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26-5 Negotiating a win-win end to the lose-lose US-China trade war over technology and critical minerals

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ABSTRACT

The United States and China put parts of the global economy at risk in 2025 through their trade war over critical minerals and technology. A series of escalatory tariffs and export restrictions led to shortages of essential inputs, nearly forcing automakers worldwide to shut down production. The costly policies reflected uncoordinated and uncommunicated efforts by both countries to reduce their mutual economic dependence. This paper explores a novel path for the United States and China to "cooperate" over how they reduce their dependence on each other in technology and critical minerals, with the aim of limiting future escalation risks and avoiding unnecessary costs. The proposal draws on a version of the reciprocal approach to negotiations developed under the General Agreement on Tariffs and Trade, modified to accommodate a mutual reduction in each country's market dominance in key sectors.

JEL codes: F51, F52, F53, F13

Keywords: economic security, supply chains, tariffs, export restrictions

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INTRODUCTION

The United States and China put parts of the global economy at risk with a spiral of trade policy escalation in 2025. The new Trump administration suddenly increased tariffs on goods from China by 145 percentage points—leaving them in place for a month—causing importers and exporters on both sides of the Pacific to scramble. China retaliated not only with matching tariffs but also by restricting exports of rare earth elements and permanent magnets, nearly shutting down automobile supply chains worldwide.

Washington responded by expanding its export control regime, first to cover the software needed to design the chips powering artificial intelligence (AI) and then to include the global subsidiaries of Chinese firms. Beijing countered by cutting off exports of certain semiconductors that were also essential to carmakers, nearly slamming the brakes on global auto production for a second time in less than six months.

Toward the end of the year, Presidents Donald Trump and Xi Jinping met in South Korea and called a truce, dialing back some of these policies. But many remained, and the truce seemed fragile.

Both the United States and China seek to reduce their mutual economic dependence. Each wants greater autonomy to pursue its own domestic and foreign policy priorities and less vulnerability to external interference. Even before 2025, the two countries had intervened to address those underlying worries. Their motivations are partly economic, driven by the desire to end the market dominance of the other. But they are also partly noneconomic. National security concerns, combined with the considerable policy resources available to each country, make significantly less interdependence in these key sectors seem like an unavoidable ultimate outcome.

The path to achieving that outcome is not yet settled. The lack of US-China cooperation and open channels for communication in 2025 revealed the risks of unnecessary escalation and the implementation of excessively inefficient policies. Some use of trade policy was more restrictive than necessary to achieve the desired effect of responsible de-risking. Governments also suddenly adopted new subsidies, bought into companies, implemented price floors, and applied other far-reaching policies. Each has suffered economic costs—from its own and the other country's chaotic policies—that could have been avoided. Unless the United States and China come together, policies may continue to spiral, and costs will increase.

This paper explores a novel path for US-China "cooperation" over technology and critical minerals that is explicitly designed to limit the costs of reducing dependencies and the risks of that escalatory spiral. It exploits a version of the reciprocal trade policy negotiations undertaken during the General Agreement on Tariffs and Trade (GATT) period. The novelty is the application of the fundamentals of creating a mutually beneficial negotiating process to a new setting.

The United States and other large industrial economies used reciprocal negotiations over tariffs repeatedly between 1947 and 1994 to ensure a balanced exchange of market access concessions. This approach allowed them to move collectively and in an orderly fashion from one outcome (less trade) at the end of World War II to another outcome (more trade) by the 1990s.

The proposal in this paper would modify that reciprocal negotiating approach along two dimensions. The first is recognition that the two primary protagonists now seek to move in the opposite direction: from more trade to less trade. The second is a focus on outcome metrics (such as diversification of sourcing) rather than the policy instruments (such as tariffs) designed to achieve those outcomes. China's economic model—and the excessive complexity involved in translating its nonmarket policies and practices into economic effects—necessitates targeting the outcome metrics of policymaker concern.

The rest of this paper is organized as follows. The next section summarizes efforts by the United States and China to decouple since 2013, the policy escalation and narrowly avoided crises of 2025, and the underlying problem the two countries are attempting to solve. The following section proposes a framework for "cooperation," defined as achieving a more efficient and less risky path to unwind key dependencies. The last section outlines some of the additional economic costs of failing to act.

US-CHINA TRADE RELATIONS AND THE PROBLEM POLICYMAKERS ARE NOW TRYING TO SOLVE

Both the United States and China had unrealistic expectations about what would happen after China joined the World Trade Organization (WTO) in 2001. A dominant Washington view at the time was that the combination of WTO disciplines and the reformers in Beijing would push China to become even more market oriented. That American hope did not pan out. China never fully shifted its economic model to one that the GATT/WTO system was set up to accommodate.[1] Many of its market-oriented reforms in the period since have even gone into reverse.[2]

US-China decoupling policies of 2013–24 and areas of concern

For the technology and trade conflict at issue today, key events coincide with Xi Jinping's rise to power in 2013. Table 1 provides a nonexhaustive list of important policies and milestones through 2024 (a handful of earlier events are noted for reference purposes).[3]

In 2014, Beijing announced the establishment of new subsidies via a government guidance fund for semiconductors ("The Big Fund"). The following year, it announced the "Made in China 2025" policy.[4] These actions signaled that higher-technology sectors would be an emphasis of its industrial policy. The plans also articulated explicit market (dominance) share targets for these high-tech Chinese industries, to reduce interdependence with the West.[5]

1 Wu (2016) analyzes how the Chinese economic system and policies evolved following its accession to the WTO in 2001.

2 Lardy (2019) points to Xi Jinping's leadership as reversing reforms and shifting more economic activity away from private firms and toward the state.

3 For details on US–China trade actions between 2017 and 2024, see Bown and Kolb (2025). For details on US–China trade actions beginning in 2025, see Bown (2026).

4 On the Big Fund and China's government guidance funds more generally, see Huang (2019) and Lee (2024).

5 China's target was to produce 70 percent of its domestic semiconductor consumption by 2025 (Semiconductor Industry Association 2021).

Table 1
Key events in the US-China technology and trade war, 2009–24

Date	Event	Why important
2009	China retaliates against US safeguard on imported tires imposed in 2009	China signals that it will not follow the World Trade Organization (WTO) rulebook to challenge other countries' WTO-permissible trade actions
2010	China restricts exports of rare earth elements to Japan after Senkaku Islands dispute	China exploits Japan's supply chain vulnerability with export restrictions
2014	China announces National Integrated Circuit Industry Investment Fund Co. (Big Fund) for semiconductors	Government applies guidance fund model of subsidies for the chip industry
2015	China adopts Made in China 2025 policy	China sets market share targets, aiming for market dominance in new (and critical) sectors
2018	US sanctions ZTE, then backs off	US signals that its use of export controls for national security are now negotiable; China experiences the threat to a national champion because of its interdependence
2018–19	US imposes tariffs on imports from China, and China retaliates	US begins process of reducing dependence on China for certain imports
2019–20	US controls exports of high-end chips to Huawei for 5G equipment	US restricts exports of inputs for national security reasons
2019	China implements Phase II of its Big Fund	China engages in new chips subsidies; priorities include national suppliers of semiconductor manufacturing equipment
2020	US controls exports of equipment sales to SMIC	US export restrictions limit access to the equipment one major Chinese firm needs to manufacture chips
2022	West establishes the Minerals Security Partnership and tasks the International Energy Agency to include critical minerals in its work program	US and partner countries signal new cooperative efforts to end China's market dominance in critical minerals
2022	US CHIPS Act, Inflation Reduction Act signed into law	US industrial policy is designed to diversify away from China's market dominance for critical minerals and potential market dominance in segments of the semiconductor supply chain
2022	US imposes "small yard, high fence" export controls; coordinates policy with the Netherland and Japan	US signals concern with Chinese access to equipment used to manufacture high-end chips that could empower its military
2023	China controls exports of gallium and germanium	China signals displeasure with efforts by the US, the Netherlands, and Japan to control exports of chip manufacturing equipment

