Testimony before the U.S.-China Economic and Security Review Commission

Hearing on "Made in China 2025—Who Is Winning?"

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Vice Chair Schriver, Commissioner Kuiken, members of the Commission, and Commission staff, thank you for inviting me to testify on Made in China 2025 and China's industrial policy.

China today dominates a wide range of industries, both traditional and emerging, from steel and shipbuilding to lithium batteries and electric vehicles. China has succeeded or made significant progress in most of the target sectors set out in the original Made in China 2025 program, including telecommunications equipment, industrial robotics, high-speed rail, and clean energy. In 2023, China was the largest net exporter of manufactured goods, which exceeded $1.8 trillion in value.[1] The United Nations projects China's share of global industrial production will reach 45 percent by 2030.[2] Chinese President Xi Jinping has repeatedly called for China to become a "manufacturing powerhouse" (制造强国), a term that was used throughout the original Made in China 2025 document.[3]

China pursues an all-of-the-above approach to achieving global industrial leadership. China's industrial policy does not merely consist of tariffs and subsidies. It is wider, deeper, and more sophisticated than many realize. China uses an exceptionally broad array of policy tools and strategies to acquire technology and build up its industrial capacity. These include steep protectionist barriers, joint ventures with foreign firms, state bank loans, industrial espionage, talent poaching, support with land acquisition and infrastructure, resource deals with foreign governments, and strategic outbound investments, to name a few. These are not passive, static tools but rather active policy efforts, often involving coordination or direct intervention by state organizations.

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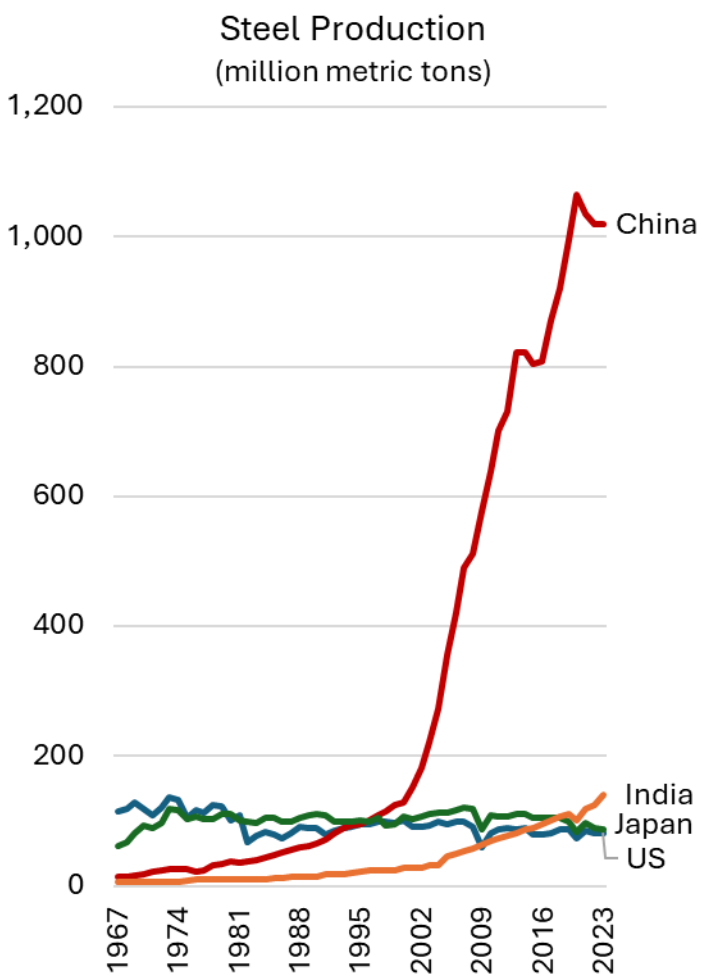
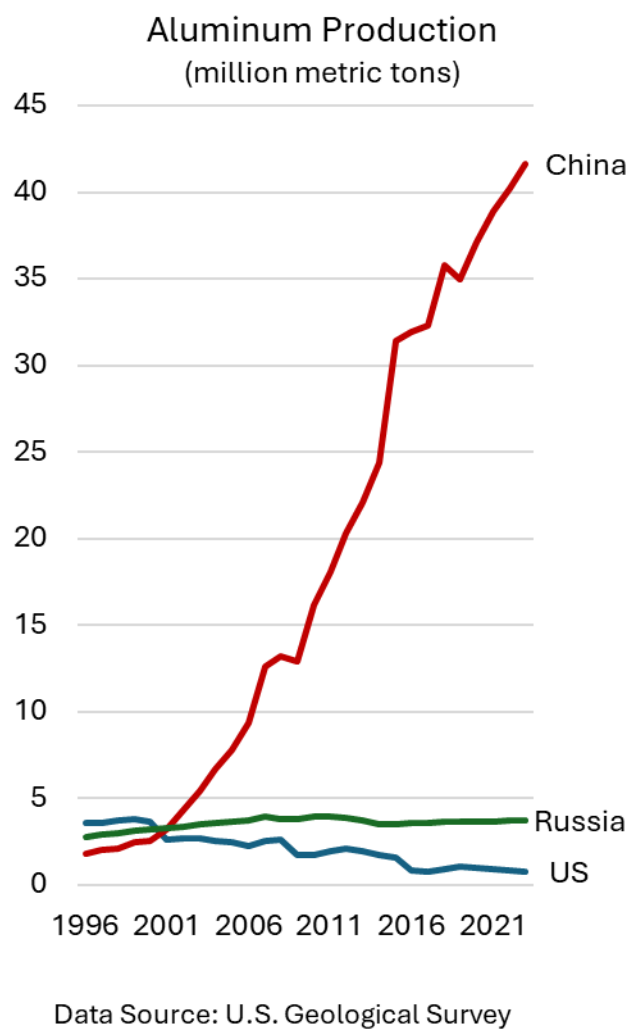
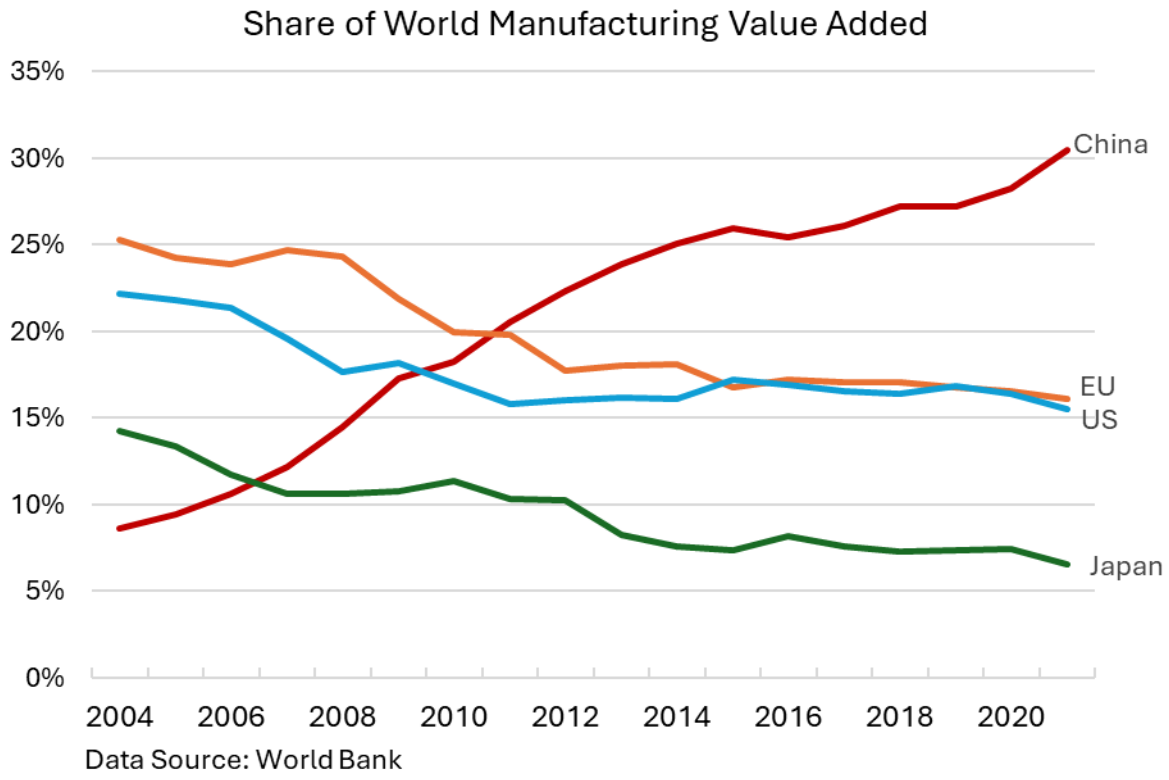
[1] Brian Hart, Hugh Grant-Chapman, and Leon Li, "China dominates global manufacturing," Center for Strategic and International Studies, https://www.csis.org/analysis/china-dominates-global-manufacturing.
[2] UN Industrial Development Organization, *The Future of Industrialization*, 2024.
[3] PRC State Council, "Made in China 2025 (中国制造 2025)," May 8, 2015, https://www.gov.cn/zhengce/content/2015-05/19/content_9784.htm





