as Senate Majority Leader Schumer's National Security Advisor, holding the Senate's most senior national security staff role. He crafted and led the successful campaign to secure passage of the CHIPS and Science Act and played a key role in establishing and managing the Senate's Artificial Intelligence Insight Forums.

Prior to joining Senator Schumer's team, Mike spent more than 12 years as a professional staff member on the Senate Armed Services Committee. He began his career on the staff of the late Senator Carl Levin in the summer of 2001.

Mike's career has spanned America's most consequential national security challenges of the past two decades—from the wars in Afghanistan and Iraq through the rise of ISIS to today's strategic competition with China. He has shaped legislative and policy responses to the Arab Spring, the Syrian civil war, Russia's illegal invasion of Ukraine, and evolving cyber threats. His work has taken him to over 80 countries and every major conflict zone since 9/11, bringing firsthand perspective to U.S. national security policy.

Mike earned his B.A. in Political Science and Economics from Calvin University and his M.A. in International Commerce and Policy from George Mason University.

Commissioner Kuiken was appointed to the Commission by Senate Democratic Leader Chuck Schumer for a term expiring December 31, 2025.

Leland R. Miller

Commissioner Leland Miller is the co-founder and CEO of China Beige Book.

A noted authority on China's economy and financial system, he is a frequent commentator on major media outlets and has served as guest host of two of the financial world's top morning news shows, CNBC Squawk Box and Bloomberg Surveillance. His work is featured regularly in the *Wall Street Journal*, *New York Times*, *Financial Times*, *Washington Post* and others.

Before co-founding China Beige Book in 2010, Leland was a capital markets attorney based out of New York and Hong Kong and worked on the deal team at a global investment bank. He holds a law degree from the University of Virginia School of Law, where he was Hardy C. Dillard fellow and editor-in-chief of the International Law Journal; a master's degree in Chinese History from Oxford University (St. Antony's College); a BA in European History from Washington & Lee University; and a graduate Chinese language fellowship from Tunghai University (Taiwan). An elected life member of the Council on Foreign Relations, he returned to W&L as the Williams School's Executive-in-Residence in 2015.

Commissioner Miller was appointed by Speaker Mike Johnson for a term expiring December 31, 2025.

Livia Shmavonian

Livia has served as a leading voice in shaping international trade, economic and national security policy as Director of the White House Made in America Office, Senior Advisor to the Under Secretary for International Trade at the Department of Commerce, Democratic Staff Director of the Finance Subcommittee on Trade Customs and Global Competitiveness and Senior Advisor to Senator Bob Casey.

An expert on issues at the intersection of economic and national security, Livia has navigated complex issues, including building and maintaining secure and resilient supply chains, addressing non-market economy practices, and supporting U.S. firms facing unfair trade practices.

As Director of the Made in America Office, Livia led administration-wide oversight of domestic content laws and standards, worked extensively with the National Economic Council, National Security Council and executive branch agencies on international competitiveness, including critical supply chains, non-market economy practices, and emerging technologies. Prior to joining the White House, Livia served as Senior Advisor to the Under Secretary for International Trade at the Department of Commerce. In this role, Livia was a key advisor on U.S. negotiations and high-level engagement between U.S. officials, foreign governments and stakeholders. During her time as Staff Director for the Finance Subcommittee on Trade, Customs and Global Competitiveness, Livia led the subcommittee's efforts to highlight the multifaceted economic and national security challenges posed by China, including through hearings on overcapacity and China's economic coercion practices. As Senior Advisor to Senator Casey, Livia led policy efforts on outbound investment screening.

During her time as a congressional aide, Livia also worked on a range of financial services and banking policy issues including digital currency and informal value transfer systems and CFTC matters.

Commissioner Shmavonian was appointed by Senate Democratic Leader Chuck Schumer for a term expiring December 31, 2026.

Cliff Sims

Commissioner Cliff Sims served as Deputy Director of National Intelligence for Strategy and Communications, helping to oversee the 18 agencies of the U.S. intelligence community (IC) and playing an integral role in shifting the IC's funding and focus toward the threat of a rising and adversarial China. After the 2024 presidential election, Sims led the Trump Transition for the Central Intelligence Agency. He was previously Special Assistant to the President and Director of White House Message Strategy. Commissioner Sims has appeared on Fox News, CNN, MSNBC, CBS, and ABC, and his opinions on national security, foreign policy, and current events have been published in The Wall Street Journal, Newsweek, The National Interest, and numerous other publications.