Date	Event	Why important
2023	China controls exports of graphite	China signals displeasure with EU potential tariffs on subsidized Chinese electric vehicles
2023–24	China announces new export control procedures and coverage of more critical minerals and rare earths	China significantly expands product coverage and demands additional information from firms to grant licenses
2023–24	US restricts outbound foreign investment	US develops and implements policies restricting US investments in the artificial intelligence, semiconductor, and quantum computing industry in China
2024	China implements Phase III of Big Fund	China extends chip subsidies to focus on new segments of supply chain, including high-bandwidth memory and other needs for artificial intelligence

Market share targets for Chinese industrial policy were not new.[6] The novelty was the size of the goal, the sectors targeted, and the emerging evidence that Chinese industries were beginning to dominate certain global markets. Also important was China's signal that it was using an explicit policy process to reduce its dependence on Western firms for technology and other inputs in which they had market dominance.

In the period since, the United States and China have used a range of tools to unwind what each views as its excessive dependence on the other in key sectors. These tools include new tariffs, subsidies, export controls, investment restrictions, sanctions, and anti-trust actions.[7]

Tariffs are one important and easy-to-measure example. As late as February 2018, the average US tariff on imports from China was only 3 percent.[8] The first Trump administration imposed numerous rounds of tariffs, raising the average rate to 21 percent by the end of 2019. China retaliated, raising its average tariff on imports from the United States from 8 percent to 21 percent.

The 2018–19 tariff escalation hurt both the US and Chinese economies, but it did not result in a crisis, for several reasons. The tariff increases were modest and spread over 15 months.[9] US policy focused primarily on imported intermediate inputs, the full cost-increasing effects of which took time to wind through supply chains.[10] The US farm sector was severely affected by China's retaliation, but the US government compensated it through subsidies. The fact that the main

6 See, for example, China's announced aspirations to dominate commercial shipbuilding in the early 2000s and its success at reaching 50 percent of global production in 2009, six years earlier than its initial target date to become the world's largest supplier (Barwick, Kalouptsidi, and Zahur forthcoming).

7 For sanctions, see Chorzempa, Lovely, and Wan (2024); for outbound investment restrictions, see Chorzempa (2023) and Daya et al. (2024).

8 See Bown (2021) for a comprehensive analysis of US and China tariffs between 2017 and 2020.

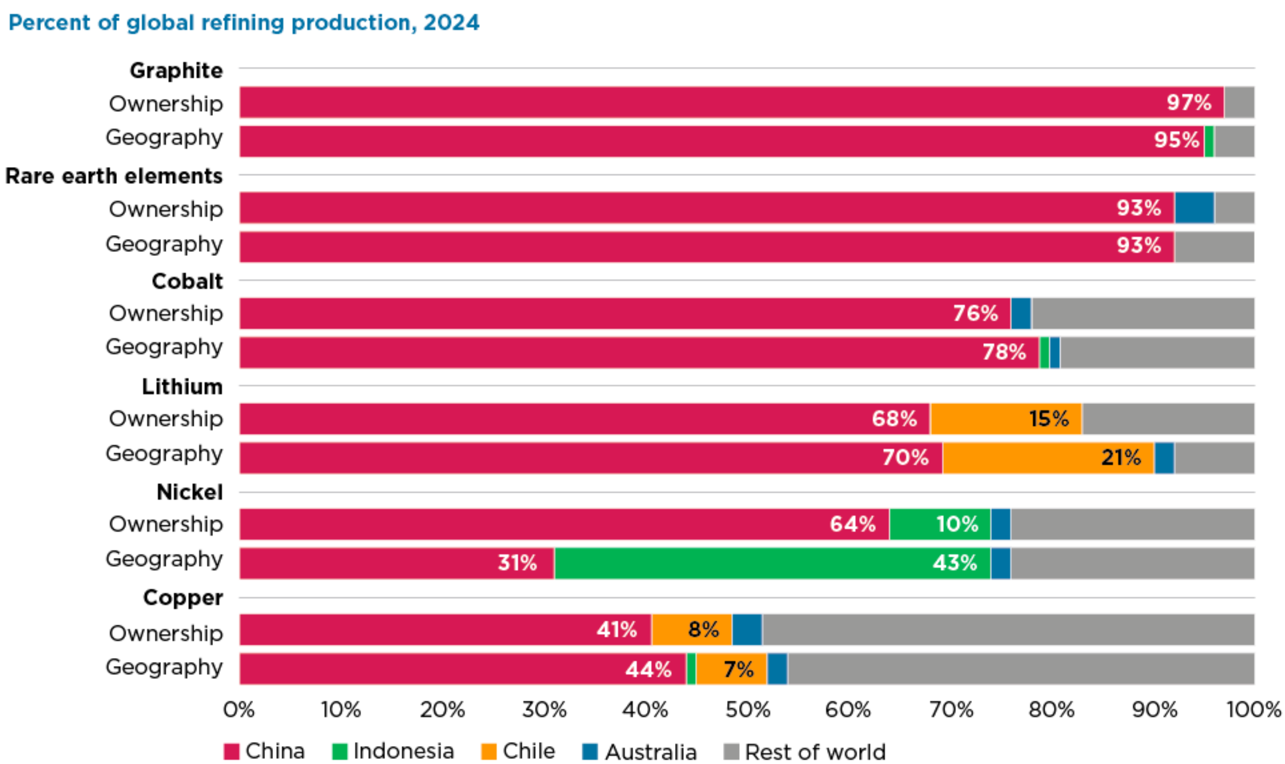
9 Flaaen and Pierce (forthcoming) document the negative effect on US employment and the increase in prices in the manufacturing sector arising from the 2018–19 tariffs. See Chor and Li (2024) for the negative impacts of the US tariffs on the Chinese economy.

10 See Cavallo et al. (2021).

policy instruments used were taxes—rather than quantitative limits or outright bans—meant that the result was typically a cost increase instead of something more dramatic, such as a shortage, which could have more abruptly shut down production.

Some of the tariffs, as well as the use of industrial policy and other actions summarized in table 1, were deliberate attempts to move supply chains to create alternative sources of production. For a set of essential industries, each side became worried about the other having market dominance that could be exploited at its expense.

Figure 1
China dominates refining of rare earth elements and other critical minerals



Note: Ownership is based on the location of company headquarters. Geography is based on the physical location of production.
Source: IEA (International Energy Agency), *Global Critical Minerals Outlook 2025*, Paris, page 28.

