ITIF | INFORMATION TECHNOLOGY & INNOVATION FOUNDATION

Testimony of

Stephen Ezell

Vice President, Global Innovation Policy

Information Technology and Innovation Foundation

Before the

U.S.-China Economic and Security Review Commission

Hearing on

"U.S.-China Innovation, Technology, and Intellectual Property Concern"

April 14, 2022

Washington, DC

Micron Ex. 1046, p. 1
Micron v. YMTC
IPR2025-00244

Contents

Impact of Chinese Mercantilism on U.S. and Global Innovation 3
An Overview of Chinese Innovation Mercantilist Practices 3
Academic Studies of the Impact of Chinese Mercantilism on Innovation 4
Industry-level Case Studies of Chinese Innovation Mercantilism 6
Economic Impact of Chinese Innovation Mercantilism 10
Responding to Chinese Innovation Mercantilism 11
Domestic Responses to Chinese Innovation Mercantilism 11
Strengthening U.S. Competitiveness 11
Strengthening Organizational Capabilities Within the Federal Government 12
Revoke China's PNTR and Renegotiate Market Access Schedules for Chinese Goods and Services at the WTO 13
Self-Initiate More WTO Cases 14
Coordinated, Allied Responses to Chinese Innovation Mercantilism 14
Amend, and Use, Section 301 to Target Digital, Services, and Other Modern Trade Barriers in China 15
Pursue a Specific Section 301 Investigation Into China's Cloud, Cyber, and Other Digital Trade Restrictions 15
Collaborate to Document and Share Information on Chinese Unfair Trade Practices 15
Create a "DATO" for Trade 16
Form a Global Strategic Supply Chain Alliance 17
Aligned and Complementary Frameworks for Foreign Direct Investment Screening 17
Aligned Export Control Rules With Allies 18
New, Stronger Rules Prohibiting Forced Technology Transfers and Market-Distorting Subsidies 20
Collaborate to Bring a Non-violation Nullification and Impairment Case Against China at the WTO 21
Observations on the EU-U.S. Trade and Technology Council 21
Conclusion 23
Graphs and Tables 25
Endnotes 27

Micron Ex. 1046, p. 2
Micron v. YMTC
IPR2025-00244

The Information Technology and Innovation Foundation (ITIF) appreciates the United States-China Economic and Security Review Commission's invitation to provide testimony regarding U.S. concerns with China's innovation, technology, and intellectual property (IP) practices.

IMPACT OF CHINESE MERCANTILISM ON U.S. AND GLOBAL INNOVATION

This section examines the nature of Chinese innovation mercantilism, reviews academic literature assessing the impact of Chinese mercantilism on U.S. and global innovation, provides several case studies of the impacts of Chinese innovation mercantilism on U.S. industries, and concludes with an assessment of the broader impacts of China's innovation mercantilist practices on the U.S. economy.

An Overview of Chinese Innovation Mercantilist Practices

When it joined the World Trade Organization (WTO) on December 11, 2001, China committed to joining a community of nations pursuing "open, market-oriented policies" in accordance with the foundational WTO principles of "non-discrimination, market access, reciprocity, and fairness."[1] But while China has taken full advantage of its WTO rights, it has also largely ignored its responsibilities and commitments through its embrace of state-directed capitalism predicated upon aggressive innovation mercantilism.[2]

Indeed, China has contravened many of its WTO commitments, but perhaps the three most fundamental ways it has done so are through its rejection of the WTO's market orientation, its embrace of the principle of absolute vs. comparative advantage, and its adoption of a wide range of unfair, trade-distorting innovation mercantilist practices.

Regarding the first, during WTO entry negotiations, Chinese representatives averred that China would hew to a market orientation and that its government would not influence trade and business operations. As the *WTO Report of the Working Party on the Accession of China* notes, "The Government of China would not influence, directly or indirectly, commercial decisions on the part of state-owned or state-invested enterprises, including on the quantity, value, or country of origin of any goods purchased or sold, except in a manner consistent with the WTO Agreement."[3]

But China's embrace of "state capitalism" (or "China Inc.," as described by Mark Wu) shows how China has backtracked from (or simply ignored) this essential requirement of WTO membership through its embrace of, in Chinese President Xi Jinping's framing, a "socialist market economy with Chinese characteristics." The Chinese government—that is, the Chinese Communist Party (CCP)—exercises effective control over all domestic firms, whether state-owned enterprises (SOEs) or private ones, operating in its economy. In fact, under Article 19 of the *Company Law*, all SOEs or private Chinese companies have a Chinese CCP cell that management must listen to, if not necessarily obey.[4] Article 19 in essence codifies CCP influence over corporate governance and business decisions in China.

This gives rise to an economy wherein the party-state—a form of government in which a political party, rather than citizens or individual politicians, are the primary basis of rule—remains all powerful, though with a veneer of economic activity putatively driven by private enterprises. It is difficult to

Micron Ex. 1046, p. 3
Micron v. YMTC
IPR2025-00244

apply labels such as "market vs. nonmarket" and "private-led vs. state-led" to the Chinese context.[5] To be sure, Chinese leaders may attempt to obfuscate or prevaricate about the true nature of their economic system with epithets, but, essentially, China fundamentally rejects a market-based system.

The intellectual foundation of the global trading system stems from the work of classical economist David Ricardo, who developed the theory of comparative advantage, which suggested that nations should specialize in production of goods or services at which they are the most efficient at producing and trade for other goods and services at which they're not, with this system of exchange being global welfare-maximizing. But China fundamentally rejects the theory of comparative advantage, instead seeking *absolute advantage* in virtually all industries, especially in advanced technology products, such as aerospace, high-speed rail, semiconductors, telecommunications equipment, biotechnology, robotics, and clean-energy technology platforms such as wind turbines, solar panels, and electric batteries and vehicles.[6] Unfortunately, China's goal of absolute advantage runs counter to the effective functioning of the global trading system, which is grounded in the notion of competitive advantage: nations finding what they are good at or can be good at and exporting products and services in these areas to pay for the imports of goods and services they are not as good at producing.

But it's not only that China seeks absolute advantage in virtually all advanced technology industries, it's that the manner in which China has elected to compete in these industries is not (only) through "good" innovation policies such as investing in research and development (R&D), skills, and digital and physical infrastructure (policies that increase the global stock of knowledge and innovation), but increasingly through a wide-range of zero-sum "innovation mercantilist" practices.

Indeed, the nature of Chinese economic and trade policy—such as showering massive subsidies on domestic companies, manipulating its currency to gain unfair price advantage in foreign markets, obtaining massive amounts of foreign IP without paying for it, restricting or limiting Chinese market access to foreign firms in digital industries, etc.—represent extremely distortionary and unfair practices.[7] These and other such policies (see Table 1) have conferred an unfair advantage upon Chinese companies—which on average are significantly less innovative than their foreign competitors, the very reason China embarked on its "innovation mercantilist" efforts. China's "innovation mercantilist" polices have created such intense competitive pressures that many foreign companies have either closed or cut back, including on their R&D expenditures and other innovative activities, not only in China's market but in their home markets as well.

Academic Studies of the Impact of Chinese Mercantilism on Innovation

Indeed, when Chinese subsidies prop up enterprises that would not be genuinely competitive on a market basis, these firms can sell their products on less-than-market terms and so draw market share from more-innovative companies, depriving those enterprises of revenues needed to recoup investments and fund future generations of innovation. This is why virtually all academic studies have found a negative impact from China's mercantilist policies on U.S. and global innovation.

For instance, 2017 research by Autor, Dorn, Hanson, Pisano, and Shu examined the impact of Chinese competition on U.S. patents from 1975 to March 2013. The authors:

Micron Ex. 1046, p. 4
Micron v. YMTC
IPR2025-00244

> Document a robust, negative impact of rising Chinese competition on firm-level and technology class-level patent production. Accompanying this fall in innovation, global employment, sales, profitability, and R&D expenditure all decline within trade-exposed firms.[8]

They also find that "accelerating import competition from China during the 2000s can explain about 40% of the slowdown in patenting in 1999–2007 relative to 1991–1999."[9] On average, Autor et al. find that firms reduce R&D investment when they belong to industries that are exposed to more import competition from China.

A number of other studies have found similar results for the U.S. economy. Akcigit, Ates, and Impullitti looked at the impact of China on U.S. innovation and found that, "Even a relatively very advanced economy might experience a reduction in aggregate innovation, if it has an enough number of sectors that are getting discouraged by foreign competition."[10] They went on to note "foreign technological catching-up hurts U.S. welfare by stealing away business and profits of U.S. firms."[11] Hombert and Matray found similar results, observing, "[R]ising imports lead to slower sales growth and lower profitability for firms in import competing industries."[12] However, this effect is significantly smaller for firms that have invested large amounts in R&D, thanks to more generous state R&D tax credit policies.

Studies of the impact of Chinese competition on the Canadian innovation system have reached similar findings. Kim studied whether Chinese competition could help explain both the decline in business enterprise R&D and total factor productivity (TFP) in Canada after 2000 (China was accepted into WTO in December 2001). Myeong Wan Kim used Canadian firm-level data to explore the impact of rising Chinese import competition on Canadian firm R&D. Chinese imports as a share of domestic production increased from around 2 percent in 2000 to around 8 percent in 2010. The study found "increasing Chinese import competition reduced R&D" within Canadian firms.[13] Another study analyzing the impacts on Canadian innovation found similar results. Keung, Li, and Yang found "the 4-percentage-point increase in Chinese import share between 1999 and 2005 led to the exit of 4.2% of the firms sampled in 1999 over that period, which is very large relative to the 17% overall exit rate of these firms."[14] Moreover, surviving firms had lower profits than otherwise would have been the case.[15]

The evidence with regard to the impact on Europe is mixed. One highly cited study on the effect of Chinese trade on a number of northern European economies found Chinese trade stimulated innovation. Bloom, Draca, and Van Reenen studied the impact of Chinese trade on EU innovation from 2000 to 2007 and concluded, "China appeared to account for almost 15% of the increase in patenting, IT, and productivity."[16] They found, "Chinese import competition reduces employment and survival probabilities in low-tech firms."[17] In addition, "Firms with lower levels of patents or TFP shrink and exit much more rapidly than high-tech firms in response to Chinese competition." However, "Chinese import competition increases innovation *within* surviving firms," especially firms that are more high-tech (higher patenting rates). One key question the authors failed to answer, in part because it is methodologically difficult, is whether these firms that went out of business are less innovative than their Chinese counterparts.

Micron Ex. 1046, p. 5
Micron v. YMTC
IPR2025-00244

However, in a more recent, 2019, paper, Douglas Campbell and Karsten Mau reached a different conclusion, finding:

> [T]he apparent positive impact of Chinese competition on European patenting [that Bloom et al. find] disappears once one controls for richer sectoral trends, the lagged level of patents, or switches to Chinese import penetration instead of the Chinese share of imports… Thus, we believe we have partially solved the puzzle of why the rise of China ostensibly had a negative impact on patents in the US (or, others have found no impact on R&D for the US), but a positive impact in Europe—the latter results appear to be spurious.[18]

Indeed, Karsten and Mau conclude, "When controlling for lagged patents and outsourcing, and using Chinese penetration, one is more likely to get negative and significant coefficients."[19] The authors reached this finding in part because they used more robust methods, including more controls for spurious correlation, such as lagged patents trends and pretreatment levels.