China's industrial policy also involves a sprawling constellation of state and private entities, including state-owned enterprises, state-run research centers, universities, industry associations, local government financing vehicles, venture capital firms, startups, and partnerships with foreign firms and universities. State efforts to support Chinese firms often span across multiple levels of government, from local government departments and bureaus to central ministries and commissions. In some cases, the central government takes the lead, often laying out an industrial policy agenda like Made in China 2025 to signal to local governments, firms, and other actors where they should direct their resources. In other cases, competition among local governments can produce ground-up policy innovations that are later incorporated into nationwide initiatives.

This testimony will highlight three features of China's industrial policy that make it particularly distinctive and effective.

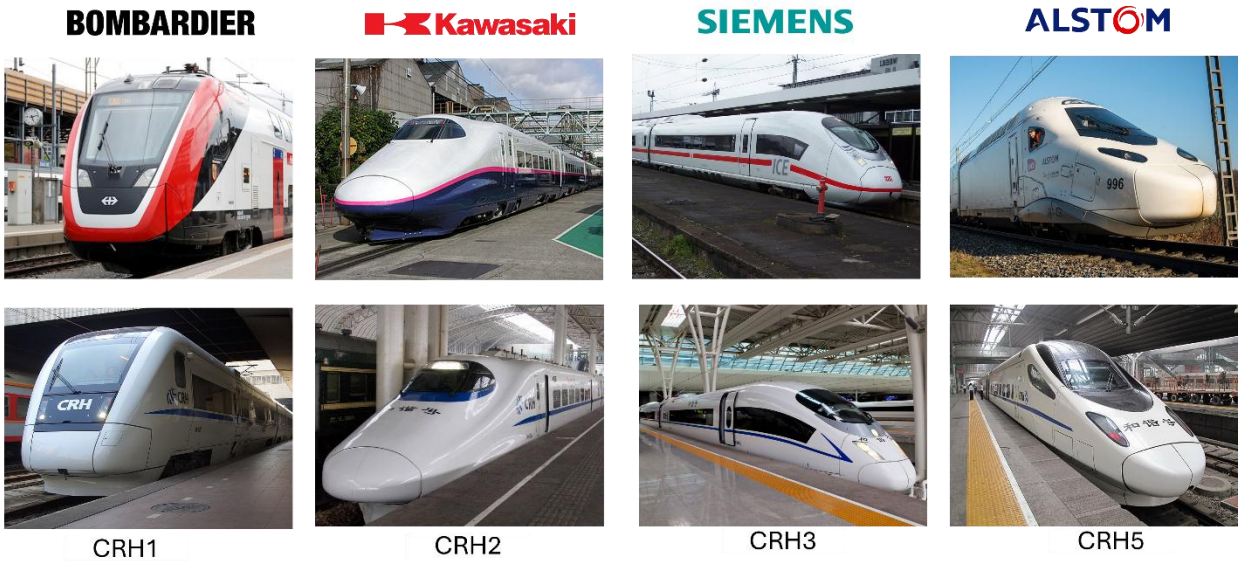


1. Foreign Technology Acquisition

A central component of China's industrial policy has been the acquisition of foreign technology through joint ventures and other partnerships with foreign firms. Across a range of industries, China has required foreign firms that wish to sell to the Chinese market to establish manufacturing facilities in China, often through joint ventures with Chinese firms. This strategy even has a name in Chinese—市场换技术—that translates to "market access in exchange for technology." In addition to joint manufacturing facilities, Beijing also presses foreign firms to establish R&D centers in China, helping to share cutting-edge technology and train Chinese scientists and engineers. Ultimately, foreign firms agree to a Faustian bargain where they profit from selling to China's market in the near term but build up their future Chinese competitors in the long run.

China's high-speed rail industry provides a striking example of China's use of joint ventures to acquire foreign technology. In the early days of China's high-speed rail program, China's Ministry of Railways directly arranged joint venture partnerships between foreign high-speed train makers, such as Siemens and Alstom, and Chinese train makers, such as Changchun Railway Vehicles and Qingdao Sifang.[4] China promised foreign train makers access to a once-in-

[4] Chen Wang, "An all-powerful owner is born (全能业主诞生)," Caixin, July 2, 2012, http://magazine.caixin.com/2012/cw508/.

