OFFICE *of the* UNITED STATES TRADE REPRESENTATIVE
EXECUTIVE OFFICE OF THE PRESIDENT

FOUR-YEAR REVIEW OF ACTIONS TAKEN IN THE SECTION 301 INVESTIGATION: CHINA'S ACTS, POLICIES, AND PRACTICES RELATED TO TECHNOLOGY TRANSFER, INTELLECTUAL PROPERTY, AND INNOVATION

May 14, 2024

Abbreviations and Acronyms

Acronym	Definition
AEI	American Enterprise Institute
ALL	Administrative Licensing Law
AmCham China	American Chamber of Commerce in China
AmCham Shanghai	American Chamber of Commerce in Shanghai
APT	advanced persistent threat
ASEAN	Association of Southeast Asian Nations
AVIC	Aviation Industry Corporation of China
BfV	Federal Office for the Protection of the Constitution (Germany)
CAC	Cyberspace Administration of China
CBP	U.S. Customs and Border Protection
CCP	Chinese Communist Party
CHIPS	Creating Helpful Incentives to Produce Semiconductors Act
CFIUS	Committee on Foreign Investment in the United States
COMAC	Commercial Aircraft Corporation of China
CSIS	Center for Strategic and International Studies
CSL	Cybersecurity Law
CSR	Cybersecurity Review Measures
DOJ	U.S. Department of Justice
EU	European Union
European Chamber	European Union Chamber of Commerce in China
FBI	Federal Bureau of Investigation
FDI	foreign direct investment
FIL	Foreign Investment Law
FINL	Foreign Investment Negative List
FIRRMA	Foreign Investment Risk Review Modernization Act of 2018
HTSUS	Harmonized Tariff Schedule of the United States
HGR	human genetic resources
IDDS	National Innovation-Driven Development Strategy
IMF	International Monetary Fund
IP	intellectual property
IRA	Inflation Reduction Act
IT	information technology
JV	joint venture
M&A	mergers and acquisitions
MIIT	Ministry of Industry and Information Technology of the People's Republic of China
MLPS	Multi-Level Protection Scheme
MOF	Ministry of Finance of the People's Republic of China

MOFCOM	Ministry of Commerce of the People's Republic of China
MOST	Ministry of Science and Technology of the People's Republic of China
MSS	Ministry of State Security of the People's Republic of China
NAICS	North American Industry Classification System
NBC	National Agricultural Genetically Modified Organism Biosafety Committee (China)
NBER	National Bureau of Economic Research
NDRC	National Development and Reform Commission of the People's Republic of China
NEV	new energy vehicle
NIH	National Institutes of Health
NPC	National People's Congress of the People's Republic of China
OFDI	outbound foreign direct investment
PRC	People's Republic of China
R&D	research and development
SMNS	Strong Manufacturing Nation Strategy
SOE	state-owned enterprise
USCBC	US-China Business Council
U.S.-China ETA	Economic and Trade Agreement Between the Government of the United States of America and the Government of the People's Republic of China
USDA	U.S. Department of Agriculture
USITC	U.S. International Trade Commission
USTR	Office of the United States Trade Representative
VC	venture capital
WTO	World Trade Organization

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I. Background and Introduction

On August 18, 2017, following appropriate consultations, the United States Trade Representative ("Trade Representative") initiated an investigation under section 301 of the Trade Act of 1974, as amended ("Trade Act") (19 U.S.C. 2411) to determine whether the acts, policies, and practices of the Government of China related to technology transfer, intellectual property (IP), and innovation[1] are unreasonable or discriminatory and burden or restrict U.S. commerce.[2]

Based on the information obtained during the investigation and the advice of the Section 301 Committee, on March 22, 2018, the Trade Representative released the *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* ("Section 301 Report"), determining that China employed a series of technology transfer-related acts, policies, and practices that are unreasonable or discriminatory and burden or restrict U.S. commerce, and are thus actionable under section 301(b) of the Trade Act.[3] In particular, the Trade Representative determined that:

1. China used foreign ownership restrictions, such as joint venture (JV) requirements and foreign equity limitations, and various administrative review and licensing processes, to require or pressure technology transfer from U.S. companies.

2. China's regime of technology regulations forced U.S. companies seeking to license technologies to Chinese entities to do so on non-market-based terms that favor Chinese recipients.

3. China directed and unfairly facilitated the systematic investment in, and acquisition of, U.S. companies and assets by Chinese companies to obtain cutting-edge technologies and IP and generate the transfer of technology to Chinese companies.

4. China conducted and supported unauthorized intrusions into, and theft from, the computer networks of U.S. companies to access their IP, including trade secrets, and confidential business information.[4]

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[1] Referred to throughout the document as "technology transfer-related acts, policies, and practices." For definitions of "technology" and "technology transfer," *see* OFFICE OF THE UNITED STATES TRADE REPRESENTATIVE [*hereinafter* "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 6 (Mar. 22, 2018).

[2] *See Initiation of Section 301 Investigation; Hearing; and Request for Public Comments: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, 82 Fed. Reg. 40,213 (Aug. 24, 2017).

[3] 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.

[4] *Id.*; *see also Notice of Determination and Request for Public Comment Concerning Proposed Determination of Action Pursuant to Section 301: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual*

The Trade Representative determined that the second category of technology transfer-related acts, policies, and practices under investigation involve certain discriminatory technology regulations and addressed those through dispute settlement at the World Trade Organization (WTO). Specifically, on March 23, 2018, the Office of the United States Trade Representative (USTR) requested consultations with the Government of China regarding certain specific aspects of China's technology regulations considered in the investigation.[5] On March 18, 2019, China's State Council issued a *Decision Revising Some Administrative Regulations*, revising certain of the technology licensing requirements cited in the U.S. complaint.[6] On June 18, 2020, following a request of the United States, the WTO panel suspended its work pursuant to Article 12.12 of the Dispute Settlement Understanding.[7] After review, the United States did not reinitiate the proceedings, and the Panel's authority lapsed on June 9, 2021. With respect to the remaining categories of technology transfer-related acts, policies, and practices, the Trade Representative addressed these through various tariff actions and modifications taken under sections 301 and 307 of the Trade Act, as discussed below.

A. Actions Taken Under Section 301(b) of the Trade Act (Lists 1 and 2)

Following the findings that China's technology transfer-related acts, policies, and practices were unreasonable or discriminatory and burden or restrict U.S. commerce, and in a notice published on April 6, 2018, the Trade Representative proposed to take action in the form of additional duties of 25 percent on 1,333 tariff subheadings.[8] After a period of public notice and comment, the Trade Representative determined, in a notice published on June 20, 2018, to impose additional duties of 25 percent on 818 of the proposed tariff subheadings, with an approximate annual trade value of $34 billion (2017),[9] effective July 6, 2018 ("List 1" or "July 6, 2018 action").[10]

The June 20 notice also proposed further action in the form of additional duties of 25 percent on a list of 284 tariff subheadings with an approximate annual trade value of $16 billion (2017). Following a separate period of notice and comment, the Trade Representative determined to impose additional duties of 25 percent on 279 tariff subheadings with an approximate annual

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Property, and Innovation, 83 Fed. Reg. 14,906 (Apr. 6, 2018). In November 2018, the Trade Representative issued the *Update Concerning China's Acts, Policies and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, finding that China persisted in its technology transfer-related acts, policies, and practices. *See* USTR, UPDATE CONCERNING CHINA'S ACTS, POLICIES AND PRACTICES RELATED TO TECHNOLOGY TRANSFER, INTELLECTUAL PROPERTY, AND INNOVATION (Nov. 20, 2018).

[5] Request for Consultations by the United States, *China – Certain Measures Concerning the Protection of Intellectual Property Rights*, WTO Doc. WT/DS542/1 (Mar. 26, 2018).

[6] *Decision Revising Some Administrative Regulations*, Art. 38 (PRC State Council, Order No. 709, issued on Mar. 18, 2019, effective Mar. 18, 2019), https://www.gov.cn/zhengce/content/2019-03/18/content_5374723.htm.

[7] Communication From the Panel, *China – Certain Measures Concerning the Protection of Intellectual Property Rights*, WTO Doc. WT/DS542/14 (Jun. 22, 2020).

[8] *See* 83 Fed. Reg. 14,906.

[9] Unless otherwise specified, all dollar figures in this report reflect nominal values.

[10] *Notice of Action and Request for Public Comment Concerning Proposed Determination of Action Pursuant to Section 301: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, 83 Fed. Reg. 28,710 (Jun. 20, 2018).

trade value of $16 billion (2017), effective August 23, 2018 ("List 2" or "August 23, 2018 action").[11]

B. Subsequent Modifications Under Section 307 of the Trade Act (Lists 3 and 4)

The Trade Representative subsequently modified the July 6, 2018, and August 23, 2018, actions, pursuant to authority under section 307 of the Trade Act (19 U.S.C. 2417(a)), at the specific direction of the President. These modifications were in the form of additional duties on supplemental lists of products.

On July 17, 2018, at the specific direction of the President, the Trade Representative proposed an additional 10 percent duty on 6,031 tariff subheadings with an annual trade value of $200 billion.[12] On August 7, 2018, the Trade Representative requested interested persons to comment on raising the duties for the proposed modification from 10 percent to 25 percent.[13] On September 21, 2018, at the specific direction of the President, the Trade Representative announced additional duties on a portion of the proposed subheadings—5,745 full and partial tariff subheadings, with an approximate trade value of $200 billion ("List 3").[14] As directed by the President, the additional duty was initially set at 10 percent, effective September 24, 2018, and increased to 25 percent on May 10, 2019.[15]

On May 17, 2019, at the specific direction of the President, the Trade Representative invited public comment on modifying the actions taken in the section 301 investigation by imposing up to an additional 25 percent *ad valorem* duty on products of China classified in 3,805 full and partial tariff subheadings, with an annual trade value of approximately $300 billion.[16] Subsequently, at the specific direction of the President, the Trade Representative announced the determination to modify the actions taken in the investigation by imposing additional duties of

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[11] *Notice of Action Pursuant to Section 301: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, 83 Fed. Reg. 40,823 (Aug. 16, 2018).

[12] *Request for Comments Concerning Proposed Modification of Action Pursuant to Section 301: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation,* 83 Fed. Reg. 33,608 (Jul. 17, 2018).

[13] *Extension of Public Comment Period Concerning Proposed Modification of Action Pursuant to Section 301: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, 83 Fed. Reg. 38,760 (Aug. 7, 2018).

[14] *Notice of Modification of Section 301 Action: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, 83 Fed. Reg. 47,974 (Sep. 21, 2018).

[15] *Id.* at 47,975*; see also Notice of Modification of Section 301 Action: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation,* 84 Fed. Reg. 20,459 (May 9, 2019) (as amended by *Implementing Modification to Section 301 Action: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation,* 84 Fed. Reg. 21,892 (May 15, 2019)); *Additional Implementing Modification to Section 301 Action: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, 84 Fed. Reg. 26,930 (Jun. 10, 2019); *Notice of Technical Amendment to Product Exclusions: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property and Innovation*, 86 Fed. Reg. 22,092 (Apr. 26, 2021); and *China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation; Technical Modifications to 301 Action*, 84 Fed. Reg. 9,785 (Feb. 22, 2022).

[16] *Request for Comments Concerning Proposed Modification of Action Pursuant to Section 301: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, 84 Fed. Reg. 22,564 (May 17, 2019).

10 percent on a list of 3,782 full and partial tariff subheadings with an annual trade value of approximately $300 billion (2017) to be implemented in two segments, with tariffs on 3,243 subheadings taking effect on September 1, 2019 ("List 4A"), and tariffs on 555 subheadings taking effect January 1, 2020 ("List 4B").[17] On August 30, 2019, at the specific direction of the President, the Trade Representative determined to modify the action by increasing the rate of additional duty from 10 to 15 percent.[18]

Following the announcement of the *Economic and Trade Agreement Between the Government of the United States of America and the Government of the People's Republic of China* ("U.S.-China ETA")[19] between the United States and China, on December 15, 2019, the actions were further modified by suspending, until further notice, the additional duty of 15 percent on certain products of China on List 4B and then further modified, effective February 14, 2020, to reduce the rate of additional duty on certain products of China on List 4A from 15 percent to 7.5 percent.[20]

C. Exclusions

For each tranche of section 301 duties, the Trade Representative established a process by which interested persons could request the exclusion of particular products covered by the actions. With few exceptions, most of these exclusions expired in 2019 and 2020. On March 28, 2022, the Trade Representative determined to modify the actions by reinstating 352 expired exclusions. These exclusions are scheduled to expire on May 31, 2024.[21]

Additionally, on March 25, 2020, the Trade Representative requested public comments on proposed modifications to temporarily exclude from section 301 duties certain medical-care products related to the U.S. response to COVID-19.[22] On December 29, 2020, the Trade Representative announced 99 product temporary exclusions for medical-care products and products related to the U.S. COVID-19 response.[23] There are currently 77 COVID-19 exclusions, which are scheduled to expire on May 31, 2024.[24]

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[17] *Notice of Modification of Section 301 Action: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation,* 84 Fed. Reg. 43,304 (Aug. 20, 2019).
[18] *Notice of Modification of Section 301 Action: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, 84 Fed. Reg. 45,821 (Aug. 30, 2019).
[19] The *Economic and Trade Agreement Between the Government of the United States of America and the Government of the People's Republic of China* [*hereinafter* "U.S.-China ETA"] was signed on January 15, 2020 and contained chapters addressing specific topics, including technology transfer. *See*, U.S.-China ETA Text, U.S.-PRC, Jan. 15, 2020.
[20] *Notice of Modification of Section 301 Action: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, 84 Fed. Reg. 69,447 (Dec. 18, 2019); *see also Notice of Modification of Section 301 Action: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation,* 85 Fed. Reg. 3,741 (Jan. 22, 2020).
[21] *Extension of Exclusions and Request for Comments: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, 88 Fed. Reg. 90,225 (Dec. 29, 2023).
[22] *Request for Comments on Additional Modifications to the 301 Action to Address COVID-19: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, 85 Fed. Reg. 16,987 (Mar. 25, 2020).
[23] *Notice of Product Exclusion Extensions and Additional Modifications: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, 85 Fed. Reg. 85,831 (Dec. 29, 2020).
[24] 88 Fed. Reg. 90,225.

D. Initiation of the Statutory Review

On May 5, 2022, the Trade Representative commenced the statutory review of the List 1 and List 2 actions, as modified by the List 3 and List 4 modifications and exclusions.[25] Pursuant to section 307(c)(2) of the Trade Act (19 U.S.C. 2417(c)(2)), USTR announced that the actions, as modified, were subject to possible termination on their respective four-year anniversary dates and notified representatives of domestic industries which benefit from the trade actions of the opportunity to request continuation of the actions.[26] USTR received numerous requests to continue the July 6, 2018, and August 23, 2018, actions, as modified, from interested persons, including domestic producers and associations. Accordingly, the actions, as modified, remain in effect.[27]

As part of the statutory review process, USTR opened a docket on November 15, 2022, for interested persons to submit comments with respect to a number of considerations covered in the Four-Year Review Questionnaire ("questionnaire"), including: (1) the effectiveness of the actions in achieving the objectives of the investigation; (2) other actions that could be taken; and (3) the effects of such actions on the U.S. economy, including consumers. The docket closed on January 17, 2023.[28] USTR received 1,498 comments in response to its questionnaire. The comments covered nearly 6,000 tariff lines. Additional discussion of the comments is contained in Appendix A of this report.

Throughout 2023 and early 2024, USTR and the Section 301 Committee held numerous meetings with agency experts concerning the statutory review, utilizing the tiered structure of the questionnaire to organize the discussions. The Section 301 Committee considered the extent to which the tariff actions have been effective in bringing about the elimination of China's technology transfer-related acts, policies, and practices, or counteracting such practices, and other actions that could be taken in achieving the objectives of the investigation. The Section 301 Committee considered the effects of the actions on the U.S. economy, including consumers, small businesses, and domestic manufacturing in various sectors of the economy, including strategic sectors such as steel, aluminum, solar, batteries, electric vehicles, and critical minerals. Finally, and in light of the Section 301 Committee discussions on the effectiveness of the actions and the effects of the actions on the U.S. economy, the Section 301 Committee considered possible modifications to the actions and how those possible modifications would affect the U.S. economy.

This report presents the three same elements as in the questionnaire and the work of the Section 301 Committee. Section II discusses the effectiveness of the actions in achieving the objective

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[25] *Initiation of Four-Year Review Process: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, 87 Fed. Reg. 26,797 (May 5, 2022).
[26] *Id*.
[27] *See Continuation of Actions: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, 87 Fed. Reg. 55,073 (Sep. 8, 2022).
[28] *Request for Comments in Four-Year Review of Actions Taken in the Section 301 Investigation: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, 87 Fed. Reg. 62,914 (Oct. 17, 2022).

of the investigation; Section III discusses the overall effects of the tariff actions on the U.S. economy; and Section IV discusses the proposed modifications to the actions.

II. Effectiveness of Section 301 Actions in Eliminating China's Technology Transfer-Related Acts, Policies, and Practices

A. Background

This section examines the effectiveness of the section 301 tariffs levied on products of China in achieving the objectives of the section 301 investigation in bringing about the elimination of China's technology transfer-related acts, policies, and practices, or in counteracting such acts, policies, and practices. As this section details, the section 301 tariffs have been an effective tool in changing some of China's technology transfer-related acts, policies, and practices. However, despite some positive developments, China persists in efforts to transfer technology from U.S. companies and the burden of China's technology transfer-related acts, policies, and practices on U.S. commerce has increased. The section 301 tariffs provide leverage to induce China to resolve the unaddressed issues raised by the section 301 investigation.

In assessing the effectiveness of the section 301 tariffs in achieving the objectives of the section 301 investigation, USTR considered:

1. The role of the section 301 tariffs, or threat thereof, in eliminating China's technology transfer-related acts, policies, and practices;

2. Whether the section 301 tariffs burdened or otherwise negatively impacted the Chinese economy, including through declines in China's share of U.S. imports for covered products, thereby imposing a cost on China for its technology transfer-related acts, policies, and practices, and encouraging China to eliminate them; and

3. Whether the section 301 tariffs reduced the exposure of American companies to China's technology transfer-related acts, policies, and practices by incentivizing U.S. firms to shift their production out of China.

This section of the report examines each of these considerations and is divided into the following subsections:

- Subsection B describes changes to China's technology transfer-related acts, policies, and practices that appear to have occurred because of the section 301 tariffs. Available evidence suggests that section 301 tariffs have encouraged China to take steps toward eliminating some of its technology transfer-related acts, policies, and practices in some key areas, including a number of changes made in accordance with the U.S.-China ETA.[29] The section 301 tariffs appear to have stimulated China to issue or amend certain laws and other measures to prohibit forced technology transfer through administrative means and encouraged China to eliminate JV requirements in certain sectors that may have been used to force technology transfer.

- Subsection C describes how China's technology transfer-related acts, policies, and practices persist despite application of the section 301 tariffs. These technology transfer-

[29] U.S.-China ETA Text.

related acts, policies, and practices are a key part of China's technology-related industrial drive that, among other things, aims to achieve technological self-sufficiency and state-directed market dominance in key sectors.

- Subsection D describes how the section 301 tariffs negatively impacted China's economy.

- Subsection E discusses how the section 301 tariffs have contributed to U.S. companies shifting their sourcing out of and away from China, reducing their exposure to China's technology transfer-related acts, policies, and practices.

For completeness, USTR notes that while this section is directed at the effectiveness of the section 301 tariffs in achieving its objectives, it does not detail the full extent of U.S. government actions to counteract China's harmful technology transfer-related acts, policies, and practices.[30]

B. Section 301 Actions Induced Changes in China's Technology Transfer-Related Acts, Policies, and Practices

Evidence indicates that the imposition of section 301 tariffs, or threat thereof, has induced China to take steps toward eliminating some of its technology transfer-related acts, policies, and practices.

1. Section 301 Tariffs Resulted in an Economic and Trade Agreement Addressing Certain Acts, Policies, and Practices

After a year-and-a-half of tariff escalation and negotiation, the United States and China signed the U.S.-China ETA on January 15, 2020.[31] The U.S.-China ETA addresses several unfair trade practices that USTR identified in the section 301 investigation. Most prominently, in Chapter 2 of the U.S.-China ETA on technology transfer, China made commitments to end its longstanding practice of requiring or pressuring U.S. companies to transfer their technology to Chinese companies as a condition for obtaining market access, securing administrative approvals, or receiving advantages from the Chinese government.[32] In Chapter 2, China also committed to provide transparency, fairness, and due process in administrative proceedings and to ensure that any technology transfer and licensing takes place on market terms. Furthermore, China committed to refrain from directing or supporting outbound investments aimed at acquiring foreign technology under market-distorting industrial plans.[33] While China has taken some steps on these commitments, many elements remain unaddressed, as detailed in Section II.C of this report.

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[30] For example, the passage of the Foreign Investment Risk Review Modernization Act of 2018 (FIRRMA), appears to be strongly correlated with a decline in China's systematic investment in and acquisition of U.S. companies for technology transfer-related purposes during the Four-Year Review Period. However, as a non-tariff action, this Section does not factor FIRMMA into its discussion on the role of section 301 tariffs in inducing changes to China's technology transfer-related acts, policies, and practices.

[31] U.S.-China ETA Text.

[32] *Id.* at Ch. 2.

[33] *Id.* at Art. 2.1.3.

One example of a change China made to its acts, policies, and practices on technology transfer after the section 301 tariffs were enacted and the U.S.-China ETA entered into force relates to the new energy vehicle (NEV) sector. In July 2020, China revised the *Provisions on the Administration of Access for New Energy Vehicle Manufacturers and Products* ("NEV Access Provisions") to remove requirements for NEV producers to "demonstrate mastery" over the development and manufacturing technology of a complete NEV, and possess key "R&D [research and development] capabilities" in order to receive market access.[34] As described in the Section 301 Report, when paired with China's previous JV requirements, U.S. automakers would have to transfer a high degree of their technology to their NEV JVs with their Chinese partners in China in order for the JV to acquire mastery of the manufacturing process.[35]

2. China Introduced Prohibitions on Technology Transfer Due to Section 301 Tariffs

Since the imposition of the section 301 tariffs, China has enacted several legal measures that ostensibly prohibit state administrative organs and staff from engaging in certain forced technology transfer practices. Most notably, on January 1, 2020, China's *Foreign Investment Law* (FIL), along with the *Foreign Investment Law Implementing Regulations*, entered into force. The FIL governs various aspects of foreign investment in China and introduces explicit prohibitions against forced technology transfer.[36] Article 22 of the law states:

> The state encourages technology cooperation on the basis of free will and business rules in the process of foreign investment. Technology cooperation conditions shall be determined under the principle of fairness by all investing parties through equal consultation. No administrative agency or its employee may force the transfer of any technology by administrative means.[37]

Furthermore, on penalty of criminal liability, the law prohibits administrative departments and their staff from revealing or divulging foreign company trade secrets,[38] which can include technical information relevant to a company's technology.[39] The law's provisions on forced technology transfer and trade secrets are reinforced by the *Foreign Investment Law Implementing Regulations*.[40]

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[34] *Decision on Amending the 'Provisions on the Administration of Access for New Energy Vehicle Manufacturers and Products'* (Ministry of Industry and Information Technology [*hereinafter* "MIIT"], Order No. 54, issued Jul. 24, 2020), https://www.gov.cn/gongbao/content/2020/content_5541490.htm.

[35] For more on technology transfer requirements under China's previous market access rules for new energy vehicles, *see* 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 at 32.

[36] *Foreign Investment Law of the People's Republic of China* [English] [*hereinafter* "*Foreign Investment Law*"], Art. 22 (National People's Congress [*hereinafter* "NPC"], adopted on Mar. 15, 2019, effective Jan. 1, 2020), http://english.www.gov.cn/services/investment/202102/24/content_WS6035aa38c6d0719374af9609.html.

[37] *Foreign Investment Law* at Art. 22.

[38] *Foreign Investment Law* at Art. 23, 39.

[39] *Trade Secrets,* WORLD INTELLECTUAL PROPERTY ORGANIZATION, https://www.wipo.int/tradesecrets/en/ (last accessed Oct. 2023).

[40] *Foreign Investment Law Implementing Regulations*, Arts. 24-25 (PRC State Council, Order No. 723, issued on Dec. 31, 2019, effective Jan. 1, 2020), https://www.gov.cn/zhengce/content/2019-12/31/content_5465449.htm.

The FIL underwent an expedited approval process. Starting in December 2018, the FIL underwent three rounds of deliberation and was passed on March 15, 2019 by China's National People's Congress (NPC),[41] all within a 90-day window aligned with U.S.-China trade negotiations. Based on USTR's contemporaneous discussions with Chinese counterparts, the FIL's expedited timeline, and USTR's analysis of the changes made in the FIL, the forced technology transfer- and trade secret-related provisions of the FIL and its implementing regulations appear to be the result of pressure brought by the section 301 investigation and tariffs.

Experts both inside and outside of China also agree that the technology transfer-related provisions of the FIL and its implementing regulations are the result of pressure brought by the section 301 investigation and tariffs. For example, Chinese law firm Zhong Lun asserts that the FIL's approval timeline represented an "almost unprecedented fast turnaround in the legislation history of China," and that this was to "keep pace with the 90-day trade negotiations between the U.S. and China."[42] This assessment was echoed by contemporaneous media reports.[43] Additionally, the Carnegie Endowment for International Peace attributes the FIL's passage to section 301 tariffs:

> Because the [Foreign Investment] [L]aw explicitly addresses some major U.S. concerns, including the practice of forced technology transfers, many have interpreted the new legal framework as a peace offering to Washington amidst talks to end the ongoing trade war.[44]

Shortly after the FIL's passage in 2019, the Chinese government included similar prohibitions against forced technology transfer in other laws and regulations. Both the *Cryptography Law* and the *Administrative Licensing Law* (ALL) now feature forced technology transfer prohibitions, whereas prior versions and drafts did not.[45] In the case of the ALL specifically, which was amended a month after the FIL's passage, sources tie its revisions to the section 301 investigation. A University of Hong Kong professor stated that the ALL was one of many areas

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[41] The NPC is China's legislative body.

[42] Jack Qiao, Roxy Wang, Sanya Yu, *Changing Trends and Implementation of China's Foreign Investment Laws and Policies*, ZHONG LUN, Mar. 25, 2019, https://www.zhonglun.com/Content/2019/03-25/1138412793.html.

[43] *See* Zhou Xin, *China Approves New Foreign Investment Law Designed to Level Domestic Playing Field for Overseas Investors*, SOUTH CHINA MORNING POST [*hereinafter* "SCMP"], Mar. 15, 2019, https://www.scmp.com/economy/china-economy/article/3001780/china-approves-new-foreign-investment-law-designed-level.

[44] Yukon Huang, *China's Foreign Investment Law and US-China Trade Friction*, CARNEGIE ENDOWMENT FOR INTERNATIONAL PEACE, Mar. 19, 2019, https://carnegieendowment.org/2019/03/19/china-s-foreign-investment-law-and-us-china-trade-friction-pub-78647; *See also China Further Opens Its Market With New Foreign Investment Law*, JONES DAY, Feb. 2020, https://www.jonesday.com/en/insights/2020/02/chinas-new-foreign-investment-law; Sofia Balino, *How Could China's New Foreign Investment Law Impact Trade Debate?*, INTERNATIONAL INSTITUTE FOR SUSTAINABLE DEVELOPMENT, Apr. 30, 2019, https://www.iisd.org/articles/forced-technology-transfers.

[45] *Cryptography Law* [English], Art. 21 (NPC, adopted on Oct. 26, 2019, effective Jan. 1, 2020), http://english.www.gov.cn/services/investment/202102/24/content_WS6035aa38c6d0719374af9609.html; *Decision of the Standing Committee of the National People's Congress on Amending Eight Laws Including the Construction Law of the People's Republic of China* (PRC State Council, issued Apr. 4, 2019), https://www.gov.cn/xinwen/2019-04/23/content_5385561.htm.

where, "China made a number of concessions by quickly and preemptively amending some of its IP-related laws between March and April [2019] to directly address U.S. [section 301] concerns."[46] A contemporaneous press report notes that, China had made a "rapid-fire series of legal changes that appear designed to help reach a trade deal with the U.S.," including, "a revision to the Administrative Licensing Law."[47]

These examples suggest that without the section 301 tariffs, it is unlikely that China would have made legal changes to address technology transfer.

3. China Relaxed Certain Foreign Ownership Restrictions Due to Section 301 Tariffs

The Section 301 Report and Section 301 Report Update detailed that China employs an inbound investment regime that in certain sectors forces U.S. and other foreign companies to establish JVs with Chinese companies in exchange for market access, and often requires the Chinese company to hold controlling or majority shares.[48] These JV requirements preclude companies from entering the market on their own terms and make it easier for the Chinese government to require or pressure technology transfer, including through informal, unwritten means. China issued the most recent version of its *Special Administrative Measures (Negative List) for the Access of Foreign Investment* ("Foreign Investment Negative List," or "FINL") in December 2021.[49] The FINL continues to identify sectors where foreign companies must enter into JVs in order to gain market access in China, or where foreign investment is outright prohibited. Since the section 301 tariffs took effect in 2018, China has released updated versions of its FINL that decrease sectors with JV requirements from 21 to 10.[50]

The threat of section 301 tariffs appears to have contributed to China's removal of JV requirements in the automotive sector in particular. In 2018, following the issuance of the Section 301 Report and a notice proposing, among other things, the imposition of section 301 tariffs as a remedy,[51] the National Development and Reform Commission (NDRC) announced that it would eliminate JV requirements for NEVs that year, as the first step in a five-year timeline to completely eliminate foreign investment JV requirements for the automotive sector

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[46] Angela Huyue Zhang, *The U.S.-China Trade Negotiation: A Contract Theory Perspective*, 51 GEORGETOWN JRNL OF INT'L LAW 809 (2020).

[47] *What China Has and Hasn't Done to Address U.S. Trade Gripes*, BLOOMBERG, Sep. 8, 2019, https://www.bloomberg.com/news/articles/2019-09-08/what-china-has-and-hasn-t-done-to-address-u-s-trade-gripes#xj4y7vzkg.

[48] For discussion on inbound investment restrictions and equity limitations under China's previous market access rules, *see* 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 at 23; *see also* USTR, UPDATE CONCERNING CHINA'S ACTS, POLICIES AND PRACTICES RELATED TO TECHNOLOGY TRANSFER, INTELLECTUAL PROPERTY, AND INNOVATION at 25.

[49] *Special Administrative Measures (Negative List) for the Access of Foreign Investment (2021)* (National Development and Reform Commission [*hereinafter* "NDRC"] & Ministry of Commerce [*hereinafter* "MOFCOM"], [2021] Order No. 47, issued Dec. 27, 2021, effective Jan. 1, 2022), https://www.ndrc.gov.cn/xxgk/zcfb/fzggwl/202112/t20211227_1310020.html.

[50] *See* Appendix B. One of these reductions resulted from two line items being combined into one rather than the removal of a restriction.

[51] *See* 83 Fed. Reg. 14,906; *see also* 83 Fed. Reg. 40,823.

overall by 2022.[52] Previously, the Ministry of Industry and Information Technology (MIIT), NDRC, and Ministry of Science and Technology (MOST) had provided general signals in an April 2017 *Automotive Industry Medium- to Long-Term Development Plan* that the government would "improve the domestic and foreign investment administration system and open up the restrictions on ownership of joint ventures in an orderly manner," but the plan did not contain further specifics on scope or timing.[53] It was only after the prospect of section 301 tariffs became clear that China signaled it would relax the automotive industry restrictions "as soon as possible" and announced further details and a timeline.[54]

Press reporting also suggests a link between NDRC's announcement and the section 301 actions. One report noted that "China will permit foreign carmakers to take full ownership of their local ventures, offering a trade-talk olive branch."[55] Another drew an explicit connection between China's concessions and section 301 actions, stating:

> Chinese state-run auto makers have long argued against changes to the joint-venture system to safeguard the healthy profits they generate from mass-producing foreign-branded cars for the Chinese market. The threat of a trade war with the U.S. appears finally to have eclipsed those arguments in the minds of Chinese policy makers.[56]

China implemented the elimination of JV requirements for NEVs in the 2018 edition of its FINL.[57] China removed the equity requirements for commercial vehicles in 2020 and removed all remaining automotive manufacturing JV requirements in the 2021 FINL, which went into effect January 1, 2022, adhering to NDRC's promised timeline.[58]

As evidenced above, the section 301 tariffs appear to have been a contributing factor in hastening the removal of the automotive sector from the FINL, and may have contributed to the elimination of other JV restrictions from the FINL post-2018, such as in financial services, oil and gas, and shipping.

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[52] *China Will Abolish Restrictions on the Proportion of Foreign Capital in the Auto Industry Through a 5-year Transitional Period* [Chinese], PRC STATE COUNCIL, Apr. 17, 2018, https://www.gov.cn/xinwen/2018-04/17/content_5283413.htm?eqid=fc825c6b000e40a5000000036459aae1.
[53] *Automotive Industry Medium- to Long-Term Development Plan*, Sec. 6.4 (MIIT, NDRC & Ministry of Science and Technology [*hereinafter* "MOST"], Gong Xin Bu Lian Zhuang [2017] No. 53, issued Apr. 6, 2017), https://www.gov.cn/gongbao/content/2017/content_5230289.htm.
[54] *Xi Jinping Attends the Opening Ceremony of the 2018 Boao Forum for Asia Annual Conference and Delivered a Keynote Speech* [Chinese], PRC STATE COUNCIL, Apr. 10, 2018, https://www.gov.cn/xinwen/2018-04/10/content_5281320.htm.
[55] *Tesla Gets Edge Under China's Relaxed Rules for Foreign Automakers*, BLOOMBERG, Apr. 17, 2018, https://www.bloomberg.com/news/articles/2018-04-17/china-to-remove-auto-ventures-foreign-ownership-limit-by-2022#xj4y7vzkg.
[56] Trefor Moss, Mike Colias, *China to Ease Rules on Foreign Auto Makers*, WALL STREET JOURNAL, Apr. 17, 2018, https://www.wsj.com/articles/china-to-ease-rules-on-foreign-auto-makers-1523963345.
[57] *Special Administrative Measures (Negative List) for the Access of Foreign Investment (2018)* (NDRC & MOFCOM, [2018] Order No. 18, issued Jun. 28, 2018, effective Jul. 28, 2018), https://www.ndrc.gov.cn/xxgk/zcfb/fzggwl/201806/t20180628_960861.html.
[58] *Id*.

C. China Persists in Technology Transfer-Related Acts, Policies, and Practices

The developments described in Section B above, while positive and associated with the imposition of section 301 tariffs, do not represent a systematic and sustained response to the issues raised in the section 301 investigation nor a full redress of these issues. China has not eliminated many of its technology transfer-related acts, policies, and practices. Instead of pursuing fundamental reform, the Chinese government largely took superficial measures aimed at addressing negative perceptions of its technology transfer-related acts, policies, and practices. At the same time, China has persisted and even become more aggressive, particularly through cyber intrusions and cybertheft, in its attempts to acquire and absorb foreign technology, which further burden or restrict U.S. commerce.

In comments made to U.S. private companies in partnership with Five Eye officials, Federal Bureau of Investigation (FBI) Director Christopher Wray stated of China's continued IP theft:

> China has long targeted businesses with a web of techniques all at once: cyber intrusions, human intelligence operations, seemingly innocuous corporate investments and transactions. Every strand of that web had become more brazen, and more dangerous.[59]

At that same event, Mike Burgess, the Australian Security Intelligence Organisation's director-general stated that "[t]he Chinese government is engaged in the most sustained scaled and sophisticated theft of intellectual property and expertise in human history."[60]

In Congressional testimony given in March 2023, Kari Bingen, a senior fellow at the Center for Strategic and International Studies (CSIS), stated that China continues to employ illegal means, such as economic espionage and cyber data exfiltration, to target U.S. technologies in critical areas such as the high-performance computing, pharmaceuticals, energy, and aerospace sectors.[61] Bingen stated that China explicitly targets "the people, information, businesses, and research institutions" that form the foundation of U.S. advanced sectors.[62]

In 2023, the European Union Chamber of Commerce in China (European Chamber), which represents over 1,700 companies and individuals in China,[63] including 156 U.S. companies,[64] affirmed China made surface level changes while leaving its technology transfer regime fundamentally intact:

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[59] Zeba Siddiqui, *Five Eyes Intelligence Chiefs Warn on China's 'Theft' of Intellectual Property*, REUTERS, Oct. 18, 2023, https://www.reuters.com/world/five-eyes-intelligence-chiefs-warn-chinas-theft-intellectual-property-2023-10-18.

[60] *Id.*

[61] Kari Bingen, CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES [*hereinafter* "CSIS"], *Testimony, Hearing at the U.S. House of Representatives Homeland Security Subcommittee on Counterterrorism, Law Enforcement, and Intelligence on Chinese Threats and U.S. National Security* (Mar. 9, 2023).

[62] *Id.*

[63] European Union Chamber of Commerce materials specify that they have over "1700 member entities." *See* EUROPEAN UNION CHAMBER OF COMMERCE IN CHINA [*hereinafter* "EUROPEAN CHAMBER"], MEMBERSHIP GUIDE EUROPEAN UNION CHAMBER OF COMMERCE IN CHINA at 2 (updated Jun. 2023).

[64] The European Chamber directory indicates 156 U.S. members by "country/region of origin." *See* EUROPEAN CHAMBER, MEMBER DIRECTORY (last accessed Feb 2024), https://www.europeanchamber.com.cn/en/business-directory.

> On the political front, there have been several high-level statements regarding the protection of IP in China, and, more concretely, the condemnation of unfair technology transfers. Yet, in practice, policy guidance at the municipal or provincial level, as well as legal instruments such as joint venture (JV) requirements, continue to compel technology transfers. For example, guided by China Manufacturing 2025, local public tenders often include a 'made in China' requirement, pushing foreign companies into JVs in exchange for market access.[65]

Technology transfer-related acts, policies, and practices are among the tools China has used to dominate certain strategic sectors of the economy, in some cases with near complete supply chain capture. According to Jennifer Hillman of the Council on Foreign Relations, "China has perfected the model of obtaining Western technology; it uses it to develop domestic companies into giants, and then unleashes them into the world market—at which point foreign companies can no longer compete."[66] China now produces 70 percent of the world's electric vehicles,[67] accounts for over 80 percent of battery manufacturing capacity,[68] controls around twice as much 50-180nm semiconductor manufacturing capacity as the next largest producer,[69] and depending on segment, makes up as much as 95 percent of solar product manufacturing capacity.[70]

China cannot rely on domestic innovation alone to realize its ambitions to supplant the United States and its allies as the global leader in technology. Therefore, China seeks to fill gaps in its innovative and industrial capabilities with technology transferred from foreign companies. This section details how China perpetuates its technology transfer-related acts, policies, and practices, including through technology-focused industrial planning and targeting, brazen theft of U.S. IP, including trade secrets, and confidential business information through state-supported cyber or cyber-enabled means, as well as other means, which evidence that China's technology transfer-related acts, policies, and practices remain intact.

1. Industrial Planning and Targeting Continues to Motivate Technology Transfer

The Section 301 Report detailed how China's technology transfer-related acts, policies, and

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[65] EUROPEAN CHAMBER, POSITION PAPER, EUROPEAN BUSINESS IN CHINA 2023/2024 86 (Sep. 20, 2023). Note that "China Manufacturing 2025" is an alternate translation of Made in China 2025.

[66] Anshu Siripurapu, Noah Berman, *The Contentious U.S.-China Trade Relationship*, COUNCIL ON FOREIGN RELATIONS, Sep. 26, 2023, https://www.cfr.org/backgrounder/contentious-us-china-trade-relationship.

[67] Based on USTR calculations using 2022 data from Wards Intelligence, China Association of Automobile Manufacturers, Bloomberg New Energy Finance, and Trade Data Monitor. All EVs other than vehicles for the transport of 10 or more persons are included.

[68] INTERNATIONAL ENERGY AGENCY, ADVANCING CLEAN TECHNOLOGY MANUFACTURING 33 (May 2024).

[69] Jan-Peter Kleinhans, Reva Goujon, Julia Hess, Lauren Dudley, *Running on Ice: China's Chipmakers in a Post-October 7 World*, RHODIUM GROUP, Apr. 4, 2023, https://rhg.com/research/running-on-ice/.

[70] The International Energy Agency forecasts that in 2024, China will control 93 percent of polysilicon manufacturing capacity, 95 percent of wafer capacity, 88 percent of solar cell capacity, and 83 percent of solar module capacity. *See Solar PV Manufacturing Capacity by Component in China, 2021-2024*, INTERNATIONAL ENERGY AGENCY, May 24, 2023, https://www.iea.org/data-and-statistics/charts/solar-pv-manufacturing-capacity-by-component-in-china-2021-2024.

practices are integral to its core economic and industrial plans.[71] Through those plans, China pursues its goals to dominate key industrial sectors, including various fields of high technology. China's economic and industrial plans span decades and illustrate China's approach of absorbing foreign technology while developing its indigenous capabilities. Through these industrial policies, China has created an environment that facilitates its implementation of various technology transfer-related acts, policies, and practices that continue to burden or restrict U.S. commerce. This subsection briefly explains four of these ongoing industrial plans: the *Made in China 2025 Notice*, the *Innovation-Driven Development Strategy*, the *14th Five-Year Plan*, and the *Dual Circulation Strategy*.

a. Made in China 2025 Notice

Both the Section 301 Report and the Section 301 Report Update cite China's *Notice on Issuing Made in China 2025* ("*Made in China 2025 Notice*") as evidence of an industrial policy encouraging technology transfer.[72] The *Made in China 2025 Notice* implements the first ten years (2015-2025) of China's Strong Manufacturing Nation Strategy (SMNS), a 30-year plan to make China the preeminent advanced manufacturing power by 2045. SMNS is to be carried out in three ten-year phases,[73] with each phase covered by its own "Made in China" policy.[74]

The *Made in China 2025 Notice* directs state and private resources to upgrade China's indigenous mastery of ten strategic manufacturing sectors and dozens of industries within those broad sectors, including:

- Next-generation information technology (IT),
- High-end numerical control machine tools and robotics,
- Aviation and aerospace equipment,
- Maritime equipment and high-tech shipping,
- Advanced rail transportation equipment,
- Energy-saving vehicles and NEVs,
- Power equipment,
- Agricultural machinery equipment,
- New materials, and

[71] For previous discussion on how technology transfer is central to China's central economic and technological planning, *see* 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 at 10. *See also* USTR, UPDATE CONCERNING CHINA'S ACTS, POLICIES AND PRACTICES RELATED TO TECHNOLOGY TRANSFER, INTELLECTUAL PROPERTY, AND INNOVATION at 7.

[72] 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 at 16. USTR, UPDATE CONCERNING CHINA'S ACTS, POLICIES AND PRACTICES RELATED TO TECHNOLOGY TRANSFER, INTELLECTUAL PROPERTY, AND INNOVATION at 7.

[73] RESEARCH ON THE MANUFACTURING POWER STRATEGY VOL. 1 VI (Strong Manufacturing Nation Research Project Group 2015).

[74] *Interpreting Made in China 2025* [Chinese], May 19, 2015, CYBERSPACE ADMINISTRATION OF CHINA ["CAC"], http://www.cac.gov.cn/2015-05/19/c_1115335271.htm; *See also One Interpretation of Made in China 2025*: *Made in China 2025, the Grand Blueprint for Building China Into a Strong Manufacturing Nation* [Chinese], BAOTOU CITY HONDLON DISTRICT PEOPLE'S GOVERNMENT, Jul. 7, 2015, https://www.kdl.gov.cn/detail/cid/492/aid/29357.

- Biopharmaceuticals and high-performance medical devices.[75]

In furtherance of these goals, a Chinese government-affiliated advisory committee released a series of blueprints, beginning with the 2015 *Made in China 2025 Key Area Technology Roadmap* ("*Made in China 2025 Roadmap*").[76] The 2015 *Made in China 2025 Roadmap* provides over 280 explicit market share targets for hundreds of products in these ten advanced manufacturing sectors. The targets guide Chinese policymakers and economic actors in China to work toward capturing a specified share of the domestic market and, for many sectors, the international market. The implication is that by doing so, China displaces foreign market participants, first in its own market, and eventually in key international markets.

Industry analysts and experts explain that the *Made in China 2025 Notice*'s explicit market share and industry targets provide an incentive for China to deploy its technology transfer practices. In a 2022 article discussing the *Made in China 2025 Notice*, Michael Daniel, CEO of industry association Cyber Threat Alliance, stated, "If your company is in one of those industries identified in that [Made in China 2025] strategy, you are a target for Chinese intelligence."[77] Lou Steinberg, former Chief Technology Officer of TD Ameritrade, similarly stated that, "If you're on their list, they've got an army of skilled people who are trying to figure out how to get your intellectual property."[78]

Governments around the globe acknowledge that the *Made in China 2025 Notice* is a vehicle for China to deploy technology transfer tools. For example, the U.K.'s Intelligence and Security Committee of Parliament wrote in a July 2023 report:

> China is seeking technological dominance over the West and is targeting the acquisition of Intellectual Property and data in ten key [Made in China 2025] industrial sectors in which the Chinese Communist Party intends China to become a world leader—many of which are fields where the UK has particular expertise.[79]

b. The Innovation-Driven Development Strategy

In 2016, the Central Committee of the Chinese Communist Party (CCP) and State Council jointly released the *National Innovation-Driven Development Strategy Outline* (IDDS). Similar to SMNS, IDDS outlines a three-phase, 35-year timeline for China to become an innovative country by 2020, a leading innovative country by 2035, and the "global superpower in science

[75] *Notice on Issuing "Made in China 2025"* [*hereinafter* "*Made in China 2025 Notice*"] (PRC State Council, Guo Fa [2015] No. 28, issued May 8, 2015), https://www.gov.cn/zhengce/content/2015-05/19/content_9784.htm.
[76] NAT'L MANUFACTURING STRATEGY ADVISORY COMM., "MADE IN CHINA 2025" GREENBOOK FOR TECHNOLOGY INNOVATION IN KEY AREAS—TECHNOLOGY ROADMAP [*hereinafter* "2015 Greenbook"] 284 (Publishing House of Electronics Industry 2015).
[77] Kyle Apsach, *Russian Hackers Get the Headlines. But China is the Bigger Threat to Many US Enterprises,* PROTOCOL, Aug. 3, 2022, https://www.protocol.com/enterprise/china-hacking-ip-russia-cybersecurity.
[78] *Id.*
[79] INTELLIGENCE AND SECURITY COMMITTEE OF PARLIAMENT, CHINA, 2022-23, HC 1605, at 200 (UK).

and technology innovation" by 2050.[80] This technology-focused industrial policy also drives technology transfer.

Called the "nation's priority strategy,"[81] IDDS seeks to raise China's innovative capacity in a number of areas including next-generation information network technology, maritime and space technology, and "disruptive technologies that lead to industrial transformation."[82] To meet its goals, IDDS calls for the government to encourage foreign companies to invest their "capital, technology, and knowledge" into China's high-tech sectors,[83] which China would then "ingest and absorb" to transition from "laggard, to running side-by-side, and eventually leading" in the race for technological supremacy.[84] Dan Blumenthal, director of Asian studies at the American Enterprise Institute (AEI), notes IDDS' connection to technology transfer:

> The IDDS drives foreign-technology acquisition through well-capitalized government investment "guidance" funds and organizations such as the State Industry Innovational Alliances, which bridge military-industrial groups, academia, and Chinese companies to implement government priorities.[85]

The Chinese government continues to promote IDDS. In August 2022, then-NDRC Chairman, He Lifeng, wrote an article calling for "deep implementation of the IDDS."[86] Later that year, Chinese President Xi Jinping called for "accelerating the implementation of IDDS," in order to advance China's indigenous capabilities in advanced technology.[87]

c. 14th Five-Year Plan

In March 2021, the Chinese government issued the *Outline of the 14th Five-Year Plan for National Economic and Social Development and Long-Range Goals Through 2035* ("*14th Five-Year Plan*"), which covers China's overall economic and social objectives from the 2021-2025 five year period and through 2035, and calls for the implementation of IDDS,[88] while also dedicating an entire chapter to "deeply implementing the Strong Manufacturing Nation

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[80] *National Innovation-Driven Development Strategy Outline*, Art. 2.3 (PRC State Council and CCP Central Committee, issued May 19, 2016), http://www.gov.cn/zhengce/2016-05/19/content_5074812.htm.
[81] *National Innovation-Driven Development Strategy Outline* at Art. 2.1.
[82] *National Innovation-Driven Development Strategy Outline* at Art. 4.1.
[83] *National Innovation-Driven Development Strategy Outline* at Art. 5.3.
[84] *The Path of Innovative Development With Chinese Characteristics: From Version 1.0 to Version 4.0* [Chinese], COMMUNIST PARTY OF CHINA NEWS, Nov. 11, 2016, http://theory.people.com.cn/n1/2016/1111/c217905-28854590.html.
[85] Dan Blumenthal, Linda Zhang, *China is Stealing Our Technology and Intellectual Property, Congress Must Stop It*, NATIONAL REVIEW, Jun. 2, 2021, https://www.nationalreview.com/2021/06/china-is-stealing-our-technology-and-intellectual-property-congress-must-stop-it/.
[86] He Lifeng, *Deeply Implement the Innovation-Driven Defense Strategy and Strive to Realize a High Level of Technological Self Reliance* [Chinese], NDRC, Aug. 2022, https://www.ndrc.gov.cn/xwdt/gdzt/fgjhckml/desqq/202210/t20221028_1339667.html.
[87] *Accelerate the Implementation of the Innovation-Driven Development Strategy* [Chinese], COMMUNIST PARTY OF CHINA NEWS, Oct. 22, 2022, http://cpc.people.com.cn/20th/n1/2022/1022/c448334-32549357.html.
[88] *Outline of the 14th Five-Year Plan for National Economic and Social Development and Long-Range Goals Through 2035* [*hereinafter* "*14th Five-Year Plan*"], (CCP Central Committee, issued Mar. 13, 2021), http://www.gov.cn/xinwen/2021-03/13/content_5592681.htm.