Industry-level Case Studies of Chinese Innovation Mercantilism

In 2021, ITIF undertook to examine the impact of Chinese innovation mercantilist policies on five U.S. industries: solar panels, high-speed rail, telecom equipment, semiconductors, and biopharmaceutical products. In each case, ITIF's economic models suggested significant negative impact on global R&D and patenting from China's innovation mercantilist polices.[20]

For instance, ITIF's report, "Moore's Law Under Attack: The Impact of China's Policies on Global Semiconductor Innovation," found that "China's innovation mercantilist practices in the semiconductor sector have included excessive ownership and subsidization of state-owned or state-supported enterprises; direct provision of equity or provision of financing at below-market terms; state-directed or state-enabled acquisition (or attempted acquisition) of foreign semiconductor companies; IP theft; forced or compelled technology transfer, especially through mandated joint ventures; and manipulation of technology standards, alongside a variety of other market-access restrictions or impediments that seek to advantage Chinese players in this sector to the detriment of foreign competitors."[21]

In the semiconductor sector, perhaps China's most pernicious mercantilist practice has been aggressively industrial subsidization, largely channeled through the country's $170 billion National Integrated Circuit (IC) Fund. A 2019 Organization for Economic Cooperation and Development (OECD) report examined government funding support for 21 international semiconductor firms from 2014 to 2018, finding that Chinese companies received 86 percent of the below-market equity provided by nations' governments over that period.[22] With regard to China's largest semiconductor player, Semiconductor Manufacturing International Corporation (SMIC), the OECD found that state subsidies accounted for slightly over 40 percent of the company's revenues from 2014 to 2018 (state subsidies also accounted for 30 percent of Tsinghua Unigroup, and 22 percent of Hua Hong, revenues over this period).[23]

Of particular import, the OECD study found that there "notably appears to be a direct connection between equity injections by China's government funds and the construction of new semiconductor

Micron Ex. 1046, p. 6
Micron v. YMTC
IPR2025-00244

fabs in the country."[24] Such subsidies are an important part of the explanation why China's share of global semiconductor manufacturing capacity, which was barely 1 percent in 2000, increased to 11 percent by 2010, 15 percent by 2020, and is forecast to increase to 24 percent by 2030.[25] China's subsidies in the semiconductor space are especially pronounced in the memory chip part of the market. For instance, Yangtze Memory Technologies Co. (YMTC) is a Chinese state-controlled joint venture stood up from whole cloth by the National IC Industry Investment Fund, the state university-controlled fabless semiconductor firm Tsinghua Unigroup, and the Hubei Science and Technology Investment Group, supported by $24 billion in initial government funding allocated for its initial Wuhan factory alone.[26] In effect, YMTC is China's state-owned national champion for memory chips, especially those used in solid-state hard drives and USB flash drives. By year-end 2020, YMTC announced it would triple production to 60,000 wafers per month, equivalent to 5 percent of global output. As the Hinrich Foundation's Alex Capri wrote about these investments, "As China's memory chip production is based on government output targets and other strategic, non-market driven goals, then the possibility of an over-supply of NAND and DRAM chips would seem likely, at some point, which would drive down global market prices. None of this bodes well for the world's existing players in this space."[27]

In other words, Chinese subsidies (and other mercantilist practices) are propping up inferior, less-innovative Chinese semiconductor enterprises at the expense of U.S. and other foreign competitors. To wit, ITIF's analysis found that non-Chinse semiconductor firms had a patent intensity (patents as a share of sales) four times greater than Chinese semiconductor firms. Factoring in these firms' lower patent intensity and assuming that without unfair Chinese government policies these firms' global market share would be one-third of what it is today, ITIF calculated that the cost of these policies was a significant reduction in global patenting. ITIF concluded that, in 2019, Chinese innovation mercantilism led to approximately 5,100 fewer U.S. semiconductor patents awarded than would otherwise be the case (out of a total of about 19,500 issued).[28]

ITIF found similar effects when it examined China's policies toward developing its tele-communications equipment industry. As ITIF found, there's no question that, without unfair innovation mercantilist policies and programs, China would lack a globally competitive telecom equipment industry. Neither Huawei nor ZTE, China's two national champions, would have more than de minimis market shares, even in China. Nor is there any question that Chinese market-share gains have come at the expense of innovative telecom equipment providers based in other nations. In the 2000s, Chinese innovation mercantilism contributed to the demise of Canada's Nortel and America's Lucent, the world's two most-innovative telecom equipment producers in the late 1990s. And since then, China's rise has come at the expense of global market share and profits for Europe's Ericsson and Nokia, the number two and number three players in the industry, respectively.[29]

Just as with semiconductors, Chinese telecommunications firms benefitted from massive industrial subsidization. For instance, the *Wall Street Journal* reported that: "Huawei had access to as much as US$75 billion in state support over the past 25 years, including grants ($1.6 billion), credit facilities ($46.3 billion), tax breaks ($25 billion), and subsidized land purchases ($2 billion)."[30] The company's sales were also bolstered by generous export credit support, with *The Washington Post* reporting in May 2019 that, "state-owned Chinese banks have made a $100 billion line of credit available to Huawei

Micron Ex. 1046, p. 7
Micron v. YMTC
IPR2025-00244

customers." As the article noted, "[Though] less than 10 percent has been used, even $10 billion dwarfs the $200 million in new loans the U.S. Export-Import Bank granted to all customers in 2017."[31]

And, as with semiconductors, ITIF finds the evidence suggests there would be even more innovation in the industry today if Huawei and ZTE did not exist: a greater number of innovative, non-Chinese firms would have more revenue to support more productive R&D. ITIF estimated that if Ericsson and Nokia took all of Huawei and ZTE's telecom equipment sales, global telecom equipment R&D would increase 20 percent, 5G standards contributions would increase 18 percent, and essential 5G patents would increase 75 percent. In short, Chinese policies, and Chinese telecom equipment firms, on net, are a drag on global innovation.[32]

Solar panels represent another instance of massive Chinese industrial subsidization, with Chinese firms receiving $42 billion in subsidies for solar photovoltaic (PV) cells from 2010 to 2012 alone.[33] Those subsidies helped China's global share of production of PV cells, the industry's core technology, surge from 14 to 60 percent between 2006 and 2013.[34] The effect of this surge was to knock some 200 to 300 U.S. solar start-up companies out of business. The decimation of PV manufacturing outside China drove many innovative firms out of the business entirely, in large part because they could not match the predatory prices offered by government-subsidized Chinese competitors (indeed, Chinese crystalline solar PV prices decreased by 85 percent from 2009 to 2017), with China exporting 38 percent of the world's solar panels in 2018.[35] There is evidence China's new PV giants have innovated in important ways, especially through process innovation that moved the industry's dominant technology rapidly down a steep experience curve. However, the prospect of shifting to better, cheaper PV products with the potential for even-greater emissions reductions over the long run has been deferred or even lost.

Lastly, a similar story has emerged in high-speed rail, where China's state-directed bid for a leadership position in the high-speed rail sector has distorted the global market with massive subsidization, mandated mergers, forced technology transfers, and other mercantilist practices.[36] State-supported financing has allowed China's national champion, CRRC, to offer abnormally low bids—often 20 to 30 percent lower than foreign competitors—for procurement contracts. ITIF estimates that in the absence of these unfair Chinese policies, greater market share would have provided foreign rail firms with the revenue to invest an additional $1.06 billion in R&D from 2015 to 2019, which would represent a 164 percent increase over their actual R&D spending.

While those provide just a few industry-level case studies, the reality is that Chinese mercantilist practices, especially aggressive industrial subsidization, are pervasive across virtually all industries. In fact, since China joined the WTO in 2001, subsidies have annually financed about 20 percent of China's manufacturing capacity. And Fang et al. find that 95 percent of Chinese firms in tech industries received R&D subsidies in 2015, with those subsidies accounting for 22 percent of firms' R&D investments.[37]

Chinese enterprises also of course benefit from rampant intellectual property theft, much of it state-sponsored or instigated, the result of "long-running state espionage programs targeting Western firms and research centers" that has carried over into cyberspace.[38] In 2017, the Commission on the Theft

Micron Ex. 1046, p. 8
Micron v. YMTC
IPR2025-00244

of American Intellectual Property estimated that China's IP theft may cost the U.S. economy as much as $600 billion annually.[39] By 2019, a *CNBC* Global CFO Council report found that one in five North American corporations had their IP stolen in China within the past year.[40] Despite Chinese promises to curtail IP theft, the practice continues largely unabated.

Nor has the extent of forced technology transfer substantially abated in China, in sharp contradistinction to China's promise upon joining the WTO that:

> The allocation, permission, or rights for importation and investment would not be conditional upon performance requirements set by national or sub-national authorities, or subject to secondary conditions covering, for example, the conduct of research, the provision of offsets or other forms of industrial compensation including specified types or volumes of business opportunities, the use of local inputs or the transfer of technology.[41]

In reality, Chinese technology transfer requirements are a continuing feature of Chinese policy. In 2012, 23 percent of the value of all foreign direct investment (FDI) projects were joint ventures.[42] In 2015, 6,000 new international joint ventures, amounting to $27.8 billion of FDI inflows, were established in China.[43]

Because such conditions contravene China's WTO commitments, officials are careful not to put such requirements in writing. Instead, they often resort to oral communications to pressure foreign firms to transfer technology, although recent decisions of the WTO Appellate Body have made it clear these unwritten measures can also be challenged.[44] The United States Trade Representative's Office (USTR) 2018 Special 301 report comprehensively documents how industrial plans such as Made in China 2025 apply foreign ownership restrictions, including formal and informal joint venture requirements, "to require or pressure technology transfer from U.S. companies to Chinese entities.[45]

China's forced technology transfer practices persist across a range of industries, from semiconductors and cloud computing to automotives and biotechnology. For instance, China pressures foreign biopharmaceutical companies to form joint ventures if they want their products included on the government list of drugs that qualify for reimbursement.[46] Likewise, the Chinese government requires that all drugs sold in China go through Chinese clinical trials, even if they have already been approved in the United States, which can extend the waiting time for a company to sell a drug by as much as eight years. Likewise, China's ongoing requirement for 100 percent Chinese-owned technology in many rail procurement contracts, combined with the requirement that foreign firms engage via majority-Chinese owned JVs in order to submit a bid, amounts to an ongoing de facto mandate to transfer technology to local partners.

China also requires companies running cloud-computing operations to be locally controlled.[47] This means that if a company such as Amazon Web Services or Microsoft wants to serve the rapidly growing Chinese market, it must partner with a Chinese company and sell their services under the Chinese company brand. The partnership includes the expectation for the foreign cloud provider to provide the Chinese firm with technology and know-how.[48] Chinese cloud providers such as Aliyun—

Micron Ex. 1046, p. 9
Micron v. YMTC
IPR2025-00244

the cloud services unit of Alibaba—can establish their own data centers in the United States without any similar requirements.

China's forced joint venture and technology transfer practices not only continue but may be getting worse. In May 2019 the *Wall Street Journal* reported on the increasing frequency of forced technology transfers between European firms in China to local firms.[49] That same year, the European Chamber of Commerce found that more than twice as many firms felt compelled to undertake technology transfer in China as they did in 2017. European companies in high-value, cutting-edge industries felt more pressure than usual, the Chamber reported. Some 30 percent of chemicals and petroleum companies, 28 percent of medical-device companies, 27 percent of pharmaceutical companies, and 21 percent of automotive companies reported such transfers.[50]

To be sure, there can be circumstances when the innovation policies of China (or other nations) can be beneficial to the U.S. and broader global economy. (See Table 1). For instance, when China supports science, technology, engineering, or mathematics (STEM) education, this produces scientists and researchers who help Chinese enterprises more-effectively innovate, but it also contributes to the stock of global knowledge and intelligence that is helpful toward advancing global innovation. The same would go for when China supports more rapid broadband rollouts, including 5G or 6G cell sites.

Investment into basic R&D also falls into this category (because it creates knowledge that represents a global public good), but unfortunately more often than not China's R&D investments are focused on applied R&D that seeks to predominantly benefit Chinese enterprises.[51] For instance, one report noted, "China is expected to invest up to twice as much as the United States, or $658 billion (4.5 trillion yuan), in the back end of the R&D chain by 2018, focusing on translating basic and applied research into commercial products and new manufacturing processes."[52] But China intends to go well beyond this. In March 2021, Chinese Premier Li Keqiang announced that China intends to significantly increase its R&D spending over the next five years in a push to make "major breakthroughs" in technology. The comments came during a speech at China's annual parliamentary "Two Sessions" meeting, as Beijing laid out its priorities for the coming years. Accordingly, China's R&D spending will increase by more than 7 percent per year between now and 2025. R&D will subsequently account for a higher percentage of China's gross domestic product (GDP) than in the previous five years.[53]

More often, the impact of China's policies on global innovation are at best neutral, particularly because many innovation-incenting Chinese policies are available predominantly (or only) to Chinese enterprises, such as preferential R&D tax incentives, R&D subsidies, or low-cost financing mechanisms. But, as noted, the vast majority of China's innovation mercantilist policies are injurious to U.S. and global innovation.