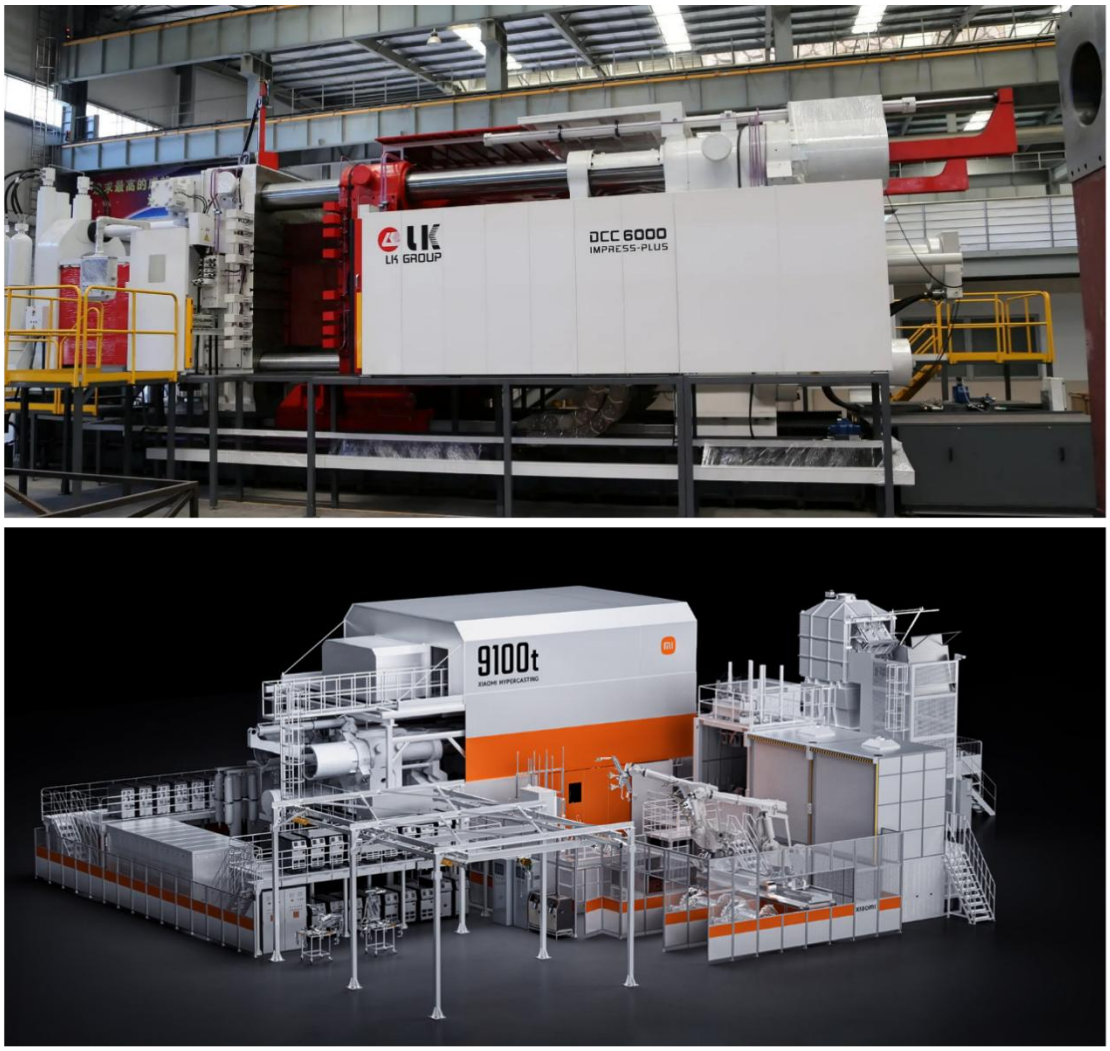


Chinese high-speed train models manufactured through joint ventures with foreign train makers

a-century market in exchange for sharing high-speed train technology and manufacturing know-how with Chinese firms. In the years since, China merged its train makers into a single state-run giant, CRRC, and developed what it claims as its own "indigenously" designed and manufactured high-speed train models. CRRC has now become the top global competitor to its former Western and Japanese partners and was cited as a reason for Siemens and Alstom to merge their train manufacturing businesses.[5]

Another example is China's auto industry. For decades, China had required foreign automakers to establish joint ventures with Chinese state-owned firms. What began with a single joint venture between Beijing Auto and American Motors Corporation in 1984 expanded into over 70 joint ventures and another 500-plus joint ventures in auto parts manufacturing by 2000.[6] GM, Ford, Volkswagen, Renault, Toyota, Honda, Hyundai—virtually every major international automaker formed joint ventures with Chinese firms to produce cars for China's growing auto market. In 2007, GM's CEO at the time said of his company's joint ventures in China: "We made a big bet back in 1997, and it's paid off for us very well."[7] Indeed, foreign automakers such as GM and Volkswagen made billions of dollars in profit from selling to China's booming auto market during this period. However, through this process, foreign automakers shared technical designs, manufacturing processes, and supply chain management techniques with their Chinese

[5] Alexander Hübner and Cyril Altmeyer, "Alstom, Siemens to merge rail businesses to counter China's CRRC," Reuters, September 27, 2017, https://www.reuters.com/article/world/alstom-siemens-to-merge-rail-businesses-to-counter-chinas-crrc-idUSKCN1C118P/.
[6] Kaidong Feng, "Chinese indigenous innovation in the car sector: being integrated or being the integrator," Yu Zhou, William Lazonick, and Yifei Sun (eds.), *China as an Innovation Nation*, Oxford University Press, 2016.
[7] Gordon Fairclough, "GM's Chinese partner looms as a new rival," The Wall Street Journal, April 20, 2007, https://www.wsj.com/articles/SB117700975798475867.



Above: LK Group gigapress. Source: LK Group. Below: Xioami hypercasting machine. Source: Xiaomi

partners. In 1995, GM even sold its rare earths magnet division to a consortium that included Chinese partners that would later sow the seeds for China's future EV industry.[8]

In some cases, China brings in global industry leaders to "turbocharge" its own domestic industry. One example is Tesla. In 2018, Tesla CEO Elon Musk struck a deal with the government of Shanghai led by then-party secretary Li Qiang (now China's premier) to build a Tesla plant. The Shanghai government pressed Tesla to work with Chinese suppliers and develop China's electric vehicle manufacturing ecosystem. As part of this process, Tesla worked with China's LK Group and its Italian subsidiary Idra Group to develop a massive industrial casting machine used to make large aluminum auto parts. Tesla named this machine the "giga press."[9]

[8] Ernest Scheyder, *The War Below: Lithium, Copper, and the Global Battle to Power Our Lives*, 2024, Simon & Schuster, p.109.
[9] Li Yuan, "In China, Tesla Is a Catfish, and Turns Auto Companies Into Sharks," The New York Times, November 30, 2021, https://www.nytimes.com/2021/11/30/business/china-tesla-electric-cars.html.