Commissioner Sims graduated Magna Cum Laude from the University of Alabama with a degree in Political Science and received an Executive Certificate in Public Leadership from Harvard University's John F. Kennedy School of Government.

Commissioner Sims was appointed by Speaker Mike Johnson for a term expiring December 31, 2025.

Chris Slevin

Chris Slevin advises companies, foundations, and nonprofits on the intersection of workforce and technology issues. He served as Chief of Staff at the U.S. Department of Commerce under Secretary Gina Raimondo where he led Commerce through the agency's expanded role in technology and national security and managed a nearly ten-fold budget increase through the execution of new legislation, including the CHIPS and Science Act. President Biden had earlier appointed Chris as Deputy Assistant to the President for Legislative Affairs, where he focused on passage of bipartisan infrastructure legislation, veterans health legislation, and the CHIPS and Science Act. Earlier he served in the U.S. Senate as a senior policy advisor for Senator Sherrod Brown and Senator Cory Booker. Chris was Vice President for the Economic Innovation Group and began his policy career at Public Citizen as communications and deputy director of its global trade division.

Commissioner Slevin was appointed by House Democratic Leader Hakeem Jeffries for a term expiring December 31, 2026.

The Honorable Jonathan N. Stivers

Commissioner Jonathan Stivers has more than 25 years of high-level foreign policy experience in the Congress and the Administration specializing in U.S.-China relations, Asian affairs, national security, trade and economics, international development, and human rights.

Jon currently is the U.S. Director at the Committee for Freedom in Hong Kong (CFHK) Foundation. He recently served as the Minority Staff Director on the Select Committee on the Strategic Competition Between the U.S. and Chinese Communist Party and as a Professional Staff Member on the House State-Foreign Operations Appropriations Subcommittee overseeing the budgets for the State Department and the U.S. Agency for International Development (USAID). He also served as the Staff Director on the Congressional-Executive Commission on China where he spearheaded the Uyghur Forced Labor Prevention Act and legislation on Tibet and Hong Kong while leading a staff of 14 researchers and analysts in support of annual reports and policy recommendations.

In the Obama Administration, Jon served as the USAID Assistant Administrator for the Bureau for Asia. In this Senate-confirmed position he managed a budget of approximately $1.2 billion in foreign assistance and led a staff of approximately 1,200 development professionals in 32 countries in East Asia and the Pacific Islands, South Asia, and Central Asia. He testified before Congressional committees on almost two dozen occasions on topics related to the Asia-Pacific Rebalance policy, China's Belt and Road Initiative, and on health, development, humanitarian, and democracy promotion initiatives in the region.

Prior to the Executive Branch, Jon served as Senior Advisor to Speaker Pelosi for 15 years. He played a leadership role on numerous foreign policy initiatives related to China and the Asia-Pacific region, trade, currency manipulation, and human rights while serving in the offices of the Speaker, Democratic Leader and Whip. In addition, he was a Senior Legislative Assistant to Rep. Pelosi when she was the Ranking Member of the State-Foreign Operations Appropriations Subcommittee and Jon was a leader in the effort to defeat China PNTR/WTO accession. He also worked in the Office of the Democratic Whip for former Rep. David Bonior (MI).

Jon earned a Masters of International Policy and Practice from The Elliott School of International Affairs at The George Washington University in Asian Affairs and a Bachelor of Arts from James Madison College at Michigan State University in International Relations.

Commissioner Stivers was appointed by House Democratic Leader Hakeem Jeffries for a term expiring December 31, 2025.

Michael Castellano, Executive Director

Mike Castellano joined the Commission as Executive Director in May 2024. Previously, he was serving as Senior Advisor to the Under Secretary of Commerce for Industry & Security (BIS), where he led various special projects and stakeholder outreach relating to export control policy and the Information and Communications Technology and Services (ICTS) authority for the Office of the Under Secretary.