Strategy."[89] Notably, the *14th Five-Year Plan* contains language on technology indigenization that creates the conditions for promoting technology transfer. For example, its stated objectives include, among other things, "achieving major breakthroughs in key and core technologies," and emphasizing innovation and self-sufficiency in high-tech sectors.[90] The emphasis on "indigenous innovation," consistent in all the industrial policies discussed in this section, undergirds China's desire to acquire foreign technology, absorb it, and eventually end its reliance on foreign companies.[91]

In 2022, cybersecurity firm Mandiant observed a "direct correlation"[92] between the *14th Five-Year Plan* and China's cyberespionage activities targeting IP.[93]

d. Dual Circulation

Dual Circulation, first publicly articulated in May 2020,[94] and later codified in the *14th Five-Year Plan*,[95] is a strategy where China continues to expand production for exports, while simultaneously seeking to create a domestic market to drive consumption and become self-sufficient. In an August 2020 speech to a group of Chinese social scientists, President Xi Jinping said, "We must also vigorously improve new indigenous innovation capabilities and make breakthroughs in key core technologies as soon as possible. This is … the key to forming domestic circulation as the mainstay [in Dual Circulation]."[96] Later in the same speech, President Xi Jinping emphasized that China must "strengthen international science and technology cooperation."[97] To that end, Dual Circulation explicitly calls for expanding imports of advanced technology and "supporting foreign-invested companies in establishing R&D centers [in China] and participating in and undertaking state science and technology projects."[98] Derek Scissors, resident fellow at AEI, views Dual Circulation as a continuation of China's previous industrial plans and technology transfer practices:

> It's merely Xi Jinping's latest stamp on a direction he set in 2013, which itself was only a moderate shift of direction after liberalization ended the previous decade. China will continue to distort competition in what it considers strategic sectors, borrowing to do so, and *continue to coerce technology transfer*.[99]

Dual Circulation's implication is that, for now, China will continue to welcome foreign companies operating in China and continue to import products for their advanced technology

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[89] *14th Five-Year Plan* at Ch. 8.
[90] *14th Five-Year Plan* at Arts. 3.1, 3.2.2.
[91] KAREN M. SUTTER & MICHAEL D. SUTHERLAND, CONG. RSCH. SERV., IF116847, CHINA'S 14TH FIVE-YEAR PLAN: A FIRST LOOK 2 (2021).
[92] MANDIANT, M-TRENDS 2022: MANDIANT SPECIAL REPORT 78 (Apr. 2022).
[93] *Id.* at 79.
[94] *CCP Central Committee Politburo Standing Committee Held a Meeting Chaired by Xi Jinping* [Chinese], XINHUA, May 14, 2020, http://www.xinhuanet.com/politics/leaders/2020-05/14/c_1125986000.htm.
[95] *14th Five-Year Plan* at Ch. 13
[96] *Xi Jinping: Speech at the Economic and Social Experts Forum* [Chinese], XINHUA, Aug. 24, 2020, http://www.xinhuanet.com/politics/leaders/2020-08/24/c_1126407772.htm.
[97] *Id*.
[98] *14th Five-Year Plan* at Ch. 13
[99] Derek Scissors, *The Same Old Wine in New Bottles*, THE INTERNATIONAL ECONOMY 19 (2020) (emphasis added).

until it possesses enough indigenous capability to displace foreign competitors. As foreign technology is absorbed, and foreign companies in China are sidelined, Dual Circulation seeks to position "China as an exporter of high value-added, high-technology goods."[100] As summarized by Stephen Olson, former trade negotiator and Senior Research Fellow at global trade non-profit Hinrich Foundation, "it [Dual Circulation] seeks to make China less dependent on the rest of the world while maximizing the leverage associated with the world's dependence on China."[101]

James McGregor, Greater China Chairman of advisory firm APCO Worldwide, warns that "foreign business[es] should remember that 'dual circulation' is Beijing's doubling down on its import substitution aspirations, reaching back to 'Indigenous Innovation' in 2006 and 'Made in China 2025' in 2015."[102]

2. Section 301 Investigation Concerns Are Not Adequately Addressed

The Section 301 Report found that China forces, requires, or pressures technology transfer from U.S. companies through various technology transfer-related acts, policies, and practices. A review of China's actions since the Section 301 Report reveals that many of the technology transfer-related acts, policies, and practices described in the original Section 301 Report persist and increasingly burden or restrict U.S. commerce.

a. Cyber-Enabled Theft Has Continued Unabated

The Section 301 Report and Section 301 Report Update evidenced that China conducted and supported unauthorized intrusions into, and theft from, the computer networks of U.S. companies to access their IP, including trade secrets, and confidential business information.[103] A review of China's technology transfer-related acts, policies, and practices since the Section 301 Report reveals that China continues to use—and may have expanded—cyber and cyber-enabled[104] theft to target the IP of U.S. companies to achieve its industrial policy objectives.

A 2021 report from cybersecurity company CrowdStrike argues that section 301 tariffs "had relatively little impact on China's cyber operational tempo," based on continued intrusions from state-affiliated actors.[105] In a 2022 joint address to business executives with MI5, the U.K.'s domestic security agency, FBI Director Christopher Wray explained that the "Chinese

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[100] *Will the Dual Circulation Strategy Enable China to Compete in a Post-Pandemic World?*, CSIS, CHINA POWER PROJECT, Dec. 15, 2021, https://chinapower.csis.org/china-covid-dual-circulation-economic-strategy/.
[101] Stephen Olson, *China's Dual Circulation Strategy Signals a New Era*, HINRICH FOUNDATION, Jun. 30, 2021, https://www.hinrichfoundation.com/research/article/us-china/china-dual-circulation-strategy-signals-a-new-era/.
[102] James McGregor, *China's Dual Circulation Policy Narrows Foreign Business Opportunities*, HINRICH FOUNDATION, Oct. 30, 2020, https://www.hinrichfoundation.com/research/article/us-china/dual-circulation-foreign-companies/.
[103] For previous discussion on China's support of unauthorized cyber intrusions into U.S. commercial networks targeting confidential business information, *see* 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 at 153. *See also* USTR, UPDATE CONCERNING CHINA'S ACTS, POLICIES AND PRACTICES RELATED TO TECHNOLOGY TRANSFER, INTELLECTUAL PROPERTY, AND INNOVATION at 7.
[104] Cyber-enabled theft refers to the stealing of IP or trade secrets through the use of some electronic means (*i.e.*, cellphone, laptop, thumb drive, etc.).
[105] CROWDSTRIKE, 2021 GLOBAL THREAT REPORT 37 (2021).

Government sees cyber [intrusions] as the pathway to cheat and steal on a massive scale," and that "Chinese state-sponsored hackers [are] relentlessly looking for ways to compromise unpatched network devices and infrastructure."[106] Wray's remarks later in the speech paint a stark picture of how China's objective to steal foreign technology continues:

> The Chinese government is set on stealing your technology—whatever it is that makes your industry tick—and using it to undercut your business and dominate your market. And they're set on using every tool at their disposal to do it.[107]

At the same event, MI5 Director Ken MacCallum echoed Wray's comments, warning of China's enduring ambition to steal Western technology:

> President Xi said that in areas of core technology where it would otherwise be impossible for China to catch up with the West by 2050, they "must research asymmetrical steps to catch up and overtake." The scale of ambition is huge. And it's not really a secret. Any number of public strategic plans, such as Made in China 2025, show the intent plainly. This means standing on your shoulders to get ahead of you. It means that if you are involved in cutting-edge tech, AI [artificial intelligence], advanced research or product development, the chances are your know-how is of material interest to the CCP. And if you have, or are trying for, a presence in the Chinese market, you'll be subject to more attention than you might think. It's been described as "the biggest wealth transfer in human history." [108]

In statements given in 2021, 2022, and 2023, the FBI announced it was pursuing more than 2,000 China-related cases[109] and that it opens a new China-related case every 12 hours, including many related to cybertheft.[110]

In 2023, John Castello, former chief of staff of the Office of the National Cyber Director, affirmed that China's cyber intrusions persist:

> China does conduct what some would call "legitimate" cyber operations, but these are vastly overshadowed by campaigns that are clearly intended to obtain intellectual property, non-public research, or place Chinese interests in an advantageous economic position.[111]

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[106] Christopher Wray, *Director's Remarks to Business Leaders in London,* FEDERAL BUREAU OF INVESTIGATION [*hereinafter* "FBI"], Jul. 6, 2022, https://www.fbi.gov/news/speeches/directors-remarks-to-business-leaders-in-london-070622. *See* Appendix C, for a collection of quotes by Christopher Wray and other U.S. officials on China's theft of U.S. technology.

[107] Max Colchester, *Heads of FBI, MI5 Issue Joint Warning on Chinese Spying***,** WALL STREET JOURNAL, Jul. 6, 2022, https://www.wsj.com/articles/heads-of-fbi-mi5-issue-joint-warning-on-chinese-spying-11657123280; *Id.*

[108] *Joint Address by MI5 and FBI Heads,* MI5, Jul. 6, 2022, https://www.mi5.gov.uk/news/speech-by-mi5-and-fbi.

[109] *China's Quest for Economic, Political Domination Threatens America's Security*, FBI, Feb. 1, 2022, https://www.fbi.gov/news/stories/director-wray-addresses-threats-posed-to-the-us-by-china-020122.

[110] Dareh Gregorian, *FBI Director Says New Probes Into China Launched 'Every 12 Hours'*, NBC NEWS, Sep. 21, 2021, https://www.nbcnews.com/politics/national-security/fbi-director-says-new-probes-china-launched-every-12-hours-n1279724.

[111] Simon Handler, *The 5×5—China's Cyber Operations*, THE ATLANTIC COUNCIL, Jan. 30, 2023, https://www.atlanticcouncil.org/content-series/the-5x5/the-5x5-chinas-cyber-operations/.

This assessment is borne out by industry reports and statistics. CrowdStrike found that between mid-2020 and mid-2021, China accounted for 67 percent of all state-sponsored cyber intrusions, and much of it was motivated by IP theft.[112] In 2023, the Mercator Institute for China Studies similarly found that "Chinese hacking activities have not only increased, they have also become more sophisticated,"[113] identifying China as "the country with the largest footprint in state-sponsored hacking,"[114] being responsible for the "largest number of cyberattacks worldwide between 2005 and 2023[.]"[115] In May 2022, U.S. firm Cybereason, Inc. published a report detailing an ongoing, years-long campaign by Chinese state-sponsored actors to steal an estimated trillions[116] of dollars in "sensitive proprietary information from technology and manufacturing companies mainly in East Asia, Western Europe, and North America," through the use of sophisticated malware.[117] Over 30 global companies[118] are suspected to be victims of the operation, losing "hundreds of gigabytes" of IP, including "sensitive documents, blueprints, diagrams, formulas, and manufacturing-related proprietary data."[119] The operation targets blueprints for unpatented technologies across a range of industries including defense, pharmaceuticals, energy, and manufacturing.[120] Speaking about the operation, Cybereason CEO Lior Div stated that Advanced Persistent Threat 41 (APT41) was even "stealing IP of drugs around diabetes, obesity, [and] depression."[121] Taken together, these reports show that China's cyber intrusion campaigns have not only continued but are intensifying.

Such facts indicate that since the imposition of the section 301 tariffs, China has not ceased its practice of conducting and supporting unauthorized cyber intrusions into the networks of U.S. companies in order to steal their IP, including trade secrets, and confidential business information. Furthermore, the role of the Chinese government in perpetuating these intrusions is evident, as over 570 documents leaked in February 2024 provided a firsthand account of how a private Chinese security contractor was paid by the Chinese government to target a range of

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[112] CROWDSTRIKE, NOWHERE TO HIDE: 2021 THREAT HUNTING REPORT 12, 13 (2021); *see also* @CrowdStrike, X (Aug. 3, 2022, 7:00 PM), https://twitter.com/CrowdStrike/status/1554965337405378560.
[113] Antonia Hmaidi, MERCATOR INSTITUTE FOR CHINA STUDIES [*hereinafter* "MERICS"], "HERE TO STAY"-CHINESE STATE-AFFILIATED HACKING FOR STRATEGIC GOALS 4 (Nov. 2023).
[114] *Id.* at 2.
[115] *Id.* at 4.
[116] Nicole Sganga, *Chinese Hackers Took Trillions in Intellectual Property From About 30 Multinational Companies*, CBS NEWS, May 4, 2022, https://www.cbsnews.com/news/chinese-hackers-took-trillions-in-intellectual-property-from-about-30-multinational-companies/.
[117] *Chinese National Pleads Guilty to Committing Theft of Trade Secrets*, DEPARTMENT OF JUSTICE [*hereinafter* "DOJ"], Nov. 12, 2019, https://www.justice.gov/opa/pr/chinese-national-pleads-guilty-committing-theft-trade-secrets.
[118] *Chinese National Sentenced for Stealing Trade Secrets Worth $1 Billion*, DOJ, Feb. 27, 2020, https://www.justice.gov/opa/pr/chinese-national-sentenced-stealing-trade-secrets-worth-1-billion.
[119] *Operation CuckooBees: Cybereason Uncovers Massive Chinese Intellectual Property Theft Operation*, CYBEREASON, https://www.cybereason.com/blog/operation-cuckoobees-cybereason-uncovers-massive-chinese-intellectual-property-theft-operation.
[120] Nicole Sganga, *Chinese Hackers Took Trillions in Intellectual Property From About 30 Multinational Companies*, CBS NEWS.
[121] *Id.*

victims for cyber intrusions, with some services costing as little as $15,000.[122] These practices are costly to the U.S. economy. Though there are few analyses precisely quantifying the costs, those that do place the annual burden of China's cyber theft at tens of billions of dollars per year.[123] For example, CSIS estimated in 2018 that China's cyber espionage potentially cost the United States $20-$30 billion annually.[124] In 2020, Lieutenant Colonel Jeffrey Jones, then-national security fellow at Harvard's Kennedy School, estimated the cost of China's cyber espionage at approximately $300 billion annually using a conservative approach to calculating the costs.[125] What is certain from these estimates is that China's cyber intrusions into U.S. networks have worsened and impose an enormous burden on the U.S. economy.

The Department of Justice (DOJ) has launched numerous cases alleging China's continued cyber or cyber-enabled intrusions into U.S. commercial networks since the imposition of section 301 tariffs. Since January 2018, DOJ has indicted at least 31 individuals and corporate entities directed or supported by the Chinese government to obtain IP, including trade secrets, and confidential business information from hundreds of U.S. and foreign companies. In some cases, evidence for these cases provides insight into the economic harm caused by actors working on behalf of the Chinese government, or by the Chinese government itself.

[122] Kwan Wei, Kevin Tan, *A Cache of Leaked Chinese Hacking Documents Just Confirmed Experts' Warnings About How Compromised the US Could Be*, BUSINESS INSIDER, Feb. 22, 2024, https://www.businessinsider.com/leaked-chinese-hacking-files-reveal-how-compromised-us-could-be-2024-2; Paul Mozur, Keith Bradsher, John Liu, Aaron Krolik, *Leaked Files Show the Secret World of China's Hackers for Hire,* THE NEW YORK TIMES, Feb. 22, 2024, https://www.nytimes.com/2024/02/22/business/china-leaked-files.html; *I-S00N*, GITHUB, https://github.com/I-S00N; Christian Shepherd, Cate Cadell, Ellen Nakashima, Joseph Menn, Aaron Schaffer, *Leaked Files From Chinese Firm Show Vast International Hacking Effort*, THE WASHINGTON POST, Feb. 21, 2024, https://www.washingtonpost.com/world/2024/02/21/china-hacking-leak-documents-isoon/.

[123] Beyond cybertheft, estimates exist quantifying the aggregated cost to the United States of China's broader economic espionage and intellectual property theft, ranging from $400 billion to $600 billion annually. *See*, William Evanina, THE EVANINA GROUP, *Testimony*, *Before the Senate Select Committee on Intelligence at a Hearing Concerning the Comprehensive Counterintelligence Threat to America's Corporations and Academic Institutions* (Sep. 21, 2022).

[124] James Andrew Lewis, *How Much Have the Chinese Actually Taken*, CSIS, Mar. 22, 2018, https://www.csis.org/analysis/how-much-have-chinese-actually-taken.

[125] Jeffrey B. Jones, *Confronting China's Efforts to Steal Defense Information*, BELFER CENTER FOR SCIENCE AND INTERNATIONAL AFFAIRS, May 2020, https://www.belfercenter.org/publication/confronting-chinas-efforts-steal-defense-information.

Table 1: DOJ Indictments Involving China's Cyber or Cyber-Enabled Theft Occurring Since 2018

Defendant Name(s)	Indictment Date or Criminal Complaint Date	Victim	Industry	Made in China 2025 Industry	Estimated Cost of Intrusion **	Nature of Alleged Crime
Ni, Weng, Cheng, Peng, Sun, Xiong, Zhao, members of APT31, associated with MSS	1/30/2024	U.S. companies, academics, et al.	Information technology, defense, manufacturing, finance, consulting and legal services, and R&D industries	✓	≥ $1 billion	Alleged conspiracy to commit computer intrusions and conspiracy to commit wire fraud.
Ding, Cheng, Zhu, Wu*, members of MSS	5/28/2021	Computer systems of various governments, universities, & global companies	Autonomous vehicles, chemicals, aircraft, biotechnology	✓	Unknown	Alleged conspiracy to commit computer fraud and conspiracy to commit economic espionage.
Hytera*	5/11/2021	Motorola	Telecommunication (digital mobile radio)	✓	Unknown	Alleged conspiracy to commit theft of trade secrets.
Li, Dong*	7/7/2020	Computer systems of various global companies	Pharmaceuticals, solar energy, medical devices, COVID-19 vaccines, etc.	✓	≥ $100 million	Alleged conspiracy to commit theft of trade secrets.
Zheng	5/23/2020	NIH, Ohio State University	Immunology	✓	≥ $4.1 million	False statements to federal authorities.
Zhang, Tan, members of APT41	9/15/2019	Computer systems of over 100 companies	Software, telecoms, videogames	✓	≥ $10 million	Alleged racketeering and intentional damage to a protected computer, etc.
Tan*	1/16/2019	Phillips 66	Lithium battery technology	✓	≥ $1 billion	Alleged conspiracy to commit theft of trade secrets, unauthorized transmission and possession of trade secrets.

Note: A cyber intrusion is considered to have occurred when a party used or provided access to computer systems they were not authorized to access. DOJ has pursued additional China cyber-related prosecutions since 2018 which have not been included in this table as they involve conduct alleged to have occurred prior to the 2018 tariff actions.
* Charge includes conspiracy to commit trade secret theft.
** Costs indicate estimates of stolen IP or costs directly related to the legal settlement of such theft from DOJ announcements or indictments.
MSS = China's Ministry of State Security

i. China's State-Sponsored Cyber Intrusions Targeting U.S. Companies in Strategic Industries

On January 30, 2024, DOJ indicted seven Chinese nationals, Ni Gaobin, Weng Ming, Cheng Feng, Peng Yaowen, Sun Xiaohui, Xiong Wang, and Zhao Guangzong, on charges of alleged conspiracy to commit computer intrusions and alleged conspiracy to commit wire fraud.[126] The indictment identifies these individuals as members of APT31, a Chinese cyber intrusion and espionage group[127] run by China's Ministry of State Security (MSS), the "foreign intelligence arm of the People's Republic of China."[128] From 2010 to as recently as November 2023, APT31 is alleged to have executed a wide-ranging cyber campaign targeting critics of China in any number of areas, including the political, defense, foreign policy, and media realms, as well as democracy activists. As part of this campaign, APT31 also conducted cyber intrusions against dozens of U.S. companies in strategic sectors, including the defense, IT, telecommunications, manufacturing and trade, aerospace, steel, finance, consulting, legal, and research industries.[129] The indictment alleges that, at least since 2010, the defendants' cyber intrusion activities resulted in the confirmed and potential compromise of "intellectual property, and trade secrets belonging to American businesses, and contributed to the estimated billions of dollars lost every year as a result of the PRC's [People's Republic of China] state-sponsored apparatus to transfer U.S. technology to the PRC," though the indictment does not include a charge of IP or trade secret theft at this time.[130]

Specific to the charge of conspiracy to commit computer intrusions, from 2010 to 2023, the conspirators used various cyber means, including the installation of malware, to illegally access computer networks of U.S. companies and academic institutions across a variety of sectors to "steal non-public information."[131] In one example taking place between 2017 and 2019, the defendants infiltrated the networks of seven IT managed service providers, the majority of whom were U.S.-based. This infiltration allowed the defendants' access to the data of the service providers' customers, which included "corporations, non-government organizations and small- and medium-sized businesses."[132] Other APT31 victims included an IT company for industrial control software, a telecommunications company for 5G equipment technology, and a research laboratory focused on machine learning.[133]

On March 25, 2024, the U.S. Department of the Treasury's Office of Foreign Assets Control and the UK Foreign, Commonwealth, and Development Office sanctioned two of the seven defendants for their roles in the malicious cyber-attacks against U.S. entities in critical

[126] Indictment, U.S. v. Ni Gaobin, et al, No. 24-CR-43 (E. D. NY Jan. 30, 2024).
[127] *Seven Hackers Associated With Chinese Government Charged With Computer Intrusions Targeting Perceived Critics of China and U.S. Businesses and Politicians*, DOJ, Jul. 19, 2021, https://www.justice.gov/usao-edny/pr/seven-hackers-associated-chinese-government-charged-computer-intrusions-targeting
[128] APT31 was directly run by MSS' provincial arm, the Hubei State Security Department. *See Id.*; *See also*, Indictment, United States v. Ding, et al., No. 21-CR1622-GPC (S.D. Cal. May 28, 2021).
[129] *Seven Hackers Associated With Chinese Government Charged With Computer Intrusions Targeting Perceived Critics of China and U.S. Businesses and Politicians*, DOJ.
[130] Indictment, U.S. v. Ni Gaobin, et al, at 6.
[131] *Id.* at 9.
[132] *Id.* at 10.
[133] *Id.* at 11-12.

infrastructure sectors.[134] All seven defendants are at large and reside within China. This case is ongoing.

ii. China's Global Campaign to Steal Information to Support Its Domestic Industries

On May 28, 2021, DOJ indicted four members of MSS.[135] The indictment alleges that MSS members Ding Xiaoyang, Cheng Qingming, Zhu Yunmin, and Wu Shurong committed economic espionage and conspiracy to commit computer fraud by conducting a global cyber intrusion campaign targeting the computer systems of companies, universities, and government entities located in the United States, Austria, Cambodia, Canada, Germany, Indonesia, Malaysia, Norway, Saudi Arabia, South Africa, Switzerland, and the United Kingdom, among others.[136] The indictment alleges that between 2011 and 2018, the defendants stole trade secrets including sensitive technologies used for submersibles and autonomous vehicles, specialty chemical formulas, commercial aircraft servicing, and proprietary genetic-sequencing technology and data, to "provide a commercial and strategic advantage to the PRC government, state-owned companies, and commercial sectors."[137]

The indictment alleges Ding, Cheng, and Zhu coordinated, facilitated, and operated computer intrusions from Hainan Xiandun Technology Development, Co., Ltd. and various MSS front companies, with the aim to install malware on protected computer systems of the victims through fraudulent spear-phishing emails. Speaking on the case, U.S. Attorney Randy Grossman of the Southern District of California stated China led "a worldwide cyber intrusion and economic espionage campaign… and the indictment demonstrates how China's government made a deliberate choice to cheat and steal instead of innovate."[138] This case is ongoing.

iii. Chinese State-Owned Enterprise Attempts to Steal U.S. Telecommunications Technology

On May 11, 2021, DOJ indicted Chinese telecommunications company Hytera and seven of its employees on charges of conspiracy to commit trade secret theft against American company Motorola between 2007 and 2020. The indictment alleges that Hytera, a partially state-owned enterprise (SOE) headquartered in Shenzhen, recruited and hired seven Malaysia-based Motorola employees to work for Hytera and conduct cyber enabled activities to take "proprietary and trade secret information from Motorola without authorization" for the benefit of Hytera's own product development.[139] The indictment alleges that the trade secrets included software code and architectures, hardware designs, and chip design and layering techniques specific to Motorola's

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[134] *Treasury Sanctions China-Linked Hackers for Targeting U.S. Critical Infrastructure*, U.S. DEPARTMENT OF THE TREASURY, Mar. 25, 2024, https://home.treasury.gov/news/press-releases/jy2205.
[135] Indictment, United States v. Ding, et al.
[136] *Id.* at p. 2-6.
[137] *Id.* at p. 2.
[138] *Four Chinese Nationals Working With the Ministry of State Security Charged With Global Computer Intrusion Campaign Targeting Intellectual Property and Confidential Business Information, Including Infectious Disease Research*, DOJ, Jul. 19, 2021, https://www.justice.gov/opa/pr/four-chinese-nationals-working-ministry-state-security-charged-global-computer-intrusion.
[139] Indictment, United States v. Hytera Communications Corp., No. 20-CR688 (N.D. Ill., May 11, 2021).

digital mobile radio technology and related products. The defendants, acting on Hytera's behalf, are alleged to have accessed Motorola's private databases and stolen company trade secrets on its digital mobile radio technology, a market segment where Hytera was a direct competitor to Motorola globally. The defendants then allegedly used the stolen trade secrets for Hytera's own product development, employee training, and product marketing.

The indictment alleges that Hytera hired the former Motorola employees, and they coordinated to steal the company's trade secrets, in part through their unauthorized copy and transfer of documents from Motorola databases.[140] One of the seven employees, Hytera's former director of R&D and member of the board, was extradited to the United States in 2022 and pled guilty to one count of conspiracy to steal trade secrets. This defendant claimed that the recruitment of Motorola employees and the campaign for stealing trade secrets came straight from Hytera's chief executive.[141] This case is still ongoing, and numerous other civil cases against Hytera for trade secret theft activities are also ongoing.

In a separate civil case, in February 2020, a federal jury found Hytera liable for trade secret theft and copyright infringement of Motorola's radio technology.[142] Hytera was subsequently fined $764.6 million.[143]

iv. China's Global Campaign to Steal COVID-19 Vaccine Data

On July 7, 2020, DOJ indicted two Chinese nationals, Li Xiaoyu and Dong Jiazhi, for allegedly infiltrating the computer systems of hundreds of companies, governments, and individuals in the United States, Australia, Belgium, Germany, Japan, Lithuania, the Netherlands, South Korea, Spain, Sweden, and the United Kingdom, among others.[144] Between 2009 and July 2020, the defendants allegedly stole "hundreds of millions of dollars' worth of trade secrets, intellectual property, and other valuable business information."[145] Trade secrets are alleged to have included information from companies engaged in pharmaceuticals, the development of COVID-19 vaccines and testing technology, solar energy, medical devices, and other industries.

The indictment describes multiple alleged attempts by the defendants to steal proprietary information related to COVID-19 vaccines. On January 25 and 27, 2020, Li allegedly searched for vulnerabilities in a Maryland biotech firm's network less than a week after it announced work on a potential COVID-19 vaccine. The indictment alleges that on January 27, 2020, Li conducted cyber reconnaissance on another Maryland biotech firm that had announced its efforts

[140] Indictment, United States v. Hytera Communications Corp. at 13. *See also Federal Indictment Charges PRC-Based Telecommunications Company With Conspiring With Former Motorola Solutions Employees to Steal Technology*, DOJ, Feb. 7, 2022, https://www.justice.gov/opa/pr/federal-indictment-charges-prc-based-telecommunications-company-conspiring-former-motorola.
[141] Plea Agreement, United States v. Gee Siong Kok, No. 20 CR 688-2 (N.D. Ill. Dec. 1, 2022).
[142] *Motorola Solutions Wins Trade Secret Theft and Copyright Infringement Lawsuits Against Hytera*, MOTOROLA SOLUTIONS, Feb. 14, 2020, https://www.motorolasolutions.com/newsroom/press-releases/motorola-solutions-wins-trade-secret-theft-and-copyright-infringement-lawsu.html.
[143] Final Judgement, Motorola Solutions Inc. v. Hytera Communications Corporation Ltd., Civil Action No. 1:17-CV-01973 (N. D. Ill. Mar. 5, 2020), ECF No. 947.
[144] Indictment, United States v. Li and Dong, No. 4:20-CR-6019-SMJ (E.D. Wash. Jul 7, 2020) ECF No. 1 at 3.
[145] *Id.* at 3.

to research a vaccine.[146] On February 1, 2020, the indictment alleges Li probed a California biotech firms' network for vulnerabilities a day after it announced researching antiviral drugs to treat COVID-19.[147] The indictment alleges that on May 12, 2020, Li searched for vulnerabilities in the network of a California company publicly known to be developing COVID-19 testing kits.

The indictment alleges that the defendants stole information "of obvious interest to the PRC Government's MSS."[148] Furthermore, when stealing data of interest to the MSS, the indictment alleges that defendants "in most instances obtained that data through computer fraud against corporations and research institutions."[149] Assistant Attorney General for National Security John C. Demers described the defendants as "on call to work for the benefit of the state."[150] The 11-count indictment includes conspiracy to commit theft of trade secrets, computer fraud, and wire fraud, as well as unauthorized access to a computer and identity theft. This case is ongoing.

v. China Uses Talent Programs to Steal U.S. Biomedical Research and Technology

On May 23, 2020, DOJ filed a criminal complaint against Zheng Song Guo, a researcher at the National Institutes of Health (NIH) and professor at Ohio State University. DOJ investigated Zheng on criminal charges for participating in an immunology research fraud scheme involving federal research funds and making false statements regarding his affiliations with the PRC's Thousand Talents Program and a Chinese government-controlled university on NIH grant applications.[151] From 2013 to 2019, Zheng received federal funding from NIH while concealing his participation in multiple Chinese talent programs, with one in particular granting Zheng nearly $3 million in funding. Zheng is alleged to have intended to bring back to China biomedical "innovative products and conduct clinical transformation of the products in hoping to develop China's brand in the biomedical area."[152]

In May 2020, after receiving notice of an investigation by Ohio State University into his NIH grants, Zheng attempted to flee to China with luggage containing two laptops, three cell phones, and several USB drives, before ultimately being apprehended by federal agents in Alaska. Later that year, Zheng pleaded guilty for making false statements regarding his associations with the Chinese government's Thousand Talents Program.[153] In May 2021, Zheng was sentenced to 37 months in prison and ordered to pay over $3.4 million in restitution to NIH and another $413,000

[146] Indictment, United States v. Li and Dong, at 21.
[147] *Id.* at 22.
[148] *Id.* at 3.
[149] *Id.* at 3.
[150] *Two Chinese Hackers Working With the Ministry of State Security Charged With Global Computer Intrusion Campaign Targeting Intellectual Property and Confidential Business Information, Including COVID-19 Research*, DOJ, Jul. 21, 2020, https://www.justice.gov/opa/pr/two-chinese-hackers-working-ministry-state-security-charged-global-computer-intrusion.
[151] Criminal Complaint, United States v. Zheng, No. 2:20-CR-00182, (S.D. Ohio May 23, 2020) ECF No. 1.
[152] United States v. Zheng, 27 F.4th 1239 (6th Cir., 2022).
[153] *University Researcher Pleads Guilty to Lying on Grant Applications to Develop Scientific Expertise for China*, DOJ, Nov. 12, 2020, https://www.justice.gov/opa/pr/university-researcher-pleads-guilty-lying-grant-applications-develop-scientific-expertise.

to Ohio State University.[154] Zheng served part of his prison sentence and in March 2023 was deported back to China.[155]

vi. China's Campaign to Target High-Tech Software Development Companies

On September 16, 2020, DOJ unsealed three indictments against five Chinese and two Malaysian nationals charged with illegally accessing networks affecting over 100 victim companies in the United States, South Korea, Japan, India, Taiwan, Hong Kong, Malaysia, Australia, and the United Kingdom, among others, from May 2014 to August 2020. The victim entities included software development companies, computer hardware manufacturers, telecommunications providers, social media companies, video game companies, non-profit organizations, universities, think tanks, and foreign governments.[156] Speaking about the case, the Deputy Attorney General stated:

> Regrettably, the Chinese Communist Party has chosen a different path of making China safe for cybercriminals so long as they attack computers outside China and steal intellectual property helpful to China.[157]

The first of these indictments, filed in August 2019, charged Zhang Haoran and Tan Dailin with wire fraud, aggravated identity theft, money laundering, and violations of the Computer Fraud and Abuse Act for targeting U.S. high-tech companies, including video game companies.[158] Zhang and Tan were identified as members of APT41 by cybersecurity professionals and are alleged to have ties with the Chinese government.[159] The U.S. Department of Health and Human Services Office of Information Security characterizes APT41 as "a Chinese state-sponsored espionage group" that "is a dual threat demonstrating creativity and aggressiveness in carrying out both espionage campaigns and financially motivated operations" whose "targeting aligns with China's economic and political goals."[160] This case is ongoing.

vii. China's Attempts to Target Critical Battery Technologies

In January 2019, DOJ indicted Tan Hongjin on three charges of committing theft of trade secrets, unauthorized transmission of trade secrets, and unauthorized possession of trade secrets from his former U.S. employer, Phillips 66 Petroleum Company. According to the indictment, in December 2018, Tan, one day before resigning from his position as an associate scientist,

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[154] *University Researcher Sentenced to Prison for Lying on Grant Applications to Develop Scientific Expertise for China*, DOJ, May 14, 2021, https://www.justice.gov/usao-sdoh/pr/university-researcher-sentenced-prison-lying-grant-applications-develop-scientific.
[155] *ERO Detroit Removes Chinese National Convicted of Defrauding National Institute of Health*, U.S. IMMIGRATION AND CUSTOMS ENFORCEMENT, Mar. 3, 2023, https://www.ice.gov/news/releases/ero-detroit-removes-chinese-national-convicted-defrauding-national-institute-health.
[156] *Seven International Cyber Defendants, Including "Apt41" Actors, Charged in Connection With Computer Intrusion Campaigns Against More Than 100 Victims Globally*, DOJ, Sep. 16, 2020, https://www.justice.gov/opa/pr/seven-international-cyber-defendants-including-apt41-actors-charged-connection-computer.
[157] *Id*.
[158] United States v. Zhang, et al. No. CR274.
[159] Indictment, United States v. Jiang, et al. No. CR-00-158, (E.D. N.Y. Apr. 7, 2022).
[160] U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, APT41, 3, 6 (Oct. 24, 2019).

logged into the company's network and accessed hundreds of files containing proprietary trade secrets on the development of next-generation battery and energy storage technology.[161] Acting against company policy, Tan downloaded and copied these trade secret files to his personal USB thumb drives and external hard drives, which contained information on the manufacture of a "research and development downstream energy market product" and were worth more than $1 billion to his former employer.[162] Tan intended to return to China with said trade secrets and turn them over to his new employer, Xiamen Tungsten Co., a Chinese state-owned nonferrous metals company engaged in rare earth and magnetic metal research for batteries.

In November 2019, Tan pleaded guilty to all three charges, and subsequently in February 2020, Tan was sentenced to 24 months in federal prison for theft of trade secrets and was ordered to pay his former employer $150,000 in restitution.[163] U.S. Attorney Trent Shores spoke about the case stating, "China's economic aggression poses a threat to America's emerging high-technology industries. Industrial spies like Tan Hongjin engage in espionage to steal American trade secrets and intellectual property born out of the innovation that is innate in our free market system."[164]

viii. China's Cybertheft Impacts Allies and Partners

China's cyber intrusions into commercial networks have global impact and threaten U.S. allies and likeminded partners. China is unique in leveraging state resources to conduct and sponsor trade secret and IP theft from private companies for transfer to Chinese entities in pursuit of its industrial policy objectives.

China's cyber intrusions have only grown more sophisticated[165] over time and are prompting governments across the globe to respond to China's actions. Following China's state-sponsored cyber-attack on Microsoft Exchange servers in 2023, government agencies from the United States, Australia, Canada, New Zealand, and the United Kingdom issued a joint advisory accusing China of targeting U.S. infrastructure and "conduct[ing] operations worldwide to steal intellectual property and sensitive data from critical infrastructure operations around the globe."[166]

In 2020, Japanese media reported that Mitsubishi Electric had been the victim of a cyberattack believed to be perpetrated by a Chinese cybertheft group. The attack resulted in the suspected

[161] Indictment, United States v. Tan, No. 4:19-CR-00009 (N.D. Okla. Jan. 16, 2019), ECF No. 18.
[162] *Chinese National Pleads Guilty to Committing Theft of Trade Secrets*, DOJ.
[163] *Chinese National Sentenced for Stealing Trade Secrets Worth $1 Billion*, DOJ.
[164] *Chinese National Pleads Guilty to Committing Theft of Trade Secrets*, DOJ.
[165] *Wave of Stealthy China Cyberattacks Hits U.S., Private Networks, Google Says,* THE WALL STREET JOURNAL, Mar. 16, 2023, https://www.wsj.com/articles/wave-of-stealthy-china-cyberattacks-hits-u-s-private-networks-google-says-2f98eaed.
[166] *NSA and Partners Identify China State-Sponsored Cyber Actor Using Built-in Network Tools When Targeting U.S. Critical Infrastructure Sectors*, NATIONAL SECURITY AGENCY, May 24, 2023, https://www.nsa.gov/Press-Room/Press-Releases-Statements/Press-Release-View/Article/3406058/nsa-and-partners-identify-china-state-sponsored-cyber-actor-using-built-in-netw/.

loss of "trade secrets and the personal data of employees."[167] In May 2022, Japan passed an economic security bill that is reportedly "primarily aimed at China,"[168] with the objective of safeguarding technology and supply chains due to an alleged increase in economic espionage by China.

In 2021, the North Atlantic Treaty Organization criticized China for the first time for its "malicious cyber activities," specifically citing the 2021 Microsoft Exchange Server breach.[169]

In early 2022, Germany's domestic intelligence agency, the Federal Office for the Protection of the Constitution (BfV), reported that China's state-sponsored cybertheft group known as APT27 had launched a campaign of cyberattacks on German businesses in the technology and pharmaceutical sectors, "stealing trade secrets and intellectual property[.]"[170] In June 2023, Germany's BfV issued its first national security strategy report that identifies China as "the greatest threat in terms of economic and scientific espionage."[171]

These developments show that Chinese state-supported cyber intrusions continue, that China continues to steal U.S. and other foreign companies' IP, including trade secrets, and confidential business information, and that these activities have global impact.

ix. China's Vulnerability Reporting Requirements Enable Cybertheft

Since the initiation of the Section 301 Report, the Chinese government has implemented policies that require foreign companies operating in China to turn over information regarding their network vulnerabilities to maintain market access. For example, in 2021, the Cyberspace Administration of China (CAC) and MIIT enacted the *Regulations on the Administration of Network Product Security Vulnerabilities* ("Network Administration Regulations"), which require companies in China to report vulnerabilities along with detailed product information to MIIT within two days of discovery.[172]

Industry experts have consistently criticized the Network Administration Regulations for contradicting cybersecurity norms globally and for their potential to be used to support China's

[167] Scott Ikeda, *Data Breach at Mitsubishi Electric Caused by Zero-Day Vulnerability in Antivirus Software*, CPO MAGAZINE, Feb. 5, 2020, https://www.cpomagazine.com/cyber-security/data-breach-at-mitsubishi-electric-caused-by-zero-day-vulnerability-in-antivirus-software/.
[168] *Japan Passes Economic Security Bill to Guard Sensitive Technology*, REUTERS, May 11, 2022, https://www.reuters.com/world/asia-pacific/japan-passes-economic-security-bill-guard-sensitive-technology-2022-05-11/.
[169] *Statement by the North Atlantic Council in Solidarity With Those Affected by Recent Malicious Cyber Activities Including the Microsoft Exchange Server Compromise*, NORTH ATLANTIC TREATY ORGANIZATION, Jul. 19, 2021, https://www.nato.int/cps/en/natohq/news_185863.htm.
[170] *Chinese Hackers Target German Pharma and Tech Firms,* REUTERS, Jan. 26, 2022, https://www.reuters.com/world/chinese-hackers-target-german-pharma-tech-firms-2022-01-26/.
[171] *German Spy Agency Says China and Russia are After Its Secrets,* THE NEW YORK TIMES, Jun. 20, 2023, https://www.nytimes.com/2023/06/20/world/europe/foreign-spies-germany-serious-threat.html.
[172] *Regulations on the Management of Network Product Security Vulnerabilities*, Art. 7.2 (MIIT & CAC, Gong Xin Bu Lian Wang An [2021] No. 66, issued Jul. 13, 2021), http://www.cac.gov.cn/2021-07/13/c_1627761607640342.htm.

commercial cyberespionage campaigns. An analyst at Georgetown's Center for Security and Emerging Technology stated:

> In effect, the new regulations would transfer software vulnerabilities found in the United States and other countries to China's MIIT before the company could patch the vulnerability. The regulatory structure positions China's security services to evaluate new vulnerabilities as they are reported. Research conducted outside China will facilitate its hacking campaigns against other nations.[173]

The Atlantic Council warned in a 2023 report that the Network Administration Regulations create a system where companies' vulnerabilities are inevitably shared with the state actors responsible for conducting cyber intrusions, such as the MSS.[174]

x. Other: Notable Developments on Cases Mentioned in the Section 301 Report Update

The Section 301 Report Update detailed other cases involving charges of economic espionage or trade secret theft, where actors affiliated with the Chinese state were charged or convicted of illegally acquiring technology, IP, or trade secrets from U.S. companies in the aircraft manufacturing and semiconductor sectors.[175] China has been targeting both aircraft and semiconductor manufacturing in industrial planning documents for decades, specifying market share targets for both in the *Made in China 2025 Roadmap*. Certain U.S. semiconductor and aviation technologies are subject to export controls in the United States, and are thus not available through the other coercive means China uses to effect technology transfer. Since the section 301 investigation, there have been the following developments in these cases:

- In November 2022, a federal court sentenced Chinese MSS officer, Yanjun Xu, to 20 years in prison for conspiracy to commit economic espionage and attempted theft of trade secrets of U.S. aviation technology.[176] Specifically in March 2017, Xu was found to have, in collusion with the "MSS and Chinese aviation entities,"[177] used aliases to obscure his ties to the Chinese government and lure an employee of Ohio-based GE Aerospace to China to give a presentation on GE "signature material design and manufacturing technology"[178] through paid expenses and a stipend. This proprietary technology had given GE "significant competitive advantage over others in the

[173] Dakota Johnson, *China's New Software Policy Weaponizes Cybersecurity Research*, THE HILL, Jul. 22, 2021, https://thehill.com/opinion/cybersecurity/564318-chinas-new-software-policy-weaponizes-cybersecurity-research/.
[174] Dakota Cary and Kristin Del Rosso, THE ATLANTIC COUNCIL, SLEIGHT OF HAND: HOW CHINA WEAPONIZES SOFTWARE VULNERABILITIES (Sep. 6, 2023).
[175] For discussion of cases involving economic espionage and trade secret theft of American aircraft manufacturing and semiconductor technology, *see* USTR, UPDATE CONCERNING CHINA'S ACTS, POLICIES AND PRACTICES RELATED TO TECHNOLOGY TRANSFER, INTELLECTUAL PROPERTY, AND INNOVATION at 13.
[176] *Jury Convicts Chinese Intelligence Officer of Espionage Crimes, Attempting to Steal Trade Secrets*, DOJ, Nov. 5, 2021, https://www.justice.gov/opa/pr/jury-convicts-chinese-intelligence-officer-espionage-crimes-attempting-steal-trade-secrets.
[177] *Chinese Government Intelligence Officer Sentenced to 20 Years in Prison for Espionage Crimes, Attempting to Steal Trade Secrets From Cincinnati Company*, DOJ, Nov. 16, 2022, https://www.justice.gov/opa/pr/chinese-government-intelligence-officer-sentenced-20-years-prison-espionage-crimes-attempting.
[178] Indictment, United States v. Yanjun Xu, No. 1:18 CR-43 (S.D. Ohio Apr. 4, 2018) at 8.

industry."[179] The technology involved the "design and use of certain types of composite materials in fan blades and fan blade encasements [that] provide greater engine durability, weight reduction, and lower costs" for civil aircraft engines.[180] It is estimated that GE spent "billions of dollars of research and development investment" in developing these technologies over several decades.[181] After the GE employee's trip to China, the employee began cooperating with the FBI,[182] and in cooperation with GE, emailed Xu proprietary GE documents relating to "fan blade encasement."[183] Xu traveled to Belgium in 2018 for the purpose of receiving "sensitive information he had requested,"[184] where he was arrested and extradited to the United States. Xu had targeted aviation companies in the United States and abroad at least since 2013, and would work with "others in the MSS to hack or copy computers in hotel rooms while the aviation employees—his 'guests'—were taken to dinner by the MSS."[185]

- In October 2018, in a separate but related case, DOJ indicted two Chinese intelligence officers, six of their paid cyber intrusion agents, and two intelligence agents China had placed in a French aerospace company.[186] The indictment alleged that over a five-year period, the Chinese intelligence officers directed the hackers and agents to "facilitate intrusions into computers of companies based in the United States and abroad" to steal IP, including trade secrets, and confidential business information, in the aerospace industry, including data and information related to a turbofan engine used in commercial jetliners. At the time of the intrusions, Aero Engine Corporation of China, a Chinese state-owned aerospace company, was developing the CJ-1000AX engine for use by Commercial Aviation Corporation of China (COMAC), China's national champion, in its domestic C919 wide-body large civil aircraft. Industry observers note that, "[t]he aim of this hacking operation was to acquire intellectual property to narrow China's technological gap in the aviation industry, and especially to help Commercial Aircraft Corporation of China (COMAC), a Chinese state-owned aerospace manufacturer, build its own airliner, the C919 airplane, to compete with industry rivals like Airbus and Boeing."[187] This case is pending.

b. Foreign Ownership Restrictions Persist in Multiple Sectors

JV requirements remain a key tool that the Chinese government uses to facilitate technology transfer, and they persist in industries such as telecommunications, cloud computing,[188] nuclear

[179] *Id.* at 3.
[180] *Id.* at 2.
[181] *Id.* at 3.
[182] *Chinese Government Intelligence Officer Sentenced to 20 Years in Prison for Espionage Crimes, Attempting to Steal Trade Secrets From Cincinnati Company*, DOJ.
[183] Indictment, United States v. Yanjun Xu, at 10.
[184] *Id.* at 12.
[185] *Jury Convicts Chinese Intelligence Officer of Espionage Crimes, Attempting to Steal Trade Secrets*, DOJ.
[186] *Chinese Intelligence Officers and Their Recruited Hackers and Insiders Conspired to Steal Sensitive Commercial Aviation and Technological Data for Years*, DOJ, Oct. 30, 2018, https://www.justice.gov/opa/pr/chinese-intelligence-officers-and-their-recruited-hackers-and-insiders-conspired-steal.
[187] *Building China's Comac C919 Airplane Involved a lot of Hacking, Report Says*, ZDNET.COM, Oct. 14, 2019, https://www.zdnet.com/article/building-chinas-comac-c919-airplane-involved-a-lot-of-hacking-report-says/.
[188] For further detail on cloud computing JV and licensing requirements, *see* Section II.C.2.d.

power, medical institutions, and the development of new wheat and corn varieties. Although China reduced by half the number of sectors in the FINL featuring JV requirements from 21 to 10, it did not eliminate them.[189] While beyond the scope of this section, outright prohibitions on investment also remain in certain sectors.[190]

The removal of a sector from the FINL does not guarantee that it will be open for foreign investment or that China will not use other measures to facilitate technology transfer. For example, in the automotive industry, NDRC implemented new investment restrictions the same year it announced the removal of the automotive sector from the FINL. In May 2018, NDRC announced the removal of JV requirements for NEVs and the removal of all foreign investment restrictions in the automotive sector by 2022.[191] However, in December 2018, NDRC finalized a new measure that prohibited certain types of investment projects, including new internal combustion engine enterprise investment projects by both foreign and domestic companies.[192] The measure also introduced additional requirements for investments in pure electric vehicle enterprises, as well as requirements on the ownership of IP and R&D in China, creating new conditions that would continue to disadvantage foreign competition and facilitate indirect technology transfer, notwithstanding the amended FINL.[193]

c. China Forces Joint Ventures Through Indirect Pressure

Even without explicit investment restrictions, China uses indirect means to pressure companies into equity JVs or partnerships with local firms that implicate technology transfer. Certain key sectors and examples are discussed below.

i. Medical Devices

The indirect pressure to form JVs and partnerships with local companies is evident in the medical device sector. The *Made in China 2025 Notice* identifies "high performance medical equipment" as one of ten industries China seeks to dominate by achieving an 85 percent domestic market share goal for "core medical device components" by 2025.[194] Government procurement provides an explicit framework for China to achieve this dominance through technology transfer because as much as 80 percent of all medical devices sold in China are

[189] *See* Appendix B. One of these reductions resulted from two line items being combined into one rather than the removal of a restriction.
[190] *Special Administrative Measures (Negative List) for the Access of Foreign Investment (2018)* (NDRC & MOFCOM, [2021] Order No. 18, issued Jun. 28, 2018, effective Jul. 28, 2018), https://www.ndrc.gov.cn/xxgk/zcfb/fzggwl/201806/t20180628_960861.html.
[191] *China Will Abolish Restrictions on the Proportion of Foreign Capital in the Auto Industry Through a Five-Year Transitional Period* [Chinese], PRC STATE COUNCIL, Apr. 17, 2018, https://www.gov.cn/xinwen/2018-04/17/content_5283413.htm.
[192] *Provisions on the Administration of Investments in the Automotive Industry*, Art. 11 (NDRC, [2018] Order No. 22, issued Dec. 10, 2018, effective Jan. 10, 2019), https://www.ndrc.gov.cn/xxgk/zcfb/fzggwl/201812/W020190905495164515512.pdf.
[193] *Id.* at Arts. 18-19.
[194] 2015 GREENBOOK at 282.

purchased through government procurement,[195] and many Chinese procurement regulations and tenders explicitly condition the purchase of imports on the supplier transferring their technology to China. Article 15 of the Ministry of Finance's 2007 *Administrative Measures for the Government Procurement of Imported Products* is a prime example. It provides that government procurers must "give priority to purchasing imported products from suppliers *that [will] transfer technology* to Chinese enterprises and/or *sign digestion, absorption, and re-innovation plans with Chinese enterprises*."[196] Many subcentral regulations also require a special examination procedure by a "panel of experts" for procurement of imported medical devices.[197] For U.S. companies seeking to export medical devices to China, the regulations explicitly demand that they transfer their technology.