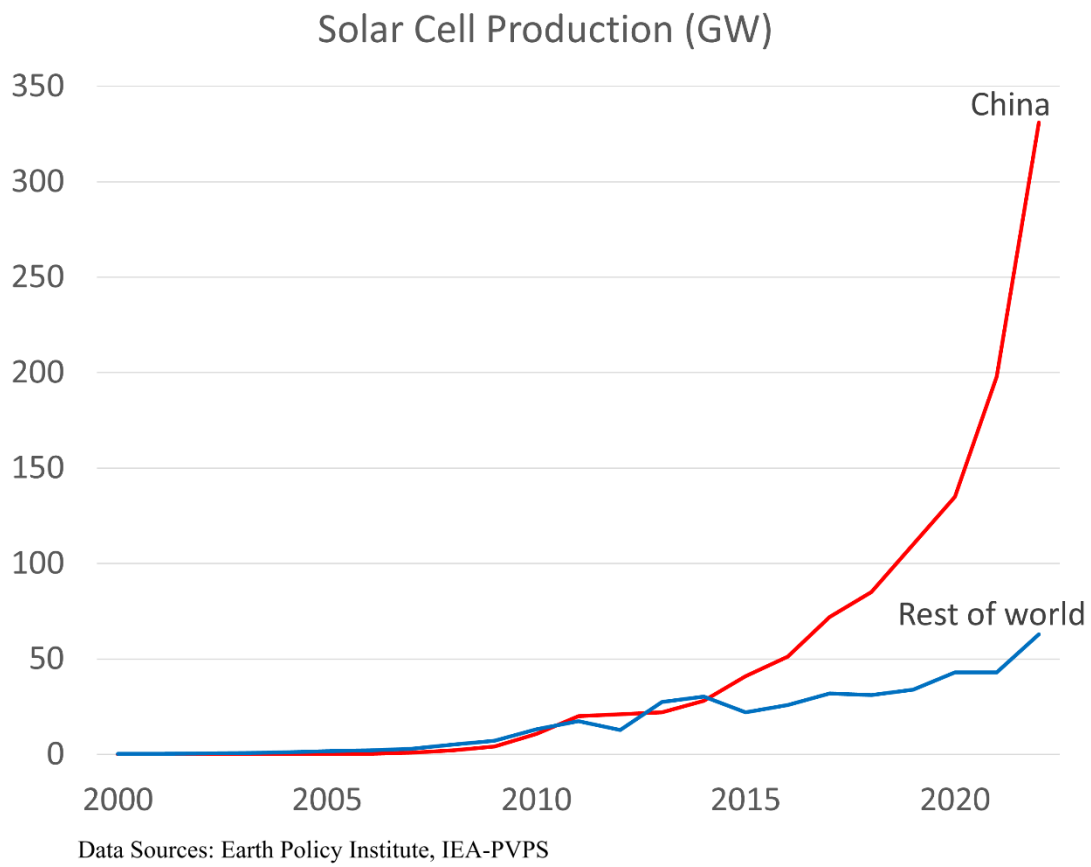
This innovation in auto manufacturing significantly reduced the costs and time required to produce key components. Chinese electric car companies quickly adopted similar "giga presses," including ones made by LK Group, for their auto plants, enabling them to produce cars faster and more cheaply than their industry peers. In addition, China pressures foreign firms like Tesla to localize their supply chains within China. In 2022, a Tesla China executive announced that Tesla's Shanghai plant had localized over 95 percent of its supply chain.[10] Through its Shanghai plant, Tesla has now trained a whole generation of Chinese managers, engineers, and technicians in its manufacturing and supply chain management techniques.

China has also used Apple to build up its smartphone and consumer electronics industry. To convince Apple and its Taiwanese contract manufacturer Foxconn to build their original iPhone factory in Zhengzhou, the city government provided a full-spectrum package of incentives that included tax breaks, loans, support for factory and housing construction, and even worker recruitment and training support.[11] Since then, Beijing has pushed Apple to help develop Chinese suppliers and localize component manufacturing. In some cases, Apple engineers work directly with Chinese suppliers such as BOE and Lens Technology to share new manufacturing techniques.[12] Of Apple's 187 suppliers, 87 percent have production facilities in China.[13] Chinese firms are increasingly supplying iPhone parts, such as camera modules, touchscreen displays, and titanium frames. Chinese state-backed NAND chip maker YMTC nearly won a contract to supply Apple with memory chips before the U.S. intervened to block the move.[14] Many of these same Chinese component manufacturers are now suppliers to Chinese smartphone companies, such as Vivo and Oppo, which are challenging Apple and Samsung in international markets.

2. Adaptability

Another key feature of China's industrial policy is its adaptability. China has repeatedly demonstrated an ability to adjust or even dramatically reorient its industrial strategy in response to unforeseen challenges or opportunities. For any given industry, 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. This process of trial and error is frequently wasteful and inefficient, leading to many policy dead ends and unsuccessful business ventures. However, from Beijing's point of view, these efforts are ultimately justified by China's overall progress in driving industrial upgrading and economic development. Crucially, China's industrial policy

[10] Phate Zhang, "Tesla VP says over 95% of Giga Shanghai's parts come from local suppliers," CnEVPost, https://cnevpost.com/2022/08/15/95-tesla-giga-shanghai-parts-from-local-suppliers/.
[11] David Barboza, "How China built 'iPhone City' with billions in perks for Apple's partner," The New York Times, December 29, 2016, https://www.nytimes.com/2016/12/29/technology/apple-iphone-china-foxconn.html.
[12] Wayne Ma, "How Apple boosts Chinese suppliers with know-how from foreign companies," The Information, May 3, 2024, https://www.theinformation.com/articles/how-apple-boosts-chinese-suppliers-with-know-how-from-foreign-companies.
[13] Cheng Ting-fang and Lauly Li, "Apple moves closer to China despite supply chain shifts," Nikkei Asia, April 26, 2024, https://asia.nikkei.com/Business/Business-Spotlight/Apple-moves-closer-to-China-despite-supply-chain-shifts.
[14] Cheng Ting-fang, Lauly Li, and Yifan Yu, "Apple freezes plan to use China's YMTC chips amid political pressure," Nikkei Asia, October 17, 2022, https://asia.nikkei.com/Business/Tech/Semiconductors/Apple-freezes-plan-to-use-China-s-YMTC-chips-amid-political-pressure



Data Sources: Earth Policy Institute, IEA-PVPS

often remains doggedly persistent in pursuing its overarching goals over the long run, changing strategies rather than giving up in the face of setbacks.