Mike spent the prior 20 years focused heavily on international trade policy, including extensive work on China. Ten of those years were as Vice President, Government Relations at the Walt Disney Company, focusing on Disney's international policy agenda. While working for Disney he served on the International Trade Advisory Committee for Intellectual Property, advising the Department

of Commerce and the U.S. Trade Representative on international trade policy. Before Disney, Mike spent ten years on Capitol Hill. Six of those years he worked for the Senate Majority/Minority Leader ending as Senior Counsel & Senior Policy Advisor, where he was responsible for issues of international trade and related international economic policy, including a significant focus on China, intellectual property rights and cyber security (commercial side), among other areas. The previous four years Mike worked dual-hatted as Trade Counsel for the Committee on Ways & Means (Minority) and Tax & Trade Counsel for a senior Member on Ways & Means, covering a wide range of international trade policy and tax issues.

Michael started his career clerking for Judge Francis Murnaghan of the U.S. Court of Appeals for the Fourth Circuit, followed by a stint practicing international trade law at petitioner's law firm Dewey Ballantine, LLP. He received his J.D. magna cum laude from Harvard Law School, M.A.L.D. from the Fletcher School of Law and Diplomacy, and B.A. with honors in political science from Johns Hopkins University.

APPENDIX III

PUBLIC HEARINGS OF THE COMMISSION

Full transcripts and written testimonies are available online at the Commission's website: *www.USCC.gov*.

February 6, 2025: Public Hearing on "Made in China 2025—Who Is Winning?" Washington, DC

Commissioners present: Hal Brands; Aaron Friedberg; Hon. Carte P. Goodwin; Michael Kuiken (Hearing Co-Chair); Leland R. Miller; Reva Price, Chair; Hon. Randall Schriver, Vice Chair (Hearing Co-Chair); Cliff Sims; Hon. Jonathan N. Stivers.

Witnesses: Drew Endy, Hoover Institution and Stanford University; Richard Aboulafia, AeroDynamic Advisory; Sunny Cheung, Jamestown Foundation; Tim Khang, Strider Technologies; Emily de La Bruyère, Horizon Advisory and Foundation for Defense of Democracies; Hanna Dohmen, Center for Security and Emerging Technology; David Lin, Special Competitive Studies Project; Liza Tobin, Garnaut Global and Jamestown Foundation; Barry Naughton, University of California San Diego; Kyle Chan, Princeton University.

February 20, 2025: Public Hearing on "An Axis of Autocracy? China's Relations with Russia, Iran, and North Korea" Washington, DC

Commissioners present: Hal Brands; Aaron Friedberg (Hearing Co-Chair); Hon. Carte P. Goodwin; Michael Kuiken; Leland R. Miller; Reva Price, Chair; Hon. Randall Schriver, Vice Chair; Cliff Sims; Hon. Jonathan N. Stivers (Hearing Co-Chair).

Witnesses: Andrea Kendall-Taylor, Center for a New American Security; Christopher Walker, National Endowment for Democracy; Christopher Chivvis, Carnegie Endowment for International Peace; Kimberly Donovan, Atlantic Council; Elina Ribakova, Peterson Institute for International Economics; Anthony Ruggiero, Foundation for Defense of Democracies; Elizabeth Wishnick, Center for Naval Analyses; Jemima Baar, independent researcher; Jake Rinaldi, U.S. Army War College; Sheena Chestnut Greitens, University of Texas at Austin.

March 20, 2025: Public Hearing on "Crossroads of Competition: China in Southeast Asia and the Pacific Islands" Washington, DC

Commissioners present: Hal Brands; Aaron Friedberg; Hon. Carte P. Goodwin; Michael Kuiken; Leland R. Miller; Reva Price, Chair (Hearing Co-Chair); Hon. Randall Schriver, Vice Chair (Hearing Co-Chair); Cliff Sims; Hon. Jonathan N. Stivers.

Witnesses: Prashanth Parameswaran, Wilson Center; Lynn Kuok, Brookings Institution; Graeme Smith, Australian National University; Gregory Poling, Center for Strategic and International Studies; Jason Tower, United States Institute of Peace; Cleo Paskal, Foundation for Defense of Democracies; Vikram Nehru, Johns Hopkins University School of Advanced International Studies; Alvin Camba, Associated Universities Incorporated; Guanie Lim, National Graduate Institute for Policy Studies.