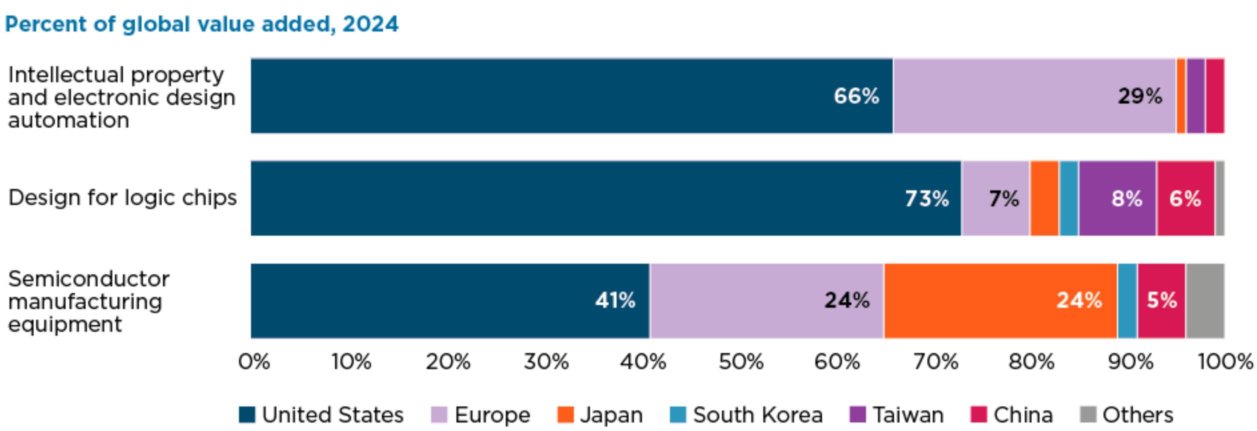
Washington became concerned that China was dominating critical minerals and rare earths mining and processing needed for essential downstream sectors, ranging from military applications to consumer electronics to automobiles. For some minerals and elements, China has more than 90 percent of global production (figure 1). Even for critical minerals in which China has less geographic market dominance, state ownership stakes in facilities located abroad allows China to continue to affect markets.[11] The lack of clarity of the relationship between even private Chinese companies and the Chinese Communist Party

11 See Leruth et al. (2022).

raises the question of whether any Chinese firms working in other countries are independent operators that respond to market signals as opposed to being an arm of the state.

China has analogous concerns in the technology sector. The United States and its partners dominate the provision of the inputs needed to develop and manufacture the advanced-node semiconductors that are the building blocks for AI.[12] The United States, Japan, and Europe supply 89 percent of the essential equipment installed in semiconductor fabs (figure 2), including the highest-end extreme ultraviolet lithography machines, made by ASML in the Netherlands. US companies supply 73 percent of the design of logic chips, such as the highest-end semiconductors for AI by Nvidia and AMD. Together, the United States and Europe supply over 95 percent of the electronic design automation (EDA) software and intellectual property used in the architecture of chips, through companies such as Cadence, Synopsys, and Arm. (These countries do not dominate all segments, as China's market share for mature-node production increased from 19 percent in 2015 to 33 percent in 2023.[13])

Figure 2
The United States and its partners dominate the markets for inputs for leading-edge semiconductors and artificial intelligence



Source: Semiconductor Industry Association, *State of the US Semiconductor Industry 2025*, page 20.

US and Chinese policymakers could respond to these facts about extreme dependencies in one of two ways.[14] One would be to acknowledge their existence in sectoral isolation but to also recognize that the other side is equally vulnerable in other industries. When viewed collectively, the countries could

12 For a discussion of the semiconductor industry's reluctant role in the US-China trade war of 2018–19, see Bown (2020). See Chorzempa (2025b) for an update and Chorzempa (2025a) for an assessment of the shifting nature of US diffusion policy for AI.

13 Semiconductor Industry Association, "Re: Request for Public Comments: China's Acts, Policies, and Practices Related to Targeting of the Semiconductor Industry for Dominance," Letter to the Office of the United States Trade Representative, February 5, 2025.

14 For a theory-based illustration of the tradeoffs, see Mayer, Mejean, and Thoenig (2025).

agree to live with their own vulnerabilities and not attempt to weaponize the other's. Such a deal would allow them to avoid the costly policies needed to reduce the dependencies. It would require an enforceable agreement to prevent weaponization, however. Currently, both sides seem unwilling to consider this approach.

Instead, Washington and Beijing are now implementing policies to reduce the other's market dominance where it feels vulnerable. China has been undertaking policy efforts since at least 2014 to reduce its vulnerability in semiconductors and more recently AI. It expanded the Big Fund with billions of additional dollars of subsidies, targeting new segments of the Chinese semiconductor and AI ecosystem in 2019 and again in 2024.[15] It has also set goals to establish market dominance to make other economies dependent on it, achieving success in critical minerals and rare earths.

The United States and its partners only later took action to reduce Chinese dominance.[16] Efforts began in 2022, when the United States passed two pieces of legislation—the Inflation Reduction Act and the CHIPS and Science Act—that used industrial policy to try to end Chinese market control in sectors it already dominated, such as critical minerals, and sectors in which its dominance was emerging, such as mature-node semiconductors.[17] Partners responded with their own legislation, including the European Union's Critical Raw Materials Act and the European Chips Act, Japan's Economic Security Promotion Act, Korea's K-Chips Act, and Taiwan's expansion of tax credits to its semiconductor firms.[18]

The West also began loose attempts to coordinate some of these emerging policies among themselves. Collectively, they launched the Minerals Security Partnership, in an effort to aggregate buyers and encourage new sellers to emerge outside of China.[19] They tasked the International Energy Agency to expand its energy security mandate beyond traditional carbon-intensive fuels to include critical minerals.[20] For semiconductors, the Organization for Economic Cooperation and Development (OECD) developed a work program, and the United States, the European Union, Japan, Korea, and Taiwan formed various

15 For an early examination of Chinese subsidies in the semiconductor industry, see OECD (2019).

16 Japan is an outlier. Through its relationship with the Australian firm Lynas, the Japanese government began a program to help diversify its sourcing of rare earth elements in the early 2010s.

17 Of course, the CHIPS Act also began an effort by US as well as Japanese policymakers to diversify production capacity for advanced-node semiconductor manufacturing away from Taiwan if China were to retake the island by force. Both have subsidized TSMC's construction of new facilities in their countries as well as advanced-node capacity by other firms, including Intel and Samsung (United States) and Rapidus (Japan).

18 Lisa Wang, "Taiwan 'Chips Act' Sets R&D Spending at NT$6 Billion," *Taipei Times*, May 2, 2023; Alex Kim, "CHIP on the Shoulder," Wilson Center blog, October 10, 2023.

19 US Department of State, "Minerals Security Partnership," Media Note, June 14, 2022.

20 International Energy Agency, "2022 IEA Ministerial Communiqué," March 24, 2022.

groupings (the Chips-4 alliance, the US-EU Trade and Technology Council) to improve communications about their new policies.[21]

Progress at establishing new sources of supply was slow, in part because semiconductors and critical minerals are industries with massive upfront costs. Domestic politics also made international coordination between the United States and its partners messy at best.[22] Nevertheless, policy alignment was headed in the right direction. Then Donald Trump was reelected.

Policy escalation and the near crises of 2025

The United States provoked a potential economic crisis with its escalatory policies in 2025 (table 2). Shortly after the second presidential inauguration of Donald Trump, the United States once again raised its tariffs on imports from China (figure 3). China retaliated. By April, each country had announced tariff increases of more than 125 percentage points. (The average applied tariffs were lower than the announcements, as some products were excluded.) For some products, prohibitive tariffs remained in place for a month. Many firms just stopped shipping. In May alone, total US imports from China and US exports to China each fell by 40 percent.[23]

As disruptive as those tariffs were, China's April 4 export restrictions on rare earth elements and permanent magnets turned out to be much more worrisome for global supply chains.[24] Permanent magnets are essential for the functioning of various components of automobiles, including seats, windshield wipers, motors, cameras, and audio systems.[25] In 2024, China manufactured over 90 percent of one major class of the world's rare earth permanent magnets.[26]

When Chinese exports of permanent magnets fell to nearly zero beginning in April 2025 (figure 4), the US auto industry panicked. "It's day to day," Ford CEO Jim Farley said in a June interview with Bloomberg, when asked about the loss of supplies.[27] "We have had to shut down factories. It's hand-to-mouth right now."