Economic Impact of Chinese Innovation Mercantilism

The impact of China's innovation mercantilist practices, and especially subsides, on the global economy has been profound. China's share of global output of high-technology manufacturing industries has increased from 8 percent in 2003 to 27 percent in 2018.[54] China has now become the world's largest high-technology goods exporter, with about a one-quarter global share.[55] And it's not

Micron Ex. 1046, p. 10
Micron v. YMTC
IPR2025-00244

just low-value-added goods, a recent University of Sussex study finds that that the average value China adds to its exports is 76 percent (the European Union's (EU) is 87 percent).[56]

China's share of global GDP has skyrocketed from around 3 percent in 1995 to 18 percent by 2018, and although this is due primarily to faster productivity growth and faster population growth, it's also been abetted by China's extensive mercantilist practices. Chinese economic practices have also led to rapid growth in rather unbalanced trade with the United States. In fact, from 2001 to 2020, China accrued a $6.82 trillion surplus in trade in goods with the United States.[57] Nor is this confined to labor-intense, lower-value-added goods such as toys or apparel. The United States has run a trade deficit in advanced technology products (ATP) with China in every year since 2001, with the United States accruing a $1.65 trillion deficit with China in ATP trade from 2001 to 2020.[58]

China's massive trade surpluses with the United States (and the rest of the world) have swelled its foreign-currency reserves. In fact, China's stock of foreign-currency reserves grew from a meager $212 billion in 2000 to $4 trillion by August 2015, and stands at slightly over $3.2 trillion today.[59] China's dramatically larger economy and base of reserves confers the ability to pursue a wide range of national security and diplomatic objectives, from a large increase in the size of its military to efforts to curry favor and investment opportunity with foreign nations through efforts like the One Belt One Road (OBOR) and Digital Silk Road (DSR) initiatives. In total, China's wealth and influence has expanded dramatically over the past two decades, in not insubstantial part through the application of economic and trade practices that are fundamentally not consonant with the WTO's principles of private enterprise-led, market-based, rules-governed trade in accordance with the fundamental tenets of reciprocity, national treatment, fairness, and non-discrimination.

RESPONDING TO CHINESE INNOVATION MERCANTILISM

The U.S. response to China's innovation mercantilism must be manifold and include a wide variety of both unilateral responses—notably to bolster its own innovation capacity and to deploy trade instruments at its disposal to contest Chinese unfair trade practices—and ones undertaken in collaboration with likeminded nations, across a range of plurilateral and multilateral forums.

Domestic Responses to Chinese Innovation Mercantilism

America's domestic response to Chinese innovation mercantilism should include a set of policies designed to bolster U.S. industrial competitiveness and another set that strengthens the resources and toolset available to respond directly to Chinese mercantilist practices.

Strengthening U.S. Competitiveness

The first step the United States must take is to bolster the capacity of its enterprises and industries to flourish in global competition. Here, the most important step the United States can take in this moment is for Congress to pass out of conference, and for President Biden to sign, an integrated version of the Senate's U.S. Innovation and Competition Act (USICA)/the House's America COMPETES Act. ITIF prefers the Senate's USICA legislation, which would include more-robust programs and investments to foster technology-driven U.S. economic growth. Notably, USICA would provide $81 billion in R&D investment over the next five years, including $29 billion that would go toward research and technology development in key technology focus areas, such as artificial

Micron Ex. 1046, p. 11
Micron v. YMTC
IPR2025-00244

intelligence and quantum science, in order to strengthen the global leadership of the United States in innovation through a new Technology and Innovation Directorate at the National Science Foundation (NSF). Other important aspects of the legislation include $52 billion to enhance the competitiveness of America's semiconductor industry, $8 billion for regional technology hubs, $2.4 billion for the Manufacturing Extension Partnership (MEP) program, and $1.2 billion for Manufacturing USA.[60] Passage of this legislation is essential to ensure sustained U.S. industrial competitiveness. To achieve the maximum impact of such investments, the U.S. government needs to continue to articulate and implement strategic plans to support U.S. competitiveness, such as one announced by the Department of Commerce on March 29, 2022 that seeks "to drive U.S. innovation and global competitiveness" including through "strategic objectives" like revitalizing U.S. manufacturing to improve domestic supply chains, developing and deploying emerging technologies, enhancing trade enforcement, protecting intellectual property rights, and improving cybersecurity.[61]

Strengthening Organizational Capabilities Within the Federal Government

The United States needs to further strengthen its organizational capabilities within the federal government to confront unfair foreign trade and economic practices.[62] Here, the president should establish and staff a new National Industrial Intelligence Unit (an "NIIU," which could be housed within the existing National Intelligence Council) charged with developing a better process and structure to understand the specifics and long-term implications of other nations' economic development strategies, particularly China's, so that the United States can respond more effectively.[63] This group would develop a better process and structure to understand the long-term implications of China's economic development strategy on U.S. competitiveness. The NIIU would produce a report every other year detailing the extent to which Chinese innovation mercantilist policies have contributed to the outsourcing of manufacturing and other activities to China and is leading to the hollowing out of the U.S. defense industrial base.

Elsewhere, Congressional legislation has directed USTR to appoint a Deputy USTR in charge of Innovation and IP. This position can become, by dent of rank, the highest-ranking person in the U.S. government solely devoted to innovation and IP, because it would be at a Deputy Secretary level, whereas leaders at the National Institute of Standards and Technology (NIST) and the U.S. Patent and Trademark Office (USPTO) are at the undersecretary level.

However, the Biden administration has yet to signal any action toward making such an appointment. This lacuna, coupled with open leadership appointments at other key federal agencies focused on innovation and IP, such as USPTO and NIST, shortchange the role of IP and innovation in U.S. trade policymaking. These gaps should be addressed as part of a broader effort to elevate the focus on technology, innovation, and IP in U.S. trade policymaking.[64]

Another idea would be to establish a cadre of U.S. tech diplomats. These officials would be the vanguard for implementing the international aspects of American industrial policies including cooperative research agreements, human capital exchanges, infrastructure development, and export controls.

Micron Ex. 1046, p. 12
Micron v. YMTC
IPR2025-00244

Revoke China's PNTR and Renegotiate Market Access Schedules for Chinese Goods and Services at the WTO

The United States decides, at its discretion, which nations to extend permanent normal trade relations (PNTR) to. Indeed, the Biden administration and U.S. Congress are considering revoking Russia's PNTR with the United States.[65] The WTO operates on the most-favored nation (MFN) principle. Essentially, this means that countries cannot discriminate among their trading partners and their best offer (e.g., a lower tariff rate on a product) must be offered to all other member nations.[66] Outside of the WTO, nations may elect to confer MFN status on other trade partners at their own discretion.

For instance, the United States suspended China's MFN status in 1951 and conditionally restored it in 1980 (in accordance with the 1974 Trade Act, but amended by Jackson-Vanik freedom-of-emigration provisions). The United States renewed China's MFN status on an annual basis until January 2002, when legislation (P.L. 104-286) was enacted granting permanent normal trade relations to China, following its accession to the WTO.[67]

In other words, before China's WTO accession in 2001, and since 1951, the United States applied MFN conditionally to China and other communist regimes. This is an important distinction, because annual congressional debates on MFN renewal have led to sustained pressure on China on issues such as human rights and unfair trade practices.

The following is an example of explicit Congressional attention on human rights in the 2000 legislation conferring PNTR status upon China:

> The human rights record of the People's Republic of China is a matter of very serious concern to the Congress. The Congress notes that the Department of State's 1999 Country Reports on Human Rights Practices for the People's Republic of China finds that "[t]he Government's poor human rights record deteriorated markedly throughout the year, as the Government intensified efforts to suppress dissent, particularly organized dissent."[68]

It is time for the United States to rethink its grant of PNTR to China. The United States could return to the practice of annually applying MFN "conditionally," with a link to labor rights and environmental protections. In fact, Senators Cotton (R-AR), Inhofe (R-OK), and Scott (R-FL) have proposed the China Trade Relations Act, which would revoke China's permanent most-favored-nation status and return to the pre-2001 status quo, whereby China's MFN status must be renewed each year by presidential decision.[69]

Furthermore, if China consistently refuses to adhere to MFN commitments, the United States and its allies should consider renegotiating market access levels for goods and services at the WTO. This would create a more meaningful difference between the preferential rates for allied trading partners and those for non-favored countries such as China. Put simply, the WTO is for market-oriented economies that actually implement its foundational principles and clear obligations; if China decides to develop an alternative economic system that is not compatible with existing multilateral rules, then it shouldn't be in the WTO—or at least it shouldn't enjoy the same benefits as countries that respect agreed-upon rules. To be clear, the preferrable outcome would be for China to fully embrace the WTO

Micron Ex. 1046, p. 13
Micron v. YMTC
IPR2025-00244

responsibilities it has committed to, but if this continues not to be the case, in ITIF's view the United States needs to consider more serious policy options, such as revoking China's PNTR, to deal with a challenge that not only has not abated but has in fact deepened over the past decade.

Self-Initiate More WTO Cases

The president should direct USTR to self-initiate more cases against China at the WTO. The egregiousness of China's innovation mercantilist practices means that cases brought before the WTO are often likely to be successful. Since its accession to the WTO, China has been a defendant in 44 cases. Six have been settled or terminated, while 12 are still in consultation. Of the remaining 26 cases, 21 have been adjudicated while 5 are pending. Of the 21 cases that have been adjudicated before the WTO's Dispute Settlement Board, China has lost every single one.[70]

Unfortunately, the U.S. approach in bringing cases before the WTO has generally been for industry to lead in making a complaint and engaging USTR to formally bring the dispute up with a trade partner or before the WTO. But USTR could be bringing a number of cases against China without waiting for industry. Consider China's unbalanced technology import-export regulations (TIER) licensing. That law was passed in November 2001, a month before China entered the WTO. It took 16 years before the United States brought a WTO case against China over the practice, which it won. When China or another nation implements a law that substantially contravenes the WTO and is likely to harm U.S. industry, USTR should proactively file a dispute rather than wait for industry to lead the charge.

The USTR has other options too. For instance, the WTO requires that "cases of general applicability be published"—in other words, countries must publish their court decisions. However, often this is not the case for China.[71]

Similarly, Article 270 of China's Civil Procedure Law puts China in violation of the WTO. Essentially, it states that for foreign litigants bringing any form of civil case, the amount of time the courts have to make a ruling is unlimited. If it is a domestic case, rulings must be made in six months.[72] This disparity gives Chinese courts free reign on how long they may take to decide a foreign case, which can and has been strategically used against foreign firms—and this again represents a national treatment violation.

Coordinated, Allied Responses to Chinese Innovation Mercantilism

While the United States can and should, where possible and necessary, undertake unilateral steps to combat Chinese innovation mercantilism, collaboration with allied, likeminded countries will be essential to containing and then rolling back Chinese mercantilism and restoring a genuine market- and rules-based global trading system. In particular, it's time for the European Union, Japan, and the United States to band together in a stronger trilateral framework to address the various ways China rigs, manipulates, and distorts markets.

This section examines how likeminded countries can collaborate on: documenting China's innovation mercantilism; developing stronger structures to stand together against it; coordinating better with regard to investment screening and export control regimes; developing stronger rules prohibiting

Micron Ex. 1046, p. 14
Micron v. YMTC
IPR2025-00244

forced technology transfers and market-distorting subsidies; and collaborating more in bringing WTO cases.

Amend, and Use, Section 301 to Target Digital, Services, and Other Modern Trade Barriers in China

The Biden administration should update its main trade defense tool—the Trade Act of 1974—to better reflect the type of digital and services trade barriers that China has enacted. Section 301 is a powerful tool when there is an administration that is willing to fully use it. With few exceptions, the United States has only ever used its prescription for tariffs. The United States has never used its services trade-related provisions.

Section 301's traditional use of tariffs makes it easy to apply to 20th century trade in goods, but it needs to be amended to create new legal and administrative mechanisms and tools to target service providers. Section 301 mentions fees and restrictions on services. It could be amended to detail the mechanism (in terms of responsible agency) and process (in terms of the action, such as licensing, certification, or legal judgement) whereby the administration imposes specific retaliatory measures on a foreign service provider. For example, it could be amended to create a reciprocal joint venture requirement. Chinese tech firms would be forced to setup local joint ventures with equivalent ownership and control restrictions that U.S. firms have had to setup in their respective countries.

Pursue a Specific Section 301 Investigation Into China's Cloud, Cyber, and Other Digital Trade Restrictions

The Biden administration could use Section 301 to initiate an investigation of China's cloud services restrictions and other digital trade restrictions as these are among the most clearly egregious examples whereby China targets U.S. firms. An investigation could be broad and include other Chinese digital/cyber sovereignty initiatives, such as discriminatory cybersecurity regulations. If used, the Biden administration could enact retaliation via tariffs on imported goods (the traditional use of Section 301), taxes, or restrictions on Chinese digital service companies doing business in the United States (a new use of Section 301), and restrictions on other Chinese service providers, such as accounting firms, air carriers, automotive companies, aerospace companies, and others.