April 3, 2025: Public Hearing on "The Rocket's Red Glare: China's Ambitions to Dominate Space" Washington, DC

Commissioners present: Hal Brands; Aaron Friedberg; Michael Kuiken (Hearing Co-Chair); Leland R. Miller; Reva Price, Chair; Hon. Randall Schriver, Vice Chair; Cliff Sims (Hearing Co-Chair); Hon. Jonathan N. Stivers.

Witnesses: General B. Chance Salzman, U.S. Space Force; Brien Alkire, RAND Corporation; Blaine Curcio, Orbital Gateway Consulting; Victoria Samson, Secure World Foundation; Dave Cavossa, Commercial Space Federation; Andrew Cox, Fourspoke LLC.

April 24, 2025: Public Hearing on "China's Domestic Energy Challenges and Its Growing Influence over International Energy Markets" Washington, DC

Commissioners present: Hal Brands (Hearing Co-Chair); Aaron Friedberg; Hon. Carte P. Goodwin (Hearing Co-Chair); Michael Kuiken; Leland R. Miller; Reva Price, Chair; Livia Shmavonian.

Witnesses: Michal Meidan, Oxford Institute for Energy Studies; David Fishman, Lantau Group; Erica Downs, Columbia University; Kate Logan, Asia Society Policy Institute; Patrick Miller, Ampyx Cyber; Brian Menell, TechMet; Cory Combs, Trivium China.

June 5, 2025: Public Hearing on "Dominance by Design: China Shock 2.0 and the Supply Chain Chokepoints Eroding U.S. Security" Washington, DC

Commissioners present: Aaron Friedberg; Hon. Carte P. Goodwin; Joshua Hodges; Michael Kuiken; Leland R. Miller (Hearing Co-Chair); Reva Price, Chair; Hon. Randall Schriver, Vice Chair; Livia Shmavonian (Hearing Co-Chair); Cliff Sims; Chris Slevin; Hon. Jonathan N. Stivers.

Witnesses: Adam Wolfe, Absolute Strategy Research; Nora Todd, independent expert, formerly with National Security Council and U.S. Trade Representative; Stephen Schondelmeyer, University of Minnesota; Jeroen Groenewegen-Lau, Mercator Institute for China Studies; Sarah Stewart, Silverado Policy Accelerator; David Schild, Printed Circuit Board Association of America; Monica Gorman, Crowell Global Advisors; Bradley Martin, RAND Corporation.

APPENDIX IIIA

LIST OF WITNESSES TESTIFYING BEFORE THE COMMISSION

2025 Hearings

Full transcripts and written testimonies are available online at the Commission's website: *www.USCC.gov*.

Alphabetical Listing of Witnesses Testifying before the Commission

Witness Name	Witness Affiliation	Hearing Date
Aboulafia, Richard	AeroDynamic Advisory	February 6, 2025
Alkire, Brien	RAND Corporation	April 3, 2025
Baar, Jemima	independent researcher	February 20, 2025
Camba, Alvin	Associated Universities Incorporated	March 20, 2025
Cavossa, Dave	Commercial Space Federation	April 3, 2025
Chan, Kyle	Princeton University	February 6, 2025
Chestnut Greitens, Sheena	University of Texas at Austin	February 20, 2025
Cheung, Sunny	Jamestown Foundation	February 6, 2025
Chivvis, Christopher	Carnegie Endowment for International Peace	February 20, 2025
Combs, Cory	Trivium China	April 24, 2025
Cox, Andrew	Fourspoke LLC	April 3, 2025
Curcio, Blaine	Orbital Gateway Consulting	April 3, 2025
de La Bruyère, Emily	Horizon Advisory and Foundation for Defense of Democracies	February 6, 2025
Dohmen, Hanna	Center for Security and Emerging Technology	February 6, 2025
Donovan, Kimberly	Atlantic Council	February 20, 2025
Downs, Erica	Columbia University	April 24, 2025
Endy, Drew	Hoover Institution and Stanford University	February 6, 2025