The alternative for foreign medical device manufacturers is to establish a domestic presence. However, even with this option, they face indirect pressure to partner with local companies in ways that implicate technology transfer. Some procuring entities in China express they will give preference to local Chinese brands, meaning the goods procured are locally produced by a majority-Chinese owned company.[198] Therefore, foreign medical device companies in China often make the difficult decision to form partnerships or JVs with local companies to appear more "domestic" in the procurement process.[199] However, partnering or forming a JV also presents technology transfer concerns because it exposes the products' IP to a potential Chinese competitor. The US-China Business Council (USCBC), which represents more than 270 American companies,[200] has detailed this issue in its report on government procurement:

> [S]ome healthcare equipment suppliers have considered working with local manufacturers through China's Market Authorization Holder system to maintain their public procurement customers. Under this framework, a company can maintain ownership of its products but delegate production to a local contract manufacturer. This could allow them to benefit from local treatment in procurement and avoid additional layers of approval required in certain provinces for [the government procurement of]

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[195] The 80 percent figure is according to unpublished industry estimates disclosed to USTR. Other sources provide proxy figures that vary between 55 percent and 85 percent: *see Fewer Patients and Lower Incomes Have Caused Hundreds of Private Hospitals to Go Bankrupt and Reorganize Over the Past Two Years Due to the Epidemic* [Chinese], CHINA NEWS, Jul. 11, 2022, https://www.chinanews.com.cn/cj/2022/07-11/9801090.shtml ("85 percent of medical care is provided by public hospitals in China."); *See also The 2022 Statistical Bulletin on Health Care Development is Released* [Chinese], NATIONAL HEALTH COMMISSION, Oct. 12, 2022, http://www.nhc.gov.cn/guihuaxxs/s3586s/202310/5d9a6423f2b74587ac9ca41ab0a75f66.shtml ("Public hospital beds account for 70 percent of hospital beds in China."); *Worldwide Medical Devices Market Factbook*, FITCH SOLUTIONS, Jun. 2022, at 42 ("Govt. health spend, % total health spend" for 2021 in China was 63.4 percent); *Global Health Expenditure Database*, WORLD HEALTH ORGANIZATION, https://apps.who.int/nha/database/ViewData/Indicators/en ("Domestic General Government Health Expenditure as a percent of Current Health Expenditure in China was 55 percent in 2020.").

[196] *Notice of the Ministry of Finance on Issuing the Administrative Measures for the Government Procurement of Imported Products*, Arts. 5, 15 (Ministry of Finance [*hereinafter* "MOF"], Cai Ku [2007] No. 119, issued Dec. 27, 2007), https://www.gov.cn/ztzl/kjfzgh/content_883643.htm (emphasis added).

[197] *See* Appendix D for examples of such measures.

[198] Alison Schonberg, US-CHINA BUSINESS COUNCIL [*hereinafter* "USCBC"], GOVERNMENT PROCUREMENT AND SALES TO STATE-OWNED ENTERPRISES IN CHINA 7 (Sept. 2021).

[199] *Id.* at 15.

[200] *About the US-China Business Council*, USCBC, https://www.uschina.org/about (last accessed Mar. 8, 2024).

> imported medical devices. Several companies, however, warn of the potential for technology transfer under this model.[201]

Later the report states:

> [W]orking with local partners can lead to intellectual property (IP) infringement and technology transfer. Some USCBC members suggest that FIEs [foreign-invested enterprises] face a difficult tradeoff when partnering with local companies—they can either maintain access to the procurement market or maintain full control of their IP. In some cases, USCBC members' JV partners have requested that new products and formulations be branded under the JV or Chinese partner's name.[202]

These technology transfer-related acts, policies, and practices have a tangible impact in the medical device sector. The European Chamber's 2020 *Business Confidence Survey* reports that 30 percent of respondents in the medical device industry felt "compelled to transfer technology in order to maintain market access," an increase from 19 percent in 2018.[203] Foreign medical device companies will continue to face explicit pressure to transfer their technology when exporting and indirect pressure to transfer their technology through JVs and partnerships with local companies, so long as medical devices are targeted by China's industrial policies, the majority of medical devices in China are purchased by public health institutions receiving government funds, and procurement regulations contain technology transfer requirements.

ii. Aircraft

The Section 301 Report detailed how China uses its purchasing power to extract technology transfer concessions in exchange for purchases of commercial aircraft by China's state-owned airlines and purchases of aircraft inputs by China's aircraft manufacturers.[204] The Section 301 Report also highlighted that, at the time of the report, China maintained JV requirements for the manufacture of civil aircraft. China's technology transfer in civil aircraft continues today, motivated by China's efforts to indigenize large civil aircraft technology. China launched the C919 program in 2008 "to break the Boeing/Airbus duopoly"[205] as part of its longstanding efforts to move up the value chain in every advanced manufacturing sector of consequence and set market share targets for aircraft and aircraft parts in the *Made in China 2025 Notice* to achieve that goal.[206]

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[201] Schonberg at 15.
[202] *Id.* at 7.
[203] Per European Chamber's website, membership is inclusive of 167 U.S. companies, *see* https://www.europeanchamber.com.cn/en/business-directory; EUROPEAN CHAMBER, 2020 BUSINESS CONFIDENCE SURVEY 39 (Jun. 10, 2020); EUROPEAN CHAMBER, 2018 BUSINESS CONFIDENCE SURVEY 40 (Jun. 20, 2018).
[204] 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 at 33.
[205] Wu Guanghui, *ARJ21 First Flight Marks China's Return to Jet Set*, AINONLINE, Dec. 30, 2008, https://www.ainonline.com/aviation-news/aviation-international-news/2008-12-30/arj21-first-flight-marks-chinas-return-jet-set-0.
[206] 2017 GREENBOOK at 63, 84.

Industry analysts observe that "China's aerospace industry (the government, really) has been well known for decades to require foreign companies to share technology as the price of doing business."[207] NDRC has final approval authority over the purchase of foreign aircraft in particular,[208] meaning that foreign aircraft manufacturers seeking to sell into China negotiate directly with the very agency that has "responsibility" for "formulation of comprehensive industrial policy," and provides overall direction for implementation of policies such as the *Made in China 2025 Notice*.[209] Additionally, China is able to leverage "its powers of final approval to play one company off against the other in order to gain concessions on price and technology transfers,"[210] according to Neil Thomas, fellow on Chinese politics at the Asia Society Policy Institute.

Regarding civil aircraft inputs, until 2015, China maintained JV requirements for manufacturing select civil aircraft inputs, such as engines and avionics.[211] COMAC explains that it selected 16 leading international suppliers and it pushed for these suppliers to partner with domestic enterprises to develop key technologies for the C919.[212] By 2015, foreign aircraft input manufacturers—for landing gear, avionics, flight control, power systems, etc.—had established at least 16 foreign-invested JVs with COMAC, Aviation Industry Corporation of China (AVIC), or other Chinese companies.[213] As a result, the JVs "improved the overall level of China's aerospace R&D and manufacturing through technology transfer, diffusion, and spillover," according to COMAC.[214] Western scholars agree that JVs, coupled with offset agreements, "have had the greatest impact on aerospace technology transfer to China."[215]

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[207] *Pontifications: From the Aviation Perspective, There's Something in China to Watch*, LEEHAM NEWS, Mar. 21, 2022, https://leehamnews.com/2022/03/21/pontifications-from-the-aviation-perspective-theres-something-in-china-to-watch/.
[208] *Administrative Measures for the Commissioning of Transportation Aircraft* (CAC, Min Hang Fa [2017] No. 65, issued Jun. 5, 2017), http://www.caac.gov.cn/XXGK/XXGK/ZFGW/201706/t20170615_44784.html.
[209] *Department of Industry*, NDRC, https://en.ndrc.gov.cn/aboutndrc/BandD/202105/t20210526_1280925.html; An NDRC representative is listed among the vice chairs of the leading small group charged with implementing the *Made in China 2025 Notice*. *See Notice on the Office of the State Council Establishing a National Manufacturing Power Leading Small Group* (PRC State Council, Guo Ban Fa [2015] No. 48, issued Jun. 16, 2015), https://www.gov.cn/gongbao/content/2015/content_2893141.htm.
[210] *For Company and for Country: Boeing and US-China Relations*, MACROPOLO, Feb. 26, 2019, https://macropolo.org/analysis/boeing-us-china-relations-history/.
[211] *Catalogue of Industries Guiding Foreign Investment (2015 Revision)* (NDRC, MOFCOM, [2015] No. 22, issued Mar. 10, 2015, effective Apr. 10, 2015), https://www.ndrc.gov.cn/fggz/lywzjw/zcfg/201503/t20150313_1046968.html; *Catalogue of Industries Guiding Foreign Investment (2011 Revision)* (NDRC, MOFCOM, [2011] No. 12, issued Dec. 24, 2011, effective Jan. 30, 2012), https://www.ndrc.gov.cn/xxgk/zcfb/fzggwl/201112/t20111229_960737.html.
[212] *The C919 First Large Passenger Plane Comes Off General Assembly Line, Xi Jinping Issues Important Directive, Premier Li Keqiang Issues Comments, Ma Kai and Han Zheng Attend the Ceremony* [Chinese], COMMERCIAL AIRCRAFT CORPORATION OF CHINA [*hereinafter* "COMAC"], Nov. 2, 2015, http://www.comac.cc/xwzx/gsxw/201511/02/t20151102_3031037.shtml.
[213] *Id. See also* Appendix E for illustrative examples of Sino-foreign joint ventures supplying the C919.
[214] *The C919 First Large Passenger Plane Comes Off General Assembly Line, Xi Jinping Issues Important Directive, Premier Li Keqiang Issues Comments, Ma Kai and Han Zheng Attend the Ceremony,* COMAC.
[215] Tai Ming Cheung, William Lucyshyn, John Rigilano, *The Role of Technology Transfers in China's Defense Technological and Industrial Development and the Implications for the United States*, NAVAL POSTGRADUATE SCHOOL 39 (2019). *See also* John David Minnich, *Scaling the Commanding Heights: The Logic of Technology Transfer Policy in Rising China*, MASSACHUSETTS INSTITUTE OF TECHNOLOGY 2 (2023).

d. Opaque Administrative Reviews Continue to Facilitate Technology Transfer

i. Introduction

The Section 301 Report found that, as a result of China's regime of technology regulations, U.S. companies seeking market access in China were subject to opaque administrative reviews and licensing procedures that required the disclosure of IP, including trade secrets, and confidential business information to expert review panels, and forced contracts with Chinese entities that risked the misappropriation of U.S. companies' IP.[216] USTR's review of China's technology transfer-related acts, policies, and practices since the Section 301 Report reveals that China continues to employ opaque administrative review and licensing processes that risk the misappropriation of technology and IP of U.S. companies operating in the Chinese market. The Center for Naval Analyses, a non-profit research organization, reached this conclusion in a report issued two years after the section 301 tariffs were first imposed:

> As part of its administrative licensing process, the PRC often uses extensive disclosure requirements and expert review panels that require foreign firms to transfer sensitive technological information in exchange for access to Chinese markets.[217]

ii. Cloud Computing

China identifies cloud computing as a priority sector in numerous industrial policies such as the *Made in China 2025 Notice*[218] and the *14th Five-Year Plan*[219] and seeks to utilize its cloud computing influence to "set cloud-related industry standards in multiple countries" and reach cloud deals in "south-east Asia, Africa, Australia, and Europe and the U.S."[220]

China continues to employ a burdensome licensing regime designed to coerce technology transfer in the cloud computing sector. China prohibits foreign companies established in China from directly providing computer data processing and storage services and software application services over the internet. The only option that a foreign company has to access the China market is to establish a contractual partnership with a Chinese company, which is the holder of the necessary internet data center license, and turn over its valuable technology, IP, know-how, and branding as part of this arrangement. While the foreign service supplier earns a licensing fee from the arrangement, it has no direct relationship with customers in China and no ability to independently develop its business. It has essentially handed over its business to a Chinese company that may well become a global competitor.

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[216] 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 at 36.
[217] Rose Tenyotkin et. al., CENTER FOR NAVAL ANALYSES, ECONOMIC STATECRAFT: HOW CHINA LEGALLY ACCESSES FOREIGN TECHNOLOGIES TO BUILD MILITARY CAPABILITIES 14 (Jun. 1, 2020).
[218] *Made in China 2025 Notice* at 1.1, 3.2.
[219] *14th Five-Year Plan* at Ch. 15.1, 15.2.
[220] Alice Kantor, *Cloud Becomes New Front Line Between China and the West*, FINANCIAL TIMES, May 17, 2021, https://www.ft.com/content/ddc4d6ff-13dc-449d-a4ca-9ad3d1d6a184.

A *Journal of International Economic Law* paper summarizes the issue, explaining that in order to access the cloud computing market in China, foreign companies "enter into contractual arrangements with Chinese entities eligible to provide such services and to transfer their proprietary cloud computing technologies to the Chinese entities in exchange for a fee or a share of the revenue."[221] This view was echoed by Naomi Wilson, Vice President of Policy at the Information Technology Industry Council, who has explained how these forced partnerships in cloud computing transfer know-how to China and accelerate indigenization:

> They're [the Chinese companies] basically learning from the experts at a much faster pace than they would be able to develop this type of business model on their own. The close coordination between the foreign cloud service provider and the Chinese partner also does lend itself to circumstances where individuals may be privy to information, such as intellectual property, that they might not otherwise be.[222]

Nigel Corey, associate director at the Information Technology & Innovation Foundation, provided an update on this issue in testimony given to Congress, stating:

> As U.S. cloud firms have told USTR as part of its Special 301 investigations, China uses a restrictive, yet ambiguous, licensing process to benefit Chinese cloud computing businesses and pressure technology transfer. China first tacitly permits foreign investors to partner with licensed Chinese cloud service providers to gain market access, and then, once key technology and know-how had been injected into these partnerships, China resolved the regulatory ambiguities that had necessitated these arrangements in favor of the Chinese partner, resulting in the transfer of technology to the Chinese partner.[223]

Today, China's approach to the cloud computing sector remains unchanged. China continues to use a restrictive and ambiguous licensing process to pressure foreign companies to transfer their technology to Chinese companies.

iii. Cybersecurity and Data Security Reviews

The Section 301 Report also highlighted concerns that China's then-nascent cyber-data regime contained ambiguous review mechanisms that could be used to pressure companies to disclose their IP and technology.[224] At the time, these review mechanisms either lacked detail or were contained in draft regulations. Since the Section 301 Report, the regulations underpinning these reviews have been finalized, propagated, and have again brought technology transfer and IP concerns to the fore.

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[221] Julia Ya Qin, *Forced Technology Transfer and the US—China Trade War: Implications for International Economic Law*, 22 JOURNAL OF INT'L ECON. LAW, 743-762 (Dec. 2019).
[222] Tracey Samuelson, *Forced Tech Transfers Happen. But How do They Actually Work?*, MARKETPLACE TECH, Jun. 20, 2019, https://www.marketplace.org/shows/marketplace-tech/chinese-forced-technology-transfers/.
[223] Nigel Cory, INFORMATION TECHNOLOGY & INNOVATION FOUNDATION, *Written Testimony at the U.S.-China Economic and Security Review Commission*: *U.S.-China Innovation, A Net Assessment of the Chinese Communist Party's Economic Ambitions, Plans, and Metrics of Future Success* (Apr. 15, 2021).
[224] For previous discussion on China's *Cybersecurity Law* and data regime, *see* 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 at 177.

The *Cybersecurity Law* (CSL), enacted in 2017, is the seminal law that underpins China's cyber-data regime, and introduced ambiguous cross-border data and equipment reviews that raise concerns of technology transfer.[225] Foreign companies criticized the review provisions of the law for their ambiguity and potential to require foreign companies to hand over their technology in order to access the Chinese market. USCBC's comments on the equipment reviews while the CSL was still in draft stated that "[t]hese types of requirements put companies' core IP at risk, endangering their competitiveness and their ability to innovate."[226]

Likely in response to these concerns, the final version of the CAC's *Cybersecurity Review Measures* (CSR), which govern the equipment review requirements of the CSL, mandate government agencies and their employees to protect IP and to not reveal trade secrets without the explicit permission of the companies being reviewed.[227] However, this does not prevent the government from requiring companies to turn over their trade secrets in the course of a cybersecurity review, as Article 8 of the CSR includes a "catch-all" clause that allows the government to require any "other required materials" deemed necessary for the review.[228]

Catch-all clauses, such as the one featured in the CSR, are a consistent feature of the implementing measures of the CSL, and have been called out by foreign businesses for their potential abuse. Given China's record of technology transfer, and stated goals of fostering national champions in the technology space, government-led or controlled reviews create a significant conflict of interest. The very government entities overseeing these reviews and responsible for protecting foreign companies' trade secrets are also charged with supporting Chinese companies in strategic sectors designated by the Chinese government for development.

For example, Article 6.4 of the *Outbound Data Security Assessment Measures* ("Security Assessment Measures"), which is one of the measures that implements China's cross-border data transfer provisions, including those related to the CSL, requires all companies to submit to government reviews if they wish to transfer "important data"[229] abroad, and allows the government to request any "other required materials," needed for a cross-border security review, enabling the Chinese government to potentially require information that exposes a company's IP.[230]

Furthermore, the Security Assessment Measures and other data regulations broaden the scope of companies subject to cross-border security reviews beyond the limited category originally

[225] *Cybersecurity Law of the People's Republic of China*, Art. 35 (NPC, adopted Nov. 7, 2016), https://www.gov.cn/xinwen/2016-11/07/content_5129723.htm.
[226] USCBC, USCBC COMMENTS ON THE DRAFT CYBERSECURITY LAW (Aug. 4, 2016).
[227] *Cybersecurity Review Measures* (CAC, NDRC, MIIT, MOF, et. al., Order No. 8, issued Dec. 28, 2021), http://www.cac.gov.cn/2022-01/04/c_1642894602182845.htm.
[228] *Cybersecurity Review Measures* at Art. 8.
[229] Important data is a nebulous classification for data that may harm China's national security.
[230] *Outbound Data Security Assessment Measures* (CAC, CAC Order No. 11, issued Jul. 7, 2022), https://www.gov.cn/zhengce/zhengceku/2022-07/08/content_5699851.htm.

outlined in the CSL.[231] A 2020 CSIS article notes this expansion of scope in draft regulations similar to the Security Assessment Measures, and argued that the Chinese government's expanding authority over data would ultimately leave "intellectual property and private information vulnerable to government abuse."[232] In March 2024, China published *Provisions on Promoting and Regulating Cross-Border Flows of Data* ("Provisions") which supersede the *Outbound Data Security Assessment Measures* in case of any inconsistencies. The Provisions continue to require companies to submit to government security reviews if they wish to transfer "important data" overseas.[233]

Finally, the CSL requires all companies operating in China to be certified on its cybersecurity framework, known as the Cybersecurity Multi-Level Protection Scheme (MLPS 2.0).[234] The MLPS 2.0 ranks companies' information systems on a 1 to 5 scale based on how China's national security would be affected should those systems fail. The higher rated a company's system is, the more stringent requirements they are subjected to, including being required to connect to government systems. Companies report that these stringent requirements put their IP at risk. A USCBC report explains:

> There are concerns the MLPS 2.0 framework gives the Chinese government excessive access to companies' proprietary information. Risks to intellectual property protection include requirements to link level 3 systems with the local public security bureau as well as routine auditing and system checks. Some companies have had to provide detailed information to government authorized auditors on their system/infrastructure design and simply trust that this information will be kept confidential and their intellectual property secure.[235]

The net result of China's cyber regime is the state's increased purview over an immeasurable quantity of data owned by companies that can be accessed at any time should the Chinese government wish to do so. The Congressional Research Service reports that China's measures restricting cross-border data flows "enhance the Chinese government's control over foreign data (*e.g.*, personal identifying and health information), IP, technology, and research that is transferred to or developed in China and may increase the potential risks to the United States of U.S. government, commercial, and academic activities in these areas."[236]

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[231] Originally, cross-border data transfer assessments only applied to entities designated as critical information infrastructure operators, a limited category of companies operating in sectors deemed essential to China's national security. The security assessment measures and other data regulations broadened the scope so that any company that, within a calendar year, transfers over one million records of personal information, over 10,000 records of sensitive personal information, or any amount important data is subject to a cross-border security review. *See Provisions on Promoting and Regulating Cross-Border Flows of Data* (CAC, enacted Mar. 22, 2024), Art. 7.2; *See also Outbound Data Security Assessment Measures* at Arts. 4.1, 4.2.

[232] Lauren Maranto, *Who Benefits From China's Cybersecurity Laws?*, CSIS, Jun. 25, 2020, https://www.csis.org/blogs/new-perspectives-asia/who-benefits-chinas-cybersecurity-laws.

[233] *Provisions on Promoting and Regulating Cross-Border Flows of Data* at Art. 7.2.

[234] *Cybersecurity Law* at Art. 27.

[235] Antonio Douglas & Hannah Feldshuh, USCBC, HOW AMERICAN COMPANIES ARE APPROACHING CHINA'S DATA, PRIVACY, AND CYBERSECURITY REGIMES (Apr. 2022).

[236] KAREN M. SUTTER, CONG. RSCH. SERV., R46915, CHINA'S RECENT TRADE MEASURES AND COUNTERMEASURES: ISSUES FOR CONGRESS 23 (Dec. 10, 2021).

iv. Human Genetic Resources

Biotechnology, pharmaceuticals, and high-performance medical devices comprise one of the ten priority sectors targeted by the *Made in China 2025 Notice*. The development and approval of such products often require testing materials that contain human genetic materials, such as organ, tissue, or cell samples. In 2019, the State Council issued the *Regulation on the Administration of Human Genetic Resources* ("HGR Regulation"),[237] superseding interim measures that had been in place since 1998.[238] July 2023 implementing rules provided additional detail on the HGR Regulation.[239] The HGR Regulation prohibits foreign companies from the collection and analysis of Chinese human genetic resources (HGR) and requires foreign companies to enter into cooperation agreements with a Chinese partner, such as a company, medical institution, or university, in order to conduct research involving Chinese HGR. These cooperation agreements are subject to approval by MOST's Office of Human Genetic Resources Administration.[240] The HGR Regulation and its implementing rules further require that the Chinese partner participates in research through the entire process of cooperation.[241] The HGR Regulation states that the foreign entity must share all records and data from the research with its Chinese partner, although the implementing rules clarify that this requirement only pertains to the parts of the research generated from utilizing China's HGR.[242] The HGR Regulation also requires the foreign entity and Chinese partner to jointly apply for and own any patents resulting from the research, although parties are free to contractually agree to rights regarding non-patented research results.[243] These requirements impose pressure on U.S. entities to share IP rights with their Chinese partners in a way that may not be based on voluntary market terms.

Beyond HGR regulations, the Pharmaceutical Research and Manufacturers of America has raised concerns that China's National Medical Products Administration's clinical trial application process "includes asking questions that would require revealing proprietary information about manufacturing steps and requesting additional data beyond what is required on the face of the application materials… [which] raises concerns about potential disclosure of manufacturing CCI [confidential commercial information] to third parties."[244] Such requirements also raise technology transfer concerns.

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[237] *Regulation on the Administration of Human Genetic Resources* (PRC State Council, [2019] Order No. 717, issued May 28, 2019, effective Jul. 1, 2019), https://www.gov.cn/zhengce/content/2019-06/10/content_5398829.htm.
[238] *Interim Measures on the Administration of Human Genetic Resources* (PRC State Council, Guo Ban Fa [1998] No. 36, issued Jun. 10, 1998), http://www.most.gov.cn/fggw/xzfg/200811/t20081106_64877.htm.
[239] *Implementing Rules for the Regulation on the Administration of Human Genetic Resources* (MOST, [2023] No. 21, issued Jun. 1, 2023, effective Jul. 1, 2023), https://www.most.gov.cn/xxgk/xinxifenlei/fdzdgknr/fgzc/bmgz/202306/t20230601_186416.html.
[240] *Regulation on the Administration of Human Genetic Resources* at Arts. 21-22; *Key Takeaways From China's Regulation on the Administration of Human Genetic Resources*, COVINGTON & BURLING LLP, Jun. 18, 2019, https://www.cov.com/-/media/files/corporate/publications/2019/06/key_takeaways_from_chinas_regulation_on_the_administration_of_human_genetic_resources.pdf.
[241] *Regulation on the Administration of Human Genetic Resources* at Art. 24; *Implementing Rules for the Regulation on the Administration of Human Genetic Resources* at Art. 14.
[242] *Regulation on the Administration of Human Genetic Resources* at Art. 24; *Implementing Rules for the Regulation on the Administration of Human Genetic Resources* at Art. 14.
[243] *Regulation on the Administration of Human Genetic Resources* at Art. 24.
[244] PHARMACEUTICAL RESEARCH AND MANUFACTURERS OF AMERICA, *Special 301 Submission* 2021 81-82.

v. Agricultural Biotechnology Import Approvals

China seeks dominance in agricultural biotechnology. In December 2022, President Xi Jinping stated that China "must persist in agricultural science and technology self-reliance and accelerate the push on breakthroughs in critical core agricultural technology."[245] China employs a regulatory approval process for imports of agricultural biotechnology products that requires companies to submit detailed information that goes beyond what is required in many other jurisdictions.[246] Not only are companies required to obtain approval in the country of origin of a genetically engineered product and submit related data to the Chinese authorities, on top of this, they are required to import viable seeds into China and use Chinese government-designated institutions to conduct in-country field trials, animal feeding studies, and lab tests.[247] The National Agricultural Genetically Modified Organism Biosafety Committee (NBC) responsible for reviewing new genetically engineered products, is comprised of around 70 experts from various Chinese government-affiliated research institutes, universities, and the Chinese government.[248] These requirements provide abundant opportunities for Chinese parties to gain access to cutting edge U.S. biotechnology and the means to replicate that technology in China.

China's regulatory review process for imported products of agricultural biotechnology has not changed meaningfully since 2016. However, China appears to have rapidly reduced regulatory barriers in the review process for domestically-developed biotech products intended for domestic cultivation. Between December 2019 and December 2022, the NBC approved 395 domestic products intended for cultivation but just fifteen foreign-developed products intended for import, suggesting significant advances in China's biotech capacity at the expense of foreign competitors.[249]

USCBC also alleges that the agricultural biotech approval process facilitates technology transfer, stating in its 2023 submission on China's WTO compliance:

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[245] *At the Central Rural Work Conference, This Is How Xi Jinping Laid Out the Construction of a Strong Agriculture Nation* [Chinese], CHINA CENTRAL TELEVISION, Dec. 25, 2022, http://politics.people.com.cn/n1/2022/1225/c1001-32593266.html.

[246] USCBC, COMMENTS REGARDING CHINA'S WTO COMPLIANCE: AN ASSESSMENT BY THE US-CHINA BUSINESS COUNCIL FOR THE TRADE POLICY STAFF COMMITTEE (Sep. 20, 2023).

[247] U.S. DEPARTMENT OF AGRICULTURE [*hereinafter* "USDA"], CHINA: AGRICULTURAL BIOTECHNOLOGY ANNUAL (Nov. 30, 2022).

[248] *Notice of the Member Roster for the Sixth Agricultural Genetically Modified Organism Biosafety Committee* (Ministry of Agriculture and Rural Affairs, issued Nov. 30, 2021), http://www.moa.gov.cn/nybgb/2021/202112/202201/t20220104_6386255.htm.

[249] USDA FOREIGN AGRICULTURAL SERV., GAIN REPORT NO. CH2019-0202, AGRICULTURE BIOTECHNOLOGY ANNUAL (Feb. 2020); USDA FOREIGN AGRICULTURAL SERV., GAIN REPORT NO. CH2020-0161, AGRICULTURE BIOTECHNOLOGY ANNUAL (Dec. 2020); USDA FOREIGN AGRICULTURAL SERV., GAIN REPORT NO. CH2021-0010, CHINA ANNOUNCES SECOND BATCH OF BIOSAFETY CERTIFICATES (Jan. 2021); USDA FOREIGN AGRICULTURAL SERV., GAIN REPORT NO. CH2022-0003, NEW AND RENEWED BIOSAFETY CERTIFICATES ISSUED (Jan. 2022); USDA FOREIGN AGRICULTURAL SERV., GAIN REPORT NO. CH2022-0059, MARA ISSUES ADDITIONAL NEW AND RENEWED BIOSAFETY CERTIFICATES (May 2022); USDA FOREIGN AGRICULTURAL SERV., GAIN REPORT NO. CH2023-0007, MARA ISSUES NEW AND RENEWED GE BIOSAFETY CERTIFICATES (Jan. 2023); USDA FOREIGN AGRICULTURAL SERV., GAIN REPORT NO. CH.2023-0078, NEW AND RENEWED BIOSAFETY CERTIFICATES ISSUED INCLUDING FIRST EVER FOR GENE-EDITED EVENT (May 2023); USDA FOREIGN AGRICULTURAL SERV., GAIN REPORT NO. CH2023-0148, MARA ISSUES NEW AND RENEWED BIOSAFETY CERTIFICATES (Oct. 2023).

> Certain regulatory approval processes also compel information that is not directly relevant and goes far beyond what is required in other jurisdictions. Examples include agricultural biotechnology and type testing for medical devices. While it is often difficult to draw direct connections to technology being transferred to a competitor, such regulatory requirements indirectly facilitate tech transfers.[250]

As shown above, China continues to leverage its opaque licensing and administrative approval regime to force technology transfer from U.S. companies in a variety of industries all targeted by China for industrial dominance.

e. China Continues to Drive Outward Investment Toward Advanced Technology

The Section 301 Report found that China directed and unfairly facilitated the systematic investment in, and acquisition of, U.S. companies and assets by Chinese companies to obtain cutting-edge technologies and IP.[251] A review of China's policies since the Section 301 Report reveals that China has not abandoned its use of state-directed and supported outbound foreign direct investment (OFDI) as a tool to acquire technology. This is despite increased U.S. regulatory oversight under the Committee on Foreign Investment in the United States (CFIUS) and Chinese restrictions on certain types of outbound investments, and despite Chinese commitments in the U.S.-China ETA not to direct OFDI to acquire foreign technology.[252] China continues to employ OFDI policies that direct the acquisition of and investment in foreign technologies, is directly engaged in overseas investment through CCP or state-controlled actors, and continues to focus its investment in the United States on advanced technology.

i. China Maintains Policy Tools to Direct Outbound Investment

The majority of the OFDI-related Chinese measures referenced in the Section 301 Report remain unchanged, preserving the regulatory framework that enables Chinese technology transfer-focused OFDI practices. China maintains an outbound investment approval process that requires companies to undergo multiple layers of government approval.[253]

The central government also continues to issue guidance to shape the implementation of these approvals and provide signals to industry. For example, following capital outflow pressure, the Chinese government issued high level guidance in 2017 to encourage or restrict different kinds of outbound investment. The guidance encouraged "investment cooperation" with overseas high-tech and advanced manufacturing enterprises, as well as the establishment of overseas R&D centers, while restricting investment in "real estate, hotels, cinemas, entertainment, and sports

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[250] USCBC, COMMENTS REGARDING CHINA'S WTO COMPLIANCE: AN ASSESSMENT BY THE US-CHINA BUSINESS COUNCIL FOR THE TRADE POLICY STAFF COMMITTEE.

[251] For previous discussion on China's promotion and facilitation of unfair outbound foreign direct investment, *see* 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 at 66.

[252] U.S.-China ETA Text at Art. 2.1.3.

[253] *Decision on Establishing Administrative License for the Administrative Screening and Approval Items Absolutely Necessary to Be Retained*, Appendix items 1, 2, 188, 191, 468, 487 (PRC State Council, [2004] Order No. 412, issued Jun. 29, 2004, effective Jul. 1, 2004, amended Jan. 29, 2009, further amended Aug. 25, 2016).

clubs" among other areas.[254] This guidance was followed by the 2018 NDRC *Measures for the Administration of Enterprise Outbound Investment*, which outline an approval process for overseas investment in sensitive sectors, and a subsequent *Overseas Investment Sensitive Industry Catalogue,* which lists sensitive sectors in accordance with those restricted in the 2017 guidance.[255] Taken together, these policies channel Chinese OFDI toward Chinese government priorities by requiring companies to obtain approval for investments in non-strategic sectors.

Furthermore, China continues to promote its "Going Out" strategy, which the Section 301 Report describes as an outbound investment strategy that promotes foreign technology acquisition. The 2017 guidance,[256] which calls for "catalyzing the 'Going Out' strategy for products, technologies, and services," remains in effect, while numerous other "Going Out" policies have since been released.[257] For example, on July 27, 2020, the State Council released the *Notice on Several Policies for Promoting the High-Quality Development of the Integrated Circuit Industry and the Software Industry in the New Era.* In its section on international cooperation, the policy states:

> The "Going Out" of the integrated circuit and software industry shall be promoted. The joint establishment of overseas R&D centers shall be facilitated, and international innovative resources shall be more effectively used to improve the level of industrial development.[258]

This policy also outlined numerous tax incentives and other forms of financing support for Chinese integrated circuit companies to follow the "Going Out" strategy for semiconductors.

ii. State and CCP-Backed Investors Remain Heavily Involved in OFDI

Beyond regulatory tools and policy guidance, as described in the Section 301 Report,[259] China leverages an array of state-backed actors to further its OFDI objectives. According to AEI,

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[254] *Guiding Opinions on Further Directing and Standardizing Overseas Investments*, Arts. 3.3, 4.2 (PRC State Council, Guo Ban Fa [2017] No. 74, issued Aug. 18, 2017), https://www.gov.cn/zhengce/content/2017-08/18/content_5218665.htm.

[255] *Measures for the Administration of Enterprise Outbound Investment*, (NDRC, [2017] No. 11, issued Dec. 26, 2017, effective Mar. 1, 2018), https://www.ndrc.gov.cn/fggz/lywzjw/zcfg/201712/t20171226_1047050.html; *Overseas Investment Sensitive Industry Catalogue (2018)*, Sec. 4 (NDRC, Fa Gai Wai Zi [2018] No. 251, issued Jan. 31, 2018), https://www.ndrc.gov.cn/fggz/lywzjw/zcfg/201802/t20180211_1047052.html.

[256] *Guiding Opinions on Further Directing and Standardizing Overseas Investments* at Preamble.

[257] The following policies all promote Chinese companies "Going Out" and investing abroad: *Notice on Several Policies for Promoting the High-Quality Development of the Integrated Circuit Industry and the Software Industry in the New Era*, Art. 37 (PRC State Council, Guo Fa [2020] No. 8, Jul. 27, 2020), http://www.gov.cn/zhengce/content/2020-08/04/content_5532370.htm; MOFCOM, REPORT ON DEVELOPMENT OF CHINA'S OUTWARD INVESTMENT AND ECONOMIC COOPERATION (Feb. 2, 2021); and, *Several Measures on Beijing's Professional Service Industry to Aid the Development of 'Going Out'*, Art. 1 (Beijing Municipal Bureau of Commerce, Development and Reform Commission, & Bureau of Finance, issued Nov. 19, 2021), https://www.beijing.gov.cn/fuwu/lqfw/gggs/202111/t20211119_2541085.html.

[259] For discussion on China's use of state-backed actors to achieve its unfair outbound investment strategy, *see* 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 at 80.

SOEs accounted for over half of China's global outbound investment in 2023.[260] State-owned banks, in particular the policy banks including the Export-Import Bank of China and China Development Bank, and the four largest state-owned commercial banks, have also facilitated outbound investments. SOEs and state-owned banks in China function as extensions of the Party-state and are mandated to place policy objectives above market considerations. According to the Peterson Institute's analysis, SOEs received 83 percent of corporate loans in 2016, providing a resource advantage for companies subject to a greater degree of state direction to invest abroad.[261]

Additionally, through Party committees, the CCP also maintains a direct presence in most companies that do business in China, providing another mechanism to covertly influence investment decisions. Party committees are CCP cells embedded in companies to "discuss and decide" a number of "major issues"[262] within the institutions they inhabit, including for "significant company investments."[263]

Regarding OFDI, FBI Director Christopher Wray stated in a 2022 speech:

> The Chinese government also makes investments and partnerships to position their proxies to take valuable technology. Sometimes they just wave enough money to get what they want, but often they also conceal which companies they actually control. *Or use companies they don't literally own but instead can control through embedded Chinese Communist Party cells* that are required to exist in virtually any Chinese company of any real size, using elaborate shell games to disguise their efforts both from our companies and from our government investment screening program, CFIUS—the Committee on Foreign Investment in the United States.[264]

In 2019 it was estimated that 92 percent of China's top 500 companies had established Party committees.[265] According to official statistics, in 2022, Party committees existed in 1.57 million firms in China.[266]

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[260] Derek Scissors, AMERICAN ENTERPRISE INSTITUTE, BETTER BUT NOT WELL: CHINA'S GLOBAL INVESTMENT NEEDS MORE FUEL (Jan. 18, 2023).
[261] Nicholas R. Lardy, Zixuan Huang, *State-Owned Chinese Firms Borrowing Far More Than Private Firms Despite Lagging Profits*, PETERSON INSTITUTE FOR INTERNATIONAL ECONOMICS, Jan. 24, 2018, https://www.piie.com/research/piie-charts/state-owned-chinese-firms-borrowing-far-more-private-firms-despite-lagging.
[262] *Regulations on the Work of Party Groups of the Communist Party of China*, Arts. 16, 17 (CCP Central Committee, issued Apr. 6, 2019), https://www.gov.cn/xinwen/2019-04/15/content_5383062.htm.
[263] Scott Livingston, CSIS, THE NEW CHALLENGE OF COMMUNIST CORPORATE GOVERNANCE (Jan. 15, 2021).
[264] Christopher Way, *Countering Threats Posed by the Chinese Government Inside the U.S.*, FBI, Jan. 31, 2022, https://www.fbi.gov/news/speeches/countering-threats-posed-by-the-chinese-government-inside-the-us-wray-013122 (emphasis added).
[265] *Code of Corporate Governance for Listed Companies*, Art. 5 (China Securities Regulatory Commission, 2019 Announcement No. 29, issued Sep. 3, 2018), http://www.ezhou.gov.cn/gk/xxgkzt/yshj/yszc/bhzxtzz/202010/P020201019562114025605.pdf; Neil Thomas, *Party Committees in the Private Sector: Rising Presence, Moderate Prevalence*, MACRO POLO, Dec. 16, 2020, https://macropolo.org/party-committees-private-sector-china/?rp=e.
[266] *Intra-Party Statistical Bulletin of the Chinese Communist Party* [Chinese], PEOPLE'S DAILY, Jul. 1, 2023, http://paper.people.com.cn/rmrb/html/2023-07/01/nw.D110000renmrb_20230701_5-02.htm.

Increasingly in recent years, China has also taken "golden shares" in large private Chinese companies. Under this type of arrangement, the Chinese government, via a government guidance fund or other state-backed entity, purchases a small stake in the company in exchange for a seat on the board of directors or veto rights.[267] The result is stronger Chinese government oversight and control of the company's operations.

The guidance and approval processes for outbound investment and Party committees embedded in companies themselves demonstrates the multiple avenues through which the CCP and Chinese state can advance its objectives through outbound investment. China continues to employ ample tools to steer outbound investment toward strategic sectors in its effort to acquire advanced technology, thought results have been mixed, as the following section demonstrates.

iii. Chinese Investment Continues to Focus on Advanced Technology

Since the passage of the Foreign Investment Risk Review Modernization Act of 2018 (FIRRMA) into law, China's OFDI in the United States has declined precipitously.[268] FIRRMA expanded CFIUS' review authority beyond inbound investments that could result in foreign control of a U.S. business to also include certain non-controlling, non-passive investments into certain businesses involved in critical technology, critical infrastructure, or sensitive personal data.[269] China also tightened its OFDI approval process in 2017 to limit capital flight by reducing investment in non-strategic sectors.[270]

As direct outbound investment has declined, Chinese venture capital (VC) investments in the United States have as well, although they continue to focus on high-tech sectors. [271] Rhodium Group data demonstrate this focus:

> More than half of all transactions (132) [in 2020] occurred in the Health, Pharmaceuticals and Biotechnology sector, followed by Financial and Business Services (43) and Information and Communications Technology (26).[272]

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[267] *China Moves to Take 'Golden Shares' in Alibaba and Tencent Units*, FINANCIAL TIMES, Sep. 20, 2023, https://www.ft.com/content/65e60815-c5a0-4c4a-bcec-4af0f76462de.

[268] According to AEI data, Chinese direct investment in the United States has fallen 93 percent from $23.4 billion in 2017, the last full year of data before FIRRMA, to $1.7 billion in 2023. The Rhodium Group, which corroborates these findings using a different methodology, shows that within this same period, Chinese OFDI in the U.S. information and communications technology sector specifically declined from $1.25 billion to less than $50 million, representing over a 95 percent decline. *See China Global Investment Tracker*, AMERICAN ENTERPRISE INSTITUTE, https://www.aei.org/china-global-investment-tracker/; *China Investment Monitor* (2020), RHODIUM GROUP, http://rhg.com/interactive/china-investment-monitor (last visited Jul. 13, 2023).

[269] *See* Foreign Investment Risk Review Modernization Act of 2018, Pub. L. No. 115-232, tit. XVII, Subtitle A, 132 Stat. 2289; CATHLEEN CIMINO-ISAACS, CONG. RSCH. SERV., IF10952, CFIUS REFORM UNDER FIRRMA (2020).

[270] *Guiding Opinions on Further Directing and Standardizing Overseas Investments* at Art. 4.2.

[271] According to Rhodium Group data, Chinese venture transactions dropped by nearly a third from $4.7 billion in 2018 to $3.2 billion in 2020. FIRRMA, which passed in 2018, made certain venture transactions subject to CFIUS review. *See* RHODIUM GROUP, TWO-WAY STREET – US-CHINA INVESTMENT TRENDS – 2021 UPDATE (May 19, 2021), https://rhg.com/research/twowaystreet-2021/.

[272] *Id.*

While VC investors usually make minority investments and do not obtain operational control of a company, they may still receive access to proprietary company information and technology. Expanded CFIUS coverage under FIRRMA provides increased protection against Chinese efforts to acquire material nonpublic technical information through VC and other forms of investment. However, other channels still exist, such as attempting to obtain technology through due diligence before making an investment or while feigning interest in making an investment.[273] Alon Raphael, the CEO of FemtoMetrix, an American semiconductor tool company that fell victim to Chinese technology theft, explained that Chinese VC funds will "seek proprietary information on technology, customer status, and market position under the guise of due diligence" as part of a "systematic playbook to steal strategic technologies."[274]

The *Made in China 2025 Notice* states that China will "support enterprises that carry out mergers and acquisitions (M&A), equity investment, and venture capital overseas."[275] Bloomberg data on cross-border M&A, private equity, and VC investment by deal count between 2018-2023 demonstrates that Chinese investment continues to disproportionately focus on certain high-tech sectors. China made up 5.4 percent of all cross-border investment entering the United States during this period, but 16.5 percent of all biotechnology investment, 11.7 percent of all pharmaceutical investment, and 9.4 percent of all semiconductor investment.

The above factors show that even as Chinese OFDI continues to decline, its use as a tool for acquiring key technology in critical sectors in the United States remains. This is in part driven by China's OFDI policy environment, which remains largely intact since the Section 301 Report. Even as investment screening creates challenges for China to acquire U.S. technology companies, China maintains a disproportionate focus on high-tech investment.

3. Industry Surveys Affirm the Continued Prevalence of Technology Transfer in China

Industry associations representing foreign business in China have long documented the existence of technology transfer in China through annual surveys. Associations such as the American Chamber of Commerce in China (AmCham China), USCBC, the European Chamber, and other similar groups, have published a number of surveys that affirm that China's technology transfer-related acts, policies, and practices continue after the imposition of section 301 tariffs. All survey responses are anonymized, which incentivizes companies to respond candidly.

As shown in Table 2 below, in response to the *Business Climate Survey* by AmCham China, which represents nearly 1,000 companies operating in China,[276] the aggregate percentage of respondents reporting that they transferred technology to China other than "as a voluntary business decision" increased from 19 percent in the 2020 survey to 40 percent in the 2023

[273] *Chinese Free Look Schemes to Steal your IP*, CHINA LAW BLOG, Mar. 7, 2022, https://harris-sliwoski.com/chinalawblog/chinese-free-look-schemes-to-steal-your-ip/.
[274] Alon Raphael, FEMTOMETRIX, *Testimony*, *House Foreign Affairs Committee, Indo-Pacific Subcommittee – Standing United Against the People's Republic of China's Economic Aggression and Predatory Practices*, 4 (May 2023).
[275] *Made in China 2025 Notice* at 3.9.
[276] *See About Us*, AMCHAM CHINA, https://www.amchamchina.org/about-us/.

survey.[277] This figure includes respondents who transferred technology "as required by joint venture regulations," which increased from 8 percent in the 2020 survey to 15 percent in the 2023 survey, and respondents who transferred technology "to (implicitly/explicitly) improve market access prospects," which increased from zero percent in the 2020 survey to 21 percent in the 2023 survey.[278]

A 2022 survey by the European Chamber, reports that technology transfer is "ongoing" and that "compelled technology transfers occurred after the Foreign Investment Law" entered into force in 2020.[279] Furthermore, in its most recent 2023 survey, the European Chamber reports that 17 percent of its respondents felt "compelled to transfer technology and/or trade secrets in order to maintain market access."[280] Of respondents that did transfer their technology, 41 percent did so "due to joint venture regulations," "written policy requirements," or "verbal pressure from government officials."[281]

[277] Respondents range from 372 in 2020 to 319 in 2023; AMCHAM CHINA, 2020 BUSINESS CLIMATE SURVEY 73 (Mar. 10, 2020); AMCHAM CHINA, 2023 BUSINESS CLIMATE SURVEY 85 (Mar. 5, 2023).
[278] AMCHAM CHINA, 2020 BUSINESS CLIMATE SURVEY at 73; AMCHAM CHINA, 2023 BUSINESS CLIMATE SURVEY at 85.
[279] Of 511 respondents; EUROPEAN CHAMBER, 2022 BUSINESS CONFIDENCE SURVEY 34 (Jun. 20, 2022).
[280] Of 457 respondents; EUROPEAN CHAMBER, 2023 BUSINESS CONFIDENCE SURVEY (Jun. 21, 2023).
[281] *Id.* at 35-36.

Table 2: Industry Association Surveys of Technology Transfer in China 2020-2024

		Percent Answering "Yes"				
Association	**Technology Transfer Question**	**2020***	**2021**	**2022**	**2023**	**2024**
AmCham China	Companies transferring technology to China (inclusive of those transferring same, less, or more than other jurisdictions)	76	72	73	76	74
	Of companies transferring technology, those doing so other than "as a voluntary business decision"	19	34	42	40	40
	Of companies in R&D intensive industries transferring technology, doing so other than "as a voluntary business decision"	30	43	38	45	47
USCBC	Have you been asked to transfer technology?	13	5	14	X**	-
European Chamber	Felt compelled to transfer technology to maintain market access?	16	16	14	17	-

*Survey year corresponds with year the survey was published and not the year the survey was conducted.
** Question not addressed in USCBC's 2023 survey.