Collaborate to Document and Share Information on Chinese Unfair Trade Practices

Likeminded countries should coordinate to create a collective "bill of particulars" that enumerates the vast extent of Chinese innovation-mercantilist policies—in great detail. This should not be about recycling USTR's annual report to Congress on China's WTO compliance, the China chapter from the annual USTR National Trade Estimate report, or the submissions countries make during China's trade policy review at WTO.[73] This would be a useful exercise to conduct together, as past experience—and current Chinese practices—creates a difficult evidentiary hurdle to clear for a WTO dispute case, as much of the information and evidence needed to support a claim, particularly one based on unwritten rules or practices (which is common in China), can be difficult to obtain.

Likeminded countries can also collaborate in advocating for improved transparency and surveillance at the WTO, which matters because the lack of transparency in Chinese trade-related policymaking acts as a considerable, and growing, nontariff barrier to trade. China's governance system is

Micron Ex. 1046, p. 15
Micron v. YMTC
IPR2025-00244

notoriously opaque, complex, and multilayered, with overlapping and often inconsistent national, provincial, and municipal government policies. The rules-based multilateral trading system was founded on transparency and predictability, which is why WTO members must insist upon strong and enforceable compliance and notification obligations. To enhance this, the United States has coordinated and presented, together with the EU and Japan, a joint set of proposals—the first in November 2018, and the second in June 2019.[74] The proposal includes some basic steps that should already be in place: to "name and shame" those members not complying with WTO transparency and reporting requirements, administrative penalties for members failing to meet transparency obligations, and for WTO's trade policy review to include a specific, standardized focus on members' compliance with transparency requirements in their reviews.

Likeminded countries should establish formal meetings between relevant agencies to discuss and exchange information related to the respective defensive mechanisms they've implemented to address predatory, nonmarket-driven, Chinese trade and economic activity, mainly with regard to investment screening, export controls, countering IP theft, and controlling access to financial markets. Such countries should work together to ensure they're on the same page and that their relevant countermeasures are working as necessary to prevent Chinese state-directed, predatory economic activity.

These meetings would report to respective leaders and ministers/senior officials on:

- Cooperation and information exchanges on foreign investment screening frameworks and cases, including Chinese venture-capital-backed investment;
- Cooperation and information exchanges on export control frameworks and cases; and
- Cooperation on developing domestic measures to identify and prevent the cyber-theft of commercial trade secrets and measures to target and respond to Chinese firms that benefit from stolen IP.[75]

Create a "DATO" for Trade

Allied nations should form a new "NATO for trade" to combat Chinese trade aggression. Allied nations should form a pact wherein they agree to come to the aid of each other when economically threatened by the CCP.[76] The new organization, a DATO, would be governed by a council of participating countries, and if any individual nation were threatened or attacked, the DATO would quickly convene and potentially agree to take joint action to defend the nation attacked. For example, if China threatened to expel a given nation's students, DATO nations could agree to ban Chinese students in return. If China threatened to put a country's firms on its "unreliable list," the DATO nations could agree to limit imports from Chinese firms. Any democratic nation would be welcome to join DATO, including Taiwan, but should any nation not take the steps needed to respect after a DATO decision, they would lose the right to be a member.[77]

Further, in a "DATO" likeminded nations could develop a comprehensive list of enterprises, entities, and individuals who have attempted or effected IP theft, and develop mechanisms to restrict such firms and individuals from competing in likeminded nations' markets. Second, likeminded nations should enhance information-sharing efforts to combat foreign economic espionage and

Micron Ex. 1046, p. 16
Micron v. YMTC
IPR2025-00244

IP/technology/trade secret theft. Here, likeminded nations could work to expand the Five Eyes partnership.[78] The alliance provides mutual access between members regarding intelligence activities, including cybersecurity, and promotes greater levels of military interoperability. There has been discussion about possibly bringing Germany and Japan into the framework.[79] To be sure, there is a significant defense component to the Five Eyes Alliance, so another, potentially broader, approach would be for the United States to lead likeminded nations in developing a broader Five Eyes-like alliance specifically focused on combatting state-sponsored economic espionage in advanced-technology industries.

Form a Global Strategic Supply Chain Alliance

A related approach some have called for would be for likeminded nations to come together to form a Global Strategic Supply Chain Alliance (GSSCA) that could collectively address security needs with respect to critical strategic items.[80] Such a GSSCA would organize certain key industries for the benefit of its member states, with members agreeing to develop supply chains within the GSSCA to the exclusion of similar items from non-member states. Such an alliance could be organized around particular items or products, such as 5G networks, rare earth metals, active pharmaceutical ingredients, or perhaps a key tool or component in the semiconductor supply chain. The theory behind the GSCCA structure would be "an economically oriented calculus that combines risk assessment at a supply chain level with a strategic overlay."[81] Such a structure could become necessary in the future should some nation(s) seek to corner certain key inputs or supplies to the detriment of the international supply chain or other nations.

Aligned and Complementary Frameworks for Foreign Direct Investment Screening

The United States should work with likeminded nations to align foreign investment screening practices and to exchange information when it appears other nations are trying to use unfair practices in making foreign investments, such as heavily state-subsidized SOEs attempting to purchase foreign enterprises in advanced-technology industries.[82] This matters especially when, by December 2020, Chinese-government-guided strategic technology investment funds controlled more than RMB 4 trillion ($610 billion) in capital, much of which was earmarked for foreign technology acquisition.[83] For instance, since 2014, Chinese businesses have made at least $56.8 billion in technology-related investments abroad, of which $36.7 billion (65 percent) was invested outside the United States.[84] The largest allied destinations of Chinese tech-related FDI outside the United States have been the United Kingdom, the Netherlands, Germany, France, and Singapore.[85] The Foreign Investment Risk Review Modernization Act (FIRRMA) instructs the Committee on Foreign Investment in the United States (CFIUS) to "establish a formal process to share information with foreign allied governments and coordinate and cooperate on investment security issues."[86]

The EU was initially slow to realize its high-tech firms were being picked off by nonmarket-based, Chinese government-supported investment acquisitions, but were spurred into action as China's acquisitions of European high-tech firms increased in 2016 and 2017, in part, as Europe presented an easier target after the United States had increased scrutiny of foreign investment.[87] Indeed, European high-tech firms like German robotics manufacturer Kuka were going for a song. EU nations make their own FDI screening rules, but in April 2019, the European Union's new framework for the screening of FDI went into force. It will provide a better instrument to detect and raise awareness of

Micron Ex. 1046, p. 17
Micron v. YMTC
IPR2025-00244

foreign investment in critical assets, technologies, and infrastructure in the EU. The central feature of the EU framework is it sets minimum requirements for national screening mechanisms and aims to enhance cooperation and information sharing between the commission and member states on specific foreign investments likely to affect security and public order in member states and in the whole EU. However, it neither harmonizes investment screening mechanisms that are currently in place in member states, nor replaces them with an EU-level mechanism.[88]

Likeminded countries should use a formal meeting and cooperation arrangement to help each other build a more comprehensive picture of foreign investors of concern, their intentions, their products, and the potential impact on the host or a third-party country and sector. This is critical because the Chinese government, often through SOEs operating under CCP dictates, funnels money in nontransparent ways to obfuscate the fact that the real investor is the Chinese government. Each of the trilateral parties should also provide semiannual and annual reports covering relevant FDI and transactions to help them identify trends and changes. The parties should be able to provide feedback (on a confidential basis) as to whether they think a particular transaction in a given country would affect their own economic or military security or public order, and why. In a way, this would formalize the connection between respective agencies involved in a shared case of concern. For example, when the CFIUS review rejected China's Fujian Grand Chip Investment Fund's attempted acquisition of the semiconductor equipment supplier Aixtron (headquartered in Germany, with assets in the United States) in December 2016, German regulators withdrew their approval because of security concerns.[89]

Lastly, Australia, Canada, and the United Kingdom are the countries currently on CFIUS's white list, which exempts foreign investors from filing requirements for their non-controlling investments in "TID" U.S. businesses—those that operate or manage critical technologies, critical infrastructure, or sensitive personal data.[90] The United States should consider expanding its list of "excepted foreign states" to include countries such as France, Germany, the Netherlands, Italy, Japan, and South Korea (among others). As a recent Brookings Institution report concurs, "The United Kingdom, Germany, Netherlands, France, Italy, and Japan are optimal partners for the United States to prevent the transfer of sensitive technical information through investments," adding that the United States should work to bring in Austria, Finland, and New Zealand as well. As that report concludes, "Allies are vital if the United States is to establish comprehensive, data-driven screening procedures based on the risk of technology transfer."[91]

Aligned Export Control Rules With Allies

Just as with investment screening, likeminded countries should ensure their export control regimes are comparably defined and applied so as to be compatible. Export control rules should also be updated on a regular basis, and allow the parties to share information relevant to cases of shared concern. While not always explicitly identified in relevant policies and debates, China is the main country of concern given the extent of its trade in high-tech goods. However, updated export-control regimes are going to be especially challenging given the task of managing emerging technologies (such as AI) that may have some specific defense-related dual uses. This is critical because, unless likeminded countries can come up with fairly aligned export control regimes of the kind designed to limit technology access to, say, the former Soviet Union, China will simply play off companies and countries against each other, few of which can resist the lure of sales in the Chinese market.

Micron Ex. 1046, p. 18
Micron v. YMTC
IPR2025-00244

Many countries, including the European Union, Japan, and United States as part of the trilateral trade ministers' working group have modernized—or are currently modernizing—their export control regimes. Besides recent changes concerning South Korea, Japan has also updated its export control regime in recent years.[92] The European Commission submitted a proposal to modernize the EU's export control regime, which included cybersecurity and surveillance technology.[93] In June 2019, the president of the European Council was given a mandate to negotiate with the European Parliament on a new export control regime.[94] Earlier, on August 18, 2018, the Export Control Reform Act (ECRA) was signed into law in the United States. A critical part of this was the requirement for the U.S. Commerce Department's Bureau of Industry and Security (BIS) to develop rulemaking regarding extending export controls to an enlarged set of emerging and foundational technologies (EFTs): new or foundational technologies that in some narrow cases are essential to national security and are not currently covered by existing export control rules.[95]

Export control cooperation among likeminded countries could include:

- Participating parties setting up periodic meetings between agencies involved in their respective export control regimes, including defense, law enforcement, commerce, and trade agencies.
- Whether part of this or separate (given sensitivities), participating parties should ensure their respective intelligence and related agencies are able to discuss and share intelligence related to export control issues.
- Participating parties should discuss efforts to identify a narrow and specific set of EFTs that would be subject to export controls, specifically, those products that provide a unique, identifiable, and qualitative military advantage. This could involve efforts to ensure similar definitions/terminology. As ITIF has argued, how export control regimes cover new EFTs will remain a challenging task given the potential dual use of many new technologies; and in many sectors, what constitutes "state of the art" changes too rapidly for export rules to reliably and readily adapt.[96] This is important to ensure export controls only target very specific EFTs (such as preventing the spread of AI-enabled advanced weapons systems), but are not overly broad in how they define and restrict other emerging technologies.[97]
- Ideally, participating parties would develop a joint regime to sanction Chinese firms where there is clear, compelling, and agreed upon evidence of IP theft from any of the three parties' economies and their firms. In these cases, participating parties should implement a coordinated export control regime applied to the firm committing the violation. In line with this, the Biden administration should consider ways to blacklist Chinese companies that steal American IP from doing business in the United States (and indeed in the markets of likeminded countries as well).[98]
- Participating parties should exchange information to help identify the actual end user of a potentially concerning transaction (as this is the most important question in export control). Where cases or questions arise, respective agencies from participating nations should have a mechanism in place that allows them to query their counterparts on certain potential buyers in order to, given China's extensive use of opaque ownership structures and vehicles, gain a better idea of whom is involved.
- Each party should address not just product exports but also technology transfer (such as technical know-how in joint ventures, technology licensing, etc.) to organizations (e.g., private

Micron Ex. 1046, p. 19
Micron v. YMTC
IPR2025-00244

companies, SOEs, and government organizations) from nations such as China that continue to make coerced technology transfer a central component of their economic development strategies.[99]

- Export controls are most successful when they are coordinated internationally, so participating countries should engage (either collectively or separately) with other key countries on this issue, and encourage convergence toward a similar export control model and item coverage. Related to this outreach is the scenario whereby each party's respective export control authority assesses where else foreign entities could obtain particularly sensitive technology, and engage their export control counterparts in these third countries.