Alphabetical Listing of Witnesses Testifying before the Commission—*Continued*

Witness Name	Witness Affiliation	Hearing Date
Fishman, David	Lantau Group	April 24, 2025
Gorman, Monica	Crowell Global Advisors	June 5, 2025
Groenewegen-Lau, Jeroen	Mercator Institute for China Studies	June 5, 2025
Kendall-Taylor, Andrea	Center for a New American Security	February 20, 2025
Khang, Tim	Strider Technologies	February 6, 2025
Kuok, Lynn	Brookings Institution	March 20, 2025
Lim, Guanie	National Graduate Institute for Policy Studies	March 20, 2025
Lin, David	Special Competitive Studies Project	February 6, 2025
Logan, Kate	Asia Society Policy Institute	April 24, 2025
Martin, Bradley	RAND Corporation	June 5, 2025
Meidan, Michal	Oxford Institute for Energy Studies	April 24, 2025
Menell, Brian	TechMet	April 24, 2025
Miller, Patrick	Ampyx Cyber	April 24, 2025
Naughton, Barry	University of California San Diego	February 6, 2025
Nehru, Vikram	Johns Hopkins University School of Advanced International Studies	March 20, 2025
Parameswaran, Prashanth	Wilson Center	March 20, 2025
Paskal, Cleo	Foundation for Defense of Democracies	March 20, 2025
Poling, Gregory	Center for Strategic and International Studies	March 20, 2025
Ribakova, Elina	Peterson Institute for International Economics	February 20, 2025
Rinaldi, Jake	U.S. Army War College	February 20, 2025
Ruggiero, Anthony	Foundation for Defense of Democracies	February 20, 2025
Saltzman, Gen. B. Chance	U.S. Space Force	April 3, 2025
Samson, Victoria	Secure World Foundation	April 3, 2025
Schild, David	Printed Circuit Board Association of America	June 5, 2025
Schondelmeyer, Stephen	University of Minnesota	June 5, 2025

Alphabetical Listing of Witnesses Testifying before the Commission—*Continued*

Witness Name	Witness Affiliation	Hearing Date
Smith, Graeme	Australian National University	March 20, 2025
Stewart, Sarah	Silverado Policy Accelerator	June 5, 2025
Tobin, Liza	Garnaut Global and Jamestown Foundation	February 6, 2025
Todd, Nora	independent expert, formerly with National Security Council and U.S. Trade Representative	June 5, 2025
Tower, Jason	United States Institute of Peace	March 20, 2025
Walker, Christopher	National Endowment for Democracy	February 20, 2025
Wishnick, Elizabeth	Center for Naval Analyses	February 20, 2025
Wolfe, Adam	Absolute Strategy Research	June 5, 2025

APPENDIX IV
LIST OF RESEARCH MATERIAL

Contracted and Staff Research Reports Released in Support of the 2025 Annual Report

Disclaimer

The reports listed in this appendix were prepared to support the ongoing research and deliberations of the Commission. They have been posted to the Commission's website to promote greater public understanding of the issues addressed by the Commission in its ongoing assessment of U.S.-China economic relations and their implications for U.S. national security, as mandated by Public Law No. 106–398, and amended by Public Laws No. 107–67, No. 108–7, No. 109–108, No. 110–161, No. 113–291, and No. 117–286. The posting of these reports to the Commission's website does not imply an endorsement by the Commission or any individual Commissioner of the views or conclusions expressed therein.

Contracted Reports

China's Remote Sensing
Prepared for the Commission by Tate Nurkin, Christian Le Miere, Chris Eusebi, Stephen Rodriguez, Hassan Almaala, Andrew Gonzales
OTH Intelligence Group LLC
December 2024
https://www.uscc.gov/research/chinas-remote-sensing

Commission Spotlights

China's Exploitation of Scam Centers in Southeast Asia
July 2025
https://www.uscc.gov/research/chinas-exploitation-scam-centers-southeast-asia

Staff Research Reports, Issue Briefs, and Backgrounders

China's Position on Russia's Invasion of Ukraine
April 2022 to August 2025 (Periodically updated)
https://www.uscc.gov/research/chinas-position-russias-invasion-ukraine

PRC in International Organizations
May 2025 (Periodically updated)
https://www.uscc.gov/research/prc-international-organizations

Chinese Companies Listed on Major U.S. Stock Exchanges
March 2025 (Periodically updated)
https://www.uscc.gov/research/chinese-companies-listed-major-us-stock-exchanges

China Bulletins

The Commission periodically publishes a China Bulletin written by Commission staff. The Bulletins are accessible on the Commission's website at: *https://www.uscc.gov/research*.