21 OECD, "Semiconductor Informal Exchange Network," accessed March 1, 2026; Yuka Hayashi, "US, EU Agree to Coordinate Semiconductor Subsidy Programs," *Wall Street Journal*, December 5, 2022; Rihao Nagao, "Japan and EU to Share Chip Subsidy Info to Disperse Production. Three-Way Exchange with US Aims for Better Supply Chain Distribution," *Nikkei Asia*, June 29, 2023; Jake Sullivan, "Remarks by National Security Advisor Jake Sullivan on Renewing American Economic Leadership at the Brookings Institution," Speech at Brookings Institution, Washington, DC, April 27, 2023.

22 See, for example, the case of electric vehicles in the Inflation Reduction Act (Bown 2024). For semiconductors, see Bown and Wang (2024).

23 US Census Bureau, "Trade in Goods with China," accessed March 13, 2026.

24 Ministry of Commerce of the People's Republic of China, "Announcement No. 18 of 2025 on Export Controls for Certain Medium and Heavy Rare Earth-Related Items," April 4, 2025.

25 Keith Naughton, "Ford Forced to Idle Multiple US Plants on China Magnet Shortage," Bloomberg, June 27, 2025.

26 International Energy Agency, "China's Share in Rare Earth Magnet Production, 2024," October 6, 2025; International Energy Agency, "Global Critical Minerals Outlook 2024," May 17, 2024.

27 Keith Naughton and Matthew Miller, "Ford CEO Says Rare Earth Supply Is 'Day to Day' After Plant Halt," Bloomberg, June 13, 2025.

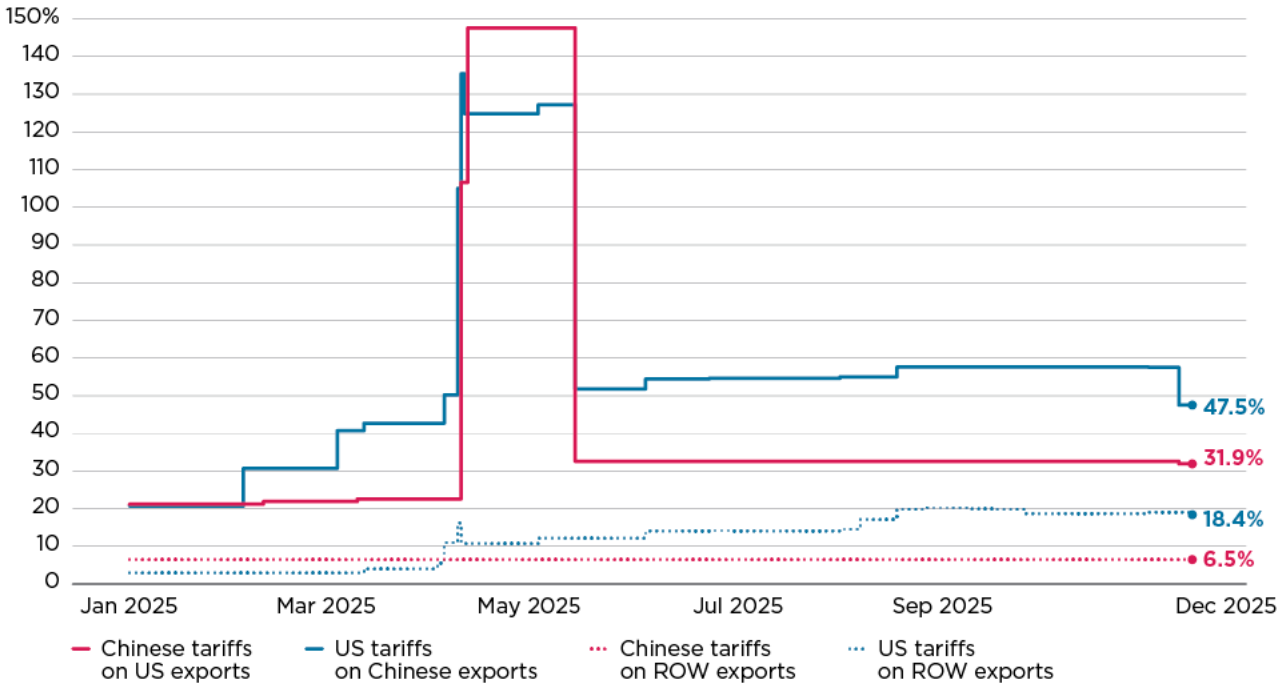
Table 2
US-China technology and trade policy escalation, February 2025–February 2026

Year	Event	Why important
2025	US resumes tariff escalation against China; China retaliates with tariffs and other policies	US and Chinese tariffs reach more than 120 percent; US rare earths mining company MP Materials loses sales to its main customer (Shenghe Resources) for refining in China
2025	China tightens export controls on rare earths and permanent magnets	Auto plants and suppliers in the US, Japan, Europe and elsewhere temporarily shut down because of lost access to rare earth permanent magnets
2025	US reduces tariffs on imports from China; China reciprocates and agrees to relax rare earth export controls	US and China reduce hostilities, but tariffs remain considerably higher than in 2024
2025	US loosens export controls on chips used in artificial intelligence	US again signals its export controls ostensibly imposed for national security purposes may be negotiable
2025	US announces export controls on electronic design automation tools then reverses them just weeks later	US signals it is adding export controls to new products to increase leverage, given that US-China negotiations have shifted to mainly export controls
2025	US takes ownership stake in MP Materials for rare earths, provides price guarantee for offtake	US government makes financial commitment to a domestic rare earths mining company, with aspirations for domestic refining and manufacturing of permanent magnets
2025	US expands export controls to cover subsidiaries of foreign companies already subject to its controls	Nexperia, a subsidiary of the Chinese firm Wingtech, is caught up in new US controls
2025	China restricts chip exports from Nexperia	Automakers worldwide again face shutdowns, this time because of lack of chips for their supply chains
2025	China quietly tells firms to stop buying US-produced chips used in AI	China signals further intent to develop its own domestic AI ecosystem in attempt to end US market dominance
2025	US and China agree to October truce, relaxing some 2025 trade restrictions	China postpones export controls on rare earths and Nexperia's chips; US postpones expanding its export controls to cover subsidiaries of companies already facing controls
2026	US implements export tax on chips used in artificial intelligence produced by Nvidia and AMD	US administration signals it does not find China's access to such American chips a national security threat
2026	US convenes two ministerial-level meetings on critical minerals	US signals potential willingness to cooperate with partners on critical minerals and rare earths

Figure 3

The United States and China raised tariffs to prohibitive levels in 2025 before calling a truce

US-China tariff rates toward each other and rest of world (ROW), January–December 2025