Collective, aligned, and proactive efforts to prevent the export of defense-related products and technical knowledge are necessary to protect national security. In addition, a joint export-control regime can be an effective tool to punish Chinese firms that engage in serious IP theft. Joint efforts are critical, as export controls need regular updating in order to reflect the global state of play in advanced technology industries (and hence, require greater international cooperation) as well as the changing ways in which countries and their firms are trying to acquire access to prohibited defense-related products. A coordinated approach is also necessary to avoid firms from one party being put at a competitive disadvantage to their competitors in the EU, Japan, or the United States, as in the case whereby one party blocks the export of a particular technology, but the others don't.

New, Stronger Rules Prohibiting Forced Technology Transfers and Market-Distorting Subsidies

Since its formation in December 2017, the trilateral trade ministers' grouping from the European Union, Japan, and the United States have been working to develop new rules to target China's extensive use of market-distorting industrial subsidies for its private firms and state-owned enterprises, particularly those that lead to overcapacity.[100] The types of practices they're trying to target are bank lending incompatible with a company's creditworthiness; government or government-controlled funds making equity investment on noncommercial terms; subsidies to insolvent companies; and noncommercial debt-to-equity swaps. The three parties are also working on new rules to enhance transparency in subsidies and the operations of SOEs, including new remedies to increase the costs of transparency and notification failures.[101] Rules should obligate the subsidizing country to prove that a given subsidy does not inflict harm on others. Likeminded nations should focus on achieving a significant increase in global subsidies transparency, including insisting upon timely and complete notification of subsidies and establishing a presumption of prejudice toward subsides not timely notified.[102]

As part of text-based negotiations, experts have also reportedly been negotiating language around the critical issue of how to define a "public body," which is a critical part of this issue, as ownership and control of banks and other entities in China is not clear, and China has used this lack of clarity in WTO trade law to provide massive amounts of capital to firms in select high-tech industries. For example, it is common in China for a bank (notionally private, but partly government owned) to provide (rather than receive) a subsidy (e.g., a loan on a preferential basis) to another Chinese entity in a particular industry.[103] Likewise, China's investment fund to subsidize Chinese semiconductor companies was designed to skirt WTO subsidy rules by appearing to be a private investment enterprise. In fact, it was organized by China's Ministry of Industry and Information Technology

Micron Ex. 1046, p. 20
Micron v. YMTC
IPR2025-00244

(MIIT) and staffed by former MIIT employees. And it was funded in large part by SOEs that were presumably told by the state-owned Assets Supervision and Administration Commission of the State Council they had to "invest" in the fund. This is for all intents and purposes money laundering to minimize the risk of WTO action.

Beyond this, the three parties should discuss and develop some new legislative and policy tools. One should be to create a way for joint antitrust exemptions for companies to cooperate against forced tech transfers and investment in China.[104] If companies in a similar industry can agree that none of them will transfer technology to China in order to gain market access, then the Chinese government will have much less leverage over them. Another should be for the three parties to ensure their own government procurement processes don't inadvertently buy from—and thereby support—these subsidized Chinese firms.

Collaborate to Bring a Non-violation Nullification and Impairment Case Against China at the WTO

Article XXIII of the General Agreement on Tariffs and Trade (GATT) addresses dispute-settlement provisions and includes a "non-violation" clause that provides a legal cause of action against measures that do not explicitly violate the treaty but nevertheless upset the reasonable expectations of the parties and which can be aimed at policies that might otherwise be beyond the reach of the GATT/WTO agreements.[105] Such a "non-violation nullification and impairment" claim would assert that the United States—and other likeminded nations that might join the case—is being denied the benefits of reasonably expected market access. China's manifold mercantilist policies, it can be argued, undermine the benefits and rights that the United States expected when it assented to China joining the WTO.[106]

Indeed, as the Council on Foreign Relations' Jennifer Hillman writes, "It is exactly for this type of situation [i.e., China's innovation mercantilism] that the non-violation nullification and impairment clause was drafted." Hillman further elaborated, regarding WTO members' expectations of China:

> That it would achieve a discernable separation between its government and its private sector, that private property rights and an understanding of who controls and makes decisions in major enterprises would be clear, that subsidies would be curtailed, that theft of IP rights would be punished and diminished in amount, that SOEs would make purchases based on commercial considerations, that the CCP would not, by fiat, occupy critical seats within major "private" enterprises and that standards and regulations would be published for all to see.… Addressing these cross-cutting, systemic problems is the only way to correct for the collective failures of both the rules-based trading system and China.[107]

Observations on the EU-U.S. Trade and Technology Council

ITIF views the EU-U.S. Trade and Technology Council (TTC) as a useful vehicle for a pragmatic and cooperative agenda and applaud the efforts of policymakers on both sides of the Atlantic to build a better, stronger, and broader transatlantic economic relationship. But ITIF believe four core principles should guide the effort.

First, the overriding principle guiding the initiative should not simply be to promote the values of innovation, progress, and growth. Rather, efforts should focus especially on promoting the power of

Micron Ex. 1046, p. 21
Micron v. YMTC
IPR2025-00244

the digital economy to transform industries, enterprises, and human lives in a positive, constructive, and impactful way.[108] Here, in our view, too often European digital policy focuses on the information and communications technology (ICT)-producing sectors of the economy and not enough on where the power of ICT really lies: in transforming the productivity and innovation potential of every downstream sector of the economy that uses it: from agriculture and manufacturing to finance and hospitality. A focus more on adoption and uptake is critical to bolstering sagging productivity on both sides of the Atlantic, especially considering that well over 80 percent of the benefits of ICTs to an economy come from their adoption, nor their production.

Second, we need more formal EU-U.S. technology policy cooperation in order to collaboratively bolster the competitiveness of our respective technology sectors. For instance as ITIF wrote in a recent report titled "An Allied Approach to Semiconductor Leadership," in our respective U.S. CHIPS and European CHIPS Act, we could coinvest to solve challenges identified in the Decadal Plan for Semiconductors such as embedding security features in the chip, reducing power consumption, and increasing computational efficiency. Moreover, as EU and U.S. governments roll out or expand specialized technology programs in technologies like 6G, energy storage, battery technology, autonomous systems, and quantum computing, there should be joint collaboration between U.S. and EU firms, universities, and governments. Here, each region should allow the others' enterprises to participate in government-funded industry research programs, like the EU's Horizon 2020 program and similar U.S. programs that agencies like NSF operate. We can also work on easier migration for technically skilled workers, eliminating regulatory barriers to science and technology cooperation, and data sharing for AI, particularly in key public interest areas such as smart cities and health care.

Third, we should recognize that the TTC's goal should not be harmonization but interoperability when it comes to digital regulations. There is no reason why there should not be different U.S. and EU regimes for most digital issues, as long as they are broadly aligned and do not violate WTO rules. The numerous references in the joint statement that both sides "should respect the different legal systems in both jurisdictions" should dispel any expectation that the United States would simply accept EU regulations and base discussions on data privacy, AI, and platform regulation around them. It would not be in the U.S. interest to harmonize regulations with the EU, nor is it necessary. Indeed, there is no reason why there should not be different U.S. and EU regimes for most digital issues, as long as they are broadly aligned. Regulations don't need to be carbon copies to have a broadly similar effect. After all, Europe and the United States are unlikely to agree on a privacy framework or how to regulate AI. This is not to say that the two sides should not work toward common principles and regulations, but they should not expect to achieve complete convergence.[109]

Lastly, we need to recognize that the biggest challenge to the global economy, and to our respective economies, is China. Thus, a key task of the TTC should be to cooperate both defensively and offensively with regard to China. As noted, this can include with regard to 5G equipment and systems, investment screening, joint WTO cases against China, updating WTO rules to address China's massive industrial subsidies, cooperation on cyberhacking and IP theft, supply-chain cooperation, cooperative export controls, and cooperation in international forums related to the digital economy.[110]

Micron Ex. 1046, p. 22
Micron v. YMTC
IPR2025-00244

CONCLUSION

There is much talk about "decoupling" between China and the United States. As one report notes, "China has launched an intensified effort to "de-Americanize" its supply chains."[111] The report continues, "For many in the leadership who always wanted to make China less dependent on others, the U.S. trade war and Huawei sanctions [initiated by the Trump administration] have arguably given decision-makers in Beijing the necessary cover for something it has long desired."[112] But in ITIF's view, this gets it wrong: China's desire for absolute advantage and autarky means *it has long sought* these goals. Indeed, that was the mission behind a seminal document called the "National Medium- and Long-Term Program for Science and Technology Development (2006-2020)," the so-called "MLP," which called on China to master 402 core technologies, everything from intelligent automobiles to semiconductors and high-performance computers.[113] Of course, China later updated its MLP with its Made in China 2025 strategy, which sought to establish Chinese leadership across 10 critical emerging technologies. Across these 10 industries, China developed a series of national and provincial funds to progress Chinese firms toward three key strategic goals: 1) "localize and indigenize," meaning "to indigenize R&D and control segments of global supply chains"; 2) "substitute," meaning to replace foreign suppliers with domestic sourcing wherever possible in value chains toward the production of final products; and 3) "capture global market share," meaning to "go out into the world" and compete.[114]

So certainly the Trump administration's actions, including its Special 301 investigation, imposition of tariffs, and entity listings for firms like Huawei and others since (while likely certainly a wake-up call for China) did very little to animate goals that China has already long desired.[115] That this is clear is so from a review of China's National Integrated Circuit Plan, which seeks for 70 percent of the semiconductor chips used by companies operating in China to be domestically produced by the year 2025.[116] Such a clear import substitution goal is worrisome when about 36 percent of U.S. semiconductor company revenues, or $75 billion, in 2018 resulted from sales to China.[117] This dependence upon China for foreign sales creates a long-term vulnerability for the industry (and many other high-tech ones), as noted in the 100-Day Biden administration supply chain review report.[118]

The point is that it is China, not the United States, that seeks decoupling in advanced-technology industries: from aerospace to solar panels to clean energy, China will trade with the world up until the point it has capable domestic suppliers in advanced-technology industries, at which point its intent will be to close off, or severely restrict, its market to foreign competitors, while still enjoying the opportunity WTO membership gives the country to sell its goods in international markets. For instance, China's so-called "De-IOE" initiative sought to reduce China's reliance on IBM, Oracle, and EMC in large business and government environments, and has helped drive Alibaba's cloud business. (Indeed, De-IOE might be better termed De-IOEAWS to include Amazon Web Services.)[119] In fact, examining the economic impact of market access restrictions and other constrains like forced joint ventures that China has imposed on U.S. cloud providers, ITIF conservatively estimates (based on market-share comparisons) that Google, which withdrew from the Chinese market in 2010, subsequently lost $32.5 billion in search revenue from 2013 to 2019, while Amazon and Microsoft's cloud services (IaaS, which is restricted in China) lost a combined $1.6 billion over the two-year period from 2017 to 2018.[120] Indeed, if COMAC could produce commercially viable civilian jet aircraft,

Micron Ex. 1046, p. 23
Micron v. YMTC
IPR2025-00244

Airbus and Boeing's market share in the country would crater rapidly.[121] This is fundamentally not consonant with the commitments China made in joining the WTO.

Of course, prevailing upon China to come into full and immediate compliance with its WTO commitments is the optimal solution, and every instrument the United States and likeminded countries can bring to bear to make that a reality is the preferred outcome. But that can't be the only option pursued. The United States and likeminded countries need to make a concerned effort to build up the technology ecosystems in a wide range of countries and regions, from East Asia to South America, from Africa to India, to Europe itself, to diversify global supply chains in information technology and other advanced-technology industries, so that collective dependence on the Chinese market is lessened, and indeed the economies of likeminded, rule-of-law, democratic free-market economies are strengthened. Here, there's great opportunity for collaboration among countries involved in the Indo-Pacific Economic Framework.[122] Further, the United States must extract greater leverage from the U.S. International Development Finance Corporation (DFC), created by the Better Utilization of Investments Leading to Development (BUILD) Act in 2018, which will be providing $60 billion in development financing to attract more private-sector investment into global emerging markets, especially by more-effectively connecting DFC with similar agencies from likeminded countries. Indeed, the United States and likeminded countries need to collaborate to develop more-sophisticated and holistic responses to China's One Belt One Road and Digital Silk Road Initiatives. This should include collaborative export credit offerings, mutual investments in development initiatives, and greater collaboration around digital technology infrastructure development projects (i.e., smart cities, smart grids, intelligent transportation systems, high-speed rail, etc.) in developing countries.