As another example, data from an ongoing assessment of the U.S. semiconductor industry conducted by the Department of Commerce's Bureau of Industry and Security indicate that approximately 23 percent of Sino-foreign semiconductor JVs operating in China were formed due to market access or geopolitical concerns.[282]

Taken together, these surveys evidence that China persists in its technology transfer practices four years after the imposition of section 301 tariffs, and three years after the enactment of the FIL. The European Chamber's 2020 *Business Confidence Survey* frames the issues starkly; it observes that while the issue of technology transfer has improved somewhat, technology transfer remains an issue, especially in the *Made in China 2025 Notice* sectors:

[282] U.S. DEPT. OF COMMERCE BUREAU OF INDUSTRY AND SECURITY, U.S. MICROELECTRONICS INDUSTRIAL BASE ASSESSMENT (Oct. 22, 2022).

In industries like *medical devices, aerospace and aviation, and environment*—the crown jewels of European innovation—nearly a third of members report having been compelled to transfer technology in order to maintain market access.[283]

D. Section 301 Tariffs Impact China's Economy

Available trade and investment data and economic literature suggest that the section 301 tariffs have burdened China's economy, imposing meaningful costs in response to China's technology related acts, policies, and practices that demonstrate the leverage afforded by this tool.

1. Data Demonstrate China's Declining Share of U.S. Imports and Foreign Investment

Since the imposition of section 301 tariffs, shifts of U.S. imports and import shares from China to other trading partners, and lower levels of foreign investment in China, suggest the tariffs have imposed a cost on China's economy.

a. Section 301 Tariffs Have Decreased China's Market Share of U.S. Imports

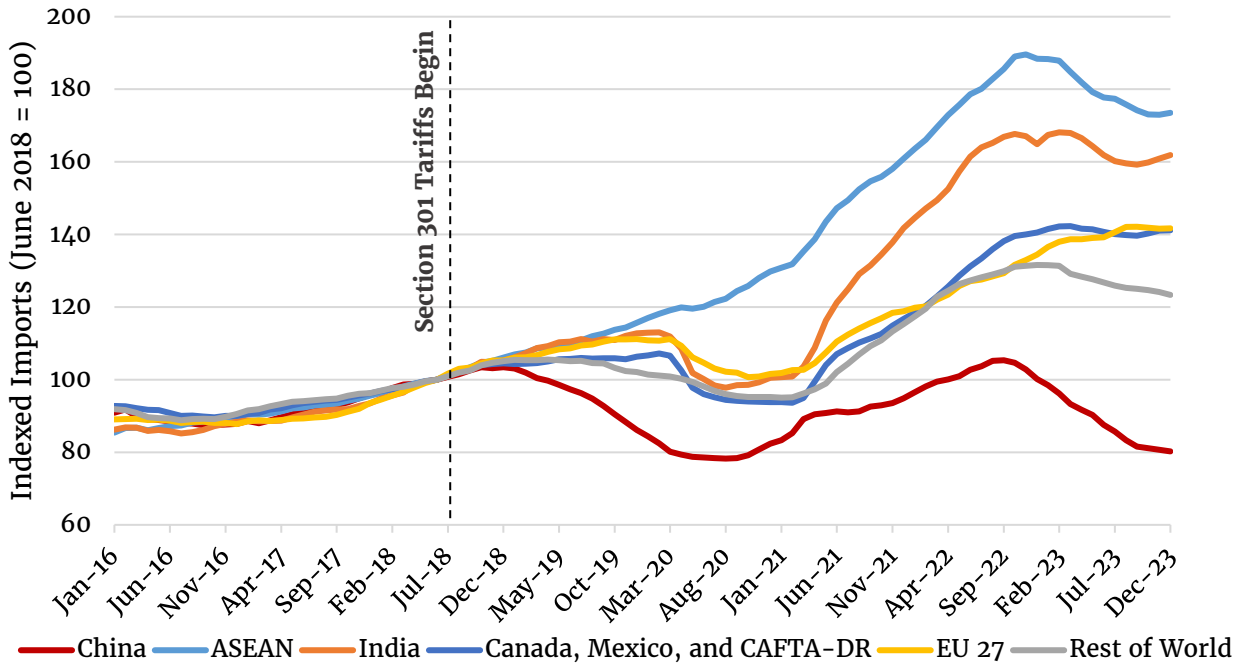
China's market share of U.S. imports has significantly decreased since 2017, the last full year before the imposition of section 301 tariffs. U.S. Census Bureau statistics show that China's overall share of U.S. imports declined steadily from 21.6 percent in 2017 to 13.7 percent in 2023, the lowest level since 2005. Shifting imports and market share declines impose costs on Chinese firms and burden China's economy. As mentioned below in Section II.D.2, estimates indicate that China has been unable to entirely make up for its lost share of U.S. imports with exports to other countries.

By increasing importer prices for goods from China, section 301 tariffs incentivize importers to search for alternative sources of products. The effect is visible in U.S. trade data. Figure 1 displays indexed growth of all U.S. goods imports (by value) from various trading partners and regions, with import levels normalized to June 2018, the month before section 301 tariffs went into effect. Figure 1 depicts a significant change in U.S. import levels and patterns.

Immediately following the imposition of the section 301 tariffs, overall U.S. imports from China begin to fall markedly relative to other trading partners, an observable shift from long-standing trading patterns. Despite a short-lived rebound in 2022, imports from China in 2023 remain below pre-section 301 levels. Figure 1 also demonstrates that while U.S. imports from China have declined from pre-section 301 levels, U.S. imports from other trading partners—particularly Association of Southeast Asian Nations (ASEAN) countries and India, but also, for example, U.S.-Mexico-Canada Agreement and the European Union (EU)—have grown, potentially supporting more diverse and resilient supply chains for American producers and consumers.

[283] Of a total of 626 respondents; EUROPEAN CHAMBER, 2020 BUSINESS CONFIDENCE SURVEY at 43 (emphasis added).

Figure 1: All U.S. Goods Imports from China and Select Regions, Indexed

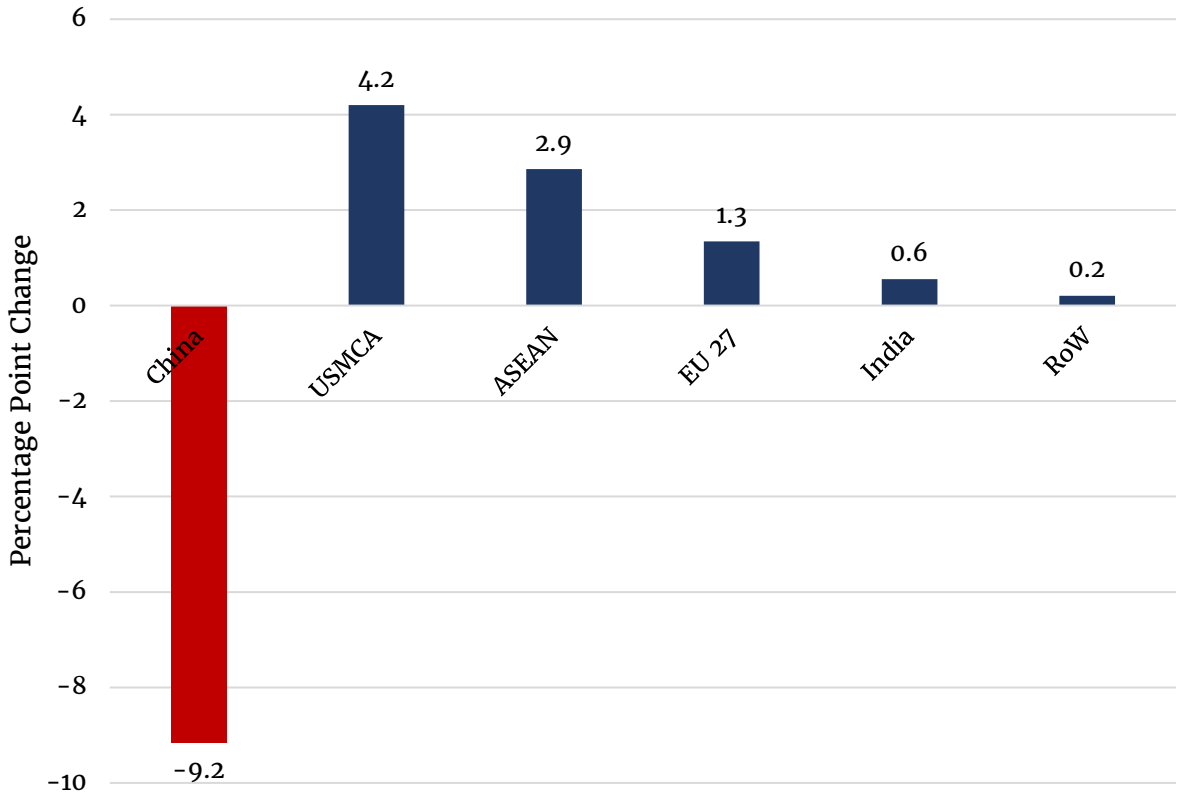


Indexed import values, 12-month trailing sums
Source: U.S. Census

The failure of imports from China to grow alongside imports from other sources results in a significant loss to China's market share of U.S. imports. Figure 2 displays the market share changes for imports of products subject to the section 301 actions from 2017 through 2023. For products on Lists 1 – 4A, China lost 9.2 percentage points of market share while Canada, Mexico, ASEAN countries, the EU, and India experienced the largest gains.[284]

[284] For a breakdown of market share changes within each active section 301 list, *see* Appendix F.

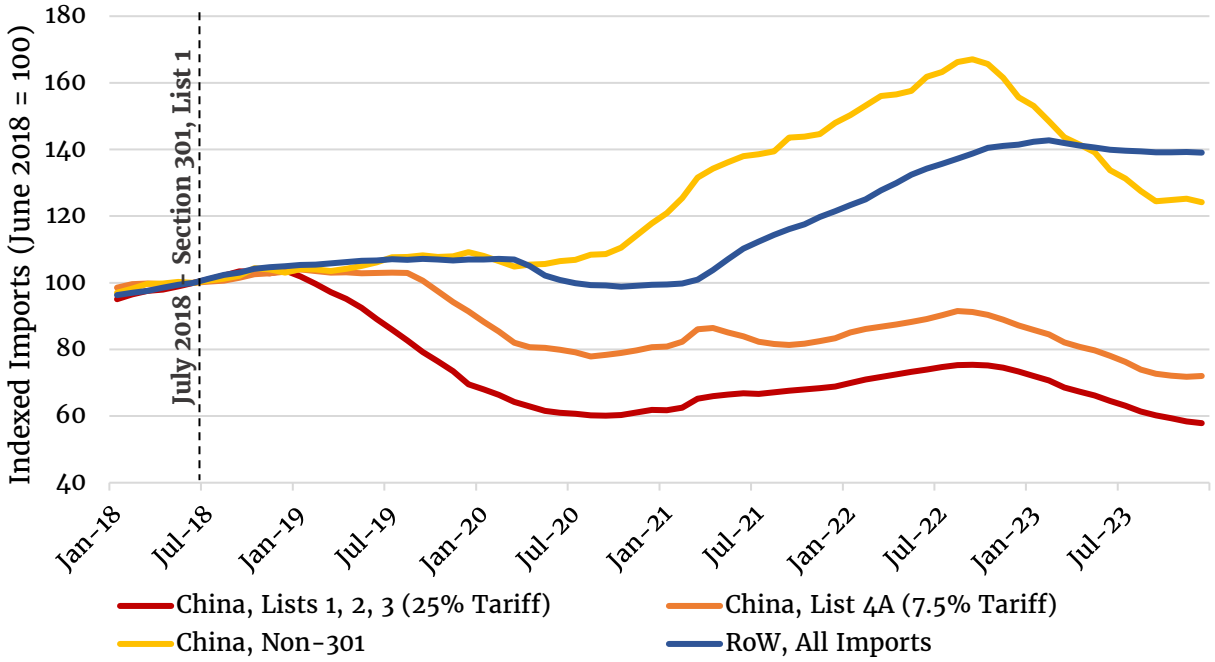
Figure 2: Market Share Changes of U.S. Imports for Section 301 Products (Lists 1-4A), 2023 vs. 2017



Source: U.S. Census

Moreover, products facing higher section 301 tariffs have seen more significant declines than products facing lower section 301 tariffs. Figure 3 compares U.S. imports of products on Lists 1 – 3 and List 4A to goods not subject to section 301 tariffs. Goods on Lists 1 – 3 (subject to 25 percent duties) show steeper declines than goods on List 4A (subject to 7.5 percent duties). By comparison, Chinese goods not subject to section 301 tariffs and goods from other sources are well above 2018 levels.

Figure 3: U.S. Goods Imports by Section 301 List, Indexed (June 2018 = 100)



Indexed import values, 12-month trailing sums
Source: U.S. Census

The changes in imports described in this section cannot be solely attributed to the section 301 tariff actions. Other dynamics, such as the global COVID-19 pandemic, Russia's invasion of Ukraine, fluctuating exchange rates, rising costs of labor in China, shifting U.S. consumer demand, and pre-existing trends may have played a role.

Model-based analyses can help provide an estimate of the extent to which tariffs, in isolation, impact imports from China. In March 2023, the U.S. International Trade Commission (USITC) published the *Economic Impact of Section 232 and 301 Tariffs on U.S. Industries* ("USITC Report"), which incorporates model estimates and is perhaps the only analysis to isolate the impacts of the section 301 tariffs.[285] The analysis found that of products covered by the section 301 tariffs, U.S. imports declined 15 percent from about $311 billion in 2017 to $265 billion in 2021. Using partial equilibrium models to estimate the isolated impact of section 301 tariffs as opposed to other tariffs, and controlling for other factors impacting trade like the COVID-19 pandemic, the USITC found that between 2018 and 2021, the section 301 tariffs decreased imports from China by 13 percent on average. A USITC econometric model estimated that for every 1 percent increase in tariff rate, import value and import quantity from China fall by about 2 percent for products covered by the section 301 tariffs, and the effect becomes greater over time, indicating that U.S. importers will continue to adjust their sourcing away from China into the future.[286]

[285] Economic Impact of Section 232 and 301 Tariffs on U.S. Industries, Inv. No. 332-591, USITC Pub. 5405 (Mar. 2023) (Final) [*hereinafter* "USITC Report"].
[286] USITC Report at 146.

Census data show that for the ten sectors in the USITC Report most directly affected by the section 301 duties, China's market share in 2023 declined from 2017 for each industry (see Appendix G). In Appendix H, graphs show changes in import value and percentage change from 2017 to 2023 for each of the ten industries for China and select regions. These graphs show absolute and percentage declines in imports from China compared to increases from select regions. For additional discussion of the extent to which tariffs impacted imports from China, see Section III.

b. Section 301 Tariffs Disincentivize FDI Into China

U.S. section 301 tariffs applied to China-origin goods may also burden China's economy by incentivizing companies seeking to export to the United States to invest elsewhere in order to reduce costs at the point of import into the United States. In addition, and unrelated to the section 301 tariffs, China itself has discouraged foreign investment through its own actions, such as restrictive data, personal information, and cybersecurity rules; discriminatory licenses and approvals; uneven enforcement of laws and regulations; lack of transparency; poor IP protection; and industrial policies.[287] China's economic challenges and slowdown also make it less attractive as an investment destination.[288]

Rhodium Group analysis of fDi Markets data show announcements of foreign greenfield investment in China declining from over $100 billion in 2018, when the section 301 tariffs were first applied, to just $6 billion in the first half of 2022, its lowest level in almost 20 years.[289] Rhodium's analysis of Bloomberg data show that newly announced cross border M&A transactions have also declined since 2019.[290] Lower rates of foreign investment in China decrease opportunities for China to leverage JV requirements or invasive licensing procedures to force technology transfer from foreign companies.

An April 2023 International Monetary Fund (IMF) analysis found that China is losing market share in Foreign Direct Investment (FDI) flows in strategic sectors in particular.[291] The IMF defines strategic sectors as "semiconductors, telecommunications and 5G infrastructure, equipment needed for green transition, pharmaceutical ingredients, and strategic and critical minerals."[292] Using fDi Markets data, the IMF shows that U.S. greenfield FDI into China for the period of Q2 2020 through Q4 2022 dropped 40.6 percent compared to the period from Q1 2015 to Q1 2020.[293]

China's reaction to this decline in foreign investment has been pronounced, suggesting deep-seated misgivings about the withdrawal of foreign investment from China and betraying China's

[287] USCBC's 2023 member survey includes these issues as top concerns of respondents. *See* USCBC, 2023 MEMBER SURVEY 2 (Sep. 26, 2023).
[288] IMF, WORLD ECONOMIC OUTLOOK UPDATE, JANUARY 2024: MODERATING INFLATION AND STEADY GROWTH OPEN PATH TO SOFT LANDING 6 (Jan. 2024).
[289] Thilo Hanemann, Mark Witzke, Yvonne Yu, *Cutting Through the Fog: FDI in China Since COVID-19*, RHODIUM GROUP, Dec. 13, 2022, https://rhg.com/research/cutting-through-the-fog/.
[290] *Id*.
[291] IMF, APRIL 2023 WORLD ECONOMIC OUTLOOK 95 (Apr. 2023).
[292] *Id.* at Ch. 4 ¶ 3.
[293] *Id.* at 95.

reliance on foreign investment for economic growth and technological advancement. The degree of China's concern about lower FDI became evident in the months following its lifting of COVID-19-related restrictions when China launched a public-facing charm offensive aimed at attracting foreign investors:

- In Li Qiang's first press conference as premier at the end of China's March 2023 NPC meetings, he declared that "An open China welcomes investors from all over the world."[294]

- Later that month, China's vice premier in charge of the economy, He Lifeng, delivered remarks at a ceremony in Guangdong to kick of the "Year of Investing in China."[295]

- At a May 2023 meeting with U.S. companies in Shanghai, Chinese Commerce Minister Wang Wentao emphasized that "U.S. companies are welcome, as always, to do business in China for win-win cooperation."[296]

- In June 2023, Premier Li gave the opening address at the Summer Davos Forum in Tianjin where he highlighted that China will "provide opportunities of win-win cooperation to investors from all countries."[297]

- In August 2023, China's State Council issued a 24-point document on attracting foreign investment, promising improvements in government procurement access, cross border data flows, transparency, tax and financial support, and market access.[298] In March 2024, China released a follow up 24-point document with additional commitments.[299]

This coordinated push to attract FDI by China's most senior economic officials demonstrates their recognition that American and other foreign companies are not investing in China as they had in the past, and that this is a problem for China. Neither lower FDI in China nor China's most senior economic officials' observable concern over lower FDI can be entirely attributed to section 301 tariffs. Nevertheless, it is reasonable to conclude that these trends show foreign firms' reluctance to invest in China is due in part to section 301 tariffs.

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[294] *Premier Li Qiang Meets the Press: Full Transcript of Questions and Answers*, MINISTRY OF FOREIGN AFFAIRS [*hereinafter* "MOFA"], Mar. 13, 2023, https://www.fmprc.gov.cn/mfa_eng/zxxx_662805/202303/t20230314_11040394.html.
[295] *The Opening Ceremony of the "Year of Investing in China" Investment Promotion Event Commences* [Chinese], PEOPLE'S DAILY, Mar. 29, 2023, http://politics.people.com.cn/n1/2023/0329/c1001-32653132.html.
[296] *Minister of Commerce Wang Wentao Chairs a Meeting With US Companies*, MOFCOM, May 23, 2023, http://english.mofcom.gov.cn/article/newsrelease/significantnews/202305/20230503412324.shtml.
[297] *Li Qiang Attends and Addresses the Opening Plenary of the 2023 Summer Davos Forum*, MOFA, Jun. 27, 2023, https://www.fmprc.gov.cn/eng/wjdt_665385/wshd_665389/202306/t20230630_11106104.html.
[298] *State Council Opinions on Further Optimizing the Foreign Investment Environment and Increasing the Attraction of Foreign Investment* (PRC State Council, Guo Fa [2023] No. 11, issued Aug. 13, 2023), https://www.gov.cn/zhengce/content/202308/content_6898048.htm.
[299] *Notice on Issuing the Action Plan for Solidly Promoting High-Level Opening Up and More Vigorously Attracting and Utilizing Foreign Investment* (PRC State Council, Guo Ban Fa [2024] No. 9, issued Mar. 19, 2024), https://www.gov.cn/zhengce/content/202403/content_6940154.htm.

There are further sources evidencing the link between the section 301 tariffs and changes in company investment decisions. Business group surveys demonstrate that companies consider the section 301 tariffs, among other factors, when assessing or reassessing investments in China. The American Chamber of Commerce in Shanghai's (AmCham Shanghai) 2023 member survey found that 22 percent of respondents planned to decrease investment in China in 2023 compared to the previous year.[300] Top reasons cited for decreasing investment spanned a number of factors, including uncertainty about U.S.-China trade policy and expectations of slower growth in China. A noteworthy 22 percent of respondents decreasing investment in China indicated tariffs were a factor in their decision-making process.[301] The USCBC 2023 member survey found that 22 percent of respondents invest in China expressly to export to the United States, which represents the population of companies likely to be most influenced by the section 301 tariffs in making decisions to move some of their investment out of China.[302]

2. Economic Literature Suggests Tariffs Burden China's Economy

While significant literature exists on the costs of the section 301 tariffs on the U.S. economy, including estimates by the USITC on the impacts of the section 301 tariffs to trade, production, and prices in certain sectors of the U.S. economy, less has been written about the overall cost to China's economy. In the economic literature, the cost to an economy can be captured by a measure of aggregate welfare loss or loss of economic efficiency and is commonly estimated as an annualized percent of GDP.

The lack of Chinese studies on the section 301 tariffs' welfare loss to China's economy may be due to insufficient data, censorship, and lack of transparency in China. China has long censored the internet and media and is exercising ever-increasing control over information within its borders.[303] This has likely played a role in suppressing any in-country analysis of what the section 301 tariffs have done to affect China's industrial drive for dominance.

Nevertheless, existing studies along with a qualitative statement from one former Chinese government official provide some insight into the ongoing cost of section 301 tariffs and China's retaliatory tariffs on China's economy. The general equilibrium models employed by the academic studies provide avenues for China to reduce the welfare loss to its economy through redirection of exports to alternative trading partners. However, model estimates find an overall welfare loss for China's economy, suggesting that China is not able to fully displace all lost exports to the United States. Researchers from Singapore Management University deploy a micro-to-macro approach and estimate that the cost of section 301 tariffs and China's retaliatory tariffs is 0.31 percent of GDP or $38 billion to China's economy, annually.[304] Over five years, such losses would amount to $190 billion in 2017 dollars. Similarly, economists at the Asian Development Bank estimate that the section 301 tariffs and China's retaliatory tariffs,

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[300] AMERICAN CHAMBER OF COMMERCE IN SHANGHAI [*hereinafter* "AMCHAM SHANGHAI"], 2023 CHINA BUSINESS REPORT at 12 (2023).
[301] *Id.* at 70.
[302] USCBC, 2023 MEMBER SURVEY at 22.
[303] Vincent Brussee, Kai Von Carnap, MERICS, THE INCREASING CHALLENGE OF OBTAINING INFORMATION FROM XI'S CHINA (Feb. 2024).
[304] Pai-li Chang, Kefang Yao, & Fan Zheng, *The Response of the Chinese Economy to the U.S.-China Trade War: 2018-2019*, ECONOMICS AND STATISTICS WORKING PAPERS (2021).

implemented as of May 2019, would cost the Chinese economy 0.36 percent of GDP—$44 billion annually and $221 billion over five years in 2017 dollars.[305] Finally, using a similar technique, economists at UNISINOS, a Brazil-based university, estimate that the section 301 tariffs and China's retaliatory tariffs implemented as of July 2018 cost China's economy up to $54 billion annually—0.44 percent of GDP—or $270 billion over five years.[306] Since further tariffs were enacted beyond those covered by these studies, it stands to reason that if the studies had been conducted later, the welfare losses would have been found to be higher.

The sole public statement by a current or former Chinese official quantifying the cost of the section 301 tariffs to China was made in early September 2018. Zhou Xiaochuan, former governor of the People's Bank of China,[307] told *CNBC* that the negative effect of section 301 tariffs on China's economy "is less than half a percent impact to the Chinese economy."[308] A 0.5 percent welfare loss to GDP for China would amount to $62 billion annually or $308 billion in 2017 dollars over five years. Given that the scope of the tariff actions increased significantly following Zhou's comment, the welfare loss to China's economy would be expected to be far greater than Zhou's estimate.

In sum, the available academic literature indicates that the section 301 tariffs have and continue to impose a material cost on China and its economy.

E. Section 301 Tariffs Likely Reduced Exposure of American IP to China

Production shifts out of China—particularly shifts of a company's own manufacturing operations—reduce exposure to key tools China uses to induce technology transfer. Two main tools of technology transfer are foreign ownership restrictions, which require JVs in certain sectors for foreign companies to operate in China, and invasive, selectively applied licensing requirements and administrative review processes. The fewer U.S. firms operating directly in the Chinese market, the less exposed they are to these coercive tools. In addition, China is less able to deploy insider threats when U.S. companies move their operations out of China, which may play some part in reducing the risk for their China-based confidential business information and know-how.

IP theft in the context of contract manufacturing is a particularly salient problem for foreign companies sourcing from the Chinese market. A decrease in contract manufacturing in China can also reduce the exposure of U.S. companies' IP, including trade secrets and confidential business information, to China's technology transfer-related acts, policies, and practices.

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[305] Elisabetta Gentile, Gen Li, Mahinthan Mariasingham, *Assessing the Impact of the United States-People's Republic of China Trade Dispute Using a Multiregional Computable General Equilibrium Model*, ASIAN DEVELOPMENT BANK (Sep. 2020).

[306] Measures include section 232, List 1 of section 301, and China's retaliation to List 1. Monique Carvalho, André Azevedo, Angélica Massuquetti, *Emerging Countries and the Effects of the Trade War between US and China*, 45 ECONOMIES 7(2) (2019).

[307] The People's Bank of China, or PBOC, is China's central bank.

[308] *The Trade War's Impact on China will be Insignificant, Former Central Bank Governor Says,* CNBC, Sep. 7, 2018, https://www.cnbc.com/2018/09/07/trade-war-impact-on-china-insignificant-zhou-xiaochuan--says.html. ("We used a mathematical model to calculate the negative impact of the trade war. It is not very large, it is not significant. It is less than half a percent (of an) impact to the Chinese economy.")

Lawyers advising U.S. and other foreign businesses in China describe particularly acute challenges with Chinese contract manufacturers stealing the designs of products they produce for foreign companies and creating similar competing products or counterfeits. One legal expert explained in 2020, "We are seeing a large increase in Chinese manufacturers low-balling their pricing to lure in foreign companies simply to flip around and steal and start selling the foreign company's product."[309] According to U.S. Customs and Border Protection (CBP) statistics, China (together with Hong Kong) accounted for 82 percent of the value of counterfeit and pirated goods seized by CBP in FY 2022 and increased to 84 percent in FY 2023.[310]

Since the imposition of section 301 tariffs, statements made by certain American companies, as well as business surveys, indicate that many U.S. firms are shifting production capacity out of China, thereby reducing U.S. companies' exposure to China's technology transfer-related acts, policies, and practices addressed in the Section 301 Report. These anecdotal sources combined with survey data suggest that the section 301 tariffs are an important factor in companies' decision-making processes.

1. Some U.S. Companies Attribute Production Shifts to Section 301 Tariffs, Decreasing Exposure to China's Acts, Policies, and Practices

USTR analysis finds that since 2018, hundreds of U.S. companies, ranging from large multinationals listed on the S&P 500 to small and medium-sized enterprises, have made public statements directly attributing their decisions to move production capacity out of China to the section 301 tariffs.[311] Many of these statements come from companies in high-technology sectors.[312] For example, the CFO of Honeywell International Inc., an American technology company, stated during a 2018 earnings call that the company was "making structural changes, including modify[ing] some sources of supply, seeking alternative sources and taking other commercial actions as necessary" in response to section 232 and section 301 tariffs.[313] In July 2019, press reporting revealed that Indiana diesel-engine maker Cummins, "has avoided $50 million in tariff expenses by moving some production [from China] to India and other countries."[314]

In July 2019, press reporting indicated American personal computer manufacturers HP and Dell were planning to move up to 30 percent of their notebook production out of China. Dell had reportedly started a "pilot run" of notebook production in Taiwan, Vietnam, and the Philippines.

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[309] Dan Harris, *It's Perfectly Legal for Your Chinese Manufacturer to Copy Your Products*, HARRIS BRICKEN SLIWOSKI LLP, Dec. 19, 2020, https://harrisbricken.com/chinalawblog/its-perfectly-legal-for-your-chinese-manufacturer-to-copy-your-products/.

[310] *Intellectual Property Rights (IPR) Seizures*, U.S. CUSTOMS AND BORDER PROTECTION, https://www.cbp.gov/newsroom/stats/intellectual-property-rights-ipr-seizures.Value is measured by manufacturers' suggested retail sale price.

[311] This subsection assumes all comments are at least inclusive of section 301 tariffs when using non-specific terminology, based on timing and context of cited quotes.

[312] For a sampling of additional representative statements, *see* Appendix I.

[313] *Q3 2018 Honeywell International Inc. Earnings Call – Final*, CQ FD DISCLOSURE, Oct. 19, 2018.

[314] *Manufacturers Move Supply Chains Out of China*, WALL STREET JOURNAL, Jul. 14, 2019, https://www.wsj.com/articles/manufacturers-move-supply-chains-out-of-china-11563096601.

[315] Dell CFO Thomas Sweet said at a September 2019 industry conference, "as a result of some of these tariff dynamics, we've had to reallocate where we're building certain capabilities and [where] we're building certain end-user demand items."[316]

American computer-controlled cutting tool manufacturer Cricut Inc. reported in a November 2021 regulatory filing that, "gross margin increased due to the net impact of tariff mitigation by moving a significant amount of machine manufacturing from China to Malaysia."[317]

In a February 2022 regulatory filing, executives from computer networking company Netgear stated that the company "worked closely with our manufacturing partners to implement ways to mitigate the impact of these tariffs on our supply chain as promptly and reasonably as practicable, including shifting production outside of China."[318]

Owens Corning Inc., an Ohio-headquartered composite materials manufacturer, stated in a July 2023 regulatory filing:

> In December 2021, the Company took actions to restructure operations within the Roofing segment's components product line by relocating production assets from China to India, which allowed the business to optimize its manufacturing network and support a tariff mitigation strategy.[319]

In an August 2023 regulatory filing, wind blade manufacturing firm TPI Composites Inc., stated that:

> [due to] increased logistics costs and tariffs imposed on components of wind turbines from China… we ceased production at our Yangzhou, China manufacturing facility as of December 31, 2022 and plan to shut down our business operations in China in the next 12 months.[320]

These company statements demonstrate that section 301 tariffs were a contributing factor in decisions to shift production and other operations out of China. The consistency with which company officials cite the section 301 tariffs speaks to the tariffs' efficacy in prompting American companies to re-think their decisions. Shifting production and other operations outside of China helps companies shield their IP, including trade secrets, and confidential business information, from China's technology transfer-related acts, policies, and practices.

2. Industry Group Surveys Show Foreign Companies Shifting Away From China

Surveys of U.S.-headquartered companies with investments in China corroborate the finding above that U.S. companies are shifting some production capacity away from China in part due to

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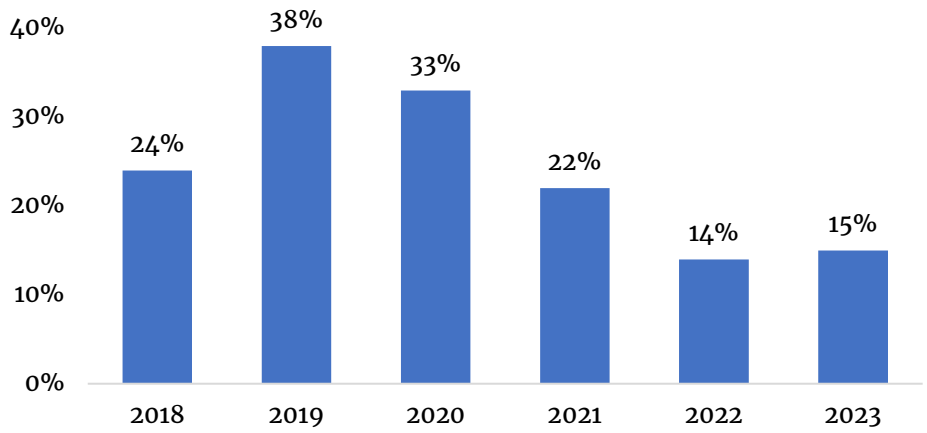
[315] *HP, Dell and Microsoft Look to Join Electronics Exodus From China*, NIKKEI ASIA, Jul. 3, 2019, https://asia.nikkei.com/Economy/Trade-war/HP-Dell-and-Microsoft-look-to-join-electronics-exodus-from-China.
[316] *Dell Technologies Inc at Citi Global Technology Conference - Final*, CQ FD DISCLOSURE, Sep. 5, 2019.
[317] Cricut Inc., Q3 2021 Quarterly Report (Form 10-Q) (Nov. 12, 2021).
[318] Netgear Inc., 2021 Annual Report (Form 10-K) (Feb. 18, 2022).
[319] Owens Corning Inc., Q2 2023 Quarterly Report (Form 10-Q) (Jul. 26, 2023).
[320] TPI Composites, Inc., Q2 2023 Quarterly Report (Form 10-Q) (Aug. 3, 2023).

the section 301 tariffs. USCBC member surveys show a steadily increasing percentage of respondents moving some or all operations out of China in recent years, nearly tripling from 8 percent in 2017 to 23 percent in 2023.[321] AmCham China's 2024 survey similarly reports that 23 percent of companies were considering or had already begun the process of relocating manufacturing or sourcing outside of China in 2023.[322]

Surveys also demonstrate, to some degree,[323] the impact section 301 tariffs have had on these production shifts. AmCham China's member surveys show that, of respondents considering moving capacity or having already started moving capacity out of China, those moving explicitly because of U.S. tariffs amounted to 24 percent in 2018, 38 percent in 2019, 33 percent in 2020, 22 percent in 2021, 14 percent in 2022, and 15 percent in 2023.[324]

Figure 4: AmCham China: Of Companies Considering or Already Moving Capacity Out of China, Percentage Citing U.S. Tariffs as a Reason[325]



Similarly, AmCham Shanghai's 2023 member survey found that 19 percent of respondents were considering moving some portion of their operations outside of China in the next one to three years, and 24 percent of these respondents highlighted tariffs as a reason for moving operations.[326] This survey suggests that the section 301 tariffs will have an impact on future investment decisions involving China as well. In the past year, 40 percent of respondents

[321] USCBC, 2023 MEMBER SURVEY at 22. USCBC's 2023 survey includes responses from 117 member companies.
[322] AMCHAM CHINA, 2024 BUSINESS CLIMATE SURVEY 49 (Feb. 1, 2024). AmCham China's 2024 survey includes 337 respondents.
[323] This subsection assumes that all cited surveys are at least inclusive of section 301 tariffs when asking all tariff-related questions, based on their timing context.
[324] AMCHAM CHINA, 2024 BUSINESS CLIMATE SURVEY at 50; AMCHAM CHINA, 2022 BUSINESS CLIMATE SURVEY 68 (Mar. 8, 2022); AMCHAM CHINA, 2021 BUSINESS CLIMATE SURVEY 49 (Mar. 9, 2021); AMCHAM CHINA, 2020 BUSINESS CLIMATE SURVEY at 41. The number of respondents in these surveys ranged from 319-372.
[325] AMCHAM CHINA, 2024 BUSINESS CLIMATE SURVEY at 50; AMCHAM CHINA, 2022 BUSINESS CLIMATE SURVEY at 68; AMCHAM CHINA, 2021 BUSINESS CLIMATE SURVEY at 49; AMCHAM CHINA, 2020 BUSINESS CLIMATE SURVEY at 41.
[325] AMCHAM SHANGHAI, 2023 CHINA BUSINESS REPORT at 17, 72.
[326] Of a total of 63 respondents; AMCHAM SHANGHAI, 2023 CHINA BUSINESS REPORT at 17, 72.

indicated they had redirected investment originally planned for China to other foreign locations, and 9 percent of these respondents cited tariffs as a factor.[327]

AmCham China's 2024 *Business Climate Survey* also shines light on some of the differences in supply chain shifts between sectors. The technology and R&D sector showed the highest percentage of respondents considering or already beginning the process of relocating manufacturing or sourcing outside of China at 32 percent.[328]

Companies shift production locations for many reasons beyond the section 301 tariffs, including labor costs, tax rates, proximity to customers, workforce skills, access to raw materials, infrastructure conditions, shipping times and costs, and production scale and speed. The COVID-19 pandemic and the Chinese government's response, as well as Russia's invasion of Ukraine, also put unprecedented pressure on supply chains in recent years. While it is not possible to precisely disaggregate all these factors, company statements and business surveys support the conclusion that the section 301 tariffs have been a key factor contributing to some manufacturing shifts out of China, decreasing exposure to China's technology transfer-related acts, policies, and practices.

[327] 40 percent of a total of 325 respondents; 9 percent of a total of 129 respondents; *Id*. at 15, 71, 72.
[328] AMCHAM CHINA, 2024 BUSINESS CLIMATE SURVEY at 49.

III. The Effects of the Actions on the United States Economy

A. Introduction

This section addresses findings from the economics literature regarding effects of the section 301 duties on the U.S. economy, including effects on producers and consumers and impacts on supply chain resilience. We include the principal U.S. government analysis regarding impacts of the section 301 duties, the USITC Report, requested by Congress and published by the USITC in March 2023. The USITC Report isolates the impact of section 301 duties applied to China-origin goods from other U.S. tariff actions enacted in 2018, including duties applied to certain steel and aluminum products from various countries under section 232 and to imports of large residential washers and solar cells and modules from all countries under section 201. The USITC estimates impacts of the section 301 duties on trade, production, and prices in certain U.S. industries, as requested by Congress. In complying with Congress' request, the USITC did not estimate overall costs of the section 301 duties on the U.S. economy or any overall benefits associated with the duties, whether or not related to findings from the Section 301 Report.

Additional economic research is similar to the USITC Report in that most studies estimate impacts of the tariffs on the U.S. economy without consideration of the reasons for application of tariffs or potential benefits associated with them in areas such as protection of U.S. IP and strengthening supply chain resilience. Unlike the USITC Report, the literature generally examines broader economic impacts related to the combined 2018-2019 tariff actions, of which section 301 duties were the largest in terms of total value of imports to which duties applied, rather than impacts of the section 301 duties in isolation. In some instances, these analyses estimate adverse impacts of retaliatory tariffs applied to U.S. exports in addition to impacts of U.S. duties. Studies generally address industry-specific, aggregate and distributional impacts on the U.S. economy, effects on prices and consumption, and effects on particular sectors including changes in production and input prices. Findings from the literature discussed below therefore address effects of the section 301 duties on the U.S. economy in multiple contexts and should be considered in combination.

USTR has reviewed the literature that addresses the economic impacts of the section 301 duties, and those duties in isolation from other tariff actions whenever possible. Economic studies selected for inclusion in this section do not represent an exhaustive catalog of all research conducted thus far on impacts of the section 301 duties. USTR has prioritized certain elements of the literature based on factors including source and quality of research, time period of publication, and relevance to effects of the duties on the U.S. economy, though referenced studies may contain additional content that is not directly relevant to the section 301 duties. We therefore exclude content from referenced studies that is not relevant to the Four-Year Review. Furthermore, our review of the literature suggests that certain economic considerations at issue in the Four-Year Review, such as issues addressed in requests for public comment, have not yet been directly addressed or addressed in sufficient detail in the literature. For example, while the literature often focuses on economy-wide impacts and impacts on certain sectors, it generally does not specifically address impacts on small businesses across particular sectors, degrees of industry concentration, or profits.

This section proceeds as follows, first are general caveats regarding the literature, as certain caveats inform how we describe U.S. duties, their estimated effects, and critical limitations of economic research conducted to date. Next are caveats specific to the USITC Report. We then provide a summary of key, generally consistent findings on the impacts of section 301 and other U.S. duties from the economics literature. All findings are subject to the preceding caveats. We then provide a discussion of select findings from the USITC Report and data from and related to it, followed by a discussion of additional select literature with references to select relevant studies. This section concludes with a review of findings from the literature on impacts of the tariffs on apparent diversification of U.S. imports and supply chain resilience.

B. General Caveats Regarding the Literature

The following general caveats apply to the literature included here regarding effects of the section 301 duties on the U.S. economy.

First, the literature generally examines the 2018-2019 U.S. tariff actions as isolated policy measures without reference to the policy landscape that may be reinforcing or undermining effects of the tariffs. In most cases the literature does not address recent U.S. legislation such as the Inflation Reduction Act (IRA), the Creating Helpful Incentives to Produce Semiconductors (CHIPS) Act, and Research and Development, Competition, and Innovation Act[329] that impact U.S. production and may impact trade and investment patterns for certain sectors and products to which section 301 duties are applied. Findings in the literature regarding investment impacts tend to be confined to the period immediately after imposition of duties and should not necessarily be interpreted to apply to current or long-run conditions.

Second, the literature tends to implicitly assume that the pre-tariff baseline economy was efficient and therefore does not consider whether, or any degree to which, China's technology transfer-related acts, policies, and practices identified in the Section 301 Report created adverse impacts that distorted the baseline economy. Relatedly, studies that address price impacts of the section 301 duties generally do not account for potential price impacts applicable to various goods and inputs resulting from China's broader economic and trade policies that may have existed prior to and following imposition of the section 301 duties.

Third, the literature estimates impact of U.S. duties, and in certain instances retaliation against those duties, but not economic impacts of any potential changes made by China after the imposition of section 301 duties to the technology transfer-related acts, policies, and practices addressed in the Section 301 Report. The literature therefore generally endeavors to estimate costs of the section 301 duties to the U.S. economy without estimation, or even consideration, of potential benefits to the U.S. economy resulting from changes in Chinese policy or reductions in firms' exposure Chinese policies.

Fourth, the literature does not compare estimated costs of the section 301 duties to any costs to the U.S. economy of permitting China's technology transfer-related acts, policies, and practices to continue without any intervention from mid-2018 onward.

[329] The latter two pieces of legislation were enacted together and are collectively known as the CHIPS and Science Act (Pub. L. 117-167).

Fifth, while multiple studies measure changes in product-specific and aggregate goods trade flows following the imposition of section 301 duties and related changes to supply chain composition, the literature generally does not estimate any value or benefit resulting from increased resiliency or security of supply chains, such as in the form of more dependable supply from diversified sources or increased protection of IP due to shifting production to locations outside China.

Sixth, as noted above, much of the literature assesses the impact of the section 301 duties in combination with other U.S. tariff actions applied to China and other countries, as well as retaliatory measures applied by China and other countries.[330] Effects of section 301 duties are most often evaluated in combination with section 232 duties on certain steel and aluminum products, retaliation against section 301 duties by China and 232 duties by China and others, and U.S. safeguard duties. Existing economic studies thus generally do not examine the effects of U.S. section 301 duties in isolation, even though those duties are by far the largest of these U.S. tariff actions in terms of both tariff lines and import value covered. We therefore refer to the "2018-2019 tariff actions" when appropriate to include section 301 duties, and to potentially include section 232 and section 201 duties, in order to avoid any implication that the referenced literature has examined the section 301 duties and their related effects in isolation.

Seventh, the literature tends to estimate tariff impacts based on product lists announced by the United States, and in some instances retaliating countries, without considering the degree to which tariff exclusions reduce actual application of tariffs. Estimates of tariff impacts in the literature may therefore overestimate actual impacts. The United States has provided exclusions to certain imports subject to section 301 (and section 232) duties, and China provides exclusions for certain of its tariffs applied in retaliation against the section 301 duties. The USITC Report is unique in estimating reduced section 301 tariff coverage of U.S. imports after accounting for U.S. exclusions. Our review of the literature did not uncover any attempt to account for the unknown scope of exclusions China has granted under the relatively opaque exclusions system it implemented in early 2020.

Lastly, analyses of the section 301 duties tend to disregard the effects of multiple global economic shocks from 2020 to present. Many existing studies tend to focus either on short-run effects, *i.e.*, impacts in 2018-2020 prior to the COVID-19 pandemic and other events that adversely impacted supply chains such as the illegal Russian invasion of Ukraine, or on model-based simulations of long-run effects assuming some set of duties not necessarily identical to applied section 301 duties are permanent, often with a baseline based on the global economy circa 2017. While findings from these studies may be helpful in understanding certain general effects of the section 301 duties on the U.S. economy, specific results should not be considered precise or indicative of actual impacts because the studies do not attempt to analyze the section 301 duties either as actually applied or in isolation.

[330] The USITC Report is unique in this regard, as it isolates impacts of the section 301 duties with respect to U.S. trade, production, and prices. Congress did not request that the USITC analysis include estimates related to retaliatory duties China imposed in response to the section 301 duties.

C. Caveats Specific to the USITC Report

The USITC Report does not address all sectors of the U.S. economy in detail and is not intended to estimate complete, economy-wide impacts of the section 301 duties. The USITC prepared its report in response to a March 2022 request from Congress for an investigation and retrospective economic analysis to include detailed information on U.S. trade, production, and prices in the industries most directly affected by tariffs active as of 2022 under section 301 of the Trade Act of 1974.[331] The report presents detailed estimated economic impacts for the ten most directly affected industries individually plus the estimated aggregate impact on all directly affected industries. The USITC selected the ten industries most directly affected by the section 301 duties as the industries with the highest volume of imports during 2016 and 2017 of products that were eventually subject to section 301 duties.[332] Consequently, the USITC's detailed estimates of impacts on U.S. prices, production, and imports resulting from the section 301 duties pertain only to select industries. These ten industries nonetheless account for the majority share of U.S. imports from China of all goods to which section 301 duties were applied, ranging from approximately 72 percent in 2018 to 84 and 85 percent by 2022 and 2023, respectively, and approximately 44 percent to 47 percent of total U.S. imports for consumption of total goods (both subject and non-subject goods) from China in a given year during this period.

Second, the partial equilibrium models used to estimate impacts of the duties on the ten most directly affected industries are static and examine each year in isolation. The models and broader analysis are not designed to, and therefore do not fully address, various long-term factors including supply chain adjustments or resilience.

Third, the analysis is short-run by design, and addresses the period 2016 through 2021 with particular focus on impacts to trade, production, and prices from the 2018 imposition of duties through 2021. The USITC notes that certain effects of the duties, such as changes in sourcing of imports away from China to third countries or investment in additional domestic U.S. production, may take additional time to occur, such that increased domestic production and potential reduction in prices of the domestic good are not captured in short-run estimates, and if they were to happen, would increase the longer-run impacts of the duties. Economic actors' expectations around the duration of the duties are therefore expected to be critical with respect to longer-run effects.

Fourth, the analysis estimates the direct effects of section 301 duties on targeted products only. It does not estimate the impact of the duties on upstream or downstream products or include U.S. industries that were only indirectly affected by the duties, such as industries that consume products subject to duties as inputs, or other industries not affected at all by the duties.

Lastly, the USITC estimates the pass through of section 301 duties to U.S. importer prices, but not the degree to which higher importer costs may impact ultimate U.S. consumers or inflation indicators.

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[331] *See* USITC REPORT at 187. We disregard the USITC's analysis of the Section 232 duties for purposes of this discussion.
[332] *Id*. at 139, 149.

D. Summary of Findings

The following findings regarding effects on the U.S. economy of the 2018-2019 U.S. tariff actions, including the section 301 duties, are generally consistent throughout the literature. As noted above, findings from the USITC Report isolate estimated impacts of the section 301 duties. All findings should be considered in conjunction with the above caveats.

1. Aggregate Economic Welfare

The economic context in which the section 301 duties were imposed, and effects the duties have generated, involve myriad interrelated economic factors such that effects on the U.S. economy may be mixed depending on the object of analysis and may differ in the short versus long run. Studies estimate that the 2018-2019 U.S. tariff actions, in aggregate, have had small negative effects on U.S. aggregate economic welfare and real incomes in the short run, due largely to reduction in imports from and exports to China. In studies that estimate long-run impacts, those effects are estimated to continue in the long run.

2. Production and Prices

The USITC Report estimates an aggregate overall increase in the value of domestic U.S. production for directly affected industries, *i.e.*, those including products subject to section 301 duties, of an average of 0.4 percent each year due to the section 301 duties. This increase is driven in part by a 0.2 percent increase in the price of domestically produced affected products. The Report analyzes a subset of the ten most directly affected industries, *i.e.,* those with the highest value of imports subject to section 301 duties. The Report estimates that by 2021 the value of U.S. production rose for all industries, ranging from 1.2 percent (computer equipment) to 7.5 percent (furniture) due to section 301 duties. These production value increases were associated with estimated increases in U.S. domestic prices for all ten most directly affected industries, including an increase of 0.6 percent for computer equipment and 3.7 percent for furniture.