APPENDIX V

CONFLICT OF INTEREST AND LOBBYING DISCLOSURE REPORTING

The Commission seeks to hold itself to the highest standards of transparency in carrying out its mission. In accordance with its policy for avoiding conflicts of interest, Commissioners who believe they have an actual or perceived conflict of interest must recuse themselves from the source or subject matter of the conflict. The following Commissioners recused themselves from the portions of the 2025 Report cycle below.

- Commissioner Carte P. Goodwin recused himself from Commission discussions or involvement in matters involving TikTok, Inc., or ByteDance, Inc.

Lobbying disclosure reports filed by any Commissioners who engage in "lobbying activities" as defined by the Lobbying Disclosure Act in connection with their outside employment activities may be accessed via public databases maintained by the House (*https://lobbyingdisclosure.house.gov/*) and Senate (*https://lda.senate.gov/system/public/*).

APPENDIX VI

ACRONYMS AND ABBREVIATIONS

ACFTA	ASEAN-China Free Trade Area
AD/CVD	antidumping and countervailing duty
ADAS	Advanced Driving Assistance System
ADB	Asian Development Bank
ADIA	Abu Dhabi Investment Authority
ADIZ	air defense identification zone
AfSA	African Space Agency
AGOA	African Growth and Opportunity Act
AI	artificial intelligence
AIS	automatic identification system
AmCham HK	American Chamber of Commerce in Hong Kong
AMR	antimicrobial resistance
API	active pharmaceutical ingredient
APT	advanced persistent threat
ASAT	anti-satellite weapon
ASEAN	Association of Southeast Asian Nations
ATP	assembly, testing, and packaging
BDS	BeiDou Navigation Satellite System
BESS	battery energy storage system
BIS	Bureau of Industry and Security
BML	Bio-Measurement Laboratory
BRI	Belt and Road Initiative
BRICS	Brazil, Russia, India, China, South Africa, Egypt, Ethiopia, Iran, Saudi Arabia, and the United Arab Emirates
C2	command and control
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CAE	Chinese Academy of Engineering
CALT	China Academy of Launch Vehicle Technology
CARES Act	Coronavirus Aid, Relief, and Economic Security Act
CASC	China Aerospace Science and Technology Corporation
CASIC	China Aerospace Science and Industry Corporation
CAST	China Academy of Space Technology
CATL	Contemporary Amperex Technology Co., Limited
CBDC	central bank digital currency
CCDI	Central Commission for Discipline Inspection
CCG	Chinese Coast Guard

CCP	Chinese Communist Party
CELAC	Community of Latin American and Caribbean States
CEPA	Closer Economic Partnership Agreement
CFA	Court of Final Appeal
CFIUS	Committee on Foreign Investment in the United States
CGTN	China Global Television Network
CHIPS	Clearing House Interbank Payments System
CHIPS	Creating Helpful Incentives to Produce Semiconductors
CHPL	Common High Priority List
CIO	operator of critical infrastructure
CLTC	China Satellite Launch and Tracking Control General
CMAC	Cambodian Mine Action Center
CMC	Central Military Commission
CMS	Centers for Medicare and Medicaid Services
CNC	computer numerically controlled
COFA	Compacts of Free Association
CPI	consumer price index
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
CSSTA	Cross-Strait Services Trade Agreement
CXMT	ChangXin Memory Technologies
DA-ASAT	direct-ascent anti-satellite
DARPA	Defense Advanced Research Projects Agency
DBTL	design-build-test-learn
DEPA	Digital Economy Partnership Agreement
DI	drug intermediates
DMF	Drug Master File
DOD	Department of Defense
DOE	Department of Energy
DPP	Democratic Progressive Party
DPRK	Democratic People's Republic of Korea
DRAM	dynamic random-access memory
DSR	Digital Silk Road
ECFA	Economic Cooperation Framework Agreement
ECRA	Export Control Reform Act of 2018
EDA	electronic design automation
EDCA	Enhanced Defense Cooperation Agreement
EEA	European Economic Area
EEZ	exclusive economic zone
E-ISAC	Electricity Information Sharing and Analysis Center
EO	electro-optical
EO	Executive Order
ETF	exchange-traded fund
EU	European Union
EV	electric vehicle
EW	electronic warfare
EXIM	Export-Import Bank of the United States
FAS	Freely Associated States