There's a battle being fought now for the soul of the global trade and economic system; it's imperative that likeminded nations collaborate to emerge victorious in it.

Micron Ex. 1046, p. 24
Micron v. YMTC
IPR2025-00244

GRAPHS AND TABLES

Figure 1: U.S. goods trade deficit with China, 2001–2020 (US$ billions)

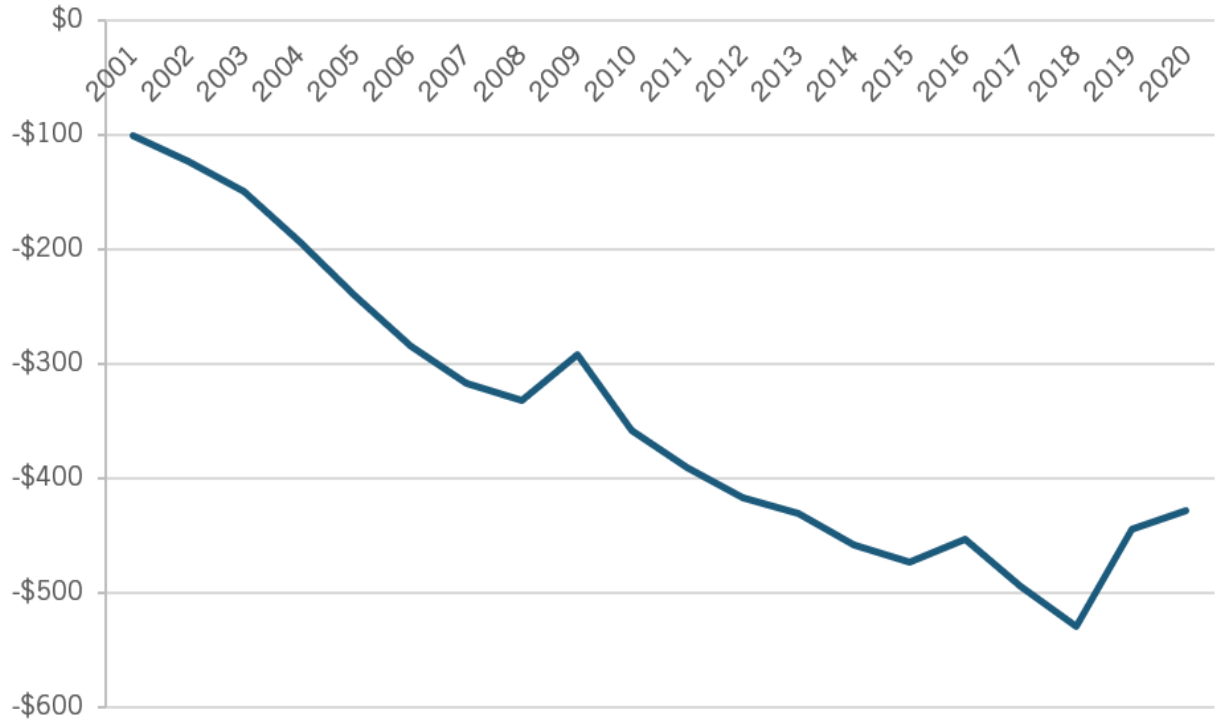
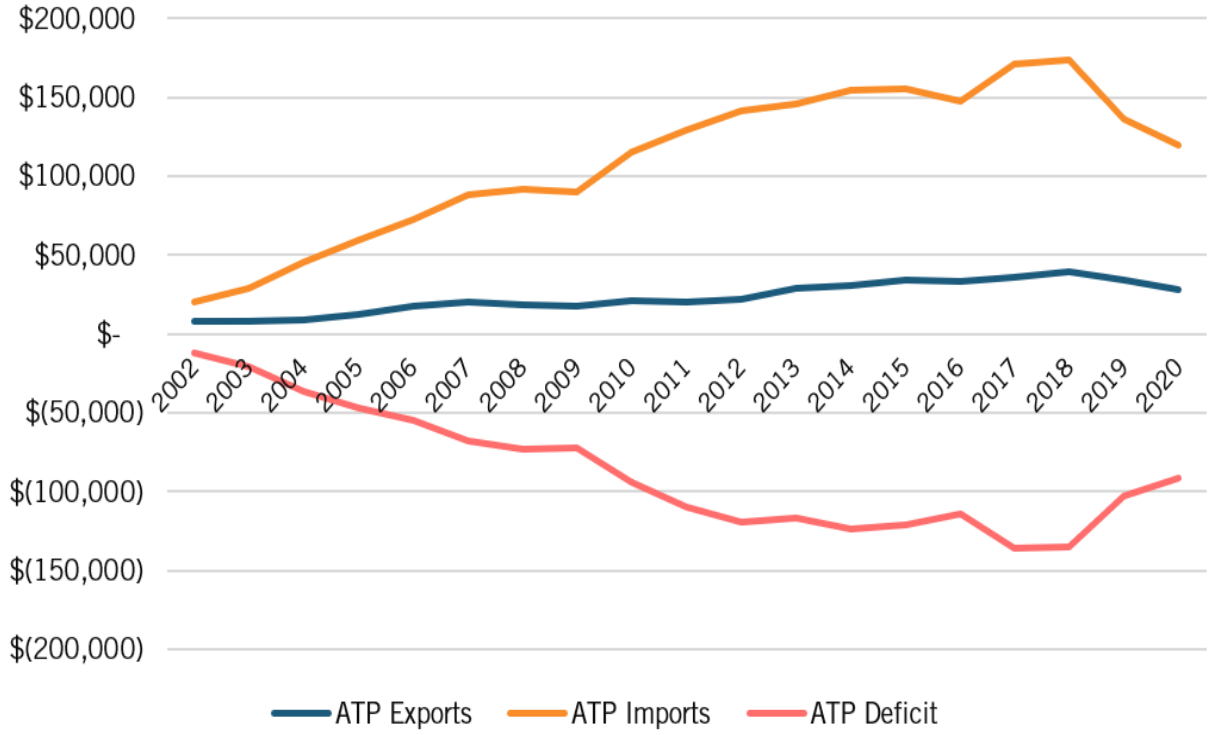


Figure 2: U.S. trade balances with China in advanced technology products, 2002–2020 (US$ millions)



Micron Ex. 1046, p. 25
Micron v. YMTC
IPR2025-00244

Table 1: Assessing China's innovation policies on global innovation

Type of Policy	Impact on Global Innovation
Funding and sharing of technology development with Chinese firms	Harmful
Forced technology transfer	Harmful
Intellectual property theft	Harmful
Currency manipulation	Harmful
Export financing above OECD guideline levels	Harmful
Tariffs	Harmful
Government-allocated domestic market shares to Chinese firms	Harmful
Political hardball for access to foreign markets	Harmful
Support of foreign corrupt business practices	Harmful
R&D tax incentives (favorable to Chinese firms)	Neutral
R&D subsidies (favorable to Chinese firms)	Neutral
Low-cost financing (for Chinese firms only)	Neutral
Limited export control regime	Neutral
Support of STEM education	Helpful
Support for more rapid wireless 5G and 6G and broadband rollout	Helpful

Micron Ex. 1046, p. 26
Micron v. YMTC
IPR2025-00244

ENDNOTES

1. United States Trade Representative's Office (USTR), "2020 Report to Congress on China's WTO Compliance" (USTR, January 2021), 3, https://ustr.gov/sites/default/files/files/reports/2020/2020USTRReportCongressChinaWTOCompliance.pdf.
2. Stephen Ezell, "False Promises II: The Continuing Gap Between China's WTO Commitments and Its Practices" (ITIF, July 2021), https://itif.org/publications/2021/07/26/false-promises-ii-continuing-gap-between-chinas-wto-commitments-and-its.
3. Report of the Working Party on the Accession of China, "WT/ACC/CHN/49 + Corr.1; WT/MIN(01)/3" (November 10, 2001). The WTO language, "Members took note of this commitment," confirms that the commitment in this paragraph is legal binding under China's WTO Protocol of Accession.
4. USTR, "2020 Report to Congress on China's WTO Compliance," 9; Clyde Prestowitz, *The World Turned Upside Down: America, China, and the Struggle for Global Leadership* (New Haven, Connecticut: Yale University Press, 2021): 78.
5. Mark Wu, "The 'China, Inc.' Challenge to Global Trade Governance," *Harvard International Law Journal 57* (2016): 1001–1063, https://papers.ssrn.com/sol3/papers2.cfm?abstract_id=2779781.
6. Robert D. Atkinson, "Enough Is Enough: Confronting Chinese Innovation Mercantilism" (ITIF, February 2012), https://itif.org/publications/2012/02/28/enough-enough-confronting-chinese-innovation-mercantilism.
7. Robert D. Atkinson, "Innovation Drag: China's Economic Impact on Developed Nations" (ITIF, January 2020), https://itif.org/publications/2020/01/06/innovation-drag-chinas-economic-impact-developed-nations.
8. David Autor et al, "Foreign Competition and Domestic Innovation: Evidence from U.S. Patents," (working paper, NBER no. 22879, December 2017), https://www.nber.org/papers/w22879.pdf.
9. Ibid., 4.
10. Akcigit et al., "Innovation and Trade Policy in a Globalized World," (International Finance Discussion Papers 1230, 2018), https://doi.org/10.17016/IFDP.2018.1230, 51.
11. Ibid., 55.
12. Johan Homberty and Adrien Matrayz, "Can Innovation Help U.S. Manufacturing Firms Escape Import Competition from China?" (July 2017), https://pdfs.semanticscholar.org/18fa/b7762b1273081b7aa95e943fbc52de318d88.pdf.
13. Myeong Wan Kim, "Does Import Competition Reduce Domestic Innovation? Evidence from the 'China Shock' and Firm-Level Data on Canadian Manufacturing?" (Centre for the Study of Living Standards, August 2019), https://ideas.repec.org/p/sls/resrep/1903.html.
14. World Bank, *World Integrated Trade Solution* (China Imports and Exports by Partner Country, accessed October 23, 2019), https://wits.worldbank.org/CountryProfile/en/Country/CHN/Year/LTST/TradeFlow/EXPIMP.
15. Ibid., 20.
16. Nicholas Bloom, Mirko Draca, and John Van Reenen, "Trade Induced Technical Change? The Impact of Chinese Imports on Innovation, IT and Productivity" (working paper No. 16717, NBER, January 2011), 88, https://academic.oup.com/restud/article-abstract/83/1/87/2461318?redirectedFrom=fulltext.
17. Ibid.
18. Douglas L. Campbell and Karsten Mau, "Trade Induced Technological Change: Did Chinese Competition Increase Innovation in Europe?" (working paper 0252, Center for Economic and Financial Research, May 2019). 14, https://www.nes.ru/files/Preprints-resh/WP262.pdf.
19. Ibid., 11.
20. Robert D. Atkinson, "Industry by Industry: More Chinese Mercantilism, Less Global Innovation" (ITIF, May 2021), https://itif.org/publications/2021/05/10/industry-industry-more-chinese-mercantilism-less-global-innovation.

Micron Ex. 1046, p. 27
Micron v. YMTC
IPR2025-00244

21. Stephen Ezell, "Moore's Law Under Attack: The Impact of China's Policies on Global Semiconductor Innovation" (ITIF, February 2021), https://itif.org/publications/2021/02/18/moores-law-under-attack-impact-chinas-policies-global-semiconductor.

22. Organization for Economic Cooperation and Development (OECD), "Measuring distortions in international markets: The semiconductor value chain" (OECD, November 2019), 98, https://www.oecd-ilibrary.org/docserver/8fe4491d-en.pdf.

23. Dan Wang, "A Bumpier Road to Semiconductor Supremacy," *Gravel Dragonomics*, July 14, 2020; OECD, "Measuring distortions in international markets: The semiconductor value chain," 98.