The additional literature generally finds that the 2018-2019 tariff actions increased prices somewhat in the United States, as well as U.S. export prices. The magnitude of price impacts has varied across industries. Both the USITC, with respect to the section 301 duties, and other studies that analyze U.S. tariff actions more broadly, find the pass through of the duties to U.S. importers was generally complete, though those costs for the most part did *not* result in increased prices for ultimate consumers, at least in the short run.

3. Employment

The 2018-2019 tariff actions did not increase overall manufacturing employment or wages in the short run. Adverse overall employment impacts tend to be more strongly associated with retaliatory tariffs applied by China and others than with U.S. duties.[333]

[333] The USITC Report does not estimate employment impacts. Congress did not request that the USITC analysis include specific estimates regarding employment.

4. Investment

Studies estimate the 2018-2019 tariff actions depressed investment growth in the United States in the short run. Regarding the long run, the USITC Report acknowledges that certain effects of the section 301 duties, such as increased investment in domestic production, may be delayed as importers and U.S. producers base investment decisions on their expectations of the duration of the duties.

5. Diversification of Imports and Supply Chain Resilience

The USITC Report estimates the section 301 duties led to a 13 percent decline in the value of U.S. imports from China in industries affected by the section 301 duties and generated increases in imports from sources other than China by 2021 ranging from 6.0 percent for computer equipment to 35.4 percent for audio and visual equipment. With specific respect to certain industries associated with advanced technology, the 2018-2019 tariff actions were found to provide import protection.

The USITC Report estimates the section 301 duties led to a shift away from imports from China and to increased U.S. production combined with greater imports from a diversified set of sources such as Mexico, Korea, Malaysia, and Taiwan for the advanced technology industries it analyzed, including computer equipment, electrical equipment, and semiconductors.

The literature for the most part does not speak directly to the question of whether the section 301 tariff actions enabled U.S. businesses to recover more quickly after supply chain disruptions to increase resilience. Studies nonetheless find that U.S. sourcing of goods subject to duties shifted away from China to a significant degree since imposition of tariffs relative to scenarios in which section 301 duties were not applied. This shift may reduce exposure to China-related disruptions and generate greater diversity in sourcing, which may have positive effects on resilience.

E. Discussion of Key Findings in the USITC Report

The USITC concludes the following regarding impacts of the section 301 duties on the directly affected industries:

> In the aggregate, prices paid by U.S. importers for goods from China increased as a result of the tariffs but the exporter prices received by Chinese firms were mostly unchanged. As the importer prices rose for Chinese products, the quantity of such imports fell leading to a significant decline in their import value. These changes led to increases in production and prices in U.S. industries that were competing with the imports.[334]

This subsection addresses USITC estimates regarding the ten most directly affected industries in detail. The above Summary of Key Findings contains additional key findings on overall impacts, including: econometrically estimated full pass through of the duties to U.S. importers; increases in both the value of U.S. production and U.S. prices in directly affected industries; and reduction in imports from China.

[334] USITC REPORT at 135.

1. Changes in U.S. Production

The USITC estimates increases in the value of U.S. production due to the section 301 duties for all ten industries. Table 6.4[335] of the report summarizes these findings in 2021, the most recent year for which estimates were made (values are annual and not cumulative):

Table 3: Effect of Section 301 Tariffs on Prices and Value of U.S. Imports from China and U.S. Production in 2021

Table 6.4 Effect of section 301 tariffs on prices and value of U.S. imports from China and U.S. production in 2021
In percentage changes.

NAICS industry group	Description	Price of imports from China	Price of domestically produced products	Average price in the United States	Tariff-inclusive value of imports from China	Value of U.S. production
3152	Cut and Sew Apparel Manufacturing	14.5	3.1	4.3	−39.1	6.3
3344	Semiconductors and Other Electronic Components	25.0	3.1	4.1	−72.3	6.4
3341	Computer Equipment	1.5	0.6	0.8	−5.3	1.2
3371	Household and Institutional Furniture and Kitchen Cabinets	22.4	3.7	7.1	−25.4	7.5
3363	Motor Vehicle Parts	24.5	1.5	2.3	−50.1	3.0
3359	Other Electrical Equipment and Components	21.2	3.4	5.5	−37.7	7.0
3399	Other Miscellaneous Manufacturing	4.3	1.2	1.7	−11.7	2.4
3343	Audio and Video Equipment	10.6	3.2	4.0	−37.8	6.4
3339	Other General Purpose Machinery	19.2	2.6	3.8	−47.6	5.3
3261	Plastics Products	12.4	1.4	2.3	−23.7	2.8

Source: Calculation by USITC. For a complete description of the model details and inputs, see appendix G.
Note: These values are calculated from the model estimates of 2021, the latest year for which data were available. Results for other years and for other sources are summarized at the end of the chapter. The change in average price is a weighted average that considers the estimated substitutability between products from different sources. The percentage change in "tariff-inclusive value" refers to the change in the value of imports from China, including the value of the section 301 duties themselves but not the value of any other duties.

The estimates in Table 3 are presented in terms of the percentage change between a counterfactual in which section 301 duties specific to each industry were not in place from 2018 onward and the actual application of the duties during that same period, including estimated granted exclusions from certain duties. Additional tables in the report indicate model findings

[335] *Id.* at 148.

for each year starting by which duties may have been applied from 2018 through 2020 and in addition to summary estimates for 2021 above in Table 3.

Upon publication of the report, the USITC made publicly available the data underlying its estimates. These data allow for a presentation of those estimates of increases in U.S. production in dollar value rather than percentage terms. Table 4 is based on these data and indicates discrete annual and period-average increases in U.S. production, the latter of which range from approximately $230 million (audio and video equipment) to $6.1 billion (semiconductors). The USITC estimates total U.S. production in these ten industries *increased* by a period average $25.6 billion due to the section 301 duties.[336] Annual changes in production for all industries increased in year-on-year terms during all years after 2017. It is important to consider these estimated increases in domestic production in combination with associated increases in both the price of U.S. domestic production and the average U.S. price, both of which are included in Table 3.

Table 4: **Estimated Changes in Value of U.S. Production in Most Directly Affected Industries** (billions USD)

Industry	2018	2019	2020	2021	Period Average
Cut and Sew Apparel Manufacturing	0.0	0.2	0.5	0.7	0.4
Semiconductors and Other Electronic Components	1.4	6.5	8.8	7.9	6.1
Computer Equipment	0.1	0.4	0.5	0.5	0.4
Household and Institutional Furniture and Kitchen Cabinets	0.5	2.3	2.8	3.1	2.2
Motor Vehicle Parts	0.8	5.3	6.3	7.2	4.9
Other Electrical Equipment and Components	0.7	2.8	3.3	3.8	2.6
Other Miscellaneous Manufacturing	0.0	0.6	1.6	1.6	1.0
Audio and Video Equipment	0.0	0.1	0.3	0.5	0.2
Other General-Purpose Machinery	1.4	4.2	5.1	5.7	4.1
Plastics Products	0.5	3.3	5.4	5.6	3.7
Ten-Industry Total	**5.4**	**25.8**	**34.7**	**36.6**	**25.6**

Source: USITC estimates

2. Changes in Sources of U.S. Imports

The USITC Report estimates trade that would have occurred were section 301 duties not applied. It finds substantial shifts away from imports from China and toward imports from third countries due to the section 301 duties. Table 5 is based on USITC data and indicates that, across all ten selected industries from 2018 through 2021, the USITC estimates a period-average $74.0 billion reduction in imports from China in contrast to a $48.4 billion increase in imports from all

[336] USITC Report underlying data. This period-total U.S. production increase equals approximately 0.1 percent of period-total nominal U.S. GDP.

sources other than China.[337] As with estimated increases in U.S. production, annual changes in imports, *i.e.*, declines from China and increases from other sources, increase in year-on-year terms during all years after 2017. Table 5 contains detailed estimates for the examined industries most directly related to advanced technology. Appendix J contains complete estimates for all ten examined industries. In the USITC models, the difference between the reduction in imports from China and increase in imports from third countries is accounted for by an increase in U.S. production.

Table 5: **Estimated Changes in Value of U.S. Imports by Source for Most Directly Affected Industries Related to Advanced Technology** (billions USD)

Advanced Technology Industries	2018	2019	2020	2021	Period Average
Semiconductors and Other Electronic Components					
China	-4.6	-21.0	-27.6	-28.8	-20.5
Malaysia	0.9	4.1	5.0	5.2	3.8
Taiwan	0.4	2.1	2.7	3.5	2.2
Korea	0.4	1.7	2.6	2.8	1.9
All Other Sources	1.5	6.6	8.5	9.4	6.5
Computer Equipment					
China	-0.8	-3.4	-4.4	-3.9	-3.1
Mexico	0.4	1.6	1.9	1.6	1.4
Taiwan	0.0	0.4	0.6	0.5	0.4
Thailand	0.1	0.3	0.5	0.5	0.3
All Other Sources	0.2	0.7	0.9	0.8	0.6
Motor Vehicle Parts					
China	-1.7	-10.7	-12.7	-15.4	-10.1
Mexico	0.4	2.7	3.2	3.8	2.5
Canada	0.1	0.7	0.8	1.0	0.7
Japan	0.1	0.5	0.6	0.9	0.5
All Other Sources	0.2	1.5	1.8	2.5	1.5
Other Electrical Equipment and Components (*e.g.*, Batteries and Fiber Optic Cable)					
China	-1.6	-6.9	-8.7	-10.6	-7.0
Mexico	0.3	1.2	1.3	1.7	1.2
Korea	0.1	0.3	0.5	0.7	0.4
Japan	0.1	0.4	0.4	0.6	0.4
All Other Sources	0.4	2.2	3.2	3.8	2.4
Ten-Industry Total					
China	-13.6	-68.6	-99.3	-114.4	-74.0
All Sources Other Than China	8.2	42.8	64.7	77.8	48.4

Source: USITC estimates

[337] The USITC Report estimates changes in the value of U.S. imports from China and an "all other sources" aggregate. The publicly available underlying data include estimated changes in imports for the leading three sources of imports other than China and a consequently lesser "all other sources" value that includes all remaining import sources. *See* USITC REPORT.

Values in Table 5 are modeled estimates of the difference in imports with section 301 duties applied relative to a non-duty counterfactual. Appendices F and G of this report contain U.S. Census import data to indicate changes in import shares by country, by section 301 list, and by industry between the pre-tariff period and the years following the imposition of the section 301 duties. Those data broadly indicate, by section 301 list and by industries examined in the USITC Report, substantial increases from sources other than China in the share of total U.S. imports.

F. Discussion of Key Findings in the Additional Literature: Welfare, Production, Prices, Employment, and Investment

1. Impacts on Aggregate Economic Welfare

We first address select findings regarding estimated effects on U.S. aggregate economic welfare and real incomes. The literature generally finds negative impacts that are small as a share of GDP given the small share of U.S. total trade (and imports from China) to GDP. Several studies estimate the effect of the section 301 duties, alongside other tariff actions and including retaliatory tariffs applied to U.S. exports, on overall U.S. economic welfare. Generally speaking, a measure of economic welfare puts a dollar value on how much better or worse off the average economic agent is in the economy. One of the most cited papers, Fajgelbaum et al., estimates a loss of 0.13 percent of GDP associated with the U.S. tariff actions in 2018 and 2019, including estimated impacts of corresponding retaliatory measures, and 0.09 percent of GDP in a non-retaliation counterfactual scenario.[338] These effects are due largely to reduction in imports from and exports to China. Several other studies that use different modeling approaches likewise find negative welfare effects that are small relative to GDP in both the United States and China, and smaller in the United States.[339]

Critically, the 2018-2019 tariff actions have had more concentrated effects on certain regions and sectors than others, such that small overall effects relative to U.S. GDP should not be misinterpreted to suggest that more acute effects did not exist in particular jurisdictions within the United States. Similar to studies of the distributional effects of trade in the "China Shock" literature, several papers analyze the distribution of the impacts of the tariff actions across regions and industries. For example, Fajgelbaum et al. estimate the dispersion of wage effects of the tariffs on U.S. counties and find an average real wage decline of 1 percent, but with a large

[338] Pablo Fajgelbaum, Pinelopi Goldberg, Patrick Kennedy, Amit Khandelwal, *The Return to Protectionism*, 135 THE QUARTERLY JRNL OF ECONOMICS 1-55 (2020). *See also Updates to Fajgelbaum et al. (2020) With 2019 Tariff Waves*, UCLA ECONOMICS, Jan. 21, 2020, http://www.econ.ucla.edu/pfajgelbaum/rtp_update.pdf.

[339] *See* Pablo Fajgelbaum, Amit Khandelwal, *The Economic Impacts of the US–China Trade War*, 14 ANNUAL REVIEW OF ECONOMICS 205-228 (2022) for a review of some of these papers, including National Bureau of Economic Research [*hereinafter* "NBER"] Working Paper No. 30335 (2022), which estimates trade war tariffs lowered overall U.S. welfare by 0.01 percent, *see* Lorenzo Caliendo, Fernando Perro, NBER, LESSONS FROM U.S.-CHINA TRADE RELATIONS, Working Paper 30335 (Aug. 2022). The literature consistently finds tariffs applied by the United States and China during 2018 and 2019 to be associated with negative aggregate economic welfare impacts in both countries, but that the negative effects were materially larger in China. *See also* Minghao Li, Edward Balistreri, Wendong Zhang, *The U.S.-China Trade War: Tariff Data and General Equilibrium Analysis*, 69 JRNL OF ASIAN ECONOMICS 1-30 (2020); Cyn-Young Park, Peter Petri, Michael Plummer, *The Economics of Conflict and Cooperation in the Asia-Pacific: RCEP, CPTPP and the US-China Trade War*, 25 (3) EAST ASIAN ECONOMIC REVIEW 233-272 (2021); and, Jian Zheng, Shudong Zhou, Xingzi Li, Antonio Domingos Padula, Will Martin, *Effects of Eliminating the U.S.-China Trade Dispute Tariffs*, 22 WORLD TRADE REVIEW 212-231 (2023).

variation across counties.[340] Flaaen and Pierce estimate the distribution of the short-run effects of U.S. tariffs and retaliatory actions by multiple trading partners enacted between January 2018 and September 2019. It finds significant relative decreases in employment in some manufacturing industries and small increases in employment in others.[341] They also find a relative loss of overall manufacturing employment associated with higher input prices and retaliatory tariffs that more than offsets the small employment gain from import tariff protection. The duties thus result in relative reductions in U.S. manufacturing employment and relative increases in producer prices, the latter of which is due solely to increased input prices. Regarding overall employment, Flaaen and Pierce found counties more exposed to tariffs experience relative unemployment rates that are statistically significant, suggesting job losses related to tariffs are not mitigated by local gains in other sectors.

Caliendo and Parro estimate the trade effects of the wider "trade war" across manufacturing sectors and find that aggregate manufacturing imports declined by 6.5 percent and manufacturing exports by about 8 percent as a result of the "trade war," but the effects vary significantly across industries—both for imports and exports.[342] The authors note that variation across industries is shaped not only by the magnitude of the tariffs, but also by industry characteristics, such as availability of alternative sources and inter-industry linkages. Regarding location-based impacts, the authors find significant variation in wage, real income, and employment effects across U.S. states and find significant heterogeneity of the impacts across states. Morgan et al. focus on a critical element of retaliation applied in response to U.S. tariffs, and especially as applied by China—the impacts of retaliatory tariffs on U.S. agricultural producers. They estimate state-by-state impacts of retaliation applied to U.S. agricultural exports and find significant costs incurred in some states but virtually no costs incurred in others.[343]

In sum, due to the United States being a large economy for which trade accounts for a relatively lower share of total output than for many other countries, estimates of impacts of the 2018-2019 tariff actions tend to be small when expressed as a share of total U.S. output. At certain household, county, state, and sector levels, however, welfare impacts are estimated to be more negative.

2. Impacts on Prices

One of the most consistent results in the literature is that of almost complete pass-through of U.S. tariffs to U.S. import prices (*see* Fajgelbaum et al., Amiti et al., Flaaen and Pierce, the USITC Report, and others).[344] This general finding runs contrary to what economic theory would have

[340] Fajgelbaum et al, *The Return to Protectionism* at 47.
[341] Aaron Flaaen, Justin Pierce, U.S. FEDERAL RESERVE BOARD OF GOVERNORS, DISENTANGLING THE EFFECTS OF THE 2018-2019 TARIFFS ON A GLOBALLY CONNECTED U.S. MANUFACTURING SECTOR (Dec. 2019) (updated Jan. 25, 2024).
[342] Lorenzo Caliendo, Fernando Parro, NBER, TRADE POLICY, Working Paper No. 29051 (2021).
[343] Stephen Morgan, Shawn Arita, Jayson Beckman, Saquib Ahsan, Dylan Russell, Philip Jarrell, Bart Kenner, USDA, ECONOMIC RESEARCH SERVICE, THE ECONOMIC IMPACTS OF RETALIATORY TARIFFS ON U.S. AGRICULTURE, ERR-304 (Jan. 2022).
[344] *See* Fajgelbaum et al., *The Return to Protectionism*; Mary Amiti, Stephen J. Redding, David Weinstein, NBER, WHO'S PAYING FOR THE U.S. TARIFFS? A LONGER-TERM PERSPECTIVE, Working Paper No. 26610 (2020); Aaron Flaaen, Justin Pierce, U.S. FEDERAL RESERVE BOARD OF GOVERNORS; and, the USITC Report.

predicted *ex ante* and indicates that Chinese exporters generally did not reduce export prices for U.S. buyers after the imposition of tariffs. The aforementioned studies consistently find that the costs of the tariffs were thus fully absorbed by U.S. importers. Notably, Cavallo et al. find that tariff pass-through did not translate to an increase in consumer prices, at least in the short run, as buyers of imported goods are typically industrial buyers consuming inputs rather than consumer-directed retail products.[345]

Regarding U.S. exports, several studies find increases in export prices of U.S. goods exposed to higher input costs due to U.S. import duties, thereby decreasing U.S. export competitiveness.[346] Handley, Kamal, and Monarch found in one study that these higher prices substantially suppressed U.S. export growth to all partners, that weak U.S. export growth in 2018-2019 extended beyond the destinations and products that were targeted by retaliatory tariffs, and that the primary source of export weakness was through higher supply chain costs for U.S. businesses.[347] They estimate that by 2019, the effect of increased U.S. import duties was equivalent to a 1.5 percent *ad valorem* tariff on U.S. exports for the average product-country pair. That export tariff equivalent becomes higher for products with more import tariff exposure, reaching up to 4 percent.

Handley, Kamal, and Monarch build on that analysis, revising that 1.5 percent *ad valorem* export tariff equivalent by 2019 up to 2 percent, and finding that more than half of the decline in U.S. imports of products subject to duties was a consequence of U.S. importers ceasing existing relationships with suppliers, foregoing adding new suppliers, exiting import markets altogether, and declining expansion into new supplier markets.[348] They characterize these changes as reduced dynamism and consider higher long-run costs for exporters due to the need to form new buyer-supplier relationships. Feng et al. estimate the tariff pass through for Chinese importers of U.S. exports was 68 percent, in contrast to estimated complete pass-through for U.S. importers of Chinese exports. U.S. exporters, some of whom had already incurred additional costs as a consequence of paying increased U.S. import duties, are therefore estimated to have paid for approximately one-third the cost of China's retaliatory import tariffs.[349]

In addition to direct impacts of the duties on trade, indirect impacts resulting from trade policy uncertainty are also estimated to have impacted U.S. output. Caldera et al. estimate that increases in trade policy uncertainty during the first half of 2018, as measured by discussion in news reports and firm earnings calls, resulted in a 0.8 percent decline in the level of global GDP

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[345] Alberto Cavallo, Gita Gopinath, Brent Neiman, Jenny Tang, *Tariff Pass-Through at the Border and at the Store: Evidence From US Trade Policy*, 3(1) AMERICAN ECONOMIC REVIEW: INSIGHTS 19-34 (Mar. 2021).
[346] *See* Felipe Benguria, Felipe Saffie, *Dissecting the Impact of the 2018-2019 Trade War on U.S. Exports*, SOCIAL SCIENCE RESEARCH NETWORK (2019); *See also* Aaron Flaaen & Justin Pierce, U.S. FEDERAL RESERVE BOARD OF GOVERNORS.
[347] Kyle Handley, Fariha Kamal, Ryan Monarch, NBER, RISING IMPORT TARIFFS, FALLING EXPORT GROWTH: WHEN MODERN SUPPLY CHAINS MEET OLD-STYLE PROTECTIONISM, Working Paper No. 26611 (2020).
[348] Kyle Handley, Fariha Kamal, Ryan Monarch, NBER, SUPPLY CHAIN ADJUSTMENTS TO TARIFF SHOCKS: EVIDENCE FROM FIRM TRADE LINKAGES IN THE 2018-2019 U.S. TRADE WAR, Working Paper No. 31602 (2023).
[349] Chaonan Feng, Liyan Han, Lei Li, CESIFO, WHO PAYS FOR THE TARIFFS AND WHY? A TALE OF TWO COUNTRIES, CESifo Working Paper No. 10497 (2023). CESifo is an independent research network based in Munich, Germany that draws on researchers at the Center of Economic Studies (CES) and the ifo Institute (University of Munich's Leibniz Institute for Economic Research).

by the first half of 2019 and lowered equities prices.[350] Additional uncertainty during the first half of 2019 in the form of continued tariff actions suggested, as of the September 2019 publication, potential additional adverse impacts on global growth. Thus, during the period of this study, the authors find that not merely the imposition of tariffs, but also uncertainty around the eventual direction and consequences of the tariff actions, impaired global growth. Additional discussion of impacts from uncertainty around the duties, with specific respect to investment, is discussed below.

In conclusion, economic studies consistently find that costs generated by the U.S. section 301 duties have been incurred largely by U.S. economic actors, including industrial importers of intermediate inputs, exporters of products that incorporate imported inputs, and to a lesser extent, consumers who may have yet to see higher import prices transmitted to retail prices as importers devise longer-term approaches to balancing higher costs.

3. Impacts on Employment

Studies that examine impacts of the 2018-2019 tariff actions on employment consistently find no increase in overall U.S. employment, including manufacturing employment, and that the duties did not increase wages in the short run. These findings should not be interpreted to indicate that positive employment and wage impacts may not have occurred in particular industries or may not occur in the long run due to changes in U.S. production and sourcing.

Caliendo and Parro find that rather than reversing the ongoing decline in U.S. employment in manufacturing, the "trade war" was associated with a 0.03 percentage point decrease in the manufacturing share of employment.[351] Flaaen and Pierce provide insight into altered cost dynamics U.S. manufacturers faced after imposition of duties, and used U.S. trade, production, and employment data through September 2019 to examine how the tariffs affected U.S. manufacturing through three "channels."[352] The authors find first that U.S. import duties can provide protection from import competition. Second, U.S. import tariffs can increase the cost of imported intermediate inputs, and thus the costs of production for U.S. manufacturers, as is found elsewhere in the literature. Third, retaliatory tariffs can reduce revenues or profits for U.S. exporters of manufactured goods. The authors find that U.S. duties and retaliatory tariffs imposed in 2018 and 2019 had a small, positive effect on employment through the protection channel, but that effect was outweighed by significantly larger, negative effects through the input cost and retaliation channels.[353]

With specific respect to employment impacts created by China's *retaliatory tariffs*, Waugh finds China's duties reduced certain U.S. counties' total exports and adversely impacted local labor markets, especially for counties most exposed to trade, estimating a 0.75 percentage point

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[350] Diego Caldera, Matteo Iacoviello, Patrick Molligo, Andrea Prestipino, Andrea Raffo, *Does Trade Policy Uncertainty Affect Global Economic Activity?*, U.S. FEDERAL RESERVE BOARD OF GOVERNORS, Sep. 2019, https://www.federalreserve.gov/econres/notes/feds-notes/does-trade-policy-uncertainty-affect-global-economic-activity-20190904.html.

[351] Caliendo & Parro, NBER, LESSONS FROM U.S.-CHINA TRADE RELATIONS.

[352] Aaron Flaaen, Justin Pierce, U.S. FEDERAL RESERVE BOARD OF GOVERNORS, DISENTANGLING THE EFFECTS OF THE 2018-2019 TARIFFS ON A GLOBALLY CONNECTED U.S. MANUFACTURING SECTOR.

[353] *Id.*

decline in employment growth for counties relatively more exposed to trade.[354] This estimate more than doubles to 1.7 percentage points for goods-producing employees in sectors such as mining, agriculture, manufacturing, and construction activities. These findings of employment declines, in combination with observed declines in consumption, suggest a relationship between adverse employment and consumption outcomes with retaliatory duties. Autor et al. find that, while U.S. tariffs had no significant negative or positive effects on overall U.S. employment, China's application of retaliatory tariffs generated significant negative employment impacts in the United States.[355] It further finds that the $23.3 billion the U.S. Department of Agriculture provided to U.S. farm producers during 2018 and 2019 under the Market Facilitation Programs offset the impacts of China's retaliatory tariffs to only a minor degree.

Regarding wages, Fajgelbaum et al. model the distribution of the effects of the tariff actions and of other countries' retaliatory tariffs on real wages across U.S. counties.[356] They estimate that real wages fell by 1 percent on average in tradable sectors, that all U.S. counties experienced declines in real wages in the short run, and that there was significant variation in the magnitude across counties. The authors' model suggests that counties in the Great Lakes Region of the Midwest and the Industrial Northeast tended to benefit from protection from import competition, whereas counties in the Great Plains and Mountain West tended to be relatively more negatively impacted, largely because of the importance to those regions of their exports of agricultural goods targeted by retaliatory tariffs. Using a different modeling approach, Caliendo and Parro examined how the tariff actions affect wages across states. The authors find that the aggregate real wage declines by 0.16 percent, but that impacts on real wages varied significantly across states, as discussed above.[357]

The economics literature includes studies on impacts on U.S. employment beyond the first-order consequences of import protection that may benefit certain U.S. producers as well as subsequent consequences including impacts on input prices and consumption patterns following negative employment outcomes. In general, the literature finds that the 2018-2019 tariff actions did not increase manufacturing employment, but rather tended to somewhat suppress employment, and in some instances consumption, in part as a consequence of retaliatory duties.

4. Impacts on Investment

The literature finds limited impacts on investment, particularly in the short run, and which were related to economic and trade policy uncertainty directly related to imposition of U.S. duties during 2018 and 2019. Amiti, Kong, and Weinstein use evidence from the impact of the tariff actions on stock market returns to estimate impacts on U.S. investment growth. The paper's authors demonstrate that lower stock market returns imply lower returns to capital and thus lower rates of investment. The authors estimate that U.S. tariff actions of 2018 and 2019 would lower

[354] Michael E. Waugh, NBER, THE CONSUMPTION RESPONSE TO TRADE SHOCKS: EVIDENCE FROM THE US-CHINA TRADE WAR, Working Paper No. 26353 (2019).
[355] David Autor, Anne Beck, David Dorn, Gordon Hanson, NBER, HELP FOR THE HEARTLAND? THE EMPLOYMENT AND ELECTORAL EFFECTS OF THE TRUMP TARIFFS IN THE UNITED STATES, Working Paper No. 32082 (2024).
[356] Fajgelbaum et al., *The Return to Protectionism*.
[357] Caliendo & Parro, NBER, LESSONS FROM U.S.-CHINA TRADE RELATIONS.

the investment growth rate of listed U.S. companies by 1.9 percentage points by the end of 2020.[358]

Ozdalgi and Wang find that increased uncertainty due to the "trade war" adversely impacted stock prices. The authors used news events related to the "trade war," which tend to be quickly reflected in securities prices, to find that "trade war" news raises the Chicago Board Options Exchange's Volatility Index two percentage points (or one standard deviation) per year, decreases the rate on 10-year U.S. Treasury notes by 2.6 basis points, and also lowers stock prices by 0.9 percent, the last of which is approximately equivalent to the effects on equity prices of a 25 basis point increase of the federal funds target rate.[359] The degree of these effects can vary based on firms' revenue exposure to China and financing sources, but the authors' general finding is that uncertainty surrounding trade policy during the "trade war" can be causally connected to adverse outcomes in financial markets.

G. Discussion of Key Findings in the Additional Literature: Supply Chain Resilience

The literature demonstrates that sourcing of U.S. imports has been significantly restructured since imposition of section 301 duties to reduce exposure to China-origin goods. This ongoing process is in its early stages, such that indirect trade linkages with China remain for the United States and countries from which U.S. imports have recently increased. Certain literature to date suggests that reducing direct and indirect exposure to risk and shocks associated with a concentrated source of imports may increase resilience, though not necessarily without costs.

1. Supply Chain Restructuring

The literature finds that U.S. imports of goods subject to 301 duties shifted away from China following imposition of section 301 duties, thereby likely reducing exposure to China-related disruptions and introducing greater diversity in sourcing of intermediate inputs and final goods.[360] This shift is also apparent for non-dutied goods, but to a lesser degree. Certain research indicates that shifts in U.S. import sourcing have been relatively more pronounced for tariffed advanced technology products than for non-tariffed goods and even for tariffed goods not considered to relate to advanced technology.

Various studies that model the impacts of the 2018-2019 tariff actions find that U.S. tariffs significantly reduced U.S. imports from China. Evidence suggests, however, that on balance, the two countries have largely been able to redirect exports and imports to and from other destinations and origins such that a reallocation rather than reduction in trade has resulted from tariffs. Li et al. suggest that in response to tariff-driven declines in U.S. imports from China and exports to China, U.S. traders have substituted toward a set of partners such as Japan, South

[358] Mary Amiti, Sang Hoon Kong, David Weinstein, NBER, THE EFFECT OF THE U.S. CHINA TRADE WAR ON U.S. INVESTMENT, Working Paper No. 27114 (2020).
[359] Ali Ozdagli, Jianlin Wang, U.S. FEDERAL RESERVE BANK OF DALLAS, UNCERTAINTY, STOCK PRICES, AND DEBT STRUCTURE: EVIDENCE FROM THE U.S.-CHINA TRADE WAR, Working Paper No. 2212 (2022).
[360] The term "disruptions," as used in the literature, can be interpreted to mean any event that causes or is related to an economic shock such as a natural disaster, global health emergency, or geopolitical event. Disruptions, in this sense, are possibly but not necessarily related to China's technology transfer-related acts, policies, and practices at issue in the 2018 section 301 Report.

Korea, and Southeast Asian countries, and particularly for imports.[361] This diversification of import partners is generally consistent with findings in Fajgelbaum et al., Mahadevan and Nugroho, Caceres et al., and Giesecke et al.[362] Bown examines trade data through Q3 2022 and finds that in the aggregate, U.S. imports from China declined significantly relative to imports from the rest of the world, even as total U.S. imports from the world have increased in nominal terms.[363] Bown finds that imports of tariffed products as a whole have fallen below pre-2018 levels, and that products facing higher tariffs have seen steeper declines than products facing lower, *e.g.,* 7.5 percent, tariffs.[364] Bown notes that tariff-induced shifts away from sourcing from China may increase resilience if diversification is useful for a particular supply chain.[365]

Alfaro and Chor analyze the evolution of U.S. supply chains with a focus on the 2017-2022 period.[366] They find that a policy-driven reallocation and reconfiguration of global supply chains occurred during this time, largely as a consequence of U.S. tariffs applied to China, of which the section 301 duties are by far the most commercially impactful. This reallocation has involved a U.S. product-level import share shift away from China and increases in import shares, particularly from Vietnam (due to cost competitiveness) and Mexico (due to nearshoring and regional supply chains). The authors caution that sourcing shifts away from China that appear evident in trade data may reflect China's increased investment in, and export relationships with, certain of the same countries that captured increased U.S. imports shares during the period.[367]

Freund et al. address the shift of U.S. imports away from China and find that U.S. tariffs stimulated "significant direct decoupling" in bilateral trade since 2017.[368] The trend in total U.S.

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[361] Minghao Li, Edward J. Balistreri, Wendong Zhang, *The U.S.-China Trade War: Tariff Data and General Equilibrium Analysis.*

[362] Pablo Fajgelbaum et al., NBER, THE U.S.-CHINA TRADE WAR AND GLOBAL REALLOCATIONS, Working Paper No. 29562 (2023); Renuka Mahadevan, Anda Nugroho, *Can the Regional Comprehensive Economic Partnership Minimise the Harm From the United States—China Trade War?*, 42 (11) THE WORLD ECONOMY 3148-3167 (2019); Carlos Ceres, Diego A. Cerdeiro, Rui C. Mano, INTERNATIONAL MONETARY FUND, TRADE WARS AND TRADE DEALS: ESTIMATED EFFECTS USING A MULTI-SECTOR MODEL, Working Paper No. 2019/143 (2019); J.A. Giesecke, R. Waschik, N.H. Tran, CENTRE OF POLICY STUDIES, MODELLING THE CONSEQUENCES OF THE U.S.-CHINA TRADE WAR AND RELATED TRADE FRICTIONS FOR THE U.S., CHINESE, AUSTRALIAN AND GLOBAL ECONOMIES, Victoria University Working Paper No. G-294 (2019)

[363] Chad Bown, *Four Years Into the Trade War, Are the US and China Decoupling?*, PETERSON INSTITUTE FOR INTERNATIONAL ECONOMICS, Oct. 20, 2022, https://www.piie.com/blogs/realtime-economics/four-years-trade-war-are-us-and-china-decoupling.

[364] *Id.*

[365] Section II.D.1 presents trade data in a format similar to Bown using U.S. data through December 2023. These more recent data indicate a continuation of the trends Bown identifies in the form of a reduction in imports of products from China offset by imports from alternate sources.

[366] Laura Alfaro, David Chor, U.S. FEDERAL RESERVE BANK OF KANSAS CITY, GLOBAL SUPPLY CHAINS: THE LOOMING "GREAT REALLOCATION" 24-26 (2023).

[367] *See* Richard Baldwin, Rebecca Freeman, Angelos Theodorakopoulos, NBER, HIDDEN EXPOSURE: MEASURING US SUPPLY CHAIN RESILIENCE, Working Paper No. 31820 (2023) for a discussion of the degree of supply chain exposure to suppliers, and in particular China, in industries such as vehicles and other machinery, that are not evident in normal trade data. Data used in that analysis for the most part predate application of section 301 duties. *See also* Caroline Freund, Aaditya Mattoo, Alen Mulabdic, Michele Ruta, WORLD BANK, IS U.S. TRADE POLICY RESHAPING GLOBAL SUPPLY CHAINS?, Policy Research Working Paper No. 10593 (2023), which uses more recent data and also detects sustained levels of indirect U.S.-China trade *via* third countries that is not evident in normal trade data.

[368] Freund, Mattoo, Mulabdic, Ruta *supra* p. 16.

imports remained stable between the pre- and post-tariff periods, indicating that the United States retained overall openness while shifting import sourcing, rather than re-shoring production of tariffed products to reduce reliance on foreign sourcing. Imports from sources such as Vietnam and Taiwan that demonstrate revealed comparative advantage in exports of particular products tended to obtain China's lost market share.

The authors suggest that these import share dynamics did not necessarily lead to major import diversification. First, these large developing exporters tend to be deeply integrated with China for intra-industry trade in intermediate inputs, such that indirect trade between the United States and China continues to a degree not evident in official trade data. Second, and for particular products for which the import share from China fell sharply, such as advanced technology products, the shift in import sourcing tends to take the form of one additional supplying country accounting for a sharp increase in import share, but with some share of imports from China remaining. The authors find this pattern to be consistent with a "China plus one" strategy in that the additional supply source is intended to mitigate risk inherent in pre-tariff import patterns more dominated by China-origin goods. The authors' finding substantial reductions in import shares of advanced technology products from China is consistent with Pierce and Yu, who find that, while U.S. imports of advanced technology products are shifting away from China regardless of tariff status (and possibly in anticipation of U.S. policy changes in addition to tariffs), the decline in imports from China is most pronounced for advanced technology products subject to tariffs.[369]

Dang et al. focus on the mechanisms by which trade is diverted to countries that increase shares of U.S. imports at China's expense.[370] Like Freund et al.,[371] the authors find that exporting countries with greater revealed comparative advantage in particular products increased their U.S. import shares, and that these countries also increased exports to countries other than the United States. Further, exports of non-tariffed products that are closely related to tariffed products in terms of Harmonized System classification also increased. The authors' findings suggest that countries with high FDI stocks and large shares of exports covered by free trade agreements experienced high levels of export growth as a consequence of the 2018-2019 tariff actions. These findings suggest that the section 301 duties stimulated increased production of tariffed products in locations outside China, which then replaced imports from China both in U.S. and third-country markets, stimulating some degree of overall trade diversification. In the event that this increase in third-country production continues, some reduction in supply chain linkages between China and these third countries, as well as between China and the United States, may result and thus generate greater resilience in U.S. supply chains.

[369] Justin Pierce, David Yu, *Assessing the Extent of Trade Fragmentation*, U.S. FEDERAL RESERVE BOARD OF GOVERNORS (Nov. 2023), https://doi.org/10.17016/2380-7172.3387.
[370] Alicia H. Dang, Kala Krishna, Yingyan Zhao, NBER, WINNERS AND LOSERS FROM THE U.S.-CHINA TRADE WAR, Working Paper No. 31922 (2023).
[371] Caroline Freund et al., WORLD BANK, IS U.S. TRADE POLICY RESHAPING GLOBAL SUPPLY CHAINS?.

2. Supply Chain Resilience and Potential Costs

Certain literature demonstrates that reducing exposure to risk and shocks associated with supply chain concentration may increase sourcing flexibility and resilience.[372] While this process may generate costs relative to continued reliance on existing supply chain structures and resilience is at present difficult to measure, improvements in supply chain transparency and security resulting from increased resilience may exceed adjustment costs over the long run.[373]

One important dimension of supply chain resilience is a diversity of sourcing options, whether from imports or increased domestic production. Initial empirical evidence suggests that supplier diversification and technology innovation that reduces foreign dependence have the potential to provide sizable resilience benefits for many countries.[374] Accordingly, to the extent that supply chains concentrated in China prior to the section 301 tariff actions have started to shift away from China, the tariffs may have promoted supply chain resilience by enhancing U.S. import diversification.

Achieving resilience through greater supply chain diversification may entail costs, at least in the short run. The literature most focused on the effects of the U.S. tariffs on advanced technology products analyzes changes in input costs, output, and employment effects related to changed imports. Studies cited in this section present a mixed picture of costs to U.S. producers, such as higher input prices which counteract, to varying degrees, apparent protective beneficial effects of the tariffs. These findings generally apply to short-run trade impacts on U.S. producers, and often do not account for potential benefits from long-run restructuring of supply chains that would minimize U.S. firms' exposure to the technology transfer-related acts, policies, and practices at issue in the Section 301 Report.

In their discussion of substantial shifts in U.S. import sourcing since the application of section 301 duties, Alfaro and Chor observe that the U.S. policy-driven shift away from higher import shares from China coincided with increasing import unit values from Vietnam (a 10 percent increase) and Mexico (a 3 percent increase) and other sources such as Korea, Taiwan, and Singapore, but to a lesser degree, suggesting that any shifting of import sourcing away from China and toward other partners may generate costs.[375]

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[372] *See e.g.*, COUNCIL OF ECONOMIC ADVISERS, ISSUE BRIEF: SUPPLY CHAIN RESILIENCE (2023); Cyrille Schwellnus, Antton Haramboure, Lea Samek, Ricardo Chiapin Pechansky, & Charles Cadestin, Organisation, ECONOMIC CO-OPERATION AND DEVELOPMENT [*hereinafter* "OECD"], GLOBAL VALUE CHAIN DEPENDENCIES UNDER THE MAGNIFYING GLASS, DSTI/ CIIE(2022)18/FINAL; and, Cryille Schwellnus, Antton Haramboure, & Lea Samek, OECD, POLICIES TO STRENGTHEN THE RESILIENCE OF GLOBAL VALUE CHAINS: EMPIRICAL EVIDENCE FROM THE COVID-19 SHOCK, DSTI/ CIIE(2022)19/FINAL.

[373] *See* Pinelopi K. Goldberg, Tristan Reed, NBER, IS THE GLOBAL ECONOMY DEGLOBALIZING? AND IF SO, WHY? AND WHAT IS NEXT?, Working Paper No. 31115 at 43, regarding challenges in measuring optimal levels of resilience. Broadly speaking, the economics literature considers macro-level statistics including trade flows and output to assess resilience for countries, whereas firms tend to use micro-level data specific to firm circumstances. Cost-benefit assessments of actions to increase resilience may therefore differ at the national and firm levels.

[374] *See* Cyrille Schwellnus et al., OECD, POLICIES TO STRENGTHEN THE RESILIENCE OF GLOBAL VALUE CHAINS: EMPIRICAL EVIDENCE FROM THE COVID-19 SHOCK.

[375] Laura Alfaro, David Chor, U.S. FEDERAL RESERVE BANK OF KANSAS CITY, GLOBAL SUPPLY CHAINS: THE LOOMING "GREAT REALLOCATION."

Flaaen and Pierce analyze the short-run impacts of the 2018-2019 tariff actions on output, wages, and employment at the 4-digit North American Industry Classification System (NAICS) industry level for approximately 80 manufacturing industries.[376] This approach allows for more granular examination of specific industries associated with technology. The authors only include results for selected industries, so a precise assessment of the implications for advanced technology industries more broadly, and however defined, is not possible, but certain results are suggestive of outcomes related to advanced technology products.

First, semiconductor and other electronic component production and other electrical equipment and component production are among the ten industries found to be most exposed to new U.S. import protection as a result of U.S. duties. Second, the ten industries most exposed to new export retaliation against U.S. products include magnetic and optical media, audio and video equipment, and computer and peripheral equipment. Third, of the top ten industries exposed to rising input costs, industrial machinery manufacturing and other general-purpose machinery manufacturing are the only industries that would normally be considered to be advanced manufacturing. In the aggregate, for the manufacturing industries studied, this research finds that short-run impacts of the tariffs were relative reductions in manufacturing employment and relative increases in producer prices.[377] The authors caution that long-run impacts of the duties may differ from their research conclusions, for example by U.S. manufacturers adjusting their supply chains to minimize tariff liability. Such a process would increase diversification in sourcing of technology-related imports and inputs.

In sum, the economics literature finds that both in the aggregate and at certain-product specific levels, the composition of U.S. goods trade is shifting away from China and toward other partners. If sustained, these shifts may generate increases in diversification and resilience across U.S. supply chains. Costs incurred from that shift may dissipate as supply chains are restructured, technology advances allow firms to minimize costs related to supply chain restructuring, and U.S. investment stimulates greater domestic production.

[376] Aaron Flaaen, Justin Pierce, U.S. FEDERAL RESERVE BOARD OF GOVERNORS, DISENTANGLING THE EFFECTS OF THE 2018-2019 TARIFFS ON A GLOBALLY CONNECTED U.S. MANUFACTURING SECTOR.
[377] *Id.*

IV. Proposed Modifications and Other Recommendations

A. Proposed Modifications to the Section 301 Actions

As discussed in Section II, the tariff actions have been effective in encouraging China to take steps toward eliminating the investigated technology transfer-related acts, policies, and practices, and in counteracting such policies. The section 301 tariffs have also been effective in reducing the exposure of U.S. persons and companies to China's technology transfer-related acts, policies and practices. U.S. companies have reported that since the imposition of the section 301 duties they have shifted sourcing and production out of China, at an increasing pace, helping to reduce exposure to some of the key tools China uses to induce technology transfer. The section 301 tariffs also provide an incentive for importers to find alternative sources. U.S. import data show that since the imposition of section 301 tariffs, China's market share of U.S. imports has decreased significantly. These ongoing shifts in market share not only provide leverage and appropriate incentives for China to eliminate the technology transfer-related acts, policies, and practices, but also support more diverse and resilient supply chains for American producers and consumers.

While China has taken some positive steps, China has not eliminated many of its technology transfer-related acts, policies, or practices at issue, which continue to impose a burden or restriction on U.S. commerce. Rather than eliminate the technology transfer-related acts, policies, and practices that are the subject of the section 301 investigation, as evidenced extensively in this report, China has become more aggressive, particularly through cybertheft and cyber intrusions, in its attempts to acquire and absorb foreign technology and IP on a non-consensual basis from U.S. companies. These acts, policies, and practices have cost U.S. companies and consumers billions of dollars, adding to the burden or restriction on U.S. commerce.

To maintain the current leverage and encourage China to eliminate the technology transfer-related acts, policies, and practices that are the subject of this investigation, products currently subject to section 301 duties should remain subject to the additional duties.

In light of the increased burden on U.S. commerce, and to further encourage China to eliminate the technology transfer-related acts, policies, and practices, and counteract the burden or restriction of these technology transfer-related acts, policies, and practices, the Trade Representative is considering modifications to add or increase tariffs for certain products.

Pursuant to section 307(c) and section 307(a)(1), the Trade Representative may modify or terminate any action, subject to the specific direction, if any, of the President with respect to such action, that is being taken under section 301 if the burden or restriction on United States commerce of the denial of rights, or of the acts, policies, and practices, that are the subject of such action has increased or decreased (paragraph B), or such action is being taken under section 301(b) and is no longer appropriate (paragraph C). Section 301(c)(3)(B) authorizes the Trade Representative to take action against any goods or economic sector of the foreign country concerned regardless of whether or not such goods or economic sector are involved in the act, policy, or practice subject to investigation.

The Trade Representative is proposing modifying the actions by adding or increasing section 301 tariffs for certain products in strategic sectors. Many of the sectors are targeted by China for dominance or are sectors where the U.S. has recently made significant investments. These include:

- Battery parts (non-lithium-ion batteries)
- Electric vehicles
- Facemasks
- Lithium-ion electrical vehicle batteries
- Lithium-ion non-electrical vehicle batteries
- Medical gloves
- Natural graphite
- Other critical minerals
- Permanent magnets
- Semiconductors
- Ship to shore cranes
- Solar cells (whether or not assembled into modules)
- Steel and aluminum products
- Syringes and needles

Commonly referred to as China's high-tech "new three," in recent years China has targeted solar products, lithium-ion batteries, and electric vehicles for export growth.[378] In 2022 and 2023, China's global exports of these products surged. With respect to solar, China maintains an overwhelming share of global solar products production. Similarly, China has targeted the processing of critical minerals, including graphite, to become the global leader in the critical minerals supply chains for electric vehicle batteries, solar products, semiconductors, and other key products. As noted above, China continues to use technology transfer-related acts, policies, and practices, among other tools, to dominate certain strategic sectors of the economy, thus continuing to burden U.S. commerce. Increasing or adding section 301 tariffs on products targeted by China for dominance will help encourage the elimination of investigated technology transfer-related acts, policies, and practices by encouraging alternative sourcing in strategic sectors of the economy, reducing U.S. reliance on China, while also reducing exposure to China's technology transfer-related acts, policies, and practices, and help to maintain resilient, diverse, and secure supply chains.

For many of the sectors covered by these proposed tariff increases, the United States has made significant investments, including through such initiatives as the IRA and the Bipartisan Infrastructure Law. This legislation seeks to improve U.S. economic competitiveness, innovation, and productivity through investment in U.S. production and technology in strategic sectors. The proposed modifications also complement these investments.

[378] Ouyang Shijia, *'New Three' Paves Way for High-Quality Growth*, CHINA DAILY, Feb. 21, 2024, https://www.chinadailyhk.com/article/377191.

For example, following passage of the IRA, the U.S. economy has made significant investments into clean energy technology, clean energy supply chains, and clean energy manufacturing. Increasing section 301 duties on tariff lines covering lithium-ion batteries, permanent magnets, electric vehicles, and solar products will help to support these investments, encouraging diversification away from Chinese sources, and providing additional leverage on China to eliminate the investigated acts, policies, and practices.

With respect to solar, China maintains an overwhelming share of global solar product production, and the United States is the second largest market for solar products in the world. As a result of U.S. investment and other incentives, domestic solar wafer, cell, and module production is expected to increase in the coming years. Increasing section 301 duties on solar products will help support domestic production in this strategic sector, decreasing reliance on China and providing additional leverage on China to eliminate the investigated technology transfer-related acts, policies, and practices.

Following passage of the CHIPS and Science Act, the United States is making significant investments into leading edge and foundational semiconductor production, as well as advanced packaging, research and development, and workforce training. China has targeted the semiconductor sector for dominance and is rapidly expanding its capacity, particularly for foundational semiconductors. Increasing section 301 duties on semiconductors will also help support domestic production in this strategic sector, decreasing reliance on China and providing additional leverage on China to eliminate the investigated technology transfer-related acts, policies, and practices.

Additionally, increasing section 301 tariffs on products in the steel and aluminum sectors will strengthen the effectiveness of the actions by reducing opportunities for circumvention and help ensure the long-term viability of U.S. production. China's over-production of steel and aluminum has distorted global markets, harming U.S. workers and manufacturers in both the U.S. market and third country markets, where U.S. exports of steel and aluminum and steel- and aluminum-intensive products compete with exports from China. This over-production has similarly harmed the workers and manufacturers of many of the United States' allies and partners. With respect to ship to shore cranes, increasing section 301 duties may be appropriate to support the security interests of the United States from the threat of Chinese state-sponsored cyber intrusions of critical infrastructure.