China's solar industry offers an example of how China alters its strategy in response to changes in the international economic environment. In the 1990s, Germany and several other European countries launched ambitious renewable energy policies that provided significant subsidies for solar power. At the same time, solar cell and module equipment makers in Germany, Japan, the U.S., and elsewhere began to sell comprehensive "turnkey" solar manufacturing equipment packages that came with technical support teams.[15] Chinese solar firms such as Yingli and Suntech, supported by their local governments, seized on this new opportunity and quickly ramped up solar equipment production to sell to these lucrative markets.[16] This external market opportunity suddenly vanished when European countries pulled back their renewable energy policies following the 2008 global financial crisis. Not long after, the U.S. and E.U. began to place tariffs on Chinese solar imports. Rather than let its solar industry languish, China's central government stepped in with a wave of state bank loans, particularly from China Development

[15] Gregory Nemet, *How Solar Energy Became Cheap: A Model for Low-Carbon Innovation*, Routledge, 2019.
[16] Fang Zhang and Kelly Sims Gallagher, "Innovation and technology transfer through global value chains: evidence from China's PV industry," Energy Policy, 2016.

BYD electric car factory. Source: BYD

Bank, and massive new demand-side policies aimed at dramatically expanding China's own solar energy production.[17]

China's traditional auto industry offers an example of industrial strategy changes in the face of internal industry roadblocks. China's original automotive industrial policy, stretching back to the 1950s, sought to develop a set of state-run automakers with Soviet technical assistance. However, this strategy yielded very low production volumes due to outdated manufacturing techniques. Starting in the 1980s and 1990s, China began to establish joint ventures with foreign automakers to acquire modern technology and manufacturing know-how, as described earlier. In 1994, the State Planning Commission formalized this strategy as China's official automotive industrial policy.[18] While this strategy was successful in boosting China's production volumes, it was widely criticized as a failure for enriching foreign automakers without fostering independent Chinese brands.[19] Starting in the late 1990s, a new generation of Chinese automakers backed by local governments, such Geely and Chery, entered the industry. China's central government initially regarded these upstart firms as "unauthorized" but then gradually threw its support

[17] Matthew Hopkins and Yin Li, "The rise of the Chinese solar photovoltaic industry: firms, governments, and global competition," in Yu Zhou, William Lazonick, and Yifei Sun (eds), *China as an Innovation Nation*, Oxford University Press, 2016.
[18] Eric Thun, *Changing Lanes in China: Foreign Direct Investment, Local Governments, and Auto Sector Development*," Cambridge University Press, 2005, p.55.
[19] An'ding Li, "The debate over 'market access in exchange for technology' in China's automotive industry emerges from the issue of indigenous innovation (中国汽车业"市场换技术"争论折射出自主创新话题)," Xinhua News, February 16, 2006, https://www.gov.cn/jrzg/2006-02/16/content_200705.htm.

behind these new players, which injected a new level of technological and commercial dynamism into a previously slow-moving industry.[20]

China's electric vehicle industry offers an example of a multi-pronged strategy that itself emerged to address failures in China's traditional auto industrial policy. In 2007, Wan Gang, China's new Minister of Science and Technology and a former Audi engineer, led a campaign to develop China's electric vehicle industry and leapfrog over global auto industry incumbents. China pursued multiple technologies simultaneously, including battery-powered electric vehicles, hybrid drivetrains, and vehicles powered by fuel cells. Consumer subsidies and public procurement programs, particularly for bus and taxi fleets, were implemented to generate demand for electric vehicles.[21] License plate-based driving restrictions in large cities such as Beijing and Shanghai designed to reduce air pollution and traffic congestion gave valuable exemptions for electric vehicles. Regulations and subsidies supported the development of EV charging infrastructure.[22] All of this built on significant public and private research and development spending, particularly on battery technology.[23] China's rapid success in EVs and hybrid vehicles, which now make up more than half of new car purchases in China, far surpassed even recent projections by Chinese policymakers.[24]

China's industrial policy has also adapted to external restrictions on China's access to cutting-edge technology, as exemplified by its semiconductor and AI sectors. For decades, China has tried a range of strategies to develop its semiconductor industry. This includes joint ventures with industry leaders, such as Huahong's partnership with NEC, and efforts to poach top talent from foreign competitors, such as SMIC's recruitment of TSMC engineers.[25] Starting in 2014 a year before the launch of Made in China 2025, China began pouring money into the industry through several waves of state-backed semiconductor investment funds. After a series of high-profile industry bankruptcies, including major fraud cases, China's National Development and Reform Commission tried to rein in what it called a "chaotic" industry.[26] More recently, in the face of U.S.-led restrictions on high-end semiconductor chips and manufacturing equipment, China has tried to pursue workaround strategies, including creative uses of deep ultraviolet (DUV)

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[20] Kaidong Feng and Junran Li, "Challenges in reshaping the sectoral innovation system of the Chinese automobile industry," in Kung-Chung Liu, Uday Racherla (eds.) *Innovation, Economic Development, and Intellectual Property in India and China*, Springer, 2019.

[21] Xiaolei Zhao et al, "Policy incentives and electric vehicle adoption in China: from a perspective of policy mixes," Transportation Research Part A, 2024.

[22] Alexandre Gomes, Robert Pauls, and Tobias ten Brink, "Industrial policy and the creation of the electric vehicles market in China: demand structure, sectoral complementarities, and policy coordination," Cambridge Journal of Economics, 2023.

[23] Yang Andrew Wu et al, "A review of evolutionary policy incentives for sustainable development of electric vehicles in China: strategic implications," Energy Policy, 2021.

[24] PRC State Council, "Notice regarding the new energy vehicle production development plan (2021-2035) issued by the State Council's General Office (国务院办公厅关于印发新能源汽车产业发展规划（2021—2035 年）的通知)," October 20, 2020, https://www.gov.cn/zhengce/content/2020-11/02/content_5556716.htm.

[25] John VerWey, "Chinese semiconductor industrial policy: past and present," Journal of International Commerce and Economics, July 2019, https://www.usitc.gov/staff_publications/jice/chinese_semiconductor_industrial_policy_past_and.