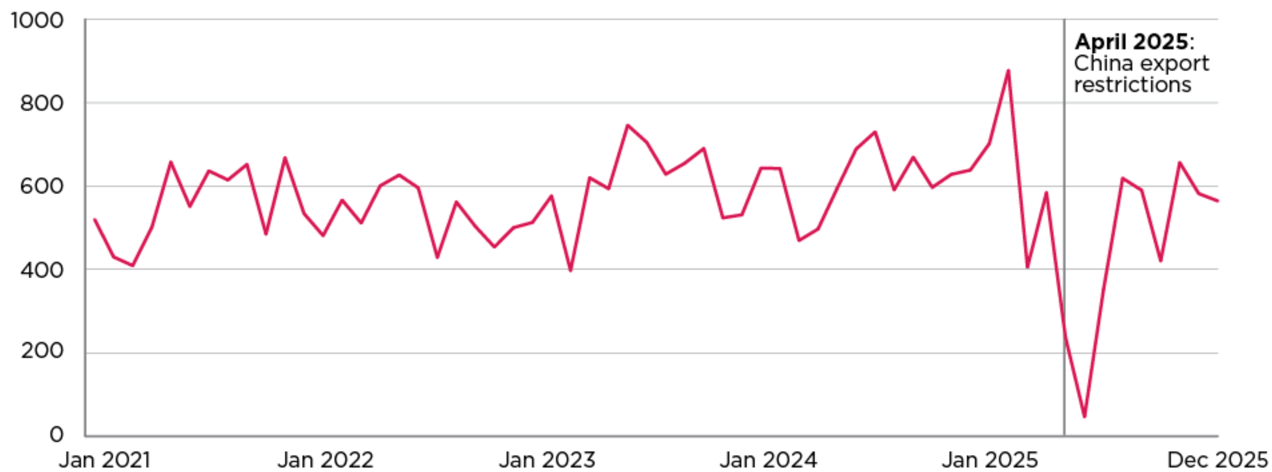


Source: Chad P. Bown, US-China Trade War Tariffs: An Up-to-Date Chart, PIIE Chart, 2026.

Figure 4

China cut off exports of rare earth permanent magnets in April 2025

China's monthly exports to US of rare earth permanent magnets, 2021–25 (metric tons)



Source: China Customs.

The shortage of permanent magnets disrupted supply chains well beyond the American Midwest. A Suzuki factory in Japan and an auto plant in India also closed down production.[28] As European parts suppliers had to take production offline, worried automakers pushed European political leaders to beg China for magnets as well.[29]

The automotive industry warned the Trump administration on May 9 that China's export restrictions could force vehicle assembly lines to shut down "before the end of this month, most likely."[30] The memory of the COVID-19 pandemic had put the sector on heightened alert for input shortages. The sudden shortfall of semiconductors in early 2021 caused US automakers to temporarily halt production, furloughing tens of thousands of manufacturing workers.[31] (Companies in Germany, the United Kingdom, Japan, and Korea faced similar problems at the time.[32])

Despite the warnings, the Trump administration escalated matters by expanding export controls that would hit the Chinese semiconductor industry.[33] In late May, for example, it threatened to broaden the scope of products covered by US export controls to include EDA software essential to the design of leading edge chips (see figure 2).[34] After a month, the administration backtracked.[35]

Then, in late September, the Trump administration again expanded the US export control regime, this time to cover the subsidiaries of foreign companies already restricted from receiving US exports.[36] This move was also expected to affect Chinese companies developing and manufacturing chips for AI, including Huawei's HiSilicon and Semiconductor Manufacturing International Corporation

28 Keith Bradsher, "Export Controls Are Endangering the Fragile US–China Truce," *New York Times*, May 29, 2025; ItsukiMiyake and Mitsutoshi Masuno, "China's Rare-Earth Export Curbs Halt Output of Suzuki Swifts in Japan," *Nikkei Asia*, June 5, 2025; Mei Mei Chu, "EU Firms Brace for More Shutdowns Due to China Rare Earth Controls Despite Summit Promise," Reuters, September 16, 2025; Nandan Mandayam, "India's Royal Enfield Maker Briefly Hit by Rare Earth Magnet Shortage, Secures Alternative, Executive Says," Reuters, July 31, 2025.

29 Victoria Waldersee and Christoph Steitz, "China's Rare Earth Export Curbs Hit the Auto Industry Worldwide," Reuters, June 4, 2025.

30 Alliance for Automotive Innovation, "Letter to the US Departments of State, Commerce, Treasury, and the Office of the US Trade Representative Regarding China Rare Earth Export Controls," May 9, 2025.

31 Reuters, "US Commerce Chief Cites Auto Chips Shortage in Jobs Report," May 7, 2021; David Coffin, Dixie Downing, Jeff Horowitz, and Greg LaRocca, "The Roadblocks of the COVID-19 Pandemic in the Automotive Industry," US International Trade Commission Working Paper, June 2022.

32 Ilona Wissenbach and Nick Carey, "Daimler to Put up to 18,500 Workers on Short-Time Work over Chip Shortage," Reuters, April 21, 2021; Reuters, "Nissan to Furlough 800 Workers at Its UK Plant as Chip Shortage Cuts Production," April 16, 2021; Maki Shiraki, "Nissan to Slash Japanese Production in May Due to Chip Shortage, Sources Say," Reuters, April 15, 2021; "Hyundai Motor to Suspend South Korea Production Due to Chip Shortage," Reuters, March 30, 2021.

33 For one early warning, see Posen (2025).

34 Karen Freifeld, "US Curbs Chip Design Software, Chemicals, Other Shipments to China," Reuters, May 29, 2025; Liam Mo and Brenda Goh, "Exclusive: Synopsys Halts China Sales Due to US Export Restrictions, Internal Memo Shows," Reuters, May 30, 2025.

35 Thomas Hale and Christian Davies, "Chip Software Makers Say US Restrictions on Sales to China Lifted," *Financial Times*, July 3, 2025.

36 Demetri Sevastopulo, "US Tightens Export Controls on Chinese Companies," *Financial Times*, September 29, 2025.

(SMIC).[37] The controls would also hit Nexperia, a subsidiary of Wingtech Technology, a Chinese company that had been subject to US export restrictions since 2024. Nexperia's plants in Europe manufactured silicon wafers that were then sent back to its Chinese facilities for assembly, testing, and packaging into finished semiconductors. One of Nexperia's most important customers for those mature-node semiconductors was the global automotive industry.

The Dutch government ousted the CEO of Nexperia shortly after the US policy announcement, reportedly because of concern that he had been involved in the "improper transfer of production assets, funds, technology and knowledge (including intellectual property)" to another foreign company that the CEO owned that was not part of Nexperia.[38]

Beijing responded by stopping Nexperia's exports on October 4.[39] The company's finished semiconductors were not permitted to leave China without a license; Nexperia's foreign customers would face lengthy delays. Two weeks later, and for the second time in less than six months, automakers warned that they once again risked having to shut down production because of lost access to an essential input coming out of China.[40] By late October, the chip shortage forced Honda to halt assembly at a plant in Mexico and adjust its production at its US and Canadian facilities.[41] Stellantis set up a "war room" to address the emergency.[42] The lack of chips caused Bosch, the auto parts supplier, to announce preparations to furlough workers in Germany.[43]

Presidents Trump and Xi met in South Korea on October 30 and declared a truce. The White House readout of the deal noted that Beijing would allow shipments of rare earths and Nexperia's chips to the world.[44] (A spokesperson for China's Ministry of Commerce confirmed the rare earths agreement.[45]) Each side also reduced its tariffs, albeit to levels that were considerably higher than before the 2025 escalation. Economic damage had been done, and supply chains remained on edge.[46]

37 Martin Chorzempa, "A New Export Rule Escalates US–China Tensions," PIIE Realtime Economics, October 27, 2025.

38 Vincent Karremans, "Developments Concerning Nexperia," Dutch Minister of Economic Affairs Letter to the President of the House of Representatives, November 19, 2025.