Increasing the section 301 duties on critical medical supplies, including certain personal protective equipment, will help protect recent investments to increase domestic production and U.S. preparedness and as a result of those investment, the United States has, or is expected to have, sufficient domestic capacity. These products include medical/surgical gloves and face masks, including N95s. Similarly, increasing section 301 duties on syringes and needles, which are critical to U.S. preparedness and response to public health emergencies, will help maintain alternative sources.

B. Additional Recommendations

1. Proposed Exclusion Process and Proposed Exclusions

In addition to the proposed modifications above, the Trade Representative is proposing the establishment of an exclusion process targeting machinery used in domestic manufacturing. The proposed exclusion process will be limited to machinery under certain 8-digit tariff lines in Chapter 84 and Chapter 85 of the Harmonized Tariff Schedule of the United States (HTSUS). Included in Appendix K is a list of 8-digit tariff lines that USTR is proposing for the exclusion process. The Trade Representative is also proposing 19 temporary exclusions for certain solar manufacturing equipment. These exclusions will support investment in U.S. solar manufacturing. Included at Appendix L are 19 proposed temporary exclusions.

2. Greater Enforcement of 301 Duties

To maintain the effectiveness of the section 301 actions, the U.S. government must ensure that all Chinese goods subject to the section 301 duties are properly assessed. The challenges faced by the agency responsible for collecting section 301 duties and enforcing customs laws and regulations at U.S. ports, the CBP, have increased significantly in recent years. As of January 2024, CBP had assessed more than $200 billion in section 301 duties under the July 6, 2018 action and the August 23, 2018 action. Additional trade remedies in 2018 under section 232 of the Trade Expansion Act of 1962 (steel and aluminum) and sections 201 of the Trade Act of 1974 (solar panels) have increased CBP's enforcement work. Total duties assessed under those actions since 2018 amount to over $20 billion. At the same time, total imports into the United States have increased from $2.64 trillion in 2018 to $3.11 trillion in 2023, an increase of nearly 18 percent.

In response to USTR's questionnaire seeking views on the section 301 actions, several interested persons submitted comments suggesting increased enforcement by CBP to combat the evasion of section 301 duties.[379] While the extent of section 301 duty evasion is not known, there is evidence of companies intentionally evading the section 301 duties. At the end of 2023, the DOJ announced settlements in three cases that alleged evasion of section 301 duties.[380]

Despite the significant increase in trade actions under section 301, section 201, and section 232, the budget for CBP does not have funds specifically allocated for the enforcement of these trade actions. Allocating additional funds to CBP would allow for the greater enforcement of the section 301 actions (and similar trade actions) and would make the section 301 actions more effective.

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[379] *See e.g.,* USTR-2022-0014-00034837.

[380] *See King Kong Tolls Settles Claims of Customs Fraud for $1.9 Million*, DOJ, Nov. 29, 2023, https://www.justice.gov/usao-ndga/pr/king-kong-tools-settles-claims-customs-fraud-19-million; *Dallas Importer and Two Chinese Companies to Pay $2.5 Million to Resolve Allegation of Underpaying Customs Duties*, DOJ, Dec. 5, 2023, https://www.justice.gov/usao-ndtx/pr/dallas-importer-and-two-chinese-companies-pay-25-million-resolve-allegations; *Importer Agrees to Pay $798,334 to Resolve Allegations of Underpayment of Customs Duties*, DOJ, Dec. 13, 2023, https://www.justice.gov/usao-edtx/pr/importer-agrees-pay-798334-resolve-allegations-underpayment-customs-duties.

3. Promoting Private Sector Awareness, Cooperation, and Action

Considering the findings in Section II of this report on China's persistent and increasingly aggressive campaign to steal U.S. technology, IP, trade secrets, and confidential business information, and warnings of FBI Director Christopher Wray and other intelligence officials on China's unwavering intent to steal cutting-edge technology through state-sponsored cybertheft, more is needed to prevent and protect U.S. companies against cyber intrusions and economic espionage. To combat state-sponsored technology theft, there must be greater collaboration and cooperation between private companies and government authorities. In particular, U.S. law enforcement and intelligence agencies should intensify their work with U.S. companies and institutions of education and research and development to identify risk and vulnerabilities in cyber networks before those vulnerabilities can be exploited. U.S. companies and institutions should report suspected cyber intrusions or suspected attempts in a timely manner, and cooperate with law enforcement in the prosecution of offenders.

U.S. companies should prioritize cyber defenses, invest in the necessary infrastructure and services, and take appropriate actions to remediate vulnerabilities and prioritize strengthening cyber defenses. Greater transparency by U.S. companies on the extent, type, and investment in cyber defense would permit market investors to support U.S. companies taking appropriate steps to protect their technology, IP, trade secrets, and confidential business information from China's cyber espionage.

4. Continue to Assess Approaches to Enhancing Supply Chain Impacts

As outlined in Executive Order 14017 (Executive Order on America's Supply Chains), the "United States needs resilient, diverse, and secure supply chains to ensure our economic prosperity and national security." Moreover, resilient domestic "supply chains will revitalize and rebuild domestic manufacturing capacity, maintain America's competitive edge in research and development, and create well-paying jobs." To reduce the exposure of U.S. persons, companies, and technologies to China's technology transfer-related acts, policies, and practices and to strengthen the resilience of America's supply chains, USTR, other U.S. government agencies, and the U.S. Congress should continue to assess approaches to shifting supply chains away from China and enhancing the supply chain impacts of the tariffs.[381]

[381] *See Request for Comments on Promoting Supply Chain Resilience*, 89 Fed. Reg. 16608 (Mar. 7, 2024).

APPENDIX A

Appendix A: Summary of Comments of Interested Persons

On November 15, 2022, the Office of the United States Trade Representative (USTR) opened a 90-day docket with a questionnaire for interested persons to submit views on the actions. In response, USTR received 1,498 comments from interested persons, including various industry groups, and small businesses covering a range of U.S. industries and interests.

The questionnaire was separated into three sections and invited views concerning the effectiveness of the actions in achieving the objectives of the investigation, other actions that could be taken, and the effects of such actions on the U.S. economy, including consumers at increasing levels of specificity. Section A of the questionnaire invited views at an economy-wide level; Section B invited views at a sector/industry level; and Section C invited views at the level of tariff headings. Submitters could use one or more of these sections to submit their views.

This Appendix follows the structure of the questionnaire and provides a summary of views under Section A (Effectiveness of the Actions and Economy-Wide Views), Section B (Sector/Industry-Specific Comments), and Section C (Comments on Tariff Headings).

A. Effectiveness of the Actions and Economy-Wide Views

1. Effectiveness of the Actions

USTR invited views on the effectiveness of the actions in obtaining the elimination of China's acts, policies, and practices related to technology transfer, intellectual property (IP), and innovation (Question 2), changes in China's technology transfer-related acts, policies, and practices since 2018 (Question 3), and the role of the actions in causing any such changes (Question 4). Approximately 367 comments responded to all or one of the questions.

Nearly one-third of the comments responded that the actions are effective, with many citing specific changes in China's technology transfer-related acts, policies, and practices and specific actions and commitments China has taken, including commitments made by China under the *Economic and Trade Agreement Between the Government of the United States of America and the Government of the People's Republic of China* ("U.S.-China ETA").[1] Others responded the actions help to maintain leverage on China to change its technology transfer-related acts, policies, and practices.[2] Comments also responded that the actions had not been sufficient to

[1] *See* USTR-2022-0014-00034861 (citing changes in China's policy regarding the loosening of certain joint venture requirements for foreign investment); USTR-2022-0014-00035055 (noting a noticeable decrease in the practice of Chinese companies conducting essentially reconnaissance missions to co-opt U.S. technologies by inquiring about U.S. sourcing options in order to tour U.S. facilities); USTR-2022-0014-00035478 (noting China's passage of the 2019 *Foreign Investment Law* banning forced technology transfer and the passage of the 2022 law providing stronger intellectual property (IP) protections).

[2] *See* USTR-2022-0014-00034452.

address China's unfair practices, but noted if the tariffs were removed, China's practices would increase.[3]

Approximately one-third of the comments expressed the view that the actions have not been effective, citing no change in China's technology transfer-related acts, policies, and practices.[4] Additional comments responded that the actions have not been effective, but could be with more time and higher tariff rates that encourage China to change its wrongful behavior.[5] Other comments asserted that the actions could be more effective if the structure of the tariffs was changed.[6]

A large number of the comments responded that there were some positive changes in China, but also noted that China's actions in removing the technology transfer-related acts, policies, and practices had fallen short.[7] Some commenters remarked that while the actions are effective, they could not evaluate changes in China's behavior or noted the lack of transparency in China.[8]

Finally, regarding the role of the actions in causing changes in China's technology transfer-related acts, policies, and practices, of the comments reporting changes in China since 2018, nearly all responded that the actions had played a role.[9]

a. Whether the Actions Counteract China's Technology Transfer-Related Acts, Policies, and Practices

USTR identified approximately 240 comments that addressed whether the actions counteract China's technology transfer-related acts, policies, and practices (Question 5).

A minority of the comments responded that the actions counteract China's technology transfer-related acts, policies, and practices. These comments remarked that the actions had brought China to the negotiation table (leading to the U.S.-China ETA),[10] put pressure on China to eliminate its technology transfer-related acts, policies, and practices and enact stronger IP protections,[11] reduced China's ability to benefit from the technology transfer-related acts,

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[3] *See* USTR-2022-0014-00034723 (expressing that without the tariff actions, competing imports from China would increase and U.S. companies' competitiveness would suffer); *see also* USTR-2022-0014-00034837; USTR-2022-0014-00035031.
[4] *See* USTR-2022-0014-00033004; USTR-2022-0014-00033643; USTR-2022-0014-00034074.
[5] *See* USTR-2022-0014-00034931.
[6] *See* USTR-2022-0014-00033651 (agreeing with the objectives and goals of the tariff actions, while also noting that the current structure of the tariffs limits their effectiveness); USTR-2022-0014-00034956 (reporting that the tariffs were too broadly applied to low-value products where forced technology transfer and IP infringement are not a concern).
[7] *See* USTR-2022-0014-00035721 (noting that since the imposition of the tariffs and subsequent negotiations in 2018, China's protection of IP had improved, however concerns about IP theft still persist).
[8] *See* USTR-2022-0014-00034837; USTR-2022-0014-00034733.
[9] *See* USTR-2022-0014-00034861 (noting that the tariffs from the List 1 action helped loosen certain Chinese joint venture requirements for foreign investment); *see also* USTR-2022-0014-00034254 (remarking that the actions were the direct cause of the Chinese government's willingness to discuss modifications to its policies in the areas of technology transfer, IP, and innovation, and pushed China toward negotiations resulting in the U.S.-China ETA).
[10] *See* USTR-2022-0014-00034297.
[11] *See* USTR-2022-0014-00035599.

policies, and practices,[12] and reduced the exposure of U.S. companies to IP theft and technology transfer.[13] Additional comments responded that the tariffs have somewhat counteracted China's practices, but suggested stronger actions are necessary.[14]

A majority of the comments responded that the tariffs do not counteract China's unfair trade practices, but approximately one-third of these comments provided no further elaboration. Of those providing further elaboration, some cited the lack of change in China's technology transfer-related acts, policies, and practices. However, the vast majority of the comments reporting that the actions do not counteract China's unfair trade practices simply alleged negative consequences of the actions, including China's retaliatory tariffs,[15] reduced U.S. competitiveness,[16] and higher prices for consumers.[17] A handful of comments focused on other issues, such as non-U.S. companies being allowed to utilize exclusions.[18]

Additional comments noted that the actions had not counteracted China's technology transfer-related acts, policies, and practices due to the structure of the tariffs and products covered.[19]

b. Modifications to the Actions

USTR identified approximately 280 comments that provided responsive comments on how the actions could be modified to make them more effective (Question 6). More than half suggested

[12] *See* USTR-2022-0014-00034452.
[13] *See* USTR-2022-0014-00035104 (stating that the actions served as a mechanism to deter joint ventures in China between U.S. manufacturers and often Chinese state-owned or subsidized companies that increase the chances of forced technology transfer and that original equipment manufacturers and suppliers are less interested in joint ventures in China as a direct result of the tariff actions).
[14] *See* USTR-2022-0014-00033011; USTR-2022-0014-00034635.
[15] *See* USTR-2022-0014-00034022.
[16] *See* USTR-2022-0014-00034074.
[17] *See* USTR-2022-0014-00034514.
[18] *See* USTR-2022-0014-00033651.
[19] *See* USTR-2022-0014-00035528; USTR-2022-0014-00034931; USTR-2022-0014-00035656; USTR-2022-0014-00034938 (noting the actions targeted products that were not at risk of IP theft or forced technology transfer).

general changes to the products covered by the actions,[20] the addition[21] or removal of particular products,[22] or the rate of duties applied.[23]

Several comments suggested modifying the actions by tailoring the tariffs to narrowly focus on particular products and industries that are targeted by China's practices, *e.g.*, high technology products or those in need of IP protection,[24] or on products that are truly subject to IP theft or technology transfer requirements.[25] A few comments provided views on reinstating expired exclusions or implementing a new exclusion process.[26]

Commenters also provided views on other actions that could be taken under section 301,[27] and on possible actions outside of section 301, including further support for research and development (R&D)/domestic manufacturing efforts,[28] and the implementation of greater enforcement capabilities and efforts to prevent the evasion of section 301 tariffs.[29]

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[20] *See* USTR-2022-0014-00033802 (suggesting that the actions could be modified to target only finished goods and not input products imported from China, such as chemical raw materials used by domestic industries); USTR-2022-0014-00035376 (suggesting that tariffs should be applied to U.S. imports from Chinese companies that moved their manufacturing (or portions of their manufacturing) outside of China to third countries to prevent circumvention and evasion of the duties); USTR-2022-0014-00033456 (suggesting the removal of the Lists 3 and 4 products from the actions because the tariffs on these goods have no impact on changing China's technology transfer-related acts, policies, and practices); USTR-2022-0014-00034989 (suggesting that the actions should cover downstream products incorporating Chinese inputs); USTR-2022-0014-00035091 (suggesting modification of the actions to allow domestic solar manufacturers to apply for certain narrow, one-time exclusions from section 301 tariffs on certain solar manufacturing equipment not reasonably available anywhere but from China); USTR-2022-0014-00035234 (suggesting modification of the actions by removing tariffs on manufacturing equipment and raw materials only available from China).

[21] *See* USTR-2022-0014-00035376 (suggesting that tariffs should be applied to U.S. imports from Chinese companies that moved their manufacturing (or portions of their manufacturing) outside of China to third countries to prevent circumvention and evasion of the duties).

[22] *See* USTR-2022-0014-00034640 (composite kayaks); USTR-2022-0014-00035032 (light-emitting diode Products); USTR-2022-0014-00034931 (consumer products, including child safety equipment, *e.g.*, bassinets or cribs).

[23] *See* USTR-2022-0014-00034751 (suggesting that tariffs could be raised to 50 percent); USTR-2022-0014-00034326 (suggesting increasing the duties on List 4A and 4B back to their originally proposed duty rates); USTR-2022-0014-00033456 (suggesting the removal of the Lists 3 and 4 products from the actions because the tariffs on these goods have no impact on changing China's technology transfer-related acts, policies, and practices).

[24] *See* USTR-2022-0014-00035336 (suggesting that the actions could be modified to target high technology products and shift away from low technology products); *see also* USTR-2022-0014-00034245.

[25] *See* USTR-2022-0014-00034927; USTR-2022-0014-00035546; *see also* USTR-2022-0014-00034475 (recommending modification of the actions by using an antidumping and countervailing duty approach to target appropriate products impacted by the forced technology transfer and IP theft).

[26] *See* USTR-2022-0014-00035529.

[27] *See* USTR-2022-0014-00034895 (suggesting suspension of the section 301 actions in lieu of pursuing further negotiations with China on the technology transfer-related acts, policies, and practices cited in the section 301 investigation); USTR-2022-0014-00034626 (suggesting that USTR should continue to use its authority under section 301 to address China's harmful trade policies that were not covered by the current investigation by conducting an investigation into industrial subsidy practices that may fall outside the letter of the World Trade Organization Agreement on Subsides and Countervailing Measures).

[28] *See* USTR-2022-0014-00035316.

[29] *See* USTR-2022-0014-00033011; *see also* USTR-2022-0014-00034022 (suggesting implementation of sticker regulations, similar to the Miscellaneous Tariff Bill, to limit Chinese investments in U.S. businesses or within the U.S); USTR-2022-0014-00034759 (suggesting the need for additional support or incentives to support domestic manufacturing and re-shoring efforts).

2. Other Actions Under Section 301

USTR identified approximately 82 comments that provided views on other actions that could be taken under section 301 (Question 7). However, most of these comments did not suggest "other actions" authorized under the statute, but rather modifications to the current actions, such as the removal of specific products or to focus the actions on specific products,[30] sectors,[31] or industries.[32]

An additional 137 comments provided views on actions beyond the scope of section 301. Several of these comments provided views on how to strengthen the action. For example, several comments suggested increasing enforcement by U.S. Customs and Border Protection to combat the evasion of section 301 duties.[33]

Other comments suggested targeted export controls against emerging technologies,[34] limiting Chinese investment in the United States,[35] and restricting the import of specific products that incorporate stolen U.S. IP, including trade secrets.[36]

a. Economy-Wide Effects of the Actions or Other Possible Actions on the U.S. Economy

Interested parties were invited to provide comments about the economy-wide effects of the actions on the U.S. economy (including consumers), or on the economy wide effects of other actions that could be taken (Question 8). Interested parties were invited to provide general views or respond to the following specific questions:

(a) The economy-wide effects of the actions or other possible actions on domestic manufacturing, including in terms of capital investments, domestic capacity and production levels, industry concentration, and profits;

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[30] *See* USTR-2022-0014-00034888 (suggesting retention of the tariffs only on products for which there is an industry producing such or similar products in the U.S. or removing tariffs from products that already have protection against unfair trade practices, *e.g.*, antidumping and countervailing duty orders).

[31] *See* USTR-2022-0014-00034461 (suggesting a focus on specific sectors that need more protection related to technology transfer, IP, and innovation); USTR-2022-0014-00034795; USTR-2022-0014-00035055; *see also* USTR-2022-0014-00035017 (suggesting the modification of the scope of the actions to cover all imports of iron, steel and steel products from China at the highest tariff rate possible).

[32] *See* USTR-2022-0014-00035158 (suggesting that USTR should narrow the scope of the investigation and place tariffs on the Chinese industries that have actually been violators with regard to technology transfers, IP, and innovation).

[33] *See* USTR-2022-0014-00034837.

[34] *See* USTR-2022-0014-00034245; *see also* USTR-2022-0014-00035377 (suggesting the imposition of restrictions on the export or use of U.S. technology abroad (such as through an extension of the Foreign Direct Product Rule)).

[35] *See* USTR-2022-0014-00035358.

[36] *See* USTR-2022-0014-00034377; USTR-2022-0014-00034861 (suggesting that USTR should consider developing minimum valuation provisions in the tariff structure, noting that China has stolen much automotive technology from the United States, and the additional 25 percent tariff has been invaluable in limiting the benefits that China would otherwise receive from its unfair practices).

(b) The economy-wide effects of the actions or other possible actions on U.S. technology, including in terms of U.S. technological leadership and U.S. technological development;

(c) The economy-wide effects of the actions or other possible actions on U.S. workers, including with respect to employment and wages;

(d) The economy-wide effects of the actions or other possible actions on U.S. small businesses;

(e) The economy-wide effects of the actions or other possible actions on U.S. supply chain resilience or the goals of U.S. critical supply chains outlined in Executive Order 14017 and in subsequent reports and findings;

(f) The economy-wide effects of the actions or other possible actions on U.S. consumers, including with respect to prices and product availability.

Approximately 270 comments provided relevant responses to one or more of the more specific questions, with most providing general views.

Comments reporting generally that the actions have a positive impact on the U.S. economy noted that the actions are effective in encouraging reshoring or near-shoring of critical industries that are vital to U.S. supply chain resiliency and security,[37] bolstering domestic production,[38] restraining imports of unfairly traded Chinese products,[39] helping domestic companies win back business from China,[40] and increasing domestic investment, jobs, and wages.[41] Comments responding generally that the actions negatively impact the economy in various ways noted increased costs for businesses and consumers alike,[42] reduced domestic competitiveness, reduced business growth,[43] increased layoffs and wage stagnation,[44] or disrupted supply chains.[45]

Comments addressing domestic manufacturing and reporting positive effects of the actions observed improved production levels and capacity utilization,[46] and an increase in the number of companies interested in reshoring their supply chains to America.[47] Conversely, comments reporting negative effects noted increased costs for inputs and manufacturing equipment,[48] shifts

[37] *See* USTR-2022-0014-00034326; USTR-2022-0014-00034328; USTR-2022-0014-00034390.
[38] *See* USTR-2022-0014-00035634.
[39] *See* USTR-2022-0014-00034989.
[40] *See* USTR-2022-0014-00033846.
[41] *See* USTR-2022-0014-00033011.
[42] *See* USTR-2022-0014-00035549; USTR-2022-0014-00035234.
[43] *See* USTR-2022-0014-00033920.
[44] *See* USTR-2022-0014-00034461.
[45] *See* USTR-2022-0014-00033772.
[46] *See* USTR-2022-0014-00034837.
[47] *See* USTR-2022-0014-00033282; USTR-2022-0014-00033206.
[48] *See* USTR-2022-0014-00034934; USTR-2022-0014-00035234.

in production to third countries,[49] reduced U.S. global competitiveness,[50] or increased consumer prices resulting in lower demand and lower profit margins.[51]

Regarding the effects on technology, a small number of comments responded that the actions have had a positive impact on U.S. technology. Some of these comments suggested that the actions have increased or strengthened R&D efforts and technology, and have enhanced protection for U.S. technology, manufacturing, and supply chains.[52]

The majority of comments responded the actions have negatively impacted U.S. technological leadership.[53] A small number of comments responded that the actions have little to no effect on U.S. technology, with some noting that the United States maintains its position as the leader in global technology and development.[54]

With respect to U.S. workers, the majority of comments indicated that the actions have negatively impacted U.S. workers. These comments suggest that the actions have resulted in lower profitability, which has led to reductions or freezing of wages and benefits in many U.S. industries.[55] By contrast, comments reporting positive effects suggested that the actions have protected U.S. jobs,[56] have increased employment levels,[57] and have resulted in additional shifts for workers through additional manufacturing capacity.[58] Finally, a few comments observed no impact on U.S. workers.[59]

Regarding the effects on U.S. small businesses, the majority of the comments responded that the tariffs had a negative impact. Some comments cited disproportionate harm to small businesses,[60] including increased operating costs,[61] reduced profits,[62] reduced capital investments,[63] business closures,[64] and an inability to meet creditor terms.[65]

Those reporting a positive impact on small businesses noted various benefits, including helping small businesses compete with large multinational companies that rely on cheap imports from

[49] *See* USTR-2022-0014-00034155; USTR-2022-0014-00035309.
[50] *See* USTR-2022-0014-00035124.
[51] *See* USTR-2022-0014-00034777.
[52] *See* USTR-2022-0014-00035376.
[53] *See* USTR-2022-0014-00033920; USTR-2022-0014-00035035; USTR-2022-0014-00034047 (suggesting that the actions have reduced the resources or capital available for research and development (R&D)); USTR-2022-0014-00033653 (suggesting that the actions have reduced joint technical and research efforts between the United States and China).
[54] *See* USTR-2022-0014-00035408; USTR-2022-0014-00035661.
[55] *See* USTR-2022-0014-00034689; USTR-2022-0014-00034074; USTR-2022-0014-00035645.
[56] *See* USTR-2022-0014-00035031.
[57] *See* USTR-2022-0014-00035017.
[58] *See* USTR-2022-0014-00035376.
[59] *See* USTR-2022-0014-00035358.
[60] *See* USTR-2022-0014-00034245.
[61] *See* USTR-2022-0014-00033067.
[62] *See* USTR-2022-0014-00033172.
[63] *See* USTR-2022-0014-00033514.
[64] *See* USTR-2022-0014-00034461.
[65] *See* USTR-2022-0014-00034859.

China,[66] increasing production for small businesses,[67] and improving the overall market position of small businesses (*e.g.*, capacity utilization, employment, shipments, market share, profitability, and capital investment).[68]

Regarding supply chain resilience, comments providing negative views responded that the actions had limited importers' ability to diversify supply chains,[69] caused damage to supply chains that rely on China,[70] and increased supply chain lead times.[71] Comments reporting a positive impact on supply chain resilience noted the rebuilding and sustainment of critical supply chains in the U.S.,[72] increased supply chain resiliency due to increased re-shoring and diversification,[73] and increased U.S. manufacturing of goods that were previously primarily sourced from China.[74] Finally, a few comments observed mixed results, noting that while the tariffs have resulted in product shortages in the short-term,[75] maintaining the actions may result in long-term investments outside of China and improved supply chains in the future.[76]

In addressing the effects on consumers, the vast majority of comments responded that the actions have had a negative impact on consumers, citing increased consumer prices,[77] reduced consumer purchasing power, and reduced product availability and diversity.[78] By contrast, a small number of comments responded that the actions have had a positive impact on consumers, with some of the comments citing that the actions have led to a reduced reliance on China,[79] increased technological innovation, and improved product quality, pricing, and availability.[80]

B. Sector/Industry-Specific Comments

For Section B (Sector/Industry-Specific Comments), submitters were asked to define the sector/industry in accordance with the scope of their views. Additionally, submitters were asked to provide the primary North American Industry Classification System (NAICS) code associated with their sector. For each sector identified, and with respect to the goods within that sector or industry, submitters could provide views on whether the actions are effective in obtaining the elimination of China's technology transfer-related acts, practices, and policies, whether other actions would be effective, and the effects of the actions or other actions on domestic manufacturing, U.S. workers, small businesses, supply chains and supply chain resilience, and consumer goods.

[66] *See* USTR-2022-0014-00034861.
[67] *See* USTR-2022-0014-00034568.
[68] *See* USTR-2022-0014-00034297; USTR-2022-0014-00034254.
[69] *See* USTR-2022-0014-00034245.
[70] *See* USTR-2022-0014-00034925.
[71] *See* USTR-2022-0014-00035105.
[72] *See* USTR-2022-0014-00034679.
[73] *See* USTR-2022-0014-00033441.
[74] *See* USTR-2022-0014-00034692.
[75] *See* USTR-2022-0014-00034861.
[76] *See* USTR-2022-0014-00034963.
[77] *See* USTR-2022-0014-00035655.
[78] *See* USTR-2022-0014-00034126.
[79] *See* USTR-2022-0014-00034356.
[80] *See* USTR-2022-0014-00035278.

USTR received 741 comments that identified one or more specific sectors/industries by NAICS code. For a summary listing the sectors/industries by 2-, 3-, or 4-digit NAICS code that received comments, see Table 1.

C. Comments on Tariff Headings

For Section C (Comments on Tariff Headings), submitters were asked to share their views, at the 8-digit or 10-digit level, on whether certain tariff headings should be removed or remain, or on adding new tariffs to the scope of the actions.

Table 2 summarizes by Harmonized Tariff Schedule of the United States (HTSUS) Chapter, the number of unique 8-digit tariff lines that received comments. Below are summaries of the comments, which suggest that a tariff heading: (1) remain; (2) be removed; and (3) be added.

1. Comments That Certain Tariff Headings Remain Covered by the Actions

USTR received 261 unique comments with views on tariff headings that should remain covered by the actions. The comments covered 1,857 specific tariff lines.

Most comments providing views to maintain lines currently covered by the actions responded that the section 301 duties were effective in obtaining the elimination of, or counteracting, China's technology transfer-related acts, policies, and practices.[81] Specifically, some of those comments noted that the tariffs provide the United States with greater leverage in negotiations with China[82] and help counteract China's technology transfer-related acts, policies, and practices by reducing the exposure of U.S. companies.[83] With respect to the impact of the tariffs on the U.S. economy,[84] comments noted that the tariffs afford domestic manufacturers additional

[81] *See* USTR-2022-0014-00035584 (the actions, with respect to Chinese phosphate fertilizer imports, are effective in obtaining the elimination of or in counteracting China's technology transfer-related acts, policies, and practices related to technology transfer, IP, and innovation.); USTR-2022-0014-00035031 (maintaining the section 301 tariffs on imports of Chinese wheat gluten at a rate of 25 percent or higher would continue to be an effective means of counteracting China's unfair policies and practices); USTR-2022-0014-00033641 (the tariffs are effective in counteracting China's technology transfer-related acts, policies, and practices related to IP and innovation because the tariffs allow US based manufacturers to price molds competitively with those made in China).
[82] *See* USTR-2022-0014-00034624 (maintaining or increasing the tariffs will preserve the United States' negotiating leverage); USTR-2022-0014-00034819 (the tariffs give the United States leverage to address China's policies).
[83] *See* USTR-2022-0014-00034486 (help to curtail China's unfair practices); USTR-2022-0014-00035104 (the tariffs have resulted in reduced opportunities for IP theft and forced technology transfer).
[84] *See* USTR-2022-0014-00033480 (noting growth in domestic manufacturing base); USTR-2022-0014-00034977 (the continuation of the tariffs will play a large role in ensuring fair market competition against Chinese practices). USTR-2022-0014-00035636 (noting the removal of the tariffs will open the floodgates to imports of soybean meal from China which will act as a backdoor for transshipment to evade the antidumping and countervailing duty orders).

protections from China's unfair trade practices,[85] help level the playing field,[86] allow domestic manufacturers to recapture and gain market share,[87] contribute to significant job growth and wage increases,[88] and allow for increased domestic production capacity and capabilities.[89]

Comments also note that the actions are furthering the Administration's objectives and goals with respect to green technology[90] and creating more resilient supply chains.[91] Regarding supply chains, comments report a greater incentive for reshoring and onshoring efforts,[92] domestic

[85] *See* USTR-2022-0014-00034525 (noting the tariffs mitigate the distorting impact of increasing Chinese sulfuric acid imports); USTR-2022-0014-00035398 (noting the tariffs have supported U.S. production of titanium dioxide pigment products, which were previously at risk due to an influx of Chinese imports); USTR-2022-0014-00033953 (the tariffs have made global competition possible and have allowed for higher levels of job training).

[86] *See* USTR-2022-0014-00033635 (noting the tariffs create a more level playing field between China and the United States); USTR-2022-0014-00033111 (noting it is necessary to maintain the tariffs on imported Chinese injection molds in order to level the playing field); USTR-2022-0014-00034308 (noting the tariffs provide a competitive level playing field for U.S. manufacturing); USTR-2022-0014-00034723 (noting the section 301 tariffs and other trade measures are necessary for U.S. producers to stay afloat and compete on a more level playing field); USTR-2022-0014-00035651 (maintaining the current section 301 duties will help level the playing field for U.S. automotive remanufacturers); USTR-2022-0014-00034820 (noting the tariffs have allowed U.S. kitchen cabinet manufacturers to compete on a more level playing field).

[87] *See* USTR-2022-0014-00034652 (noting the tariffs have enabled U.S. producers to regain market share previously lost to Chinese imports); USTR-2022-0014-00035593 (the tariffs allow domestic producers to increase production, gain market share, and sustain employment levels); USTR-2022-0014-00035065 (the submitter has regained lost market share and made additional investments in domestic facilities and R&D).

[88] *See* USTR-2022-0014-00034489 (noting the tariffs have allowed the submitter to increase employment by 92 percent and wages by 40 percent); USTR-2022-0014-00035272 (noting the tariffs have enabled the hiring of an additional 150 employees and an increase of wage rates to competitive levels); USTR-2022-0014-00034253 (noting the tariffs allowed the submitter to hire an additional 132 employees and increase wages three times over the past two years).

[89] *See* USTR-2022-0014-00034221 (recent investments in domestic steel fabrication capacity and jobs are directly attributable to the tariffs); USTR-2022-0014-00034708 (noting the tariffs have helped spur massive additional capital investments in the quartz surface product sector by the submitter and at least seven other companies); USTR-2022-0014-00033476 (increased investments, hiring, and production capacity are attributable to the tariffs).

[90] *See* USTR-2022-0014-00034832 (the tariffs have incentivized the development of a full vertically integrated U.S. solar manufacturing infrastructure); USTR-2022-0014-00034980 (noting the tariffs have allowed multiple U.S.-based biomanufacturing firms to bring a commercially viable and carbon-advantaged product to market); USTR-2022-0014-00034154 (noting higher duties foster increased U.S. consumption of environmental-friendly and less hazardous products).

[91] *See* USTR-2022-0014-00034832 (tariffs on Chinese wafers incentivize U.S. producers to shift supply chains away from China so that critical inputs for solar cell and module production will not be reliant on China); USTR-2022-0014-00035017 (noting the tariffs have encouraged appliance manufacturers operating in the United States to establish more localized supply chains); USTR-2022-0014-00035278 (noting trade measures like the tariffs and other investment incentives are helping to level the playing field and shift supply chains).

[92] *See* USTR-2022-0014-00035104 (noting the tariffs incentivize the reshoring and onshoring of manufacturing to the United States; USTR-2022-0014-00034890 (the duties encourage the onshoring and reshoring of production the United States has lost to China); USTR-2022-0014-00034339 (noting the tariffs have encouraged more U.S. manufacturing).

investments in manufacturing,[93] third country sourcing,[94] and reduced dependence on Chinese products.[95] Moreover, comments report that reshoring efforts have helped to strengthen sectors associated with national defense and security.[96]

Some comments suggested the tariffs should remain because removing them would harm U.S. interests, slow or halt reshoring efforts and domestic production,[97] encourage China to increase unfair trade practices,[98] and negate the progress made by domestic manufacturers since the tariffs were imposed.[99]

2. Comments That Certain Tariff Headings Be Removed From the Actions

USTR received 1,035 unique comments requesting the removal of 4,688 specific tariff lines from the scope of the actions.

Generally, the comments asserted that the tariffs are not effective in obtaining the elimination of or in counteracting China's technology transfer-related acts, policies, and practices,[100] cover

[93] *See* USTR-2022-0014-00034226 (increased domestic demand has prompted large investments and hiring by many large and small domestically produced kitchen cabinet companies); USTR-2022-0014-00035431 (the reconstruction of a $250 million manufacturing plant was made possible in part due to the section 301 tariffs and the rate of return on investment); USTR-2022-0014-00034826 (without the tariffs, the submitter would not have made significant investments in reshoring production).
[94] *See* USTR-2022-0014-00034837 (the tariffs have decreased U.S. dependence on foreign products while strengthening domestic supply chains).
[95] *See* USTR-2022-0014-00033109 (the tariffs have contributed to reduced dependance on overseas suppliers and increased reliance on and development of domestic suppliers); USTR-2022-0014-00035584 (the tariffs have made the U.S. agricultural supply chain more resilient by reducing dependence on unreliable phosphate fertilizer import from China).
[96] *See* USTR-2022-0014-00034506 (the tariffs help ensure a healthy domestic tungsten industry which is crucial to support the U.S. semiconductor, defense, aerospace, medical, electronics, automotive, and power generation industries); USTR-2022-0014-00034835 (the tariffs have helped preserve the U.S. forging industry, which supports critical infrastructure and national defense); USTR-2022-0014-00035228 (the section 301 duties have been an important first step in preserving the U.S. defense industrial base and fostering future supply chain resilience);
[97] *See* USTR-2022-0014-00034980 (removing the tariffs would have a detrimental impact on domestic manufacturing growth); USTR-2022-0014-00035291 (without the tariffs, Chinese polyester film import volumes would suppress U.S. capital investments, capacity, production levels, and profits).
[98] *See* USTR-2022-0014-00035055 (without action China will accelerate its actions in support of entities engaged in forced technology transfer and IP theft); USTR-2022-0014-00034946 (removal would likely result in China re-engaging in these harmful practices).
[99] *See* USTR-2022-0014-00034408 (removal would reverse the positive impacts that the tariffs have had thus far on shifting these critical supply chains back to America); USTR-2022-0014-00034548 (noting that if the tariffs were removed, the associated gains would reverse themselves, and supply chains would return to China); USTR-2022-0014-00035532 (removal of section 301 duties is likely to lead to an increase in low-priced imports from China and a reduction in domestic production and pricing).
[100] *See* USTR-2022-0014-00035496 (stating that ball bearings do not contain industrially significant technology and are outside of the scope of Made in China 2025); USTR-2022-0014-00035346 (stating that synthetic hair has does not involve advanced technologies and requires human production); USTR-2022-0014-00035410 (stating that the product is a low-technology plastic consumer good and that China is unaffected by tariffs on this product).

products not available outside of China,[101] or that the overall harm to U.S. interests and to consumers is disproportionate to any benefits gained.[102] Additionally, some comments provided views on the removal of lines covering inputs for the benefit of domestic manufacturing. Additional comments on removal noted that in some instances the section 301 duties on inputs had led to tariff inversions (where section 301 duties on the inputs are higher than section 301 duties on the downstream product(s) or finished goods(s) incorporating those inputs).[103] More broadly, some comments noted that duties on raw materials and inputs have harmed domestic growth and have dissuaded companies from investing in domestic manufacturing.[104]

3. Comments on Adding Tariff Headings Not Currently Covered by the Actions

USTR received 25 unique comments suggesting that 33 tariff lines be added to the scope of actions. Many of the comments noted that adding particular tariff lines would make the actions more effective in obtaining the elimination and counteracting China's technology transfer-related acts, policies, and practices.[105] Additionally, commenters suggested adding specific tariff lines would make the actions more effective by correcting for tariff inversions and help prevent duty evasion by aligning tariff rates across competing or similar products.[106]

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[101] *See* USTR-2022-0014-00035082 (stating that the specific marble is naturally occurring in China and cannot be sourced from geographical regions outside of China); USTR-2022-0014-00035184 (stating that the tariffs have had no impact in bringing dicumyl peroxide production back to the United States due to strict U.S. environmental and safety regulations, that potential South Korean production does not yet have meaningful production volume, and that China is currently the only major source); USTR-2022-0014-00033869 (stating that strontium mineral deposits have not been mined in the United States since 1959 and that China has the largest reserves of strontium metal in the world).

[102] *See* USTR-2022-0014-00033651 (stating that although the tariffs signaled to China the United States' willingness to combat unfair trade practices, the tariffs are no longer effective in achieving this objective because China has found ways to circumvent the tariffs and the tariffs primarily harm American consumers and companies); USTR-2022-0014-00034654 (stating that the company agrees with the goals of section 301 but in practice the tariffs are not effective and harm U.S. companies).

[103] *See* USTR-2022-0014-00034543 (stating that battery cells are subject to a 25 percent tariff on List 1, whereas complete lithium-ion batteries are subject to a 7.5 percent tariff on List 4A); USTR-2022-0014-00034959 (stating that tariffs on battery inputs are higher than tariffs for completed battery cells found on List 4A); USTR-2022-0014-00033592 (stating that fabrics are subject to a 25 percent tariff, whereas the finished products made with the fabrics are exempt from the tariffs).

[104] *See* USTR-2022-0014-00034567 (stating that removing tariffs on solar inputs would shift supply chains from China, incentivize domestic production, and protect existing domestic manufacturers from Chinese competitors); USTR-2022-0014-00035411 (stating that the tariffs have hindered the growth of the domestic solar industry and have incentivized the continued reliance on China's solar manufacturing operations); USTR-2022-0014-00035325 (stating that tariffs on inputs and equipment for manufacturing solar modules have increased the costs of domestic manufacturing and have threatened the establishment of the domestic supply chain).

[105] *See* USTR-2022-0014-00034584; USTR-2022-0014-00034544 (tariffs on methyl ethyl ketoxime would help counteract China's technology transfer-related acts, policies, and practices, contribute to preserving and strengthening manufacturing by chemical intermediates, and preserve domestic supply chains).

[106] *See* USTR-2022-0014-00035153 (tariffs on manufacturing inputs for spotting scopes, but not finished spotting scopes, has negatively impacted U.S. manufacturing operations); USTR-2022-0014-00033673 (noting that the tariff line for Tungsten waste and scrap is likely being used to import sintered tungsten parts whether wrought or unwrought).

Most comments also noted that the section 301 duties would encourage increased domestic production, with positive impacts on workers, supply chains, and consumers.[107] Other comments noted that additional domestic capacity could be available to replace any decreases in Chinese imports.[108]

[107] *See* USTR-2022-0014-00034584 (noting that tariffs on benzotriazole will strengthen domestic manufacturing, reduce price volatility, encourage domestic sourcing, stabilize supply chains, and enable domestic producers to meet consumer demand).
[108] *See* USTR-2022-0014-00033673.

Table A1: Sector/Industry-Specific Comments by NAICS Code

Economic Sector/Subsector/Industry Group	Number of Comments
11 - Agriculture, Forestry, Fishing and Hunting	**13**
11 - agriculture, forestry, fishing, & hunting general	2
1111 - oilseed & grain farming	2
1112 - vegetable & melon farming	2
1114 - greenhouse, nursery, & floriculture production	1
1121 - cattle ranching & farming	1
1129 - other animal production	1
1141 - fishing	4
21 - Mining	**4**
2111 - oil & gas extraction	2
2123 - nonmetallic mineral mining & quarrying	1
2131 - support activities for mining	1
22 - Utilities	**7**
2211 - electric power generation, transmission, & distribution	7
23 - Construction	**5**
2361 - residential building construction	2
2371 - utility system construction	1
2379 - other heavy & civil engineering construction	1
2382 - building equipment contractors	1
31-33 - Manufacturing	**615**
31-33 - all manufacturing	1
311 - food manufacturing	1
3111 - animal food manufacturing	4
3112 - grain & oilseed milling	1
3113 - sugar & confectionary product manufacturing	2
3114 - fruit & vegetable preserving & specialty food manufacturing	1
3117 - seafood product preparation & packaging	1
3119 - other food manufacturing	3
313 - textile mills	1
3131 - fiber, yarn, & thread mills	3
3132 - fabric mills	5
3133 - textile, fabric finishing, & fabric coating mills	2
314 - textile product mills	1
3141 - textile furnishings mills	1
3149 - other textile product mills	4
3152 - cut & sew apparel manufacturing	2

Economic Sector/Subsector/Industry Group	Number of Comments
3159 - apparel accessories & other apparel manufacturing	25
3161 - leather and hide tanning & finishing	2
3162 - footwear manufacturing	3
3169 - other leather & allied product manufacturing	6
3211 - sawmills & wood preservation	1
3212 - veneer, plywood, & engineered wood product manufacturing	4
3219 - other wood product manufacturing	5
3221 - pulp, paper, & paperboard mills	5
3222 - converted paper product manufacturing	7
3231 - printing & related support activities	2
325 - chemical manufacturing	3
3251 - basic chemical manufacturing	27
3252 - resin, synthetic rubber, artificial and synthetic fibers, & filaments manufacturing	11
3253 - pesticide, fertilizer, & other agricultural chemical manufacturing	6
3254 - pharmaceutical & medicine manufacturing	6
3255 - paint, coating, & adhesive manufacturing	3
3256 - soap, cleaning compound, & toilet preparation manufacturing	2
3259 - other chemical product & preparation manufacturing	10
326 - plastics & rubber manufacturing	2
3261 - plastics product manufacturing	13
3262 - rubber product manufacturing	4
3271 - clay product & refractory manufacturing	16
3272 - glass & glass product manufacturing	1
3273 - cement & concrete product manufacturing	1
3279 - other nonmetallic mineral product manufacturing	10
331 - primary metal manufacturing	1
3311 - iron, steel mills, & ferroalloy manufacturing	6
3312 - steel product manufacturing from purchased steel	4
3313 - alumina & aluminum production and processing	3
3314 - nonferrous metal (except aluminum) production and processing	10
3315 - foundries	4
3321 - forging & stamping	23
3322 - cutlery & hand tool manufacturing	4
3323 - architectural & structural metals manufacturing	4
3325 - hardware manufacturing	2
3326 - spring & wire product manufacturing	1
3327 - bolt, nut, screw, rivet, & washer manufacturing	1
3328 - coating, engraving, heat treating, & allied activities	1
3329 - other fabricated metal product manufacturing	10
333 - machinery manufacturing	1
3331 - agriculture, construction, & mining machinery manufacturing	4

Economic Sector/Subsector/Industry Group	Number of Comments
3332 - industrial machinery manufacturing	4
3333 - commercial & service industry machinery manufacturing	2
3334 - ventilation, heating, air-conditioning, & commercial refrigeration equip. manufacturing	12
3335 - metalworking machinery manufacturing	13
3336 - engine, turbine, & power transmission equipment manufacturing	11
3339 - other general purpose machinery manufacturing	25
334 - computer & electronic product manufacturing	3
3341 - computer & peripheral equipment manufacturing	3
3342 - communications equipment manufacturing	8
3343 - audio & video equipment manufacturing	5
3344 - semiconductor & other electrical component manufacturing	19
3345 - navigational, measuring, electromedical, & control instruments manufacturing	14
3351 - electric lighting equipment manufacturing	8
3352 - household appliance manufacturing	24
3353 - electrical equipment manufacturing	8
3359 - other electrical equipment & component manufacturing	15
336 - transportation equipment manufacturing	3
3362 - motor vehicle body & trailer manufacturing	2
3363 - motor vehicle parts manufacturing	30
3364 - aerospace product & parts manufacturing	3
3365 - railroad rolling stock manufacturing	2
3366 - ship & boat building	2
3369 - other transportation equipment	41
3371 - household, institutional furniture, & kitchen cabinet manufacturing	22
3372 - office furniture (including fixtures) manufacturing	1
3379 - other furniture related product manufacturing	2
339 - miscellaneous manufacturing	1
3391 - medical equipment & supplies manufacturing	18
3399 - other miscellaneous manufacturing	27
42 - Wholesale Trade	**94**
4231 - motor vehicle, motor vehicle parts, & supplies merchant wholesalers	8
4232 - furniture & home furnishing merchant wholesalers	7
4233 - lumber & other construction materials merchant wholesalers	4
4234 - professional, commercial equipment, & supplies merchant wholesalers	2
4236 - household appliances & electrical & electronic goods merchant wholesalers	8
4237 - hardware, plumbing and heating equipment, & supplies merchant wholesalers	2
4238 - machinery, equipment, & supplies merchant wholesalers	6
4239 - miscellaneous durable goods merchant wholesalers	27
4241 - paper & paper product merchant wholesalers	4
4242 - drugs & druggist's sundries merchant wholesalers	5

Economic Sector/Subsector/Industry Group	Number of Comments
4243 - apparel, piece goods, & notions merchant wholesalers	7
4244 - grocery & related product merchant wholesalers	2
4246 - chemical & allied products merchant wholesalers	6
4249 - miscellaneous nondurable goods merchant wholesalers	5
4251 - wholesale electronic markets, agents, & brokers	1
44-45 - Retail Trade	**55**
4412 - other motor vehicle dealers	2
4413 - automotive parts, accessories, & tire stores	1
4422 - home furnishing stores	2
4431 - electronics & appliance stores	1
4441 - building material & supplies dealers	4
4539 - other miscellaneous store retailers	3
4542 - vending machine operators	1
4561 - health & personal care retailers	21
4581 - clothing & clothing accessories retailers	4
4582 - shoe retailers	1
4591 - sporting goods, hobby, & musical instrument stores	10
4595 - used merchandise retailers	4
4599 - other miscellaneous retailers	1
48 - Transportation & Warehousing	**1**
4885 - freight transportation arrangement	1
51 - Information	**2**
5131 - newspaper, periodical, book, & directory publishers	1
5171 - wired & wireless telecommunications (except satellite)	1
54 - Professional, Scientific, and Technical Services	**5**
5415 - computer systems design & related services	2
5417 - scientific research & development services	2
5418 - advertising, public relations, & related services	1
56 - Administrative and Support and Waste Management and Remediation Services	**1**
5617 - services to buildings & dwellings	1
62 - Healthcare and Social Assistance	**3**
62 - healthcare & social assistance	2
6213 - offices of other health practitioners	1

Table A2: Comments on Tariff Heading by HTSUS Chapter

HTSUS Chapter	HTSUS Chapter Title	Number of Comments Under HTSUS Chapter	Number of Unique 8-digit Tariff Lines with Comments	Number of Comments on Tariff Lines to Remain	Number of Comments on Tariff Lines to Remove	Number of Comments on Tariff Lines to Add
02	Meat and edible meat offal	3	2	0	3	0
03	Fish and crustaceans, mollusks and other aquatic invertebrates	492	268	276	209	7
04	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included	1	1	1	0	0
05	Products of animal origin, not elsewhere specified or included	3	3	0	3	0
07	Edible vegetables and certain roots and tubers	9	8	5	4	0
08	Edible fruit and nuts; peel of citrus fruit or melons	52	51	1	51	0
11	Products of the milling industry; malt; starches; inulin; wheat gluten	2	2	2	0	0
12	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruits; industrial or medicinal plants; straw and fodder	5	5	1	4	0
13	Lac; gums, resins, and other vegetable saps and extracts	2	2	0	2	0