[26] Amanda Lee, "China to curb 'chaos' in semiconductor industry and hold bosses accountable for risky, loss-making projects," South China Morning Post, October 20, 2020, https://www.scmp.com/economy/china-economy/article/3106307/china-curb-chaos-semiconductor-industry-and-hold-bosses.

lithography and advanced packaging.[27] Chinese AI companies have tried to gain access to high-end GPUs through smuggling, cloud computing services, and even repurposing gaming chips.[28] DeepSeek's latest breakthroughs with its V3 and R1 large language models show how Chinese AI firms are using algorithmic innovations to squeeze more performance from limited compute resources.

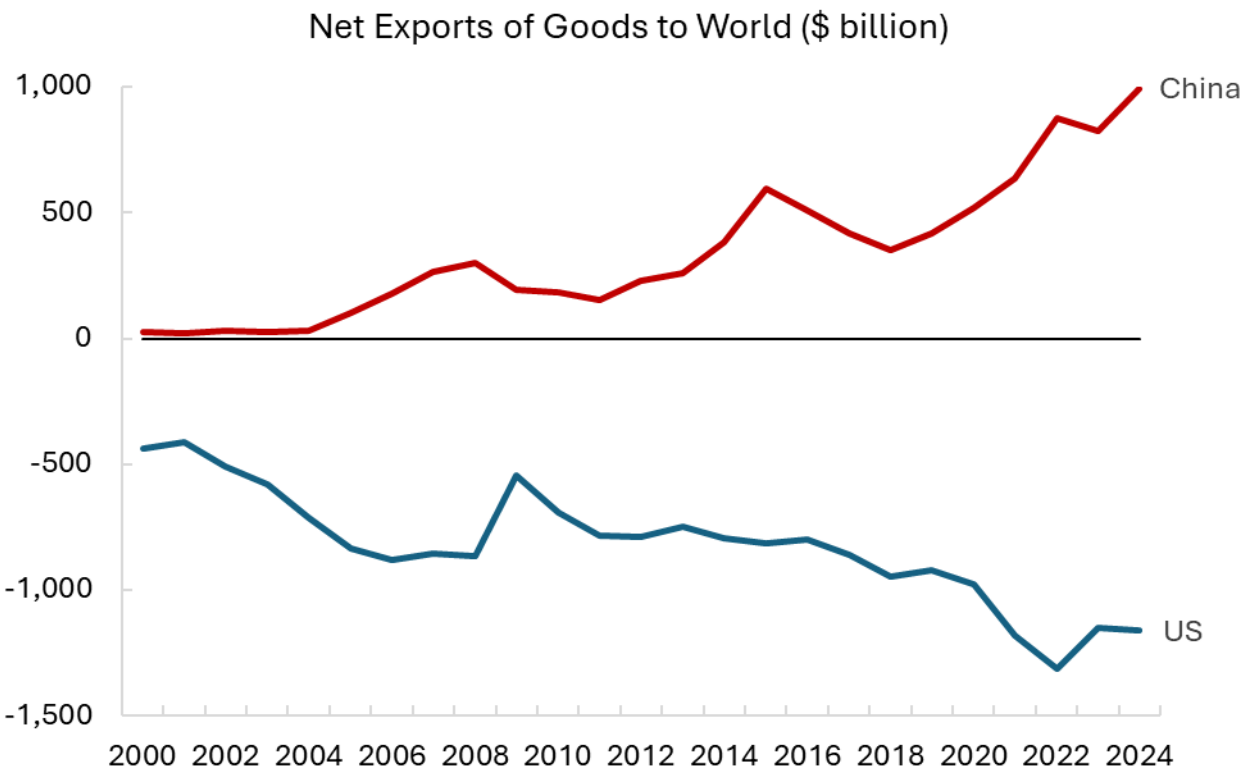
3. Going Global

Exporting goods to overseas markets is nothing new for China. Since the early days of China's reform era, China has tried to use exports to earn foreign currency and drive economic growth, following an export-led model of development pursued in a number of East Asian countries. In the late 1990s and early 2000s, China under then-President Jiang Zemin pursued a "going out" (走出去) strategy that encouraged Chinese firms to invest in foreign markets. More recently, President Xi Jinping's signature Belt and Road Initiative has sought to leverage Chinese financing and construction capabilities to develop infrastructure, particularly across the Global South.

International concerns or backlash over Chinese exports and outbound investment are also nothing new. China's exports of large volumes of inexpensive goods, such as steel and solar panels, have faced anti-dumping investigations from the U.S., Europe, and other countries since China's entry into the WTO, even stretching back to investigations into Chinese shop towel exports in the 1980s. Chinese efforts to acquire strategic overseas assets such as Midea's takeover of German industrial robotics firm Kuka or CNOOC's thwarted attempt to buy U.S. oil producer Unocal prompted security concerns from the U.S. and its partners. Indeed, when Made in China 2025 was published, Chinese firms appeared to target German firms in the ten key sectors of Made in China 2025.[29]

What is different this time is that China is now increasingly competing with U.S., European, Japanese, and Korean firms in high-value, high-tech industries they had once dominated. Previously, Chinese exports tended to be concentrated in lower-value, low-tech products that leverage China's advantages in lower labor costs as well as lower environmental standards and labor protections. These industries made up what became known as the first "China shock" in the U.S.: clothing, toys, footwear, furniture, low-end consumer devices, and other basic consumer goods. Over time, China began moving into higher-value goods, such as smartphones, home appliances, and industrial equipment. Already this shift in the structure of China's exports was becoming clear in the 1990s and early 2000s, corresponding to an increase in the complexity and

[27] Paul Triolo, "The evolution of China's semiconductor industry under U.S. export controls," American Affairs, November 2024, https://americanaffairsjournal.org/2024/11/the-evolution-of-chinas-semiconductor-industry-under-u-s-export-controls/.
[28] Ana Swanson and Claire Fu, "With smugglers and front companies, China is skirting American A.I. bans," The New York Times, August 4, 2024, https://www.nytimes.com/2024/08/04/technology/china-ai-microchips.html.
[29] Cora Jungbluth, "Is China systematically buying up key technologies?" Bertelsmann Stiftung, 2018, https://globaleurope.eu/globalization/is-china-systematically-buying-up-german-key-technologies/.



Data Source: UN Comtrade, China General Administration of Customs, U.S. Census Bureau
Note: US 2024 data is trailing twelve months to November 2024

sophistication of China's production capacity.[30] Now, driven in large part by industrial policy programs such as Made in China 2025, Chinese firms are gaining ground or even dominating advanced manufacturing and high-tech industries, such as electric vehicles, batteries, shipbuilding, semiconductors, and industrial robotics.