39 Nexperia, "Update on Company Developments," October 14, 2025.

40 Reuters, "Automaker Group Warns Nexperia Chip Supply Issue Could Quickly Disrupt US Production," October 16, 2025.

41 Maki Shiraki, "Honda to Resume Regular Output at N. America Plants after Chip Supply Disruptions," Reuters, November 18, 2025; Honda Motor Co., Ltd., "Fiscal First Half Year Ended September 30, 2025 Financial Results," November 7, 2025.

42 Reuters, "Stellantis Has Set Up 'War Room' to Manage Nexperia Chip Crisis, CEO Says," October 30, 2025.

43 Rachel More, "Bosch Warns Production at Risk as Nexperia Dispute Hits Auto Suppliers," Reuters, October 24, 2025.

44 The White House, "Fact Sheet: President Donald J. Trump Strikes Deal on Economic and Trade Relations with China," November 1, 2025.

45 Ministry of Commerce of the People's Republic of China, "A Spokesperson for the Ministry of Commerce Answered Reporters' Questions Regarding the Joint Arrangements for the China–US Kuala Lumpur Trade Consultations," October 30, 2025.

46 Eduardo Baptista, "China Warns of Global Chip Shortages as Nexperia Dispute Escalates Again," Reuters, March 7, 2026.

Concerns over the noncooperative approach to reducing trade dependency

The noncooperative approach of the United States and China to decoupling their trade dependencies is a source of worry for three reasons. One is that escalation threatens unnecessary disruption to their economies. Had they not been resolved in time, the shocks to the US auto sector, for example, could have been profound. Just-in-time automotive supply chains employ nearly 6.5 percent of all US manufacturing workers.[47] The 2008–09 Global Financial Crisis cost the US auto industry 400,000 jobs in a year, with estimates suggesting that over 1 million would have been lost had the federal government not bailed out General Motors and Chrysler in time.[48]

More generally, the early data from 2025 suggest that the tariff escalation had a potentially sizable impact. US exports to China were 26 percent lower, with the US farm sector particularly hard hit.[49] Soybean sales to China fell by almost $10 billion, to depths not seen since Trump's first trade war. Just as in 2018–19, the Trump administration announced that a farm bailout (of $11 billion) would be available starting in 2026.

China's steps to decrease transparency make it difficult to assess the impact of tariff escalation on its economy. (China has stopped publishing certain data series and has even censored economists for criticizing Xi Jinping's economic policies.[50]) Nevertheless, there are clues that policy escalation is of concern. US real imports from China in 2025 fell by more than 25 percent, a much larger decline than the 3 percent drop in the 12 months following Trump's first-term tariff actions of 2018.[51] A study of the 2018–19 trade war that used data on night lights in China (a good proxy for economic activity) found a significant negative impact—a 2.6 percent decline in per capita income and a 1.6 percent drop in manufacturing employment—in Chinese regions more exposed to the US tariffs relative to unexposed areas.[52]

Another anecdote suggesting that Chinese policymakers are wary of the disruptive employment effects of escalation comes from the Trump-Xi negotiations during the first trade war. At the time, President Trump decided to spare the Chinese telecommunications company ZTE, which employed 75,000 people, from devastating US sanctions, stating "President Xi of China, and

47 US Bureau of Labor Statistics, "Automotive Industry: Employment, Earnings, and Hours," accessed February 26, 2026.

48 The White House, "The Resurgence of the American Automotive Industry," June 2011.

49 Chad P. Bown, "China No Longer Buys US Exports: Drawing The Right Lessons for the Next Trump-Xi Deal," PIIE Realtime Economics, March 3, 2026.

50 Rebecca Feng and Jason Douglas, "How Bad Is China's Economy? The Data Needed to Answer Is Vanishing," *Wall Street Journal*, May 4, 2025; Chun Han Wong and Lingling Wei, "Top Economist in China Vanishes after Private WeChat Comments," *Wall Street Journal*, September 24, 2024.

51 Chad P. Bown, "The Trump-China trade wars: Five takeaways from US imports in 2025," PIIE Realtime Economics, March 16, 2026.

52 See Chor and Li (2024).

I, are working together to give massive Chinese phone company, ZTE, a way to get back into business, fast. Too many jobs in China lost."[53]

A second concern is that each government is applying tariffs, subsidies, and export controls in ways that are excessively costly. Their bilateral tariffs are likely too restrictive, even relative to their own objectives. (Higher US tariffs are clearly not strategic when applied to imports of clothing and footwear, industries in which China does not have market dominance.) But at least the US policy is transparent. Nearly continuous reporting out of China is that the government is also informally directing businesses to shift their purchases away from imports and toward domestically produced alternatives without formal policy announcements.[54]

Subsidies are also now likely to be excessive relative to the targeted interventions strictly necessary to end market dominance. Such compensation is often a second round of policy designed to offset the other country's original intervention, such as US subsidies to farmers for their losses from Chinese tariff retaliation.

Another example of such subsidies involves the US response to the underpricing of critical mineral and rare earth exports by Chinese state-owned enterprises (SOEs) to deter Western firms from launching new mining and processing projects. To address that concern, in July 2025 the US government took an equity stake in MP Materials, a small rare earth mining company, and agreed to buy its output for 10 years at nearly double the current market price.[55] By the end of 2025, the United States had bought ownership stakes in at least seven other companies in various critical minerals supply chains.[56] These actions pose governance challenges and increase the scope for waste, as the US government has little experience owning companies or implementing price floors effectively.

For its part, China has long been accused of subsidizing too much. The OECD estimates that direct subsidies made up 10 percent of the Chinese semiconductor industry's revenue in 2023, without accounting for the below-market equity holdings arising through the Big Fund.[57] Staff at the International Monetary Fund

53 Donald J. Trump (@realDonaldTrump), "President Xi of China, and I, are working together to give massive Chinese phone company, ZTE, a way to get back into business, fast. Too many jobs in China lost. Commerce Department has been instructed to get it done!" X, May 13, 2018, 11:01 AM; Paul Mozur and Raymond Zhong, 2018, "In About-Face on Trade, Trump Vows to Protect ZTE Jobs in China," *New York Times*, May 13.

54 Zijing Wu, Cheng Leng, and Tim Bradshaw, "China Bans Tech Companies from Buying Nvidia's AI Chips," *Financial Times*, September 17, 2025; Zijing Wu and Cheng Leng, "China Launches Customs Crackdown on Nvidia AI Chips," *Financial Times*, October 10, 2025; Reuters, "Exclusive: China Bans Foreign AI Chips from State-Funded Data Centres, Sources Say," November 5, 2025; Reuters, "Exclusive: China Mandates 50% Domestic Equipment Rule for Chipmakers, Sources Say," December 30, 2025.

55 Camilla Hodgson, Leslie Hook, and Steff Chávez, "Pentagon's China-Style Rare Earths Deal Triggers Industry Backlash," *Financial Times*, July 18, 2025.