HTSUS Chapter	HTSUS Chapter Title	Number of Comments Under HTSUS Chapter	Number of Unique 8-digit Tariff Lines with Comments	Number of Comments on Tariff Lines to Remain	Number of Comments on Tariff Lines to Remove	Number of Comments on Tariff Lines to Add
14	Vegetable plaiting materials; vegetable products not elsewhere specified or included	1	1	0	1	0
15	Animal or vegetable fats and oils and their cleavage products prepared edible fats; animal or vegetable waxes	3	3	0	3	0
16	Preparations of meat, of fish or of crustaceans, mollusks, or other aquatic invertebrates	91	87	87	4	0
17	Sugars and sugar confectionery	15	11	0	15	0
18	Cocoa and cocoa preparations	2	2	0	2	0
19	Preparations of cereals, flour, starch, or milk; bakers' wares	1	1	0	1	0
20	Preparations of vegetables, fruit, nuts, or other parts of plants	61	54	4	57	0
21	Miscellaneous edible preparations	4	3	0	4	0
22	Beverages, spirits, and vinegar	5	4	0	5	0
23	Residues and waste from the food industries; prepared animal feed	13	5	3	10	0
25	Salt; sulfur; earths and stone; plastering materials, lime, and cement	10	10	5	5	0

HTSUS Chapter	HTSUS Chapter Title	Number of Comments Under HTSUS Chapter	Number of Unique 8-digit Tariff Lines with Comments	Number of Comments on Tariff Lines to Remain	Number of Comments on Tariff Lines to Remove	Number of Comments on Tariff Lines to Add
27	Mineral fuels, mineral oils, and products of their distillation; bituminous substances; mineral waxes	13	11	0	13	0
28	Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, of radioactive elements, or of isotopes	236	121	28	178	30
29	Organic chemicals	611	362	101	501	9
31	Fertilizers	33	16	23	10	0
32	Tanning or dyeing extracts; dyes, pigments, paints, varnishes, putty, and mastics	134	86	25	109	0
33	Essential oils and resinoids; perfumery, cosmetic, or toilet preparations	68	32	0	68	0
34	Soap, organic surface-active agents, washing preparations, lubricating preparations, artificial waxes, prepared waxes, polishing or scouring preparations, candles and similar articles, modeling pastes, “dental waxes,” and dental preparations with a basis of plaster	45	15	5	40	0

HTSUS Chapter	HTSUS Chapter Title	Number of Comments Under HTSUS Chapter	Number of Unique 8-digit Tariff Lines with Comments	Number of Comments on Tariff Lines to Remain	Number of Comments on Tariff Lines to Remove	Number of Comments on Tariff Lines to Add
35	Albuminoidal substances; modified starches; glues; enzymes	33	8	4	29	0
37	Photographic or cinematographic goods	2	2	0	2	0
38	Miscellaneous chemical products	127	52	37	90	0
39	Plastics and articles thereof	667	171	43	622	2
40	Rubber and articles thereof	181	74	1	180	0
41	Raw hides and skins (other than furskins) and leather	21	20	0	21	0
42	Articles of leather; saddlery and harness; travel goods, handbags, and similar containers; articles of animal gut (other than silkworm gut)	383	82	0	383	0
43	Furskins and artificial fur; manufactures thereof	4	2	0	4	0
44	Wood and articles of wood; wood charcoal	344	105	288	56	0
45	Cork and articles of cork	4	2	0	4	0
46	Manufactures of straw, of esparto, or of other plaiting materials; basketware and wickerwork	33	18	0	33	0

HTSUS Chapter	HTSUS Chapter Title	Number of Comments Under HTSUS Chapter	Number of Unique 8-digit Tariff Lines with Comments	Number of Comments on Tariff Lines to Remain	Number of Comments on Tariff Lines to Remove	Number of Comments on Tariff Lines to Add
47	Pulp of wood or of other fibrous cellulosic material; waste and scrap of paper or paperboard	1	1	0	1	0
48	Paper and paperboard; articles of paper pulp, of paper, or of paperboard	302	108	34	268	0
49	Printed books, newspapers, pictures and other products of the printing industry; manuscripts, typescripts, and plans	54	13	0	54	0
50	Silk	3	3	0	3	0
51	Wool, fine or coarse animal hair; horsehair yarn and woven fabric	15	15	0	15	0
52	Cotton	168	158	0	168	0
53	Other vegetable textile fibers; paper yarn and woven fabric of paper yarn	34	30	0	34	0
54	Man-made filaments	63	52	0	63	0
55	Man-made staple fibers	20	17	2	18	0
56	Wadding, felt and nonwovens; special yarns, twine, cordage, ropes and cables and articles thereof	81	28	0	81	0
57	Carpets and other textile floor coverings	29	15	0	29	0

HTSUS Chapter	HTSUS Chapter Title	Number of Comments Under HTSUS Chapter	Number of Unique 8-digit Tariff Lines with Comments	Number of Comments on Tariff Lines to Remain	Number of Comments on Tariff Lines to Remove	Number of Comments on Tariff Lines to Add
58	Special woven fabrics; tufted textile fabrics; lace, tapestries; trimmings; embroidery	25	16	0	25	0
59	Impregnated, coated, covered, or laminated textile fabrics; textile articles of a kind suitable for industrial use	39	17	3	36	0
60	Knitted or crocheted fabrics	26	11	0	26	0
61	Articles of apparel and clothing accessories, knitted or crocheted	373	201	0	373	0
62	Articles of apparel and clothing accessories, not knitted or crocheted	440	302	0	440	0
63	Other made up textile articles; sets; worn clothing and worn textile articles; rags	141	46	2	139	0
64	Footwear, gaiters, and the like; parts of such articles	180	94	0	172	8
65	Headgear and parts thereof	145	28	2	143	0
66	Umbrellas, sun umbrellas, walking sticks, seatsticks, whips, riding-crops, and parts thereof	3	2	0	3	0

HTSUS Chapter	HTSUS Chapter Title	Number of Comments Under HTSUS Chapter	Number of Unique 8-digit Tariff Lines with Comments	Number of Comments on Tariff Lines to Remain	Number of Comments on Tariff Lines to Remove	Number of Comments on Tariff Lines to Add
67	Prepared feathers and down and articles made of feathers or of down; artificial flowers; articles of human hair	8	5	0	8	0
68	Articles of stone, plaster, cement, asbestos, mica, or similar materials	83	29	13	70	0
69	Ceramic products	40	24	6	34	0
70	Glass and glassware	196	96	20	176	0
71	Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal, and articles thereof; imitation jewelry; coin	29	20	0	29	0
72	Iron and steel	979	231	753	226	0
73	Articles of iron or steel	978	238	432	544	2
74	Copper and articles thereof	70	35	2	68	0
75	Nickel and articles thereof	30	28	28	2	0
76	Aluminum and articles thereof	160	54	41	119	0
79	Zinc and articles thereof	10	2	0	10	0
81	Other base metals; cermets; articles thereof	91	32	43	4	44

HTSUS Chapter	HTSUS Chapter Title	Number of Comments Under HTSUS Chapter	Number of Unique 8-digit Tariff Lines with Comments	Number of Comments on Tariff Lines to Remain	Number of Comments on Tariff Lines to Remove	Number of Comments on Tariff Lines to Add
82	Tools, implements, cutlery, spoons, and forks, of base metal; parts thereof of base metal	357	114	46	311	0
83	Miscellaneous articles of base metal	232	49	2	229	1
84	Nuclear reactors, boilers, machinery, and mechanical appliances; parts thereof	1921	580	312	1609	0
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles	2239	478	185	2053	1
86	Railway or tramway locomotives, rolling-stock, and parts thereof; railway or tramway track fixtures and fittings and parts thereof; mechanical (including electro-mechanical) traffic signaling equipment of all kinds	66	22	54	12	0
87	Vehicles other than railway or tramway rolling stock, and parts and accessories thereof	611	194	187	424	0

HTSUS Chapter	HTSUS Chapter Title	Number of Comments Under HTSUS Chapter	Number of Unique 8-digit Tariff Lines with Comments	Number of Comments on Tariff Lines to Remain	Number of Comments on Tariff Lines to Remove	Number of Comments on Tariff Lines to Add
88	Aircraft, spacecraft, and parts thereof	10	6	0	10	0
89	Ships, boats, and floating structures	10	7	0	10	0
90	Optical, photographic, cinematographic, measuring, checking, precision, medical, or surgical instruments and apparatus; parts and accessories thereof	457	146	1	455	1
91	Clocks and watches and parts thereof	38	20	0	38	0
92	Musical instruments; parts and accessories of such articles	42	37	0	42	0
94	Furniture; bedding, mattresses, mattress supports, cushions, and similar stuffed furnishings; lamps and lighting fittings, not elsewhere specified or included; illuminated sign illuminated nameplates and the like; prefabricated buildings	452	107	37	415	0
95	Toys, games, and sports requisites; parts and accessories thereof	97	35	1	95	1
96	Miscellaneous manufactured articles	94	40	1	93	0
97	Works of art, collectors' pieces, and antiques	31	13	0	31	0

APPENDIX B

Appendix B: China's Foreign Investment Joint Venture Requirements: 2018-Present

2018 No.	Sector	Summary of Requirements in 2018[1]	2021 No.	Summary of Current Requirements[2]
1	Breeding of new varieties of corn and wheat and production of seeds	Chinese entity must be the controlling shareholder (51 percent).	1	Lowered Chinese equity requirement in breeding of new wheat varieties and production of seeds from 51 percent to 34 percent in 2020.[3] Chinese entity still must be the controlling shareholder for new corn varieties (51 percent).
2	Exploration and development of oil and natural gas	Limited to contractual joint venture (CJV) or equity joint venture (EJV).		Removed in 2019.[4]
3	Printing of publications	Chinese entity must be the controlling shareholder (51 percent).	2	No change.

[1] *Special Administrative Measures (Negative List) for the Access of Foreign Investment (2018)* (National Development and Reform Commission [*hereinafter* "NDRC"] & Ministry of Commerce [*hereinafter* "MOFCOM"], [2018] Order No. 18, issued Jun. 28, 2018, effective Jul. 28, 2018), https://www.ndrc.gov.cn/xxgk/zcfb/fzggwl/201806/t20180628_960861.html.

[2] China last revised its Foreign Investment Negative List (FINL) in December 2021 and implemented these changes in January 2022. This version of the FINL remains in effect as of this writing. *See Special Administrative Measures (Negative List) for the Access of Foreign Investment (2021),* (NDRC & MOFCOM, [2021] Order No. 47, issued Dec. 27, 2021, effective Jan. 1, 2022), https://www.ndrc.gov.cn/xxgk/zcfb/fzggwl/202112/t20211227_1310020.html.

[3] *Special Administrative Measures (Negative List) for the Access of Foreign Investment (2020)* (NDRC & MOFCOM, [2020] Order No. 32, issued Jun. 23, 2020, effective Jul. 23, 2020), https://www.ndrc.gov.cn/xxgk/zcfb/fzggwl/202006/t20200624_1231938.html.

[4] *Special Administrative Measures (Negative List) for the Access of Foreign Investment (2019)* (NDRC & MOFCOM, [2019] Order No. 25, issued Jun. 30, 2019, effective Jul. 30, 2019), https://www.ndrc.gov.cn/xxgk/zcfb/fzggwl/201906/t20190628_960873.html.

2018 No.	Sector	Summary of Requirements in 2018[1]	2021 No.	Summary of Current Requirements[2]
4	Manufacturing of fully-assembled automobiles	With the exception of special use vehicles and new energy vehicles, the Chinese entity's investment in any type of automobile manufacturing cannot be lower than 50 percent, and the same foreign investor may establish no more than two joint ventures in China for the same kind of automobiles. [5]		Removed foreign equity cap for manufacturing of commercial vehicles in 2020 and removed remaining restrictions in 2021.
5	Manufacturing of satellite telecasting ground receiving facilities	Type of restriction not specified.		Removed in 2021.
6	Construction and operation of nuclear power plants	Chinese entity must be the controlling shareholder (51 percent).	3	No change.
7	Construction and operation of pipeline networks for gas, heat, water supply, and sewage for cities with over 500,000 residents	Chinese entity must be the controlling shareholder (51 percent).		Removed in 2020.

[5] In 2018, following the removal of investment restrictions on new energy vehicles and promise of removing restrictions on all passenger vehicles by 2022, the NDRC issued new regulations prohibiting new internal combustion engine investment projects and introducing conditions for new electric vehicle investments in China. *See Provisions on the Administration of Investments in the Automotive Industry* (NDRC, [2018] Order No. 22, issued Dec. 10, 2018), https://www.ndrc.gov.cn/xxgk/zcfb/fzggwl/201812/t20181218_960868.html.

2018 No.	Sector	Summary of Requirements in 2018[1]	2021 No.	Summary of Current Requirements[2]
8	Domestic water transport companies	Chinese entity must be the controlling shareholder (51 percent).	4	No change.
9	Domestic marine shipping agencies	Chinese entity must be the controlling shareholder (51 percent).		Removed in 2019.
10	Public air transportation companies	Foreign investment cannot exceed 25 percent per investor and legal representative must be Chinese.	5	No change. Public air transportation and general aviation services combined in 2020.
11	General aviation service companies	Chinese entity must be the controlling shareholder (51 percent) in most cases and legal representative must be Chinese.		
12	Construction and operation of civil airports	Chinese entity must be the controlling shareholder (51 percent).	6	No change.
13	Value-added telecommunications services	Chinese entity must control at least 50 percent, excluding e-commerce, and foreign investment is limited to World Trade Organization (WTO) commitments.[6]	7	Removed restrictions in 2019 for domestic conferencing, store-and-forward, and call center services in addition to e-commerce. Chinese entity still must control at least 50 percent in other cases, limited to WTO commitments.
	Basic telecommunications services	Chinese entity must be the controlling shareholder (51 percent) and foreign investment is limited to WTO commitments.		No change.

[6] China classifies a broad range of internet and technology-related services under value-added telecommunications.

2018 No.	Sector	Summary of Requirements in 2018[1]	2021 No.	Summary of Current Requirements[2]
14	Securities companies and securities investment fund management companies	Chinese ownership requirement of 49 percent.		Removed in 2020.
15	Futures companies	Chinese ownership requirement of 49 percent.		Removed in 2020.
16	Life insurance companies	Chinese ownership requirement of 49 percent.		Removed in 2020.
17	Market survey companies	Limited to CJV or EJV. Chinese entity must be the controlling shareholder (51 percent) for radio and television rating.	8	Limited to EJV only in 2020.[7] Chinese entity still must be the controlling shareholder (51 percent) for radio and television rating.
18	Pre-schools, ordinary secondary schools, and institutions of higher learning	Limited to CJV with Chinese nationality management requirements.	9	No change.
19	Medical institutions	Limited to CJV or EJV.[8]	10	Limited to EJV only in 2020.[9]
20	Construction and operation of cinemas	Chinese entity must be the controlling shareholder (51 percent).		Removed in 2019.

[7] China's 2019 *Foreign Investment Law* repealed its previous *Sino-Foreign Contractual Joint Venture Law*. *See Foreign Investment Law of the People's Republic of China* [English] [*hereinafter* "*Foreign Investment Law*"], Art. 42 (National People's Congress, adopted on Mar. 15, 2019, effective Jan. 1, 2020), http://english.www.gov.cn/services/investment/202102/24/content_WS6035aa38c6d0719374af9609.html.

[8] Separate regulations require a Chinese shareholder to hold at least 30 percent. *See Interim Measures for the Administration of Sino-Foreign Equity and Contractual Joint Venture Medical Institutions* (Ministry of Health, Ministry of Foreign Trade and Economic Cooperation, [2000] Order No. 11, issued May 15, 2000, effective Jul. 1, 2000), http://www.nhc.gov.cn/fzs/s3576/201808/d931da856a2a47a3bc8b29ecf511c73f.shtml.

[9] *Foreign Investment Law* at Art. 42.

2018 No.	Sector	Summary of Requirements in 2018[1]	2021 No.	Summary of Current Requirements[2]
21	Performance brokerage agencies	Chinese entity must be the controlling shareholder (51 percent).		Removed in 2019.

APPENDIX C

Appendix C: U.S. Government Official Quotes on Chinese Cybertheft

Date	Source	Quote
Oct. 2023	Federal Bureau of Investigation (FBI) Director Christopher Wray (Jointly With Five Eyes Security Chiefs)	"The People's Republic of China represents the defining threat of this generation this era. There is no country that presents a broader, more comprehensive threat to our ideas, our—our innovation, our economic security, and ultimately our national security. We have seen efforts by the Chinese government, directly or indirectly, trying to steal intellectual property, trade secrets, personal data—all across the country. We're talking everything from Fortune 100 companies, all to smaller startups. We're talking about agriculture, biotech, health care, robotics, aviation, academic research. We probably have somewhere in the order of 2,000 active investigations that are just related to the Chinese government's effort to steal information." "You have the biggest hacking program in the world by far, bigger than ever other major nation combined. Stolen more of our personal and corporate data than every nation, big or small, combined."[1]
Oct. 2023	FBI Director Christopher Wray	"But we've continued to work to outpace our adversaries by disrupting over 40 percent more cyber operations last year and arresting over 60 percent more cyber criminals than the year before. We're aggressively working to protect America's economic security from China's relentless efforts to steal our innovation and intellectual property, with around 2,000 active investigations across all 56 FBI field offices."[2]
Sep. 2023	FBI Director Christopher Wray	"Because, as we've been telling anyone who will listen, the Chinese government has been stealing American intellectual property and data for years, and you can be sure they're not going to stop now and sit back and watch while American companies develop technologies that can change the world. China already has a bigger hacking program than every other major nation combined. In fact, if each one of the FBI's cyber agents and intelligence analysts focused on China exclusively, Chinese hackers would still outnumber our cyber personnel by at least 50:1. Let me say that again: 50:1. With AI [artificial intelligence], China is now in position to try to

[1] *China Stealing Technology Secrets—From AI to Computing and Biology, "Five Eyes" Intelligence Leaders Warn*, CBS NEWS, Oct. 22, 2023, https://www.cbsnews.com/news/china-stealing-technology-secrets-five-eyes-intelligence-leaders-warn-60-minutes-transcript/.

[2] *Director Wray's Opening Statement to the Senate Committee on Homeland Security and Governmental Affairs*, FEDERAL BUREAU OF INVESTIGATION [*hereinafter* "FBI"], Oct. 31, 2023, https://www.fbi.gov/news/speeches/director-wrays-opening-statement-to-the-senate-committee-on-homeland-security-and-governmental-affairs.

Date	Source	Quote
		close the cycle—to use the fruits of their widespread hacking to power, with AI, even-more-powerful hacking efforts."[3]
Apr. 2023	FBI Director Christopher Wray	"The current Chinese regime will stop at nothing to steal what they can't create and to silence the messages they don't want to hear—all in an effort to surpass us as a global superpower and shape a world order more friendly to their authoritarian vision. What makes China's economic espionage program so insidious is that they're set on using every tool at their disposal to steal American technology, undercut our businesses, and dominate the market. They use human intelligence to target our most precious information, multiplying their efforts by working extensively through scores of 'co-optees'—people who aren't technically Chinese government officials but assist in intelligence operations—spotting and assessing sources to recruit, providing cover and communications, and helping steal secrets in other ways. And the PRC [People's Republic of China] combines those efforts with a cyber hacking program that's bigger than that of every other major nation combined, using cyber as the pathway to cheat and steal on a massive scale. The result of all this theft is lost American leadership in key industries, lost American jobs, and lost opportunity."[4]

[3] *Director Wray's Remarks at the Mandiant/mWISE 2023 Cybersecurity Conference*, FBI, Sep. 18, 2023, https://www.fbi.gov/news/speeches/director-wrays-remarks-at-the-mandiantmwise-2023-cybersecurity-conference.
[4] *Director Wray's Remarks at Texas A&M University*, FBI, Apr. 5, 2023, https://www.fbi.gov/news/speeches/director-wrays-remarks-at-texas-a-and-m-university-040523.

Date	Source	Quote
Nov. 2022	FBI Director Christopher Wray	"… the greatest long-term threat to our nation's ideas, innovation, and economic security is the foreign intelligence and economic espionage threat from China. It's a threat to our economic security—and by extension—to our national security. The Chinese government aspires to equal or surpass the United States as a global superpower and influence the world with a value system shaped by undemocratic authoritarian ideals. The pursuit of these goals is often with little regard for international norms and laws. When it comes to economic espionage, the PRC uses every means at its disposal against us, blending cyber, human intelligence, diplomacy, corporate transactions, and pressure on U.S. companies operating in China, to achieve its strategic goals to steal our companies' innovations. These efforts are consistent with China's expressed goal to become a national power, modernizing its military and creating innovative-driven economic growth. To pursue this goal, China uses not only human intelligence officers, co-optees, and corrupt corporate insiders, but also sophisticated cyber intrusions, pressure on U.S. companies in China, shell-game corporate transactions, and joint-venture 'partnerships' that are anything but a true partnership. There's also nothing traditional about the scale of their theft—it's unprecedented in the history of the FBI. American workers and companies are facing a greater, more complex danger than they've ever dealt with before. Stolen innovation means stolen jobs, stolen opportunities for American workers, stolen national power, and stolen leadership in the industries."[5]
Jul. 2022	FBI Director Christopher Wray (Jointly With MI5 Head)	"But over the last few years, we've seen Chinese state-sponsored hackers relentlessly looking for ways to compromise unpatched network devices and infrastructure. And Chinese hackers are consistently evolving and adapting their tactics to bypass defenses. They even monitor network defender accounts and then modify their campaign as needed to remain undetected. They merge their customized hacking toolset with publicly available tools native to the network environment—to obscure their activity by blending into the 'noise' and normal activity of a network The point being, they're not just big. They're also effective."

[5] Christopher Wray, FBI, *Statement*, *Threats to the Homeland*, 8 (Nov. 17, 2022), https://www.hsgac.senate.gov/wp-content/uploads/imo/media/doc/Testimony-Wray-2022-11-17.pdf.

Date	Source	Quote
		"In 2020, for example, we learned that a number of U.S. companies operating in China were being targeted through Chinese government-mandated tax software. To comply with Chinese law, these businesses had to use certain government-sanctioned software. The U.S. companies then discovered that malware was delivered into their networks through this same software. So, by complying with Chinese laws for conducting business in China, they ended up unwittingly installing backdoors into their systems that enabled hackers' access into what should have been private networks." "What makes the Chinese government's strategy so insidious is the way it exploits multiple avenues at once: They identify key technologies needed to dominate markets, like the ones they highlight in their 'Made in China 2025' plan. Then, they throw every tool in their arsenal at stealing those technologies—causing deep, job-destroying damage across a wide range of industries, like when they tried to steal cutting edge jet engine technology, recruiting an insider at GE's joint venture partner to enable access by hackers back in China. Or in another example, combining human spying with hacking in a joint effort to try to steal COVID research from one of our universities."[6]
Mar. 2022	FBI Director Christopher Wray	"…the Chinese government has hacked more than a dozen U.S. oil and gas pipeline operators, not just stealing their information but holding them, and all of us, at risk—an awfully dangerous threat from a massive, sophisticated hacking program that's bigger than those of every other major country combined. Beyond ransomware, the cyber threat to intellectual property, to our economic vitality, is also growing. That's compounding the more-easily-visible economic damage from ransomware attacks. Actors like the Chinese government are working to dominate entire technology sectors by stealing corporate ideas and innovation. They typically do this by simultaneously corrupting your trusted insiders and conducting direct cyber intrusions.

[6] *Director's Remarks to Business Leaders in London*, FBI, Jul. 6, 2022, https://www.fbi.gov/news/speeches/directors-remarks-to-business-leaders-in-london-070622.

Date	Source	Quote
		To put it simply, whatever makes an industry tick, they target. When they're successful, that results in job losses and devastates local economies, hurting Main Street as much as Wall Street, and taking food off the table in a whole different way than the JBS Foods attack did. The scale is staggering. To pick just one example, a year ago, hackers with China's Ministry of State Security targeted a vulnerability in the Microsoft Exchange Server, software widely used in corporate e-mail systems. They compromised tens of thousands of computers worldwide, and left back doors so they could return whenever they wanted. And to give you a sense of how common that kind of theft is, just using cyber means, Chinese government hackers have stolen more of our personal and corporate data than all other countries combined."[7]
Feb. 2022	Assistant Attorney General Matthew Olsen	"… the government of China has also used espionage tools and tactics against U.S. companies and American workers to steal critical and emerging technologies. Agents of the PRC government have been caught stealing everything from cutting-edge semiconductor technology to actual seeds that had been developed for pharmaceutical uses after years of research and the investment of millions of dollars."[8]
Jan. 2022	FBI Director Christopher Wray	"When we tally up what we see in our investigations—over 2,000 of which are focused on the Chinese government trying to steal our information and technology—there is just no country that presents a broader threat to our ideas, our innovation, and our economic security than China. The Chinese government steals staggering volumes of information and causes deep, job-destroying damage across a wide range of industries—so much so that, as you heard, we're constantly opening new cases to counter their intelligence operations, about every 12 hours or so."[9]
Sep. 2021	FBI Director Christopher Wray	"We also recently unsealed an indictment against four PRC nationals working with the Ministry of State Security. The four individuals were charged with a campaign to hack into the computer systems of dozens of victims while trying to obtain information with significant economic benefit to the PRC."

[7] *FBI Partnering With the Private Sector to Counter the Cyber Threat*, FBI, Mar. 22, 2022, https://www.fbi.gov/news/speeches/fbi-partnering-with-private-sector-to-counter-the-cyber-threat-032222.
[8] *Assistant Attorney General Matthew Olsen Delivers Remarks on Countering Nation-State Threats*, DEPARTMENT OF JUSTICE [*hereinafter* "DOJ"], Feb. 23, 2022, https://www.justice.gov/opa/speech/assistant-attorney-general-matthew-olsen-delivers-remarks-countering-nation-state-threats.
[9] *Countering Threats Posed by the Chinese Government Inside the U.S.*, FBI, Jan. 31, 2022, https://www.fbi.gov/news/speeches/countering-threats-posed-by-the-chinese-government-inside-the-us-wray-013122.

Date	Source	Quote
		"In March, cybersecurity companies including Microsoft disclosed that hackers—who have since been identified as affiliated with the PRC's Ministry of State Security—were using previously unknown Microsoft Exchange vulnerabilities to access email servers that companies physically keep on their premises rather than in the cloud. These 'zero day' vulnerabilities allowed the PRC actors to potentially exploit victim networks such as by grabbing login credentials, stealing e-mail messages in bulk, and installing malicious programs (web shells) allowing the hackers to send commands to the victim network." "Protecting our nation's innovation, we're opening a new China counterintelligence investigation every 12 hours."[10]
Oct. 2021	FBI Director Christopher Wray	"Too often, when we see a cyber threat and start digging, we find the adversary is also working with an unwitting company's insider to target the same sensitive and proprietary information or a foreign-controlled company trying to use a corporate transaction like a joint venture to gain access. Most of the time, that threat is coming from the Chinese government or companies under its sway. And to say they're well-resourced is an understatement. No company is armed to defend against that kind of multi-avenue threat alone."[11]
Apr. 2021	FBI Director Christopher Wray	"We have now over 2,000 investigations that tie back to the Chinese government. And on the economic espionage investigation side alone, it's about a 1,300 percent increase over the last several years. We're opening a new investigation into China every ten hours."[12]
Mar. 2021	FBI Director Christopher Wray	"Over the years, we've called out nation-state actors for their destabilizing and damaging cyber activity. For example, last summer's indictment of two hackers working on behalf of the Chinese Ministry of State Security. They are accused of stealing intellectual property from

[10] *Threats to the Homeland: Evaluating the Landscape 20 Years After 9/11,* FBI, Sep. 21, 2021, https://www.fbi.gov/news/testimony/threats-to-the-homeland-evaluating-the-landscape-20-years-after-911-wray-092121.
[11] *Working With Our Private Sector Partners to Combat the Cyber Threat,* FBI, Oct. 28, 2021, https://www.fbi.gov/news/speeches/working-with-our-private-sector-partners-to-combat-the-cyber-threat-wray-ecny-102821.
[12] Christopher Wray, FBI, *Testimony, 2021 Annual Threat Assessment of the U.S. Intelligence Community for the U.S. Senate Select Committee on Intelligence* (Apr. 14, 2021).

Date	Source	Quote
		companies both here and abroad. They also targeted dissidents who spoke out against the Chinese Communist party." "Another cyber threat that continues to grow is the blended or hybrid threat—state-sponsored economic espionage facilitated by cyber intrusions. We're deploying our own, as well as our partners' tools, against it, sequenced and synchronized, for maximum impact. In September we unsealed charges against five Chinese nationals from the hacking group called APT 41 [Advanced Persistent Threat 41]. They were targeting victim companies around the world from their safe haven in China. With our partners here and abroad, we arrested two of their co-conspirators in Malaysia, and seized or took down hundreds of the hacker accounts, servers, and domains. We also distributed a FLASH [FBI Liaison Alert System] message to our private sector and foreign partners with technical information to help detect and mitigate APT 41's malicious activities."[13]
Jan. 2021	FBI Director Christopher Wray	"We've become known for our efforts to call out destabilizing and damaging cyber activity by nation-state actors, like the indictment last summer of two hackers working on behalf of the Chinese Ministry of State Security, stealing intellectual property from companies in the U.S. and around the world while also targeting dissidents who spoke out against the Communist Party." "To take another example, the blended threat of state-sponsored economic espionage facilitated by cyber intrusions continues to grow. And we're deploying our own and our partners' tools against it, sequenced and synchronized, for maximum impact. In September we unsealed charges against five Chinese nationals from the hacking group we call APT 41. They were targeting victim companies around the world from their safe haven in China. With our partners here and abroad, we arrested two of their co-conspirators in Malaysia, and seized or took down hundreds of the hackers' accounts, servers, and domains. We also distributed a FLASH to our private sector and foreign partners with technical information to help detect and mitigate APT 41's malicious activities."[14]

[13] *Developing Unique Partnerships to Defeat the Cyber Threat,* FBI, Mar. 3, 2021, https://www.fbi.gov/news/speeches/developing-unique-partnerships-to-defeat-the-cyber-threat-abbate-bccs-030321.
[14] *The FBI and the Private Sector: Battling the Cyber Threat Together,* FBI, Jan. 28, 2021, https://www.fbi.gov/news/speeches/the-fbi-and-the-private-sector-battling-the-cyber-threat-together-012821.

Date	Source	Quote
Sep. 2020	FBI Director Christopher Wray	"Together with our partners at CISA [Cybersecurity and Infrastructure Security Agency] and DOD [Department of Defense], we've identified and attributed Chinese targeting of specific companies researching COVID-19 vaccines and treatments, and we're giving those companies the information they need to protect themselves."[15]
Sep. 2020	FBI Deputy Director David Bowdich	"We've been fighting the cyber threat for years now, and all too often, it's been a game of whack-a-mole. We investigate one hacker group, and we quickly uncover another hacker group. We disrupt one nation-state adversary targeting our infrastructure and our intellectual property, and very quickly we are often times exposing another side of that nation-state actor or another nation-state actor as well. Some days, it seems like a never-ending battle."[16]
Jul. 2020	FBI Director Christopher Wray	"If you are an American adult, it is more likely than not that China has stolen your personal data. In 2017, the Chinese military conspired to hack Equifax and made off with the sensitive personal information of 150 million Americans—we're talking nearly half of the American population and most American adults—and as I'll discuss in a few moments, this was hardly a standalone incident." "We've now reached the point where the FBI is opening a new China-related counterintelligence case about every 10 hours. Of the nearly 5,000 active FBI counterintelligence cases currently underway across the country, almost half are related to China. And at this very moment, China is working to compromise American health care organizations, pharmaceutical companies, and academic institutions conducting essential COVID-19 research." "These cases were among more than a thousand investigations the FBI has into China's actual and attempted theft of American technology—which is to say nothing of over a thousand more ongoing counterintelligence investigations of other kinds related to China. We're conducting these kinds of investigations in all 56 of our field offices. And over the past decade, we've seen economic espionage cases with a link to China increase by approximately 1,300 percent."

[15] *CISA Cybersecurity Summit: Addressing Threats Through Partnerships,* FBI, Sep. 16, 2020, https://www.fbi.gov/news/speeches/cisa-cybersecurity-summit-addressing-threats-through-partnerships.
[16] *FBI Deputy Director David Bowdich's Remarks at Press Conference on China-Related Cyber Indictments,* FBI, Sep. 16, 2020, https://www.fbi.gov/news/press-releases/fbi-deputy-director-david-bowdichs-remarks-at-press-conference-on-china-related-cyber-indictments.

Date	Source	Quote
		"…the Chinese government is also making liberal use of hacking to steal our corporate and personal data—and they're using both military and non-state hackers to do it. The Equifax intrusion I mentioned just a few moments ago, which led to the indictment of Chinese military personnel, was hardly the only time China stole the sensitive personal information of huge numbers of the American public. For example, did any of you have health insurance through Anthem or one of its associated insurers? In 2015, China's hackers stole the personal data of 80 million of that company's current and former customers. Or maybe you're a federal employee—or you used to be one, or you applied for a government job once, or a family member or roommate did. Well, in 2014, China's hackers stole more than 21 million records from OPM, the federal government's Office of Personnel Management."[17]
Jul. 2020	FBI Deputy Director David Bowdich	"China is determined to use every means at its disposal—including the theft of intellectual property from U.S. companies, labs, and universities—to degrade the United States' economic, technological, and military advantages. The scale and scope of the hacking activity sponsored by the PRC intelligence services against the United States and our international partners is unlike any other threat we're facing today."[18]
Jul. 2020	Attorney General William Barr	"'Made in China 2025' is the latest iteration of the PRC's state-led, mercantilist economic model. For American companies in the global marketplace, free and fair competition with China has long been a fantasy. To tilt the playing field to its advantage, China's communist government has perfected a wide array of predatory and often unlawful tactics: currency manipulation, tariffs, quotas, state-led strategic investment and acquisitions, theft and forced transfer of intellectual property, state subsidies, dumping, cyberattacks, and espionage. About 80 percent of all federal economic espionage prosecutions have alleged conduct that would

[17] *The Threat Posed by the Chinese Government and the Chinese Communist Party to the Economic and National Security of the United States,* FBI, Jul. 7, 2020, https://www.fbi.gov/news/speeches/the-threat-posed-by-the-chinese-government-and-the-chinese-communist-party-to-the-economic-and-national-security-of-the-united-states.

[18] *FBI Deputy Director David Bowdich's Remarks at Press Conference Announcing Charges Against Chinese Hackers,* FBI, Jul. 21, 2020, https://www.fbi.gov/news/press-releases/fbi-deputy-director-david-bowdichs-remarks-at-press-conference-announcing-charges-against-chinese-hackers.

Date	Source	Quote
		benefit the Chinese state, and about 60 percent of all trade secret theft cases have had a nexus to China."[19]
Jun. 2020	National Security Advisor Robert O'Brien	"When the Chinese Communist Party cannot buy your data, it steals it. In 2014, the CCP [Chinese Communist Party] hacked Anthem insurance, collecting sensitive information on 80 million Americans. In 2015, the CCP hacked the Office of Personnel Management, which holds security clearance information, acquiring sensitive data on 20 million Americans who work for the federal government. In 2017, it hacked Equifax, obtaining the names, birthdates, social security numbers, and credit scores of 145 million Americans. In 2019, the CCP hacked Marriot, gathering information on 383 million guests, including their passport numbers."[20]
Mar. 2020	FBI Director Christopher Wray	"They are using a wide range of methods and techniques—from cyber intrusions to corrupting trusted insiders and even physical theft—and they are doing this through a wide range of actors."[21]
Mar. 2020	FBI Director Christopher Wray	"… we face the increasingly blended threat of state-sponsored economic espionage facilitated by cyber intrusions. More than ever, our adversaries' targets are our nation's core economic assets—our information and ideas, our innovation, our research and development, our technology. No country poses a broader, more severe threat to those assets than China. As I know this audience is well aware, they're not just targeting companies related to our defense industry—they're targeting companies producing everything from proprietary rice seeds to software for wind turbines to high-end medical devices. And they're not just targeting innovation and R&D. They're going after cost and pricing information, internal strategy documents, bulk PII [personally identifiable information]—anything that can give them a competitive advantage. Their intelligence services increasingly hire hacking contractors, who do the government's bidding, to try to obfuscate the connection between the Chinese government and the theft of our data.

[19] *Attorney General William P. Barr Delivers Remarks on China Policy at the Gerald R. Ford Presidential Museum,* DOJ, Jul. 16, 2020, https://www.justice.gov/opa/speech/attorney-general-william-p-barr-delivers-remarks-china-policy-gerald-r-ford-presidential.

[20] *The Chinese Communist Party's Ideology and Global Ambitions,* TRUMP WHITE HOUSE, Jun. 26, 2020, https://trumpwhitehouse.archives.gov/briefings-statements/chinese-communist-partys-ideology-global-ambitions/.

[21] *The Importance of Partnerships in Responding to the Chinese Economic Espionage Threat to Academia,* FBI, Mar. 4, 2020, https://www.fbi.gov/news/speeches/the-importance-of-partnerships-in-responding-to-the-chinese-economic-espionage-threat-to-academia.

Date	Source	Quote
		We see Chinese companies stealing American intellectual property to avoid the hard slog of innovation and then using it to compete against the very American companies they victimized—in effect, cheating twice over."[22]
Mar. 2020	FBI Deputy Director David Bowdich	"The FBI has approximately 1,000 investigations involving attempted theft of U.S.-based technology on behalf of China, in all 56 of our field offices, spanning almost every industry and sector."[23]
Feb. 2020	FBI Director Christopher Wray	"To accomplish the breakthroughs they seek, China is acquiring American intellectual property and innovation, by any means necessary. We see Chinese companies stealing American intellectual property to avoid the hard slog of innovation, and then using it to compete against the very American companies they victimized—in effect, cheating twice over. Part of what makes this threat so challenging is that the Chinese are using an expanding set of non-traditional methods—both lawful and unlawful—blending things like foreign investments and corporate acquisitions with things like cyber intrusions and espionage by corporate insiders. Their intelligence services also increasingly hire hacking contractors, who do the government's bidding, to try to obfuscate the connection between the Chinese government and the theft of our data."[24]
Jan. 2019	FBI Director Christopher Wray	"To pick one recent example, in December, we indicted members of APT10, a hacking group operating in China, associated with the Ministry of State Security. They conducted major intrusion campaigns targeting managed service providers to compromise the networks of U.S. government agencies and companies around the world. The list of 45 victim companies ran the gamut from biotech, agriculture, and health care to oil and gas exploration and NASA [National Aeronautics and Space Administration]. They stole hundreds of gigabytes of intellectual property and confidential business information. The scope of the investigation was broad, including FBI field offices in New Orleans, New York, Sacramento, San Antonio, and Houston. We worked closely with the Department of

[22] *Tacking the Cyber Threat Through Partnerships and Innovation,* FBI, Mar. 4, 2020, https://www.fbi.gov/news/speeches/tackling-the-cyber-threat-through-partnerships-and-innovation.
[23] *The Importance of Partnerships in Responding to the Chinese Economic Espionage Threat to Academia,* FBI.
[24] *Responding Effectively to the Chinese Economic Espionage Threat,* FBI, Feb. 6, 2020, https://www.fbi.gov/news/speeches/responding-effectively-to-the-chinese-economic-espionage-threat.

Date	Source	Quote
		Justice [DOJ], Defense Criminal Investigative Service, and the Department of Homeland Security [DHS]. Our Cyber Action Team, with our counterparts at DHS, deployed to multiple locations to provide investigative assistance. And we worked with the Naval Criminal Investigative Service to investigate APT10's theft of Personally Identifiable Information (PII) from more than 100-thousand naval service members. Some people are skeptical about the value of indictments where a foreign nation-state actor is involved. But in the case of APT10, the indictments marked an important step in publicly exposing China's continued practice of stealing intellectual property to give Chinese firms an unfair advantage in the marketplace. The indictment led to statements of condemnation against China from 11 foreign governments. It also led to the first formal declaration that China had violated the 2015 Cyber Commitments agreed to by President Obama and the Chinese president."[25]
Oct. 2018	FBI Director Christopher Wray	"I want to focus for a moment on the increase in nation-state sponsored computer intrusions. It's no surprise to anyone in this room that China, in particular, seeks our information, our technology, and our military secrets. They seek to gain any advantage on the global stage, through whatever data they can pilfer. They're using an expanding set of non-traditional methods—both lawful and unlawful—like cyber intrusions, foreign investment, corporate acquisitions, and supply chain threats. As just one example, last November, DOJ unsealed indictments against three Chinese nationals for computer hacking, theft of trade secrets, conspiracy, and identity theft against employees and computers of three corporate victims over a six-year period. These three individuals worked for a China-based Internet security firm. They used their access to the computer systems of these three corporations to exfiltrate sensitive internal documents and trade secrets to help Chinese companies improperly gain a competitive advantage.

[25] *The Way Forward: Working Together to Tackle Cybercrime,* FBI, Jul. 25, 2019, https://www.fbi.gov/news/speeches/the-way-forward-working-together-to-tackle-cybercrime.

Date	Source	Quote
		The Chinese government isn't pulling any punches. They're strategic in their approach—they actually have a formal plan, set out in five-year increments, to achieve dominance in critical areas."[26]

[26] *The FBI and Corporate Directors: Working Together to Keep Companies Safe From Cyber Crime,* FBI, Oct. 1, 2018, https://www.fbi.gov/news/speeches/the-fbi-and-corporate-directors-working-together-to-keep-companies-safe-from-cyber-crime.

APPENDIX D

Appendix D: Technology Transfer Language in Sub-Central Medical Device Procurement

No.	Title	Issuing Department	Date Published	Excerpt
1	Shannan Tibetan Medicine Hospital (Tibetan Medicine Development) Service Capacity Improvement Project Procurement Announcement	Tibet Autonomous Region Public Resources Trading Network	9/28/2023	"This project allows the purchase of imported products, with priority in purchasing imported products from suppliers that transfer technology to Chinese companies and sign digestion, absorption, and re-innovation plans with Chinese companies. The imported medical equipment purchased this time is: fully automatic computer non-contact tonometer."[1]
2	Guangxi Yinghong Engineering Consulting Co., Ltd.'s Public Bidding Announcement for the 2023 Medical Equipment Procurement (Second Batch) of Fuchuan Yao Autonomous County Maternal and Child Health Hospital	Hezhou Public Resources Trading Platform	10/11/2023	"Art. 2.2: Qualification requirements that need to be met to implement government procurement policies: The notice of the *Administrative Measures for Government Procurement of Imported Products* (Cai Ku [2007] No. 119) gives priority to those suppliers of imported products who transfer technology to Chinese enterprises and sign digestion, absorption, and re-innovation plans with Chinese enterprises."[2]

[1] *Shannan Tibetan Medicine Hospital (Tibetan Medicine Development) Service Capacity Improvement Project Procurement Announcement* (Tibet Autonomous Region Public Resources Trading Network, issued Sep. 28, 2023), https://ggzy.xizang.gov.cn/jyxxzcgg/1090880.jhtml.

[2] *Guangxi Yinghong Engineering Consulting CO., Ltd.'s Public Bidding Announcement for the 2023 Medical Equipment Procurement (Second Batch) of Fuchuan Yao Autonomous County Maternal and Child Health Hospital* (Hezhou Public Resources Trading Platform, issued Oct. 11, 2023), http://www.ggzy.gov.cn/information/html/a/450000/0201/202310/11/00458ea3db853133462bb3410f8edb6cbb75.shtml.

No.	Title	Issuing Department	Date Published	Excerpt
3	Procurement Announcement of the Jincheng Health Commission, Jincheng People's Hospital Relocation Expansion Medical Equipment Purchase Project	Jincheng People's Hospital	10/19/2022	"If the above content is not specifically marked with the words 'imported products,' only domestic products must be purchased. Priority [will] be given to purchasing imported products from suppliers that [will] transfer technology to Chinese enterprises and/or sign digestion, absorption, and re-innovation plans with Chinese enterprises."[3]
4	Lushi County People's Hospital Medical Equipment Procurement Project Bid Winning Announcement	Lushi County People's Hospital	9/29/2022	"Does this project accept imported products: Yes, priority [will] be given to purchasing imported products from suppliers that [will] transfer technology to Chinese enterprises and/or sign digestion, absorption, and re-innovation plans with Chinese enterprises."[4]
5	Reply to Proposal No. 1510499 of the 1st Session of the 15th Chinese People's Political Consultative Conference	Jinan Municipal Finance Bureau	5/13/2022	"When purchasing imported products, the purchasing unit should adhere to the principle that is conducive to the independent innovation of domestic enterprises or the digestion and absorption of core technologies, and give priority to purchasing [imported] products [from suppliers] that will transfer technology to Chinese enterprise and/or provide training services and other compensatory trade measures."[5]

[3] *Procurement Announcement of the Jincheng Health Commission, Jincheng People's Hospital Relocation Expansion Medical Equipment Purchase Project* (Chinese Government Procurement Website, issued Oct. 19, 2022), http://www.ccgp.gov.cn/cggg/dfgg/gkzb/202210/t20221019_18842679.htm.
[4] *Lushi County People's Hospital Medical Equipment Procurement Project Bid Winning Announcement* (Henan Provincial Government Procurement Website, issued Sep. 29, 2022), http://zqy.www.hngp.gov.cn/henan/content?infoId=1282654&channelCode=H730202.
[5] *Reply to Proposal No. 1510499 of the 1st Session of the 15th CPPCC* (Jinan Municipal Finance Bureau, issued May 13, 2022), http://jncz.jinan.gov.cn/art/2022/5/19/art_48363_4809387.html.

No.	Title	Issuing Department	Date Published	Excerpt
6	Ledong Li Autonomous Country Health Commission - Ledong County Traditional Chinese Medicine Hospital Supporting Project (Phase II) Medical Office Equipment Project (Second Batch) - Public Bidding Announcement	Hainan Provincial Government Procurement Network	5/5/2022	"There are eight types of goods in this project that accept bids for imported products. The purchaser has applied to and obtained the approval of the financial department before the start of this procurement activity. THS2022-G002-G: patient warming system; THS2020-G002-H: image processing device, monitor, maintenance device, measurement device. Imported products can be purchased for eight types of products including leak devices, trolleys, electronic gastroscopes, and electronic colonoscopes. When purchasing the above eight imported products, buyers will give priority to purchasing imported products from suppliers who have transferred technology to Chinese enterprises and signed digestion, absorption, and re-innovation plans with Chinese enterprises."[6]
7	Bidding Announcement for a Double Pump Blood Purifier for the Shenzhen Longgang District Third People's Hospital	Shenzhen Longgang District Third People's Hospital	2/24/2022	Art. 3: "At the discretion of the purchaser, this project will purchase domestic products or imported products that are not restricted by national laws, regulations, and policies. In the case of imported products, priority [shall] be given to purchasing imported products from suppliers that [will] transfer technology to Chinese enterprises and/or sign digestion, absorption, and re-innovation plans with Chinese enterprises."[7]

[6] *Ledong Li Autonomous Country Health Commission – Ledong Country Traditional Chinese Medicine Hospital Supporting Project (Phase II) Medical Office Equipment Project (Second Batch) – Public Bidding Announcement* (Hainan Provincial Government Procurement Network, issued May 5, 2022), https://ccgp-hainan.gov.cn/cgw/cgw_show.jsp?id=24855.

[7] *Bidding Announcement of the Double Pump Blood Purifier for the Shenzhen Longgang District Third People's Hospital* (Chinese Government Procurement Website, issued Feb. 24, 2022), http://www.ccgp.gov.cn/cggg/dfgg/gkzb/202202/t20220224_17619938.htm.

No.	Title	Issuing Department	Date Published	Excerpt
8	Notice on Qidong Municipal Budget Unit Internal Control Norms for Government Procurement	Qidong Municipal Department of Finance	2/24/2022	Art. 32: "Where the Department of Finance approved the procurement of imported products, priority [shall] be given to purchasing imported products from suppliers that [will] voluntarily transfer technology to Chinese enterprises and/or sign digestion, absorption, and re-innovation plans with Chinese enterprises."[8]
9	Public Bidding Announcement for the Procurement of Medical Equipment for Guangdong Maternal and Children's Health Hospital	Guangdong Maternal and Children's Health Hospital	1/14/2022	Art. 4: "After confirmation by the purchaser, all products of this project are allowed to purchase imported products, and under the same conditions, priority [shall] be given to products from suppliers that [will] transfer technology to Chinese enterprises and/or sign digestion, absorption, and re-innovation plans with Chinese enterprises. However, there is no limit to domestic products that can meet demand to participate in the procurement competition."[9]

[8] *Notice on Qidong Municipal Budget Unit Internal Control Norms for Government Procurement* (Qidong Municipal Department of Finance, issued Feb. 24, 2022), http://www.qidong.gov.cn/qdsczj/bmwj/content/bef74c6c-4bbd-42b7-aae5-cc47e6591e14.html.
[9] *Public Bidding Announcement for the Procurement of Medical Equipment for Guangdong Maternal and Children's Health Hospital* (Chinese Government Procurement Website, issued Jan. 14, 2022), http://www.ccgp.gov.cn/cggg/dfgg/gkzb/202201/t20220114_17523268.htm.