The impact of China's industrial upgrading on the U.S. and other advanced manufacturing economies can be analyzed as a two-phase process. The first phase is a change within China's domestic market where foreign firms are gradually replaced with domestic substitutes. This is currently happening in industrial robotics where Chinese industrial automation firms such as Inovance and Siasun have seized over half of China's domestic market from foreign incumbents such as Fanuc and ABB.[31] This is also happening in the auto sector where foreign automakers such as GM, Volkswagen, and Toyota that were once dominant China's domestic market are being squeezed out by Chinese rivals such as BYD and Geely.[32] In some cases, the process is

[30] Li Cui and Murtaza Syed, "The shifting structure of China's trade and production," IMF working paper, 2007, https://www.imf.org/en/Publications/WP/Issues/2016/12/31/The-Shifting-Structure-of-Chinas-Trade-and-Production-21297.
[31] Rachel Cheung, "Chinese robots hit the factory floor," The Wire China, December 15, 2024, https://www.thewirechina.com/2024/12/15/chinese-robots-hit-the-factory-floor-industrial/.
[32] Yoko Kubota and Clarence Leong, "Foreign carmakers fight to survive in China as market share dwindles," The Wall Street Journal, July 8, 2024, https://www.wsj.com/business/autos/foreign-carmakers-fight-to-survive-in-china-as-market-share-dwindles-09990a32.

incomplete or faces roadblocks. For example, Chinese automakers have been reluctant to reduce their dependence on foreign chipmakers, which supply over 90 percent of their semiconductor needs, despite the Ministry of Industry and Information Technology's (MIIT) push for them to adopt domestic alternatives.[33] But where this process has been successful, this "domestic substitution effect" has the dual benefit to China of not only supporting its domestic firms but also depriving foreign competitors of one of their largest and fastest-growing markets.

The second phase involves Chinese firms competing in foreign markets. In some cases, the success of Chinese firms in the domestic market translates well in foreign markets, such as in the consumer electronics sector. Intense competition within China's domestic market can produce firms that are highly competitive on the world stage with sufficient scale to take on global industry leaders. On the other hand, Chinese firms who have achieved success domestically face many challenges when entering foreign markets. First, Chinese firms competing in international markets must overcome the reputational costs associated with being a Chinese company, including perceptions of lower quality. Ironically, the negative quality associations with the "made in China" label today are a hangover from China's earlier export waves. Second, in foreign markets Chinese firms no longer enjoy the "home court advantage" of policies and political support that may have fueled their success over foreign competitors in China's domestic market. In fact, the opposite is likely to be the case where Chinese firms must contend with the "home court advantage" and outright protectionism in other countries, particularly in politically sensitive industries tied to large numbers of jobs such as the automotive sector. Third, Chinese firms face growing concerns over national security risks, particularly in high-tech sectors and infrastructure. Increasingly, security and economic concerns are blending together, amplifying the challenges that Chinese firms face in many countries.

International responses to China's new wave of exports have varied widely, and China in turn has adapted its strategy accordingly. The range of reactions to Chinese electric vehicle exports offers a useful example. At one end of the spectrum stands the U.S., which has imposed high tariffs on Chinese EV exports, differential subsidies that exclude Chinese EVs, and finally an outright ban on Chinese passenger vehicles and parts that are "connected" to the internet. Chinese automakers, which expected to be nearly shut out of the U.S. auto market, limited their efforts to establish a presence in the U.S. Chinese battery makers, such as BYD and CATL, have tended to pursue licensing partnerships with U.S. firms rather than building factories in the U.S. due to political opposition.[34] India is another country that has strongly limited the entry of Chinese EVs with some exceptions, such as the joint venture between India's JSW and China's SAIC.[35] At the other end of the spectrum are countries such as Thailand, Hungary, and Morocco, which have actively sought out Chinese EV and battery investment. These countries view Chinese investment as a means of developing their own auto industries into an export platform.

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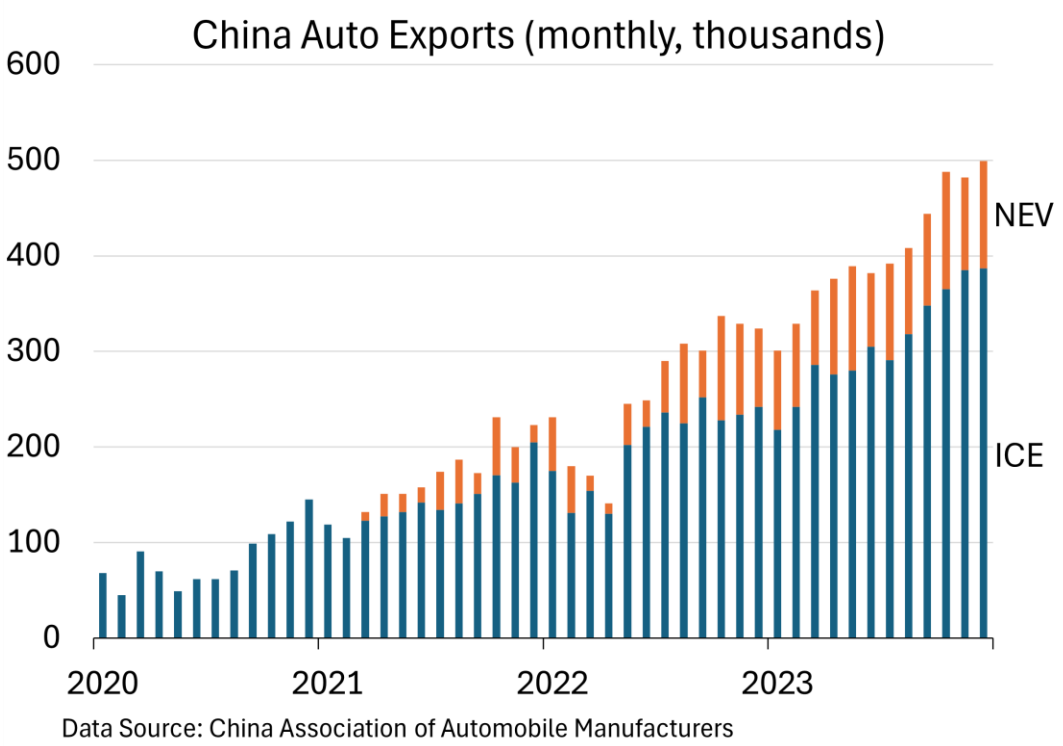
[33] Wency Chen, "China struggles to build car chip supply chain to break free of heavy reliance on imports," South China Morning Post, January 1, 2025, https://www.scmp.com/tech/tech-war/article/3292988/china-struggles-build-car-chip-supply-chain-break-free-heavy-reliance-imports.