FDA	Food and Drug Administration
FDI	foreign direct investment
FERC	Federal Energy Regulatory Commission
FIRRMA	Foreign Investment Risk Review Modernization Act of 2018
FMS	Foreign Military Sales
FOCAC	Forum for China-Africa Cooperation
FONOP	freedom of navigation operation
FTA	free trade agreement
GAC	General Administration of Customs
GBA	Greater Bay Area
GCC	Gulf Cooperation Council
GCI	Global Civilization Initiative
GDI	Global Development Initiative
GDP	gross domestic product
GEI	Global Energy Interconnection
GEO	geostationary orbit
GGF	government guidance fund
GGI	Global Governance Initiative
GOCO	Government-Owned, Contractor-Operated
GPS	Global Positioning System
GPSCF	Global Public Security Cooperation Forum
GPU	graphics processing unit
GSI	Global Security Initiative
GW	gigawatt
HDI	high-density interconnect
HIMARS	High Mobility Artillery Rocket System
HKD	Hong Kong dollar
HKEX	Hong Kong Stock Exchange
HKMA	Hong Kong Monetary Authority
IAEA	International Atomic Energy Agency
IC	Intelligence Community
ICAD	illegal, coercive, aggressive, and deceptive
ICBM	intercontinental ballistic missile
ICE	internal combustion engine
ICT	information communication technology
IDAR	Introduce, Digest, Assimilate, and Re-Innovate
IDM	integrated device manufacturer
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
ILRS	International Lunar Research Station
IMO	International Maritime Organization
IP	intellectual property
IPEF	Indo-Pacific Economic Framework for Prosperity
IPO	initial public offering
ISO	International Organization for Standardization
ISR	intelligence, surveillance, and reconnaissance
IT	information technology
ITA	U.S. International Trade Administration
ITU	International Telecommunication Union
IUU	illegal, unreported, and unregulated
JCPOA	Joint Comprehensive Plan of Action
JPY	Japanese yen

JV	joint venture
KMT	Kuomintang
KSM	key starting material
kWh	kilowatt-hour
KYC	know-your-customer
LAC	Line of Actual Control
LEC	Luzon Economic Corridor
LEO	low Earth orbit
LFP	lithium iron phosphate
LGFV	local government financing vehicle
LNG	liquified natural gas
LPO	Loan Programs Office
MCF	Military-Civil Fusion
MIC2025	Made in China 2025
MIIT	Ministry of Industry and Information Technology
MOFCOM	Ministry of Commerce
MP	Mountain Pass
MPS	Ministry of Public Security
NASA	National Aeronautics and Space Administration
NASAMS	National Advanced Surface-to-Air Missile Systems
NATO	North Atlantic Treaty Organization
NDC	National Drug Code
NDRC	National Development and Reform Commission
NERC	North American Electric Reliability Corporation
NEV	new energy vehicle
NIST	National Institute of Standards and Technology
NPT	Nuclear Non-Proliferation Treaty
NSP	New Southbound Policy
NSR	Northern Sea Route
NTD	New Taiwan dollar
NYSE	New York Stock Exchange
OECD	Organisation for Economic Co-operation and Development
OEM	original equipment manufacturer
OFAC	Office of Foreign Assets Control
OLED	organic light-emitting diode
OSNS	Office for Safeguarding National Security
PBOC	People's Bank of China
PCAOB	U.S. Public Company Accounting Oversight Board
PCB	printed circuit board
PCG	Philippines Coast Guard
PIC	Pacific Island country
PLA	People's Liberation Army
pLEO	proliferated low Earth orbit
PMC	private military company
PNT	position, navigation, and timing
PPI	producer price index
PPP	purchasing power parity
PRC	People's Republic of China
PTI	Pacific Trade Invest