24. OECD, "Measuring distortions in international markets: The semiconductor value chain," 9.

25. Antonio Varas et al., "Government Incentives and U.S. Competitiveness in Semiconductor Manufacturing" (SIA and Boston Consulting Group), 11, https://www.bcg.com/en-us/publications/2020/incentives-and-competitiveness-in-semiconductor-manufacturing.

26. SOS International, "Blue Heron: Yangtze Memory Technologies Co. (YMTC)" (SOS International, December 2020), 6.

27. Alex Capri, "Semiconductors at the Heart of the US-China Tech War" (The Hinrich Foundation, January 2020), 17, https://www.hinrichfoundation.com/research/white-paper/trade-and-technology/semiconductors-at-the-heart-of-the-us-china-tech-war/.

28. Ezell, "Moore's Law Under Attack," 41.

29. Robert D. Atkinson, "How China's Mercantilist Policies Have Undermined Global Innovation in the Telecom Equipment Industry" (ITIF, June 2020), https://itif.org/publications/2020/06/22/how-chinas-mercantilist-policies-have-undermined-global-innovation-telecom.

30. Chuin-Wei Yap, "State Support Helped Fuel Huawei's Global Rise," *The Wall Street Journal*, December 25, 2019, https://www.wsj.com/articles/state-support-helped-fuel-huaweis-global-rise-11577280736.

31. Ellen Nakashima, "U.S. pushes hard for a ban on Huawei in Europe, but the firm's 5G prices are nearly irresistible," *The Washington Post*, May 29, 2019, https://www.washingtonpost.com/world/national-security/for-huawei-the-5g-play-is-in-europe--and-the-us-is-pushing-hard-for-a-ban-there/2019/05/28/582a8ff6-78d4-11e9-b7ae-390de4259661_story.html.

32. Atkinson, "Industry by Industry: More Chinese Mercantilism, Less Global Innovation," 11.

33. Sherisse Pham and Matt Rivers, "China is Crushing the U.S. in Renewable Energy," *CNN Tech*, July 18, 2017, http://money.cnn.com/2017/07/18/technology/china-us-clean-energy-solar-farm/index.html.

34. David M. Hart, "The Impact of China's Production Surge on Innovation in the Global Solar Photovoltaics Industry" (ITIF, October 2020), https://itif.org/publications/2020/10/05/impact-chinas-production-surge-innovation-global-solar-photovoltaics.

35. Maria Carvalho, Antoine Dechezleprêtre, and Matthieu Glachant, "Understanding the dynamics of global value chains for solar photovoltaic technologies," World Intellectual Property Organization (November 2017), https://www.wipo.int/edocs/pubdocs/en/wipo_pub_econstat_wp_40.pdf; Liu Yuanyuan, "Chinese Solar Manufacturers Increased Production, Export in 2018 While Domestic Installations Fell," *Renewable Energy World*, February 4, 2019, https://www.renewableenergyworld.com/2019/02/04/chinese-solar-manufacturers-increased-production-export-in-2018-while-domestic-installations-fell/; Mark Osborne, "Global solar PV installations reach 109GW in 2018—BNEF," *PV Tech*, January 16, 2019, https://www.pv-tech.org/news/global-solar-pv-installations-reach-109gw-in-2018-bnef.

36. Nigel Cory, "Heading Off Track: The Impact of China's Mercantilist Policies on Global High-Speed Rail Innovation" (ITIF, April 2016), https://itif.org/publications/2021/04/26/heading-track-impact-chinas-mercantilist-policies-global-high-speed-rail.

37. Lily Fang et al., "Corruption, Government Subsidies, and Innovation: Evidence from China" National Bureau of Economic Research Working Paper 25098 (September 2018), https://www.nber.org/papers/w25098.

Micron Ex. 1046, p. 28
Micron v. YMTC
IPR2025-00244

38. James A. Lewis, "Learning the Superior Techniques of the Barbarians" (Center for Strategic and International Studies, January 2019), 16, https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/190115_Lewis_Semiconductor_v6.pdf.

39. The Commission on the Theft of American Intellectual Property, "Update to the IP Commission Report: The Theft of American Intellectual Property: Reassessments of the Challenge and United States Policy" (National Bureau of Asian Research, 2017), https://www.nbr.org/wp-content/uploads/pdfs/publications/IP_Commission_Report_Update.pdf.

40. Eric Rosenbaum, "1 in 5 corporations say China has stolen their IP within the last year: CNBC CFO Survey," *CNBC*, March 1, 2019, https://www.cnbc.com/2019/02/28/1-in-5-companies-say-china-stole-their-ip-within-the-last-year-cnbc.html.

41. World Trade Organization, "Report of the Working Party on the Accession of China" (WTO, November 10, 2001), Paragraph 203, https://www.wto.org/english/thewto_e/acc_e/wp_acc_china_e.doc.

42. Kun Jiang et al., "International Joint Ventures and Internal vs. External Technology Transfer: Evidence from China" (working paper, the National Bureau of Economic Research, Cambridge, Massachusetts, 2018), http://www.nber.org/papers/w24455.

43. Ibid.

44. Wayne M. Morrison, "China-U.S. Trade Issues" (Congressional Research Service (CRS), March 17, 2015), 41, https://www.fas.org/sgp/crs/row/RL33536.pdf. See, for example, Appellate Body Reports, Argentina-Measures Affecting the Importation of Goods, WT/DS438/AB/R / WT/DS444/AB/R / WT/DS445/AB/R, adopted January 26, 2015.

45. USTR, "Findings of the Investigation Into China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation Under Section 301 of the Trade Act of 1974" (USTR, 2018), https://ustr.gov/sites/default/files/Section%20301%20FINAL.PDF.

46. Angus Liu, "Riding on Booming Drug Sales, Astra Zeneca Forms $133M China Joint Venture," *FierceBiotech*, November 27, 2017, https://www.fiercebiotech.com/biotech/riding-booming-drug-sales-astrazeneca-forms-133mchina-joint-venture.

47. Nigel Cory, "Testimony Before the U.S.-China Economic and Security Review Commission Regarding China's Cloud Computing Market" (ITIF, April 15, 2021), https://itif.org/publications/2021/04/15/testimony-us-china-economic-and-security-review-commission-regarding-chinas

48. Cate Cadell, "Amazon Sells Off China Cloud Assets as Tough New Rules Bite," *Reuters*, November 13, 2017, https://www.reuters.com/article/us-china-amazon-cloud/amazon-sells-off-china-cloud-assets-as-tough-new-rulesbite-idUSKBN1DE0CL.

49. Julie Wernau, "Forced Tech Transfers Are on the Rise in China, European Firms Say," *The Wall Street Journal,* May 20, 2019, https://www.wsj.com/articles/forced-tech-transfers-are-on-the-rise-in-china-european-firms-say-11558344240.

50. Ibid.

51. For example, in 2012, only 5 percent of Chinese R&D was in basic research, compared with 17 percent in the United States. Likewise, as the joint World Bank-Chinese government study on innovation concluded, "More public R&D support could be reoriented to basic 'blue sky' research to complement private R&D and help to address China's relatively low share of R&D devoted to basic research."

52. Dai Tian, "China surpasses US in later-stage innovation spending," *China Daily*, April 18, 2017, https://usa.chinadaily.com.cn/business/2017-04/18/content_28977625.htm.

53. Arjun Kharpal, "China spending on research and development to rise 7% per year in push for major tech breakthroughs," *CNBC*, March 4, 2021, https://www.cnbc.com/2021/03/05/china-to-boost-research-and-development-spend-in-push-for-tech-breakthroughs.html.

54. National Science Board, "Science and Engineering Indicators, 2018; Chapter 6: Industry, Technology, and the Global Marketplace," https://www.nsf.gov/statistics/2018/nsb20181/report/sections/industry-technology-and-the-global-marketplace/patterns-and-trends-of-knowledge--and-technology-intensive-industries.

Micron Ex. 1046, p. 29
Micron v. YMTC
IPR2025-00244

55. Ibid.

56. "Shenzhen is a hothouse of innovation," *The Economist*, April 26, 2017, https://www.economist.com/special-report/2017/04/06/shenzhen-is-a-hothouse-of-innovation.

57. United States Census Bureau, "Trade in Goods with China," https://www.census.gov/foreign-trade/balance/c5700.html.

58. United States Census Bureau, "Foreign Trade: Advanced Technology Product Data - Imports and Exports - ATP Group by Country," https://www.census.gov/foreign-trade/statistics/product/atp/select-atpctry.html.

59. Trading Economics, "China Foreign Currency Reserves" (accessed April 4, 2022), https://tradingeconomics.com/china/foreign-exchange-reserves.

60. Congress.gov, "S.1260 - United States Innovation and Competition Act of 2021," https://www.congress.gov/bill/117th-congress/senate-bill/1260/text.

61. Hannah Monicken, "Commerce announces 'strategic plan' for improving competitiveness," *Inside U.S. Trade*, March 29, 2022, https://insidetrade.com/daily-news/commerce-announces-%E2%80%98strategic-plan%E2%80%99-improving-competitiveness.

62. Robert D. Atkinson, Nigel Cory, and Stephen Ezell, "Stopping China's Mercantilism: A Doctrine of Constructive, Alliance-Backed Confrontation" (ITIF, March 2017), https://itif.org/publications/2017/03/16/stopping-chinas-mercantilism-doctrine-constructive-alliance-backed.

63. Information Technology and Innovation Foundation Staff, "Transition Memo to President-Elect Trump: How to Spur Innovation, Productivity, and Competitiveness" (Information Technology and Innovation Foundation, November 2016), http://www2.itif.org/2016-white-house-transition-memo.pdf?_ga=1.193783853.1806060799.1471894729.

64. Ideas provided by Mark Cohen; Ezell, "False Promises II," 38-39.

65. CRS, "Russia's Trade Status, Tariffs, and WTO Issues," April 1, 2022, https://crsreports.congress.gov/product/pdf/IF/IF12071.

66. World Trade Organization, "Trade without discrimination," https://www.wto.org/english/thewto_e/whatis_e/tif_e/fact2_e.htm#seebox.

67. Wayne H. Morrison, "China-U.S. Trade Issues" (Congressional Research Service, July 2018), 2, https://fas.org/sgp/crs/row/RL33536.pdf.

68. United States Congress, "NORMAL TRADE RELATIONS FOR THE PEOPLE'S REPUBLIC OF CHINA: PUBLIC LAW 106–286," October 10, 2020, 893, https://www.congress.gov/106/plaws/publ286/PLAW-106publ286.pdf.

69. Senator Tom Cotton, "Cotton, Inhofe, Scott Introduce Bill to End China's Permanent Normal Trade Status," March 18, 2021, https://www.cotton.senate.gov/news/press-releases/cotton-inhofe-scott-introduce-bill-to-end-chinas-permanent-normal-trade-status.

70. Petros C. Mavoridis and André Sapir, *China and the WTO: Why Multilateralism Still Matters* (Princeton, New Jersey: Princeton University Press, 2021): 48-50.

71. Recommendation provided by Mark Cohen, Director and Senior Fellow, Berkeley Center for Law and Technology, University of California at Berkeley, May 20, 2021.

72. See: China Commercial International Court, "Civil Procedure Law of the People's Republic of China (Revised in 2017)," http://cicc.court.gov.cn/html/1/219/199/200/644.html.

73 "Trade Policy Review: China," World Trade Organization website, July, 2018, https://www.wto.org/english/tratop_e/tpr_e/tp475_e.htm; "USTR Releases 2019 National Trade Estimate Report," Office of the United States Trade Representative website, March 29, 2019, https://ustr.gov/about-us/policy-offices/press-office/press-releases/2019/march/ustr-releases-2019-national-trade; United States Trade Representative (USTR), *2018 Report to Congress On China's WTO Compliance* (Washing, D.C.: USTR, February, 2019), https://ustr.gov/sites/default/files/2018-USTR-Report-to-Congress-on-China%27s-WTO-Compliance.pdf.

Micron Ex. 1046, p. 30
Micron v. YMTC
IPR2025-00244

74. "Goods Council considers revised transparency proposal to 'reinvigorate' the WTO," World Trade Organization website, November 12, 2018, https://www.wto.org/english/news_e/news18_e/good_12nov18_e.htm; Joint communication from the delegations of Argentina, Australia, Canada, Costa Rica, the European Union, Japan, New Zealand, the Separate Customs Territory of Taiwan, Penghu, Kinmen and Matsu, and the United States, "Procedures to Enhance Transparency and Strengthen Notification Requirements Under WTO Agreements," World Trade Organization website, June 27, 2019, https://docs.wto.org/dol2fe/Pages/FE_Search/DDFDocuments/255258/q/Jobs/GC/204R2.pdf.