56 The companies are Lithium Americas, Trilogy Metals, Vulcan Elements, USA Rare Earth, ReElement Technologies, Korea Zinc, and Atlantic Alumina (Reuters, "Trump Administration Pivots to Buying Stakes in Critical Sectors," January 26, 2026; Reuters, "US, Vulcan Elements Ink Deal to Boost Rare Earth Magnet Supplies," November 3, 2025; Reuters, "ATALCO Secures Investment from US, Pinnacle Affiliate to Boost Alumina, Gallium Output," January 12, 2026).

57 See OECD (2025b).

(IMF) estimated China's total subsidies in 2023 at 4.4 percent of its GDP[58]—and that figure is an underestimate, as it does not include the implicit subsidies involved in Chinese SOEs periodically underpricing their sales of critical minerals and rare earths outside of China in order to deter new entrants emerging.

The expansion of export controls is also worrisome. If one country imposes such restrictions simply to create future leverage, the other is likely to do the same. In 2025, the US government reportedly told firms to prepare for its export control regime to cover not only the EDA software described earlier but also butane, ethane, machine tools, equipment used for aviation, and chemicals used for semiconductors.[59] Beyond rare earths, permanent magnets, and those chips from Nexperia, China added new rounds of controls to exports of other critical minerals as well as battery equipment technology.[60] Without any offsetting national security benefits, the imposition of more controls by both countries also increases the uncertainty and compliance costs firms face.

A third worry is that the adverse economic effects of the US-China approach to decoupling are spilling over to third countries. China's export restrictions on permanent magnets and Nexperia chips also affected production and jobs in Japan, Germany, India, Canada, and Mexico, as described earlier.

US and Chinese tariffs are also affecting trade flows to the rest of the world. Sometimes the tariffs create opportunities. For example, US imports from third countries have continued to increase, despite new tariffs on those countries, often because the tariffs on China were higher.[61] China is buying more soybeans from Brazil and Argentina, as it weans itself from US farmers. But the tariffs can also create costs. The fact that China is shifting its export focus away from the United States, for example, may also be putting unwanted and unfair pressure on unprepared industries and workers in third countries.

A RULES-GUIDED PROPOSAL FOR COOPERATION ON UNWINDING

This section establishes a path for US-China cooperation to facilitate a reduction in their excessive economic dependencies. The negotiating proposal shows how to efficiently manage the process of moving from one equilibrium to the other with the fewest additional spillovers possible, including those on trading partners.

The drafters of the rules-based trading system in 1947 foresaw that countries might someday seek an orderly way to unwind some of their economic interdependencies. They set up a process in GATT Article XXVIII, under which negotiations are based on reciprocity.[62] A country is allowed to raise its tariffs,

58 See Garcia-Macia, Kothari, and Tao (2025).

59 Karen Freifeld, "US Curbs Chip Design Software, Chemicals, Other Shipments to China," Reuters, May 29, 2025.

60 See Bown (2025, 286) and Hussain et al. (2025).

61 Chad P. Bown, "The Trump-China trade wars: Five takeaways from US imports in 2025," PIIE Realtime Economics, March 16, 2026.

62 For a legal discussion of GATT Article XXVIII, see Hoda (2004). For an early modeling interpretation of renegotiations to reduce market access after a different kind of shock (political economy, not national security or market dominance) see Bown (2002). The application is imperfect, as the GATT envisioned application on an MFN basis and involved tariff changes. As described below, the approach here is only bilateral (therefore violating MFN) and involves changes to non-tariff policies.

thereby reducing the market access it had previously granted to trading partners, but the countries that are adversely affected can reciprocally raise their tariffs to reduce an equivalent amount of market access. (The European Commission recently proposed increasing its import protection for steel and engaging in Article XXVIII negotiations with affected trading partners.[63])

US-China negotiations could apply this basic model. They would also include four elements.

Articulation of concerns, objectives, and actions

First, the negotiations would provide a forum of communication for the two sides to articulate their concerns, objectives, and actions. The US worry is that it is too dependent on China as a source of critical minerals, rare earth elements, and permanent magnets. The Chinese concern is that it is too dependent on the United States and other Western economies for semiconductors and related technology. To reduce these dependencies, each country is now throwing tens if not hundreds of billions of dollars at firms attempting to create sources of supply in other geographic locations outside the other's control.

By now, enough public analysis has been done about each side (examples include figures 1 and 2) to make clear what the private analysis of each government also likely already reveals.[64] Each recognizes its own basic vulnerabilities and strengths. China knows where it is vulnerable, the United States knows that China knows where it is vulnerable, and China knows that the United States knows that China knows where it is vulnerable. And the same holds for US vulnerabilities.

Given this public knowledge, cooperation would take the form of the two sides negotiating reciprocally to reduce their primary vulnerabilities of concern. The process would involve each drawing from a common set of publicly available metrics about the other side's market dominance in its sectors of interest.

Each side could put on the table its top five sectoral concerns. There needs to be a balance of sectors across the two countries to ensure that the negotiations can be reciprocal under an approach similar to Article XXVIII. Efforts to silo AI or rare earths, for example, into separate negotiating tracks are unlikely to be successful. They need to be linked in the negotiations for reciprocity to work.

Note, however, that this linkage is likely to meet political-economic resistance. In the United States, for example, different government agencies oversee policy on AI and rare earths, and at least one will not like having its fate linked to the other. Furthermore, the domestic industry seen as having to give something up (e.g., the AI sector in the United States) would complain if policymakers trade what it views as a strength to offset a weakness (excessive dependency) of another sector. Nevertheless, such political-economy tradeoffs form the very nature of country-level trade negotiations.

63 See European Commission (2025). For other historical examples, see WTO (2025a) for negotiations during the WTO period (1995–present) and WTO (2025b) for negotiations during the GATT period (1947–94).

64 For a recent review, see OECD (2025b).

Agreement on the definition of success

The second element involves agreeing to a definition of success, which requires thinking through to the end of the negotiations. When negotiating reductions in market access under Article XXVIII, the end point was the higher tariff rate. Identification of final tariff rates was sufficient for GATT negotiations between market economies, because the new tariff, combined with the old (original) tariff, could be used to provide a good proxy for the change in economic activity that the negotiators really cared about. Put differently, a tariff change in market economies provided enough information about changes in imports (market access), which policymakers could use to understand the implications for fundamental domestic economic activities of interest such as industry growth and job growth in key sectors, given their knowledge that firms would be maximizing their profits.

Reciprocity was used throughout the GATT era to balance the market access changes resulting from the negotiations.[65] As one example, take Europe's decision to restrict imports of poultry in 1963 which reduced market access for American chicken exporters.[66] The US increased its tariff on trucks reciprocally, which meant an offsetting decrease in market access for European truck exports. The episode became known as the "Chicken War," but such GATT-prescribed reciprocity served to limit the fallout from the initial policy change and prevented a more damaging escalation.

In the current US-China setting, the two sides need to agree to a metric of success. Defining the new outcome would also allow for a mutual understanding of when new policies designed to shift supply chains and reduce market dominance would stop. Given their apparent agreement that the underlying problem is their vulnerability because of market concentration of production, the agreed metric could be a reduction in that concentration.

As a crude example of reciprocity, the United States and its partners could reduce to 40 percent their share of the inputs used in China to produce the advanced-node semiconductors needed for AI in exchange for a reduction to 40 percent in the Chinese share of the US and partner markets for rare earths and critical minerals.[67] Such reciprocal exchanges are possible only if negotiations are linked across sectors.