PUC	Public Utility Commission
QSEI	Quantum Software Engineering Institute
Quad	Quadrilateral Security Dialogue
R&D	research and development
RATS	Regional Anti-Terrorist Structure
RCEP	Regional Comprehensive Economic Partnership
RDA	research, development, and acquisition
REE	rare earth element
REFORPAC	Resolute Force Pacific
RFA	Radio Free Asia
RIMPAC	Rim of the Pacific
RLR	reusable launch rocket
RLV	reusable launch vehicle
RMB	renminbi
ROO	rule of origin
RPO	rendezvous and proximity operation
SAMR	State Administration for Market Regulation
SAR	synthetic aperture radar
SAST	Shanghai Academy of Spaceflight Technology
SCO	Shanghai Cooperation Organization
SDR	special drawing right
SECM	Shanghai Engineering Center for Microsatellites
SETCZone	Suez Economic and Trade Cooperation Zone
SHTC	Strategic High-Tech Commodities
SME	small and medium-sized enterprise
SMIC	Semiconductor Manufacturing International Corporation
SOE	state-owned enterprise
SSBN	ballistic missile nuclear submarine
SSF	Strategic Support Force
SSPS	space solar power satellites
SSST	Shanghai Spacecom Satellite Technology
STEM	science, technology, engineering, and mathematics
SWIFT	Society for Worldwide Interbank Financial Telecommunication
THAAD	Terminal High Altitude Area Defense
TSMC	Taiwan Semiconductor Manufacturing Company Limited
TT&C	telemetry, tracking, and control
TWh	terawatt-hour
UAE	United Arab Emirates
UAV	unmanned aerial vehicle
UN	United Nations
UNCLOS	UN Convention on the Law of the Sea
USAID	U.S. Agency for International Development
USD CHATS	USD Clearing House Automated Transfer System
USGS	U.S. Geological Survey
USINDOPACOM	U.S. Indo-Pacific Command
VC	venture capital
VEU	Validated End-User

VOA	Voice of America
WMD	weapons of mass destruction
WTO	World Trade Organization
YMTC	Yangtze Memory Technologies Corp
YTD	year-to-date

2025 COMMISSION STAFF

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ACKNOWLEDGEMENTS

The Commission would like to express its deep appreciation to those who testified as expert witnesses, the researchers and analysts who prepared papers under contract, and the representatives from the executive branch and others who briefed the Commissioners on a wide array of economic and security issues. All of these efforts informed the Commission and the public debates on issues vital to ongoing U.S.-China relations.

The Commission offers its special thanks to Ambassador MaryKay L. Carlson, U.S. Embassy in Manila; then-Ambassador Kamala S. Lakhdhir, U.S. Embassy in Jakarta; Ambassador Marc E. Knapper, U.S. Embassy in Hanoi; and Chargé d'Affaires Bridgette L. Walker, U.S. Embassy in Phnom Penh, and their staffs for their outstanding support of the Commission's fact-finding trips to Southeast Asia this year. The Commission also extends special thanks to interlocutors from Amazon Web Services, the California Institute of Technology, Google Quantum AI, HRL Laboratories, the Jet Propulsion Laboratory, and the UCLA Center for Quantum Science & Engineering for their support of the Commission's quantum information sciences fact-finding trip this year.

The Commissioners are deeply grateful for the service and expertise of the staff who develop materials for our hearings, research papers, and Annual Report. Each person brings a unique perspective, expertise, and dedication to the Commission and country, which every Commissioner has benefited from as we seek to understand U.S. relations with China. We are also grateful to the congressional and administrative teams, which offer experienced and capable support ensuring the Commission's hearings, congressional engagement, and daily operations run smoothly.

Finally, the Commissioners express their thanks to Erin Mulligan, who served as a copyeditor of the Report, to Tyler Loveless, who served as a fact-checker of the Report, to former staff members Matthew Dagher-Margosian, Niels Graham, Walter Hutchens, Sierra Janik, and Ryan Mangefrida, and to current intern Eileen Miller, who each contributed to the 2025 Report cycle.