75. Nigel Cory and Robert D. Atkinson, "Why and How to Mount a Strong, Trilateral Response to China's Innovation Mercantilism" (ITIF, January 2020), https://itif.org/publications/2020/01/13/why-and-how-mount-strong-trilateral-response-chinas-innovation-mercantilism.

76. Robert D. Atkinson, "What is Chinese "Innovation Mercantilism" and How Should the UK and Allies Respond?" (ITIF, June 28, 2021), https://itif.org/publications/2021/06/28/what-chinese-innovation-mercantilism-and-how-should-uk-and-allies-respond.

77. Ibid.

78. Office of the Director of National Intelligence, "Five Eyes Intelligence Oversight and Review Council (FIORC)," https://www.dni.gov/index.php/who-we-are/organizations/enterprise-capacity/chco/chco-related-menus/chco-related-links/recruitment-and-outreach/217-about/organization/icig-pages/2660-icig-fiorc.

79. David Howell, "Why Five Eyes should now become six," *The Japan Times*, June 30, 2020, https://www.japantimes.co.jp/opinion/2020/06/30/commentary/japan-commentary/five-eyes-now-become-six/.

80. Paul Murphy and Dr. Paul Sullivan, "Formation of a Global Strategic Supply Chain Alliance (GSSCA): A New Strategic Multilateralism" (Global America Business Institute, May 2020), http://thegabi.com/wp-content/uploads/2020/05/40-Formation-of-a-Global-Strategic-Supply-Chain-Alliance-GSSCA-A-New-Strategic-Multilateralism-Paul-Murphy-and-Paul-Sullivan-5-22-2020.pdf.

81. Ibid. 2.

82. Stephen Ezell, "An Allied Approach to Semiconductor Leadership" (ITIF, September 2020), https://itif.org/publications/2020/09/17/allied-approach-semiconductor-leadership.

83. Mercedes Ruehl, James Kygne, and Kiran Stacey, "Chinese state-backed funds invest in the U.S. despite Washington curbs," *The Financial Times*, December 2, 2020, https://www.ft.com/content/745abeca-561d-484d-acd9-ad1caedf9e9e.

84. Andrew Imbrie and Ryan Fedasiuk, "Untangling the Web: Why the U.S. Needs Allies to Defend Against Chinese Technology Transfer" (The Brookings Institution, April 2020), 11, https://www.brookings.edu/wp-content/uploads/2020/04/FP_20200427_chinese_technology_transfer_imbrie_fedasiuk.pdf; American Enterprise Institute and Heritage Foundation, "China Global Investment Tracker," https://www.aei.org/china-globalinvestment-tracker/. (Investments must be greater than $1 million; tech industry coding completed by AEI.)

85. Imbrie and Fedasiuk, "Untangling the Web," 3.

86. Ibid.

87. Angela Stanzel, "Germany's turnabout on Chinese takeovers Commentary" (European Council on Foreign Relations, March 21, 2017), https://www.ecfr.eu/article/commentary_germanys_turnabout_on_chinese_takeovers_7251.

88 "New EU framework for screening FDI into the EU," Baker McKenzie website, April 15, 2019, https://www.bakermckenzie.com/en/insight/publications/2019/04/new-eu-framework-for-screening-fdi-into-the-eu.

89. Maria Sheahan, "China's FGC stands by Aixtron deal in face of German review," *Reuters,* October 25, 2016, https://www.reuters.com/article/us-aixtron-m-a-fujian/chinas-fgc-stands-by-aixtron-deal-in-face-of-german-review-idUSKCN12P152; Paul Mozur and Jack Ewing, "Rush of Chinese Investment in Europe's High-Tech Firms Is Raising Eyebrows," *The New York Times,* September 16, 2016, https://www.nytimes.com/2016/09/17/business/dealbook/china-germany-takeover-merger-technology.html?module=inline.

Micron Ex. 1046, p. 31
Micron v. YMTC
IPR2025-00244

90. Michael E. Leiter and Katie Clarke, "CFIUS' First Full Year Under FIRRMA," Skadden, January 21, 2020, https://www.skadden.com/insights/publications/2020/01/2020-insights/cfius-first-full-year-under-firrma.

91. Imbrie and Fedasiuk, "Untangling the Web," 10–12.

92. Japan's Ministry of Economy, Trade, and Industry (METI), "Trade Control Policy," METI website, https://www.meti.go.jp/english/policy/external_economy/trade_control/index.html; Tetsuro Kosaka, "Japan-South Korea spat underscores importance of export controls," *Nikkei Asian Review,* August 17, 2019, https://asia.nikkei.com/Spotlight/Comment/Japan-South-Korea-spat-underscores-importance-of-export-controls; Center for Information on Security Trade Control (CISTEC), *Overview of Japan's Export Controls* (CISTEC, June , 2015), http://www.cistec.or.jp/english/export/Overview4th.pdf.

93. "Review of Dual-Use Export Controls," European Parliament website, http://www.europarl.europa.eu/legislative-train/theme-europe-as-a-stronger-global-actor/file-review-of-dual-use-export-controls.

94. Council of the European Union, "Dual-use goods: Council agrees negotiating mandate," press release, June 5, 2019, https://www.consilium.europa.eu/en/press/press-releases/2019/06/05/dual-use-goods-council-agrees-negotiating-mandate/; General Secretariat of the European Council, "Proposal for a Regulation of the European Parliament and of the Council setting up a Union regime for the control of exports, brokering, technical assistance, transit and transfer of dual-use items — Mandate for negotiations with the European Parliament," Council of the European Council website, June 5, 2019, https://www.consilium.europa.eu/media/39555/mandate-for-negociations.pdf.

95. Stephen Ezell and Caleb Foote, "How Stringent Export Controls on Emerging Technologies Would Harm the U.S. Economy" (ITIF, May, 2019), https://itif.org/publications/2019/05/20/how-stringent-export-controls-emerging-technologies-would-harm-us-economy.

96. Robert Atkinson and Stephen Ezell, "Comments to the U.S. Commerce Department on Export Controls for Emerging Technologies" (The Information Technology and Innovation Foundation, December 18, 2018), https://itif.org/publications/2018/12/13/comments-us-commerce-department-export-controls-emerging-technologies.

97. Ibid.

98. Heather Long, "Trump administration considers blacklisting Chinese companies that repeatedly steal U.S. intellectual property," *Washington Post,* October 26, 2019, https://www.washingtonpost.com/business/2019/10/26/trump-administration-considers-blacklisting-chinese-companies-that-repeatedly-steal-us-intellectual-property/.

99. Robert Atkinson and Stephen Ezell, "Comments to the U.S. Commerce Department."

100. United States Trade Representative's Office, "Joint Statement on Trilateral Meeting of the Trade Ministers of the United States, Japan, and the European Union," September 25, 2018, https://ustr.gov/about-us/policy-offices/press-office/press-releases/2018/september/joint-statement-trilateral.

101. Office of the United States Trade Representative and the U.S. Department of Commerce, Subsidies Enforcement Annual Report to the Congress (Office of the United States Trade Representative and the U.S. Department of Commerce, 2019), https://esel.trade.gov/esel/groups/public/documents/web_resources/seo-annual-report-2019.pdf.

102. Stephen Ezell, "Strengthening Subsidies Rules to Tackle Trade-Distortions: Perspectives From the High-Tech Sector" (power point presentation at 2019 WTO Public Forum, "Trading Forward: Adapting to a Changing World," October 11, 2019).

103. Mark Wu, "The 'China, Inc.' Challenge to Global Trade Governance," *Harvard International Law Journal* Vol. 57 (Spring 2016), https://harvardilj.org/wp-content/uploads/sites/15/HLI210_crop.pdf.

104. This would be broadly similar to the 1984 Cooperative R&D Act, which allowed firms to apply to form pre-competitive R&D consortia.

105. Jennifer Hillman, "Testimony of Jennifer Hillman Before the U.S.-China Economic and Security Review Commission: Hearing on U.S. Tools to Address Chinese Market Distortions," USCC, June 8, 2018, 7, https://www.uscc.gov/sites/default/files/Hillman%20Testimony%20US%20China%20Comm%20w%20Appendix%20A.pdf?mod=article_inline.

Micron Ex. 1046, p. 32
Micron v. YMTC
IPR2025-00244

106. Stephen Ezell, "Tariffs Won't Stop China's Mercantilism. Here Are 10 Alternatives," *RealClearPolicy*, April 23, 2018, https://www.realclearpolicy.com/articles/2018/04/23/tariffs_wont_stop_chinas_mercantilism_here_are_10_alternatives_110605.html.

107. Hillman, "Testimony at Hearing on U.S. Tools to Address Chinese Market Distortions," 11–12.

108. Robert D. Atkinson, "Advancing U.S. Goals in the U.S.-EU Trade and Technology Council" (ITIF, September 2021), https://itif.org/publications/2021/09/13/advancing-us-goals-us-eu-trade-and-technology-council.

109. Nigel Cory, "How the EU-U.S. Trade and Technology Council Can Navigate Conflict and Find Meaningful Cooperation on Data Governance and Technology Platforms," *Innovation Files*, December 2, 2021, https://itif.org/publications/2021/12/02/how-eu-us-trade-and-technology-council-can-navigate-conflict-and-find.

110. Robert D. Atkinson, "Boosting Transatlantic Technology Cooperation," *The Globalist,* November 29, 2021, https://www.theglobalist.com/boosting-transatlantic-technology-cooperation/.

111. Mathew Burrows et al., "Unpacking the Geopolitics of Technology" (Atlantic Council Geotech Center, January 2022), 13, https://www.atlanticcouncil.org/in-depth-research-reports/report/unpacking-the-geopolitics-of-technology/.

112. Mathew Burrows and Julian Mueller-Kaler, "The Dangers of Economic Decoupling," March 14, 2020, https://www.atlanticcouncil.org/content-series/smart-partnerships/the-dangers-of-decoupling/.

113. Yutao Sun and Cong Cao, "Planning for science: China's "grand experiment" and global implications" *Humanities and Social Sciences Communications* Vol. 8, No. 215 (2021), https://www.nature.com/articles/s41599-021-00895-7.

114. U.S. Chamber of Commerce, "Made in China 2025: Global Ambitions Built on Local Protections" (U.S. Chamber of Commerce, 2017), 16, https://www.uschamber.com/sites/default/files/final_made_in_china_2025_report_full.pdf.

115. *Nikkei Asia,* "U.S. puts Chinese firms helping military on trade blacklist," November 25, 2021, https://asia.nikkei.com/Politics/International-relations/U.S.-puts-Chinese-firms-helping-military-on-trade-blacklist.

116. *The Economist*, "Chips on Their Shoulders," January 23, 2016, http://www.economist.com/news/business/21688871-china-wants-become-superpower-semiconductors-and-plans-spend-colossal-sums.

117. Asa Fitch and Bob Davis, "U.S. Chip Industry Fears Long-Term Damage From China Trade Fight," *The Wall Street Journal*, March 9, 2020, https://www.wsj.com/articles/chip-industry-fears-damage-china-trade-fight-11583693926.

118. Executive Office of the President, The White House, "Building resilient supply chains, revitalizing American manufacturing, and fostering broad-based growth" (White House, June 2021), 8–9, https://www.whitehouse.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf.

119. David Moschella and Robert D. Atkinson, "Competing With China: A Strategic Framework" (ITIF, August 2020), https://itif.org/publications/2020/08/31/competing-china-strategic-framework.

120. Cory, "Testimony Before the Senate Subcommittee on International Trade, Customs, and Global Competitiveness of the Committee on Finance Hearing on Censorship as a Non-Tariff Barrier to Trade."

121. Robert D. Atkinson, "Why More Aircraft Competition Is Bad for the U.S. Economy, Not Good for Consumers," *Innovation Files*, May 1, 2018, https://itif.org/publications/2018/05/01/why-more-aircraft-competition-bad-us-economy-not-good-consumers.

122. Nigel Cory, "Comments to the U.S. Commerce Department on the Indo-Pacific Economic Framework" (ITIF, March 2022), https://itif.org/publications/2022/03/21/comments-us-commerce-department-indo-pacific-economic-framework.

Micron Ex. 1046, p. 33
Micron v. YMTC
IPR2025-00244