The focus on outcomes (market shares) as opposed to policies (tariffs) is another accommodation of the realities imposed by China's nonmarket economic model relative to historical negotiations under GATT Article XXVIII. Peculiarities of the Chinese system mean that a simple focus on policy commitments is not enough. Government guidance funds as well as nonpublic requests for companies to source locally are but two examples of China's nontransparent system. The

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65 In their seminal contribution, Bagwell and Staiger (1999) show how reciprocity neutralizes the terms-of-trade impact of otherwise unilateral policy changes. Reciprocity thus provides an approach for two countries to coordinate policy changes and move from a prisoner's dilemma to an outcome with a more cooperative policy mix. For more recent summaries of the empirical evidence behind the effectiveness of reciprocal market access negotiations, see Bagwell, Bown, and Staiger (2016) and Staiger (2022).

66 Alan Wolff, "Trump's Tariff Threats Amount to a Game of Chicken with Trading Partners," PIIE Realtime Economics, September 16, 2024. See also Walker (1964).

67 For more sophisticated metrics, see the Herfindahl-Hirschman measures of industry concentration (OECD 2025b).

nature of Chinese SOEs, and even the role of the Chinese Communist Party committees within private firms, implies that Chinese companies may have objectives that differ from the pure profit maximization of Western companies.

China's system has resulted in misunderstanding and distrust by foreign policymakers especially. Cooperation that focuses on "managed trade"–type outcomes directly, instead of attempting to induce outcomes indirectly through negotiations over China's policies, may yield better results.[68]

Articulation and updating of the path of policies in use to end the other country's market dominance

The third element involves each country articulating and updating the path of policies in use to end the other's market dominance, including tariffs, subsidies, export controls, and other tools. Although information on Chinese policies will be translated into the outcome metrics of interest to policymakers only imperfectly (see above), the additional clarity will reduce misunderstandings. It may prevent a breakdown in the agreement as well as unnecessary escalation.

The request is not novel, as transparency is a requirement at the WTO. What would be novel is for China to treat the transparency requirements seriously and to convert more of its informal communications to firms into actual policy announcements.[69] The United States would also have to do more reporting than it has in the past, given its new policy instruments, including industrial subsidies, ownership stakes in private companies, and price floors. (Unlike in the WTO era, when countries were fearful that what they reported publicly could be used against them as evidence in formal dispute settlement proceedings, there will be no litigation except in the court of public opinion.)

Commitment not to deploy policies to thwart the effects of the other country's efforts to diversify

The last element is that each country would commit not to deploy policies to simply thwart the economic effects of the other's market diversification efforts. For example, China would not drive down world prices for miners and refiners of rare earths and critical minerals; high enough world prices would accommodate profitable entry by Western investors in the global market. The United States would not implement policies to encourage its semiconductor industry to offer cut-rate prices in China to thwart market entry by Chinese companies.

Such an agreement would prevent the adoption of additional layers of distortionary policies.

IMPLEMENTATION DIFFICULTIES AND CONCERNS ABOUT LACK OF COOPERATION

The proposal put forth in this paper is motivated by the US-China policy escalation in 2025, which put elements of the global economy at unnecessary risk. It accepts as legitimate each country's desire to reduce its vulnerabilities

68 See, for example, Staiger (2022) and Grossman and Sykes (2025).

69 For other historical problems in defining and monitoring China's subsidies in the WTO, see Bown and Hillman (2019).

but requires a sincere commitment by both to change how they approach that objective. If both sides are not committed and see the outcome as zero sum, there may be no scope for cooperation. The proposal requires belief that a win-win outcome is possible.

The approach would follow incentives similar to those articulated by the historical GATT model of reciprocal negotiations in market access. The benefits include providing clarity over what the other side is doing, why it is doing it, and when it would expect to stop doing it. At the point at which each side reaches its pre-agreed market diversification goal, the actions of each country would pivot from establishing new sources of production to policies needed to sustain those newly diversified supply chains to prevent conflict in this domain from reemerging.

Numerous additional difficulties in implementing such an approach have been glossed over here. For example, the proposal strips down the negotiations to the United States and China, assuming that the United States can coordinate separately with like-minded partners.[70] That may no longer be feasible. The 2025 US approach of applying (and threatening) ever-higher tariffs to imports of even partner countries and then making demands that they invest in the US market to achieve other US objectives is not a formula for cooperation between like-minded countries on how to collectively address China's market dominance.

The US government would need to reprioritize its policies toward those countries if it seeks to enlist their help in achieving any common goals for finding new sources of non-Chinese supply of critical inputs.[71]

The Supreme Court's rejection of its 2025 tariff approach presented the US administration with an opportunity to develop a new strategy. In the early months of 2026, for the first time, the administration convened dozens of countries and hosted two separate ministerial-level meetings over critical minerals.[72] Although these signs are positive, real change would require a massive reorientation of the president's tariff policy. (Those details may only emerge following completion of the Trump administration's dozens of investigations announced in March 2026 under Section 301 of the Trade Act of 1974.[73])

China, too, faces tremendous technological and innovation challenges to develop its own advanced semiconductor ecosystem. Even if the United States and its partners interfered less in China's process, the Chinese industry would need to create its own versions of companies like ASML, TSMC, and other parts of the supply chain that Western companies currently dominate technologically.

70 On the supply side for semiconductor inputs, partners would include Japan, Europe, South Korea, and Taiwan (the other major economies in figure 3), most of which share the same basic concerns about China as the United States.

71 For example, Bown (2025b) describes why the United States and partner countries need to expressly limit their use of export controls toward each other to help achieve any joint objectives at combating Chinese market dominance of critical minerals and rare earths.

72 US Department of Treasury, "Secretary Bessent Convenes Finance Ministerial on Securing Critical Minerals Supply Chains," Press Release, January 12, 2026; US Department of State, "2026 Critical Minerals Ministerial: Fact Sheet," Press Release, February 4, 2026.

73 Office of the US Trade Representative, "USTR Initiates Section 301 Investigations Relating to Structural Excess Capacity and Production in Manufacturing Sectors," March 11, 2026; Office of the US Trade Representative, "USTR Initiates 60 Section 301 Investigations Relating to Failures to Take Action on Forced Labor," March 12, 2026.

There are other important costs of failure to cooperate. Unmanaged competition over technology could lead to the excessive build out of energy-demanding AI models, in a world already struggling with the global collective action problem of climate change and the green transition. Mining and refining rare earths and critical minerals are also environmentally damaging. Excessive supply-side diversification caused by noncooperative policy would result in more facilities operating on a smaller scale, potentially increasing negative environmental spillovers.

By design, this proposal abstracts from questions about the optimal level of interdependence between the United States and China. It accepts the premise that, in a handful of critical sectors, each is excessively dependent on the other and that each is committed to diversifying its sourcing, even if doing so leads to less economically efficient outcomes. Pursuing less dependence may address concerns over market dominance, but it will involve giving up some other economic benefits, such as the full exploitation of scale economies and trade based on comparative advantage. Too little interdependence between the two countries also risks creating an environment that is more susceptible to military conflict.[74]

The goal of this proposal is extremely modest. In the current geopolitical climate, the main intent is to prevent something worse by introducing some rationality and efficiency considerations into the uncoordinated and worrisome process on display in 2025. It presents US and Chinese policymakers with an approach that allows each country to achieve its core objective while minimizing collateral damage, reducing the risk that their actions inadvertently spill over to other policies, as well as to their and other countries' economies.

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74 See, for example, Mayer, Mejean, and Thoenig (2025).

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