[34] Zhang Yan and Kevin Krolicki, "Chinese battery giant CATL would build U.S. plant if Trump allows it," Reuters, November 13, 2024, https://www.reuters.com/business/autos-transportation/china-battery-giant-catl-would-build-us-plant-if-trump-allows-it-2024-11-13/.

[35] John Reed, "MG's Chinese owner and Indian steelmaker JSW team up to build electric vehicles," Financial Times, March 20, 2024, https://www.ft.com/content/160501a4-4ce9-4b86-bc75-c20dd3d2b57f.



Between these two extremes are countries and regions that have pursued a middle path that involves tariffs on Chinese EV imports as a tool to push Chinese automakers to set up factories domestically and localize production. The European Union, Brazil, and Turkey are examples of this middle path approach to addressing Chinese EVs. In each of these cases, Chinese EV makers, particularly BYD, responded with plans for new factories in these countries and regions. However, there are many important complications to this story. For the E.U., Beijing has imposed retaliatory tariffs and directed Chinese automakers to avoid investment in E.U. countries that voted in favor of tariffs.[36] The E.U. has also pushed Chinese automakers to share technology as a condition for E.U. subsidies.[37] However, China's Ministry of Commerce has told Chinese automakers to keep core EV technology in China.[38] Lastly, Chinese firms looking to expand abroad may run into compliance issues with local labor and environmental regulations, such as Brazil's recent investigation into "slavery-like conditions" for workers building BYD's new auto plant.[39]

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[36] Zhang Yan and Kevin Krolicki, "China tells carmakers to pause investment in E.U. countries backing EV tariffs, sources say," Reuters, October 30, 2024, https://www.reuters.com/business/autos-transportation/china-tells-carmakers-pause-investment-eu-countries-backing-ev-tariffs-sources-2024-10-30/.

[37] Alice Hancock, Andy Bounds, and Alec Russell, "E.U. to demand technology transfers from Chinese companies," Financial Times, November 19, 2024, https://www.ft.com/content/f4fd3ccb-ebc4-4aae-9832-25497df559c8.

[38] Linda Lew, "China asks its carmakers to keep key EV technology at home," Bloomberg, September 11, 2024, https://www.bloomberg.com/news/articles/2024-09-12/china-asks-its-carmakers-to-keep-key-ev-technology-at-home.

[39] Fabio Teixeira and Luciana Novaes Magalhaes, "BYD brought hundreds of Chinese workers to Brazil on irregular visas, inspector says," Reuters, January 8, 2025, https://www.reuters.com/world/americas/byd-brought-hundreds-chinese-workers-brazil-irregular-visas-inspector-2025-01-08/.

Overall, Beijing has proven to be remarkably adaptable in its efforts to promote the global expansion of Chinese firms, tailoring its strategies to differing foreign market dynamics and changing course in the face of roadblocks. Across all of these country contexts, it is important to keep in mind that Beijing fuses together economic goals with broader geopolitical aims and its efforts to help Chinese firms "go global" are no exception.

Implications for the United States

Looking ahead, China plans to double-down on its push into advanced manufacturing and high-tech industries. Many of the target sectors in Made in China 2025 were named again in China's 14th Five-Year Plan[40] and the most recent Third Plenum economic roadmap, [41] including next-generation information technology, aviation and aerospace, new energy, new materials, and high-end industrial equipment. These industrial policy goals align directly with President Xi Jinping's focus on "high-quality development" (高质量发展) and "new quality productive forces" (新质生产力).[42]

China's determined efforts to lead the world in a range of critical, high-tech industries poses a distinct challenge for the United States. The conventional understanding of international market competition no longer applies. A growing number of industries are increasingly characterized as a binary outcome: the U.S. and its partners can either compete intensively or cede the market to dominance by Chinese firms. This problem is further exacerbated by structural issues created by China's industrial policy efforts. Within China, strong policy incentives for target industries frequently results in price wars and overinvestment by market players. To prevent what Beijing calls "vicious competition" (恶性竞争) or "excessive competition" (过度竞争), China tries to actively reign in firm behavior and maintain a balanced cohort of industry players through a process of "managed competition."[43] However, these cycles of Chinese overinvestment frequently cause pricing and volume fluctuations in global markets that make it difficult for private foreign firms to sustainably operate.

To address the challenges of China's industrial policy, the U.S. should pursue an array of strategies. For sectors where American firms are still dominant or competitive, such as semiconductor manufacturing and advanced industrial equipment, the U.S. should provide policy support to improve the international competitiveness of these firms and prevent them from going under in the face of difficult market conditions. It is much harder to restore industrial

[40] Xinhua News, "Outline of the People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035 (中华人民共和国国民经济和社会发展第十四个五年规划和2035 年远景目标纲要)," March 12, 2021, https://www.gov.cn/xinwen/2021-03/13/content_5592681.htm.

[41] PRC State Council, "Resolution of CPC Central Committee on further deepening reform comprehensively to advance Chinese modernization (中共中央关于进一步全面深化改革 推进中国式现代化的决定)," July 21, 2024, https://www.gov.cn/zhengce/202407/content_6963770.htm.

[42] Xi Jinping, "Explanation of resolution of CPC Central Committee on further deepening reform comprehensively to advance Chinese modernization (关于《中共中央关于进一步全面深化改革、推进中国式现代化的决定》的说明)," July 21, 2024, https://www.gov.cn/yaowen/liebiao/202407/content_6963773.htm.

[43] Kyle Chan, "Inside China's state-owned enterprises: Managed competition through a multi-level structure," Chinese Journal of Sociology, 2022, https://journals.sagepub.com/doi/full/10.1177/2057150X221123388.

competitiveness after it is lost than to maintain it while it still exists. The U.S. should also limit the ability of American firms in high-tech industries to establish local manufacturing and R&D facilities in China. American firms should not be allowed to give away even outdated technology and know-how to China in exchange for short-term profits.

For sectors where American firms lag behind the global frontier, the U.S. should use industrial policy tools to protect its domestic manufacturing base and acquire cutting-edge technology and know-how from global industry leaders, including Chinese firms. This includes turning China's industrial playbook back on itself. The U.S. should leverage access to its own sizable domestic market to obtain investment and technology from industry-leading Chinese firms, particularly in batteries and electric vehicles. These partnerships should be carefully structured to maximize technology acquisition and job creation for the U.S.

Lastly, the U.S. should not be complacent with protectionist measures that shelter American firms within the U.S. domestic market but ignore international markets. The ultimate goal of U.S. industrial policy should be to develop and support American firms as global industry leaders that can outcompete Chinese firms around the world.