No.	Title	Issuing Department	Date Published	Excerpt
10	Notice on Strengthening the Construction of the Government Procurement Internal Control System and Risk Prevention and Control of Procurement Units	Lanzhou Financial Bureau	7/19/2021	Art. 3.9: "When the products to be purchased are not available within the territory of China or cannot be obtained under reasonable commercial conditions, or where the purchase of imported products is necessary as prescribed by other laws and regulations, the purchaser shall carry out government procurement activities according to law after obtaining the approval of the financial department. The purchasers and their entrusted purchasing agencies shall specify in the procurement documents of imported products that priority [will] be given to suppliers that [will] transfer technology to Chinese enterprises and/or sign digestion, absorption, and re-innovation plans with Chinese enterprises."[10]
11	Notice on Wuxi Supply and Marketing Cooperative Internal Control Norms for Government Procurement (Trial)	Wuxi Supply and Marketing Cooperative	6/22/2021	"Where the Provincial Department of Finance approved the procurement of imported products, the procurement documents should specify that priority [shall] be given to [purchasing] imported products [from suppliers] that [will] voluntarily transfer technology to Chinese enterprises and/or sign digestion, absorption, and re-innovation plans with Chinese enterprises."[11]

[10] *Notice on Strengthening the Construction of the Government Procurement Internal Control System and Risk Prevention and Control of Procurement Units* (Lanzhou Municipal Financial Bureau, issued Jul. 19, 2021), http://czj.lanzhou.gov.cn/art/2021/7/19/art_10235_1029034.html.
[11] *Notice on Wuxi Supply and Marketing Cooperative Internal Control Norms for Government Procurement (Trial)* (Wuxi Supply and Marketing Cooperative, issued Jun. 22, 2021), http://coop.wuxi.gov.cn/doc/2021/06/22/3344707.shtml.

No.	Title	Issuing Department	Date Published	Excerpt
12	Tender Announcement for a Batch of Oral Root Canal Treatment Equipment for Shenzhen Longgang District People's Hospital	Shenzhen Longgang District People's Hospital	5/6/2021	"At the buyer's discretion, this project will purchase domestic products or imported products that are not restricted by national laws, regulations, and policies. In the case of imported products, priority [shall] be given to purchasing imported products from suppliers that [will] transfer technology to Chinese enterprises and/or sign digestion, absorption, and re-innovation plans with Chinese enterprises."[12]
13	Notice on Jiangsu Province Budget Unit Internal Control Norms for Government Procurement	Jiangsu Provincial Department of Finance	1/27/2021	"Where the Provincial Department of Finance approved the procurement of imported products, priority [shall] be given to purchasing imported products from suppliers that [will] voluntarily transfer technology to Chinese enterprises and/or sign digestion, absorption, and re-innovation plans with Chinese enterprises."[13]
14	Tender Announcement for Visual and Auditory Examination Equipment for the Longhua District Maternal and Children's Health Hospital	Shenzhen Longhua District Maternal and Children's Health Hospital	4/8/2020	"With the agreement of the Government Management Department, this project will purchase domestic products or imported products that are not restricted by national laws, regulations, and policies. In the case of imported products, priority [shall] be given to purchasing imported products from suppliers that [will] transfer technology to Chinese enterprises and/or sign digestion, absorption, and re-innovation plans with Chinese enterprises."[14]

[12] *Tender Announcement for a Batch of Oral Root Canal Treatment Equipment for Shenzhen Longgang District People's Hospital* (Longgang Municipal People's Government, issued May 6, 2021), http://www.lg.gov.cn/xxgk/zwgk/tzgg/content/post_8745191.html.
[13] *Notice on Jiangsu Province Budget Unit Internal Control Norms for Government Procurement* (Jiangsu Provincial Department of Finance, issued Jan. 27, 2021), http://czt.jiangsu.gov.cn/art/2021/1/27/art_77309_9656234.html.
[14] *Tender Announcement for Visual and Auditory Examination Equipment for the Longhua District Maternal and Children's Health Hospital* (Chinese Government Procurement Website, Apr. 8, 2020), http://www.ccgp.gov.cn/cggg/dfgg/gkzb/202004/t20200408_14120645.htm.

No.	Title	Issuing Department	Date Published	Excerpt
15	Notice of the Tibet Autonomous Region Department of Finance on Matters Concerning Further Strengthening the Administration of Government Procured Imported Products	Tibet Autonomous Region Department of Finance	3/27/2019	"When the purchase of imported products is approved by the financial department, the purchasers and their entrusted purchasing agencies shall state in the purchasing documents that the purchase of imported products is permitted, and state that priority [will] be given to purchasing imported products from suppliers that [will] transfer technology to Chinese enterprises and/or sign digestion, absorption, and re-innovation plans with Chinese enterprises."[15]
16	Yongren County People's Hospital Medical Molecular Sieve Center Oxygen Generation and Oxygen Supply System Equipment Procurement, Installation, and Debugging Project Tender Announcement	Yongren County People's Hospital	7/25/2018	"Except for the products marked as allowed to be imported, this project does not accept bids for imported products (priority will be given to purchasing imported products from suppliers that transfer technology to Chinese companies and sign digestion, absorption, and re-innovation plans with Chinese companies)."[16]

[15] *Tender Announcement for Visual and Auditory Examination Equipment for the Longhua District Maternal and Children's Health Hospital* (Chinese Government Procurement Website, Apr. 8, 2020), http://www.ccgp.gov.cn/cggg/dfgg/gkzb/202004/t20200408_14120645.htm.

[16] *Yongren County People's Hospital Medical Molecular Sieve Center Oxygen Generation and Oxygen Supply System Equipment Procurement, Installation, and Debugging Project Tender Announcement* (Yongren County Government Website, issued Jul. 25, 2018), http://www.yr.gov.cn/info/egovinfo/1007/overt_centent/1153232701517648x4-30/2020-0806691.htm.

APPENDIX E

Appendix E: Illustrative Examples of Sino-Foreign C919 Joint Ventures

JV English Name	Foreign Company in JV	Parent HQ Country	Chinese JV Partner Name	System/Parts	Year JV Established
Parker FACRI Actuation Systems (Xi'an)[1]	Parker Aerospace	United States	Aviation Industry Corporation of China (AVIC) Xi'an Flight Automated Control Research Institute (FACRI)	Flight control actuation	2016[2]
NEIAS Parker Aero Systems & Equipment (Nanjing)[3]	Parker Aerospace	United States	AVIC Nanjing Engineering Institute of Aircraft Systems (NEIAS)	Fuel, inert, and hydraulic systems	2014[4]
Liebherr LAMC Aviation (Changsha) Co., Ltd.[5]	Liebherr-Aerospace Lindenberg GmbH	Germany	AVIC Landing Gear Advanced Manufacturing Co., Ltd. (LAMC)	Landing gear	2012[6]

[1] *Parker Aerospace Selected by AVIC Aircraft to Provide Flight Controls and the Hydraulic System on the MA700,* PARKER, Jan. 26, 2015, https://www.parker.com/portal/site/PARKER/menuitem.7322a3ce19c3a730b5170b9d237ad1ca/?vgnextoid=398f42f0a7a6e210VgnVCM10000048021dacRCRD&vgnextfmt=EN&vgnextitem=106ac90375584510VgnVCM100000e6651dacRCRD&newsroom=Y&vgnextcat=News%20Release%20Details.
[2] *Parker Aerospace Joint Venture Provides OEM-Quality Aerospace MRO Services in China,* BUSINESS NEWS WIRE, Jul. 10, 2016, https://www.mromagazine.com/press-releases/parker-aerospace-joint-venture-provides-oem-quality-aerospace-mro-services-in-china/.
[3] *Parker Aerospace Selected by AVIC Aircraft to Provide Flight Controls and the Hydraulic System on the MA700,* PARKER.
[4] *NEIAS Parker Aero Systems & Equipment Co. Ltd.,* AMPLIZ, https://www.ampliz.com/company/neias-parker-aero-systems-equipment-co-ltd/90905225.
[5] *German-Chinese Joint Venture Delivers Landing Gear to COMAC,* AEROSPACE MANUFACTURING AND DESIGN, Oct. 18, 2016, https://www.aerospacemanufacturinganddesign.com/article/liebherr-china-joint-venture-landing-gear-101816/.
[6] *Id.*

JV English Name	Foreign Company in JV	Parent HQ Country	Chinese JV Partner Name	System/Parts	Year JV Established
Shanghai Saifei Aviation Ewis Manufacturing (SAIFEI)[7]	Safran Electrical & Power	France	Commercial Aviation Corporation of China (COMAC)	Electrical wiring interconnection	2011[8]
FTG Printronics Circuit Ltd.[9]	FTG Aerospace	Canada	Tianjin Printronics Circuit Corp (TPC)	Cockpit control	2013[10]
Eaton-SAMC (Shanghai) Aircraft Conveyance System Manufacturing Co., Ltd.[11]	Eaton (China) Investment Co., Ltd. (Subsidiary of Eaton Group)	Ireland	Shanghai Aircraft Manufacturing Co. (SAMC)	Hydraulic/fuel conveyance	2012[12]
GE-AVIC Civil Avionics Systems Co., Ltd.[13]	GE Aviation	United States	AVIC	Integrated modular avionics	2011[14]

[7] *SAIFEI Praised by COMAC for Its Good Performance,* SAFRAN, Dec. 21, 2018, https://www.safran-group.com/news/saifei-praised-comac-its-good-performance-2018-12-21.
[8] David Donald, *Paris 2011: Safran and COMAC Form Joint Venture for C919 Wiring,* AINONLINE, Jun. 23, 2011, https://www.ainonline.com/aviation-news/2011-06-23/paris-2011-safran-and-comac-form-joint-venture-c919-wiring.
[9] *FTG Announces It has Established a Joint Venture With Tianjin Printronics Circuit Corp (TPC),* FTG, Jul. 8, 2013, https://www.ftgcorp.com/news/ftg-announces-it-has-established-a-joint-venture-with-tianjin-printronics-circuit-corp-tpc/.
[10] *Id.*
[11] *Eaton-SAMC (Shanghai) Aircraft Conveyance System Manufacturing Co. Ltd.,* EATON-SAMC, https://www.eaton-samc.com/en/.
[12] *Eaton SAMC (Shanghai) Aircraft Conveyance System Manufacturing Co, Ltd.,* CAGE, Apr. 18, 2018, https://cage.report/CAGE/SQR88.
[13] *GE and AVIC Sign Agreement for Integrated Avionics Joint Venture,* GE AVIATION, Jan. 21, 2011, https://www.geaviation.com/press-release/systems/ge-and-avic-sign-agreement-integrated-avionics-joint-venture.
[14] *Id.*

JV English Name	Foreign Company in JV	Parent HQ Country	Chinese JV Partner Name	System/Parts	Year JV Established
AVIAGE SYSTEMS[15]	GE Aviation Systems[16]	United States	AVIC Systems	Avionics core processing system	2012[17]
Honfei Flight Control Technology Co., Ltd.[18]	Honeywell (China) Co., Ltd.	United States	AVIC Xi'an Flight Automatic Control Research Institute	Flight control	2013[19]
Xian SAVI Nacelles[20]	Nexcelle	France and United States	AVIC Aircraft Co., Ltd.	Engine nacelle components	2011[21]
Honeywell Boyun Aviation System Co., Ltd.[22]	Honeywell (China) Co., Ltd.	United States	Hunan Boyun New Materials CO., LTD	Wheels and braking	2012[23]

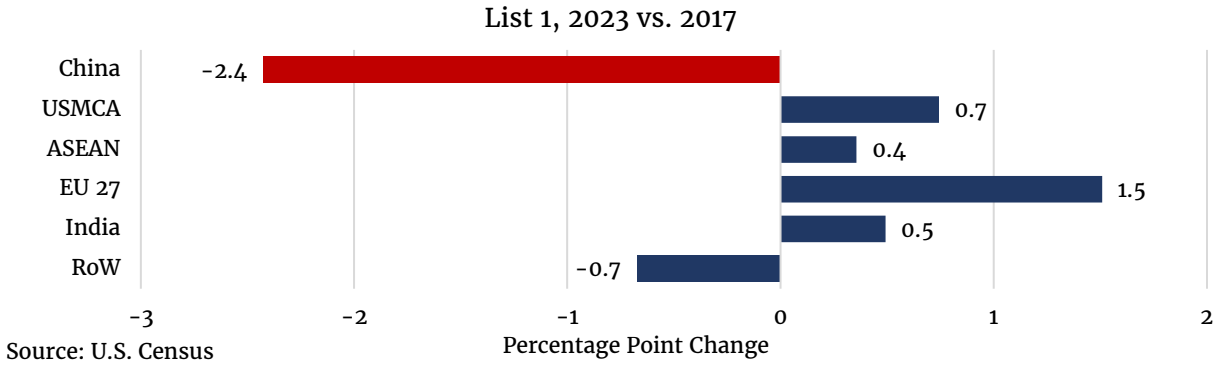
[15] *Integrated Avionics Solutions*, AVIAGE SYSTEMS, https://www.aviagesystems.com/en/.
[16] *GE and AVIC Providing Systems for China's First Large Commercial Aircraft,* GE, Jul. 12, 2010, https://www.ge.com/news/press-releases/ge-and-avic-providing-systems-chinas-first-large-commercial-aircraft.
[17] *About AVIAGE SYSTEMS,* AVIAGE SYSTEMS, https://www.aviagesystems.com/en/company.
[18] *Introduction,* HONFEI, https://www.honfei.cn/en/introduction.
[19] Renata Gao, *Innovative Honeywell Technologies Help COMAC's C919 Soar on its First Flight,* HONEYWELL, May 4, 2017, https://aerospace.honeywell.com/us/en/about-us/press-release/2017/05/innovative-honeywell-technologies-help-comacs-c919-soar.
[20] *Id.*
[21] *Id.*
[22] *Honeywell Boyun Aviation System Co., Ltd. Announced That It Expects to Receive CNY 127.8774 Million in Funding From Honeywell Co., Ltd., Hunan Boyun New Materials Co., Ltd*, MARKET SCREENER, May 6, 2020, https://www.marketscreener.com/quote/stock/HUNAN-BOYUN-NEW-MATERIALS-6500417/news/Honeywell-Boyun-Aviation-System-Co-Ltd-announced-that-it-expects-to-receive-CNY-127-8774-million-33883217/.
[23] Renata Gao, *Innovative Honeywell Technologies Help COMAC's C919 Soar on Its First Flight,* HONEYWELL.

JV English Name	Foreign Company in JV	Parent HQ Country	Chinese JV Partner Name	System/Parts	Year JV Established
Rockwell Collins CETC Avionics Co. Ltd (RCCAC)[24]	Collins Aerospace	United States	CECT Avionics Co., Ltd.	Communication and navigation	2014[25]
AVIC Leihua Rockwell Collins Avionics Company (ALRAC)[26]	Collins Aerospace	United States	AVIC Leihua Electronic Technology Research Institute	Surveillance	2013[27]
Xi'an AVIC Hamilton Sundstrand Aviation Electric Co., Ltd.[28]	Collins Aerospace	United States	Shaanxi Aviation Electrical Co., Ltd. (SAEC), a subsidiary of AVIC Airborne Systems Co., Ltd.	Power system	2014[29]
Thales CETC Avionics Co., Ltd.[30]	Thales	France	China Electronics Technology Group Corporation (CETC)	Cabin entertainment	2013[31]

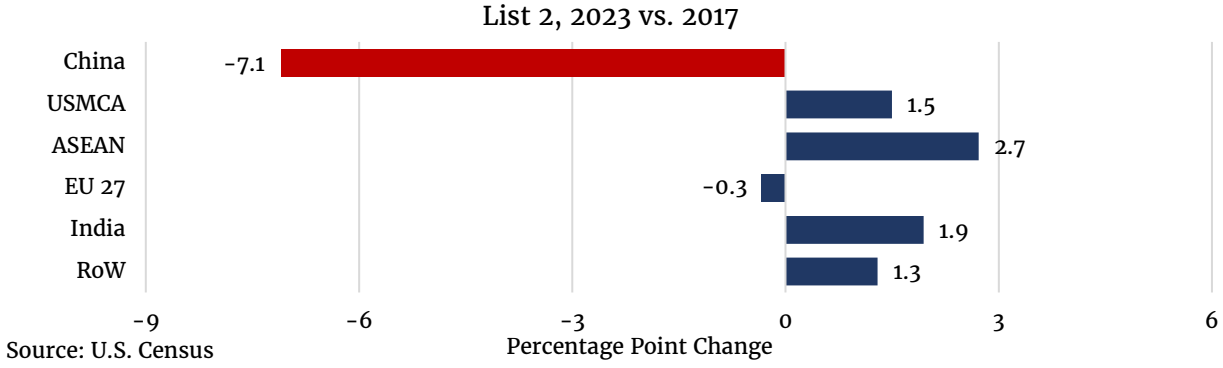
[24] *Joint Ventures*, COLLINS AEROSPACE, http://www.collinsaerospace.com/who-we-are/about-us/global/asia/china/local-presence/joint-ventures.
[25] *Id.*
[26] *Id.*
[27] *Id.*
[28] *Id.*
[29] *AVIC Hamilton Sundstrand Aviation Electric Co., Ltd. Opened to Undertake Tasks of Developing and Manufacturing C919 Power Supply System*, COMAC, Apr. 15, 2014, http://english.comac.cc/news/latest/201404/25/t20140425_1576479.shtml.
[30] *Thales in China,* THALES, https://www.thalesgroup.com/en/countries/asia-pacific/china.
[31] *Id.*

APPENDIX F

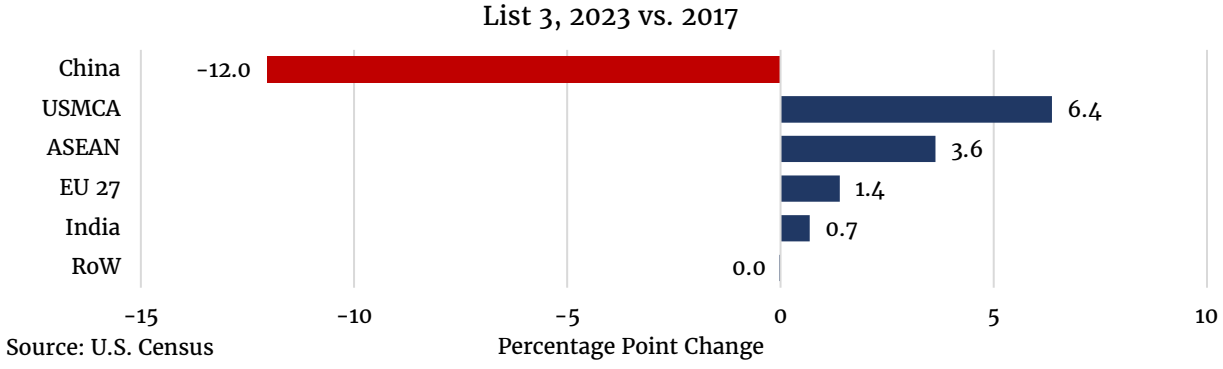
Appendix F: Market Share Changes of U.S. Import Values for Select Regions by Section 301 Product List, 2023 vs. 2017



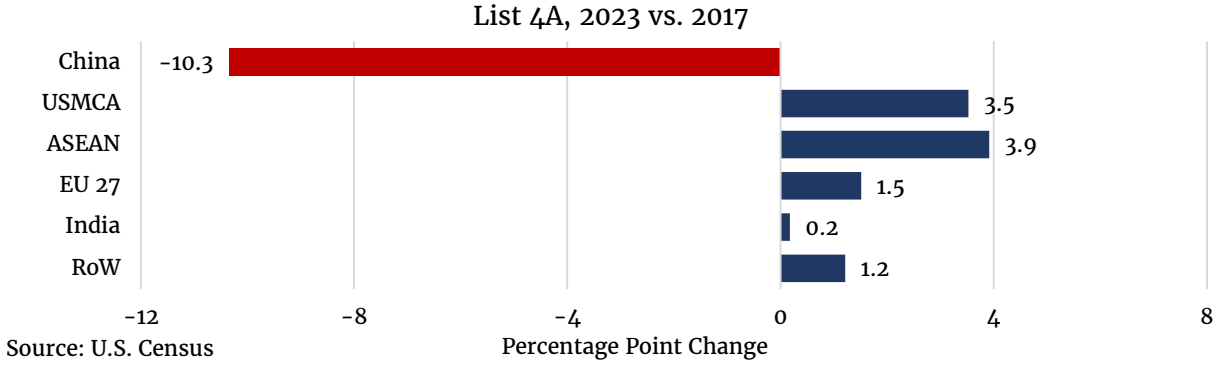
Source: U.S. Census



Source: U.S. Census



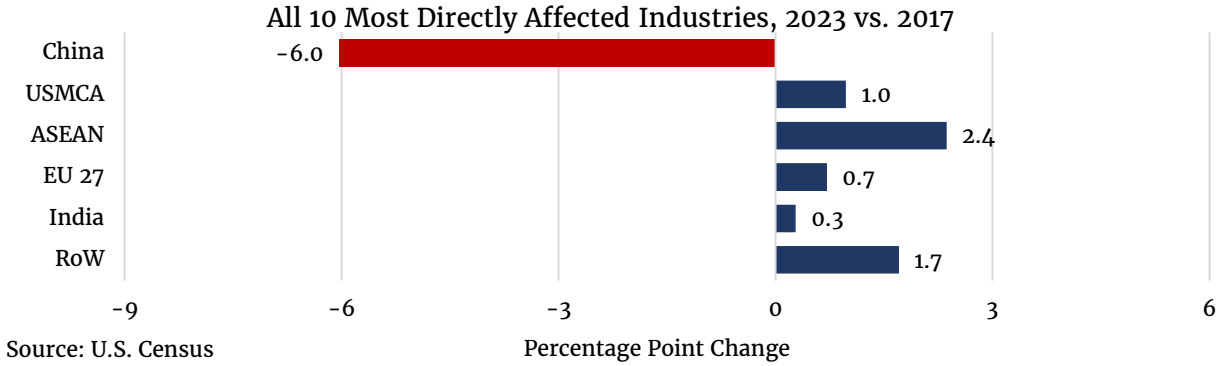
Source: U.S. Census



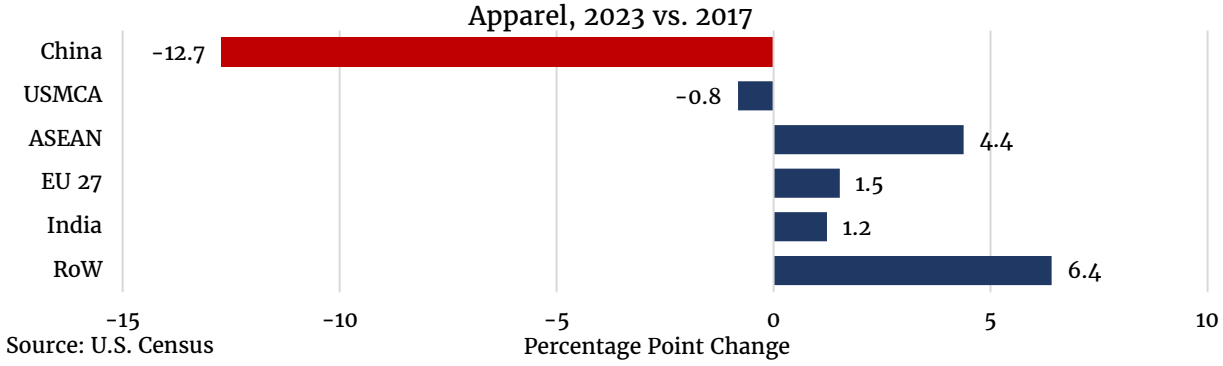
Source: U.S. Census

APPENDIX G

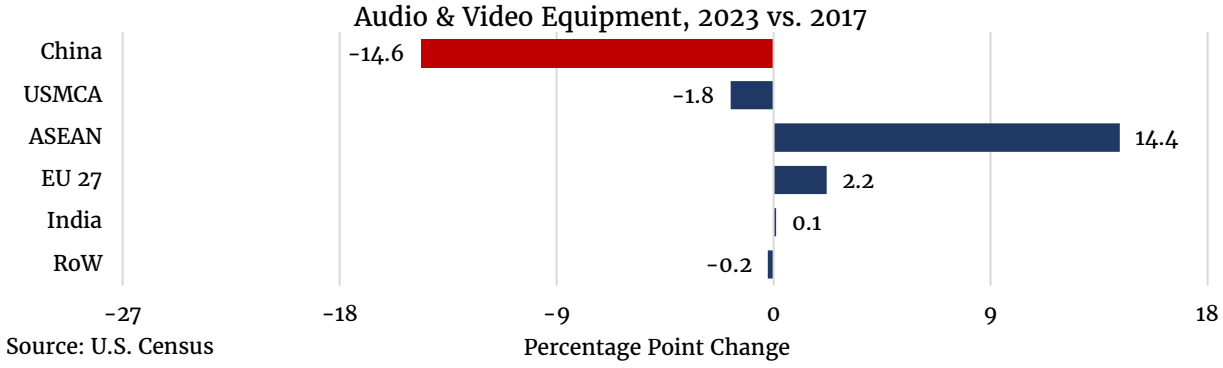
Appendix G: Market Share Changes of U.S. Import Values for Select Regions by USITC Most Directly Affected Industries, 2023 vs. 2017



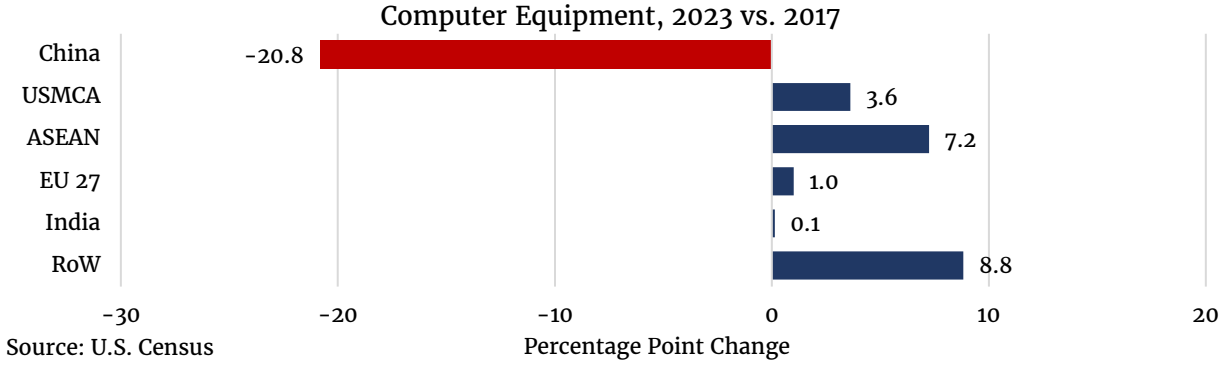
Source: U.S. Census



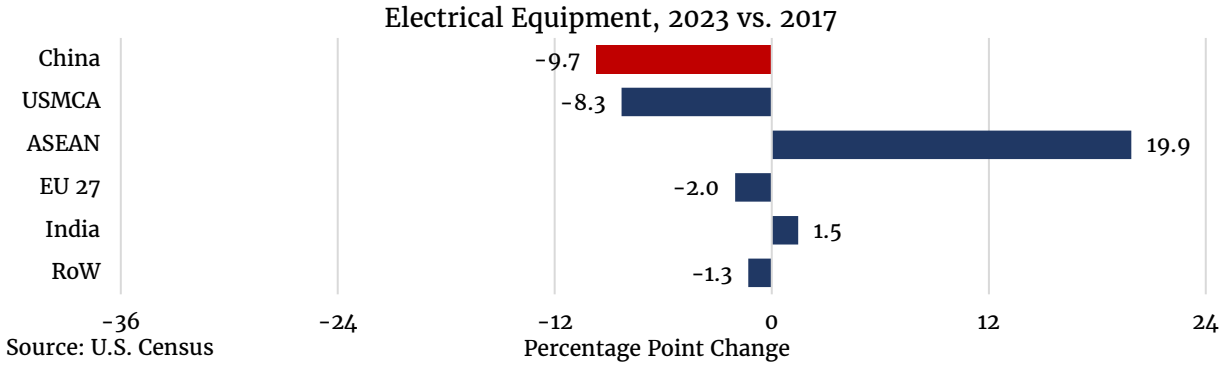
Source: U.S. Census



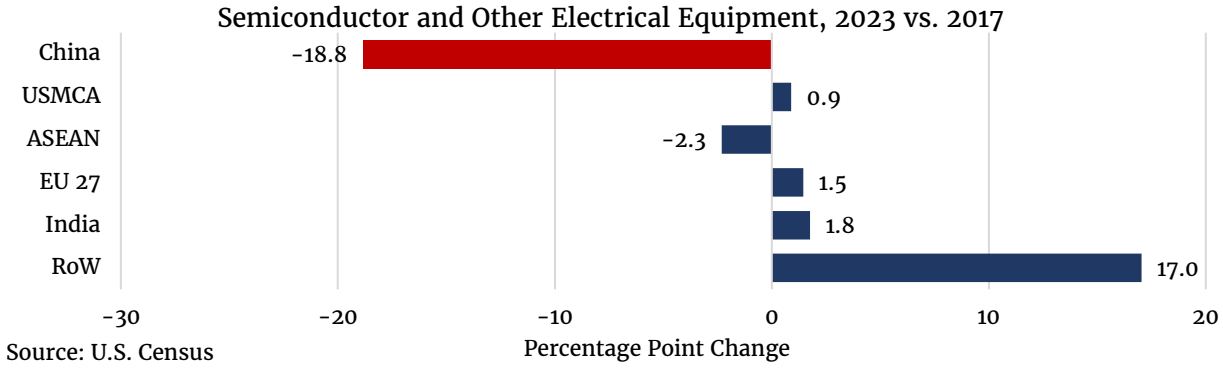
Source: U.S. Census



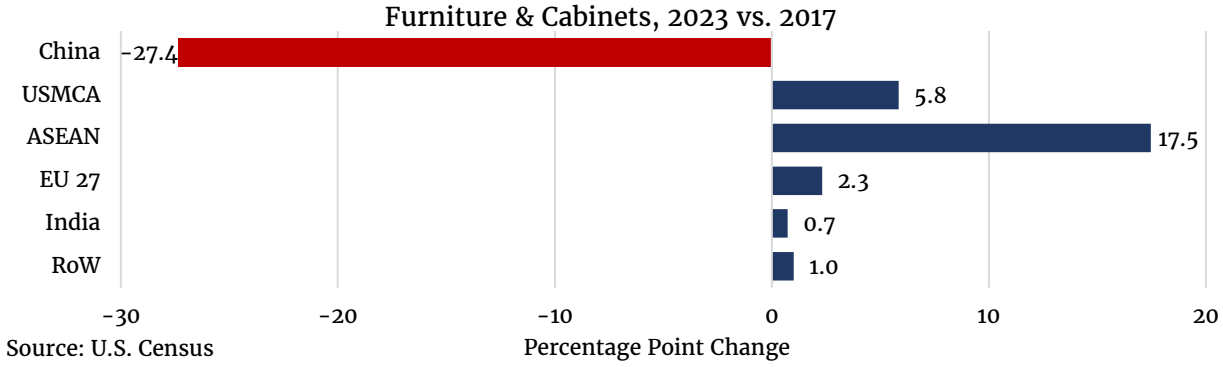
Source: U.S. Census



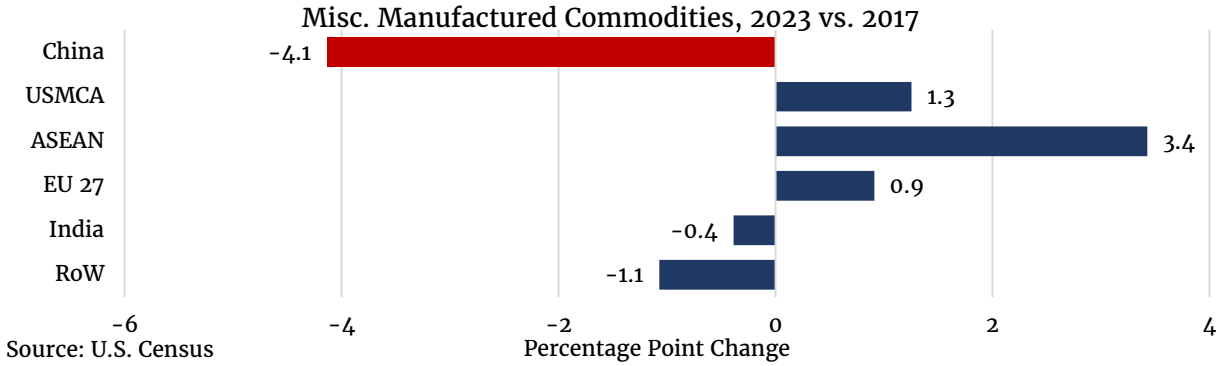
Source: U.S. Census



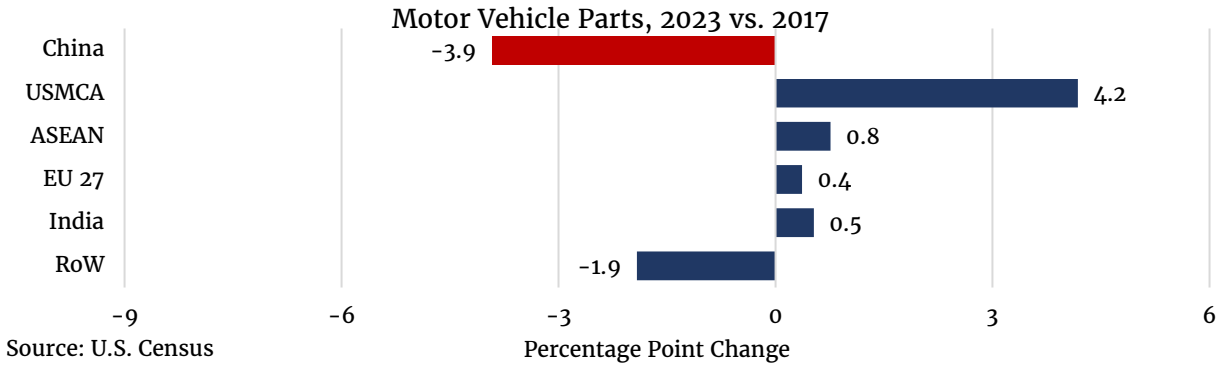
Source: U.S. Census



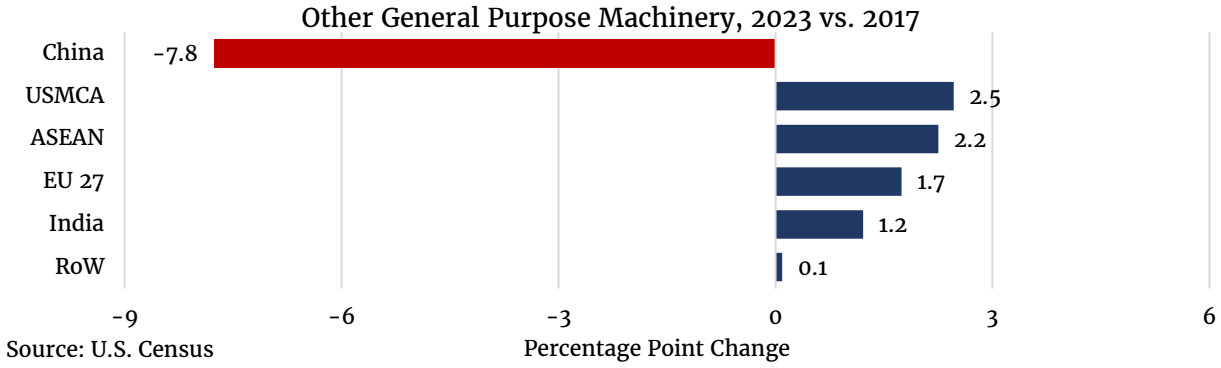
Source: U.S. Census



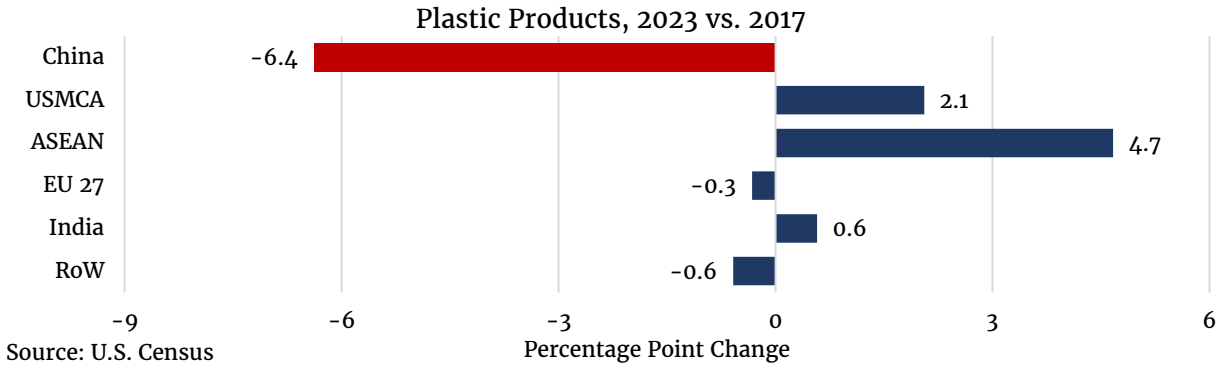
Source: U.S. Census



Source: U.S. Census



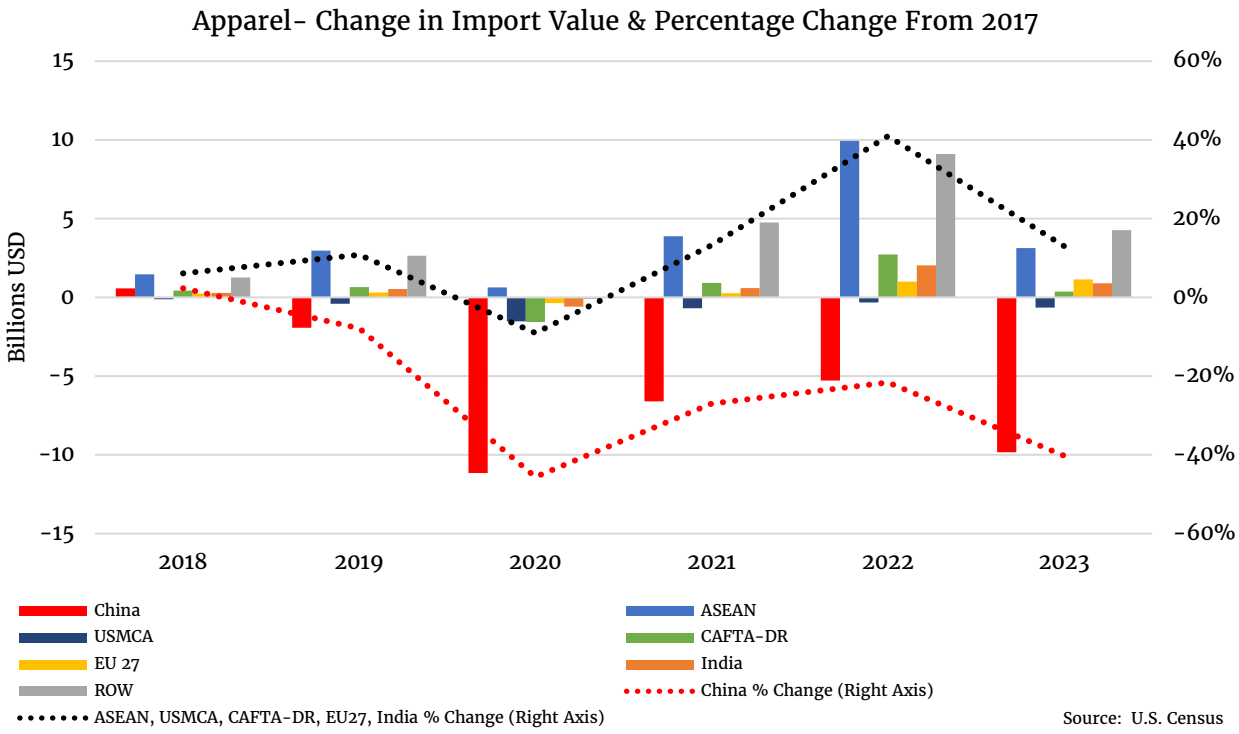
Source: U.S. Census



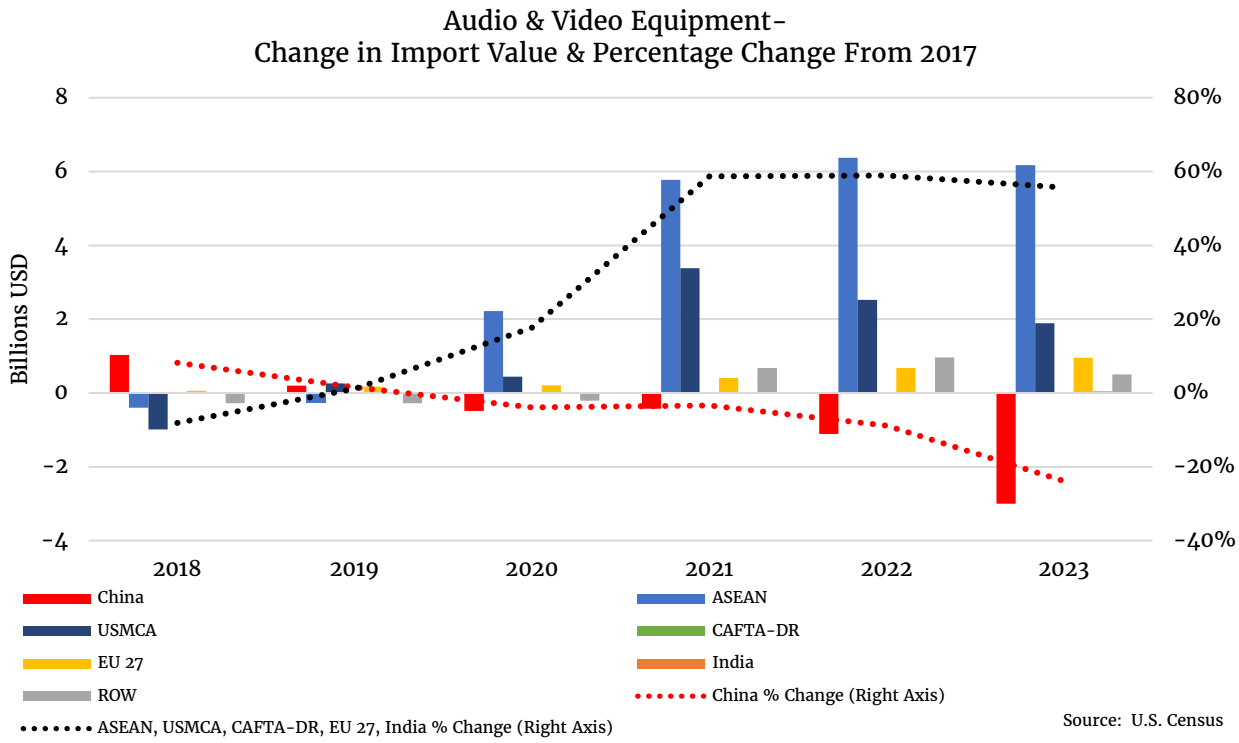
Source: U.S. Census

APPENDIX H

Appendix H: Graphs for Changes of U.S. Import Values for USITC Most Directly Affected Industries by Select Regions, Since 2017

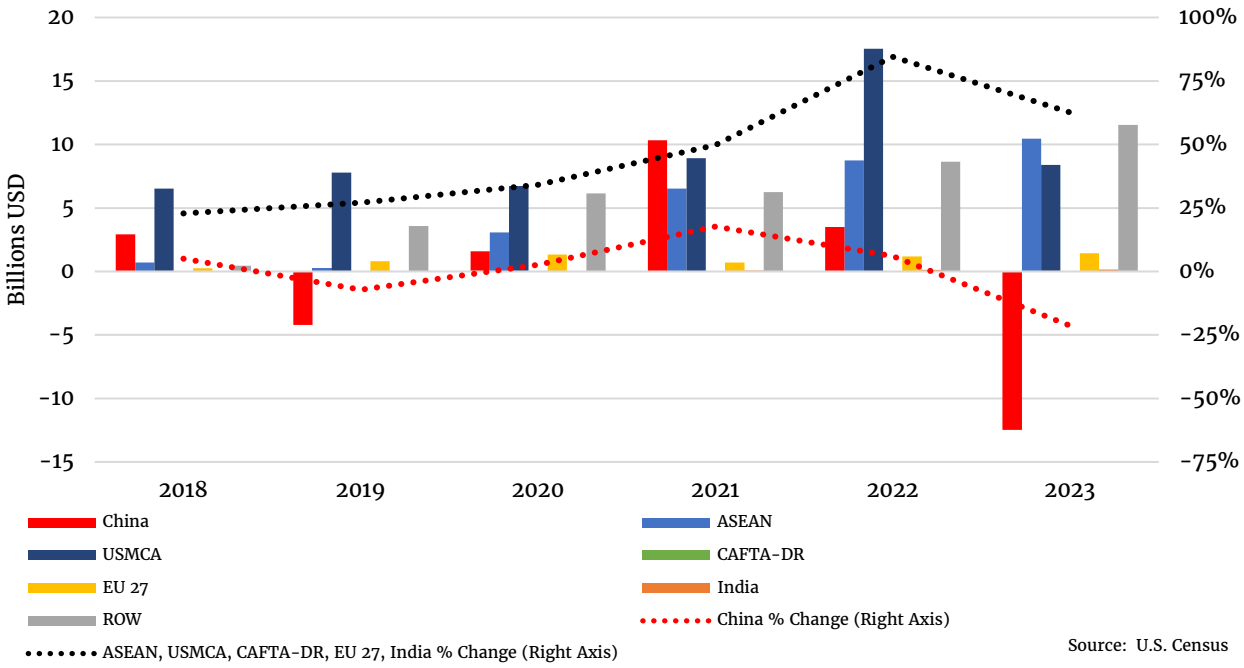


Source: U.S. Census



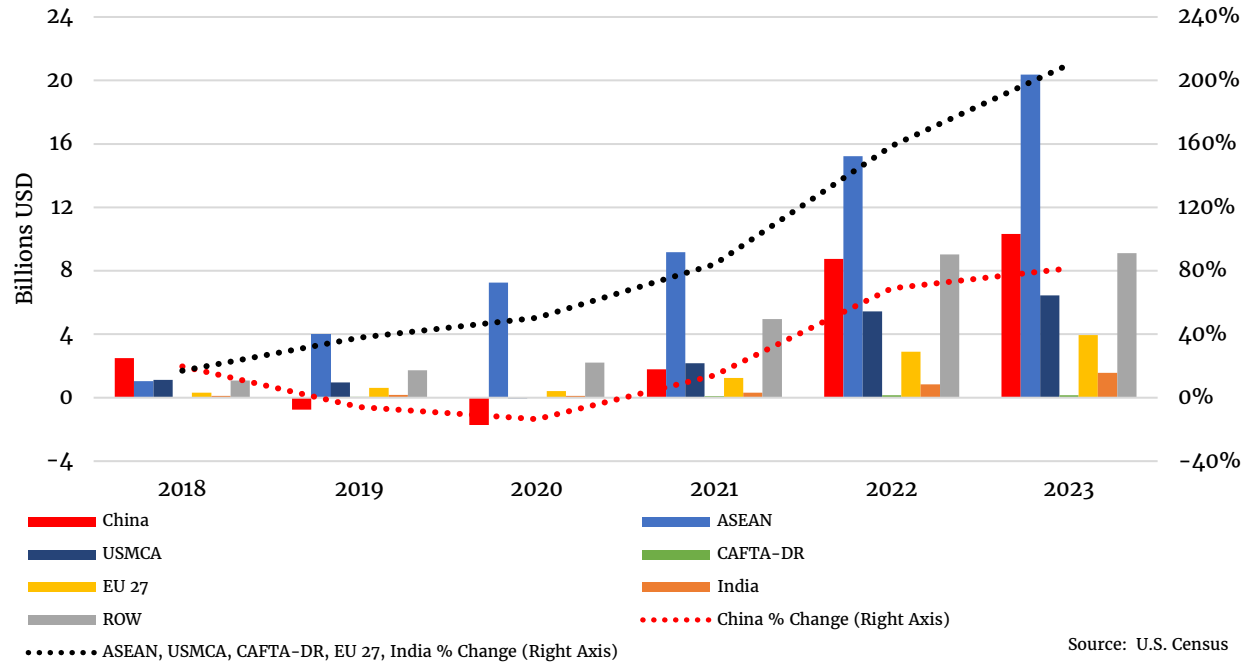
Source: U.S. Census

Computer Equipment-
Change in Import Value & Percentage Change From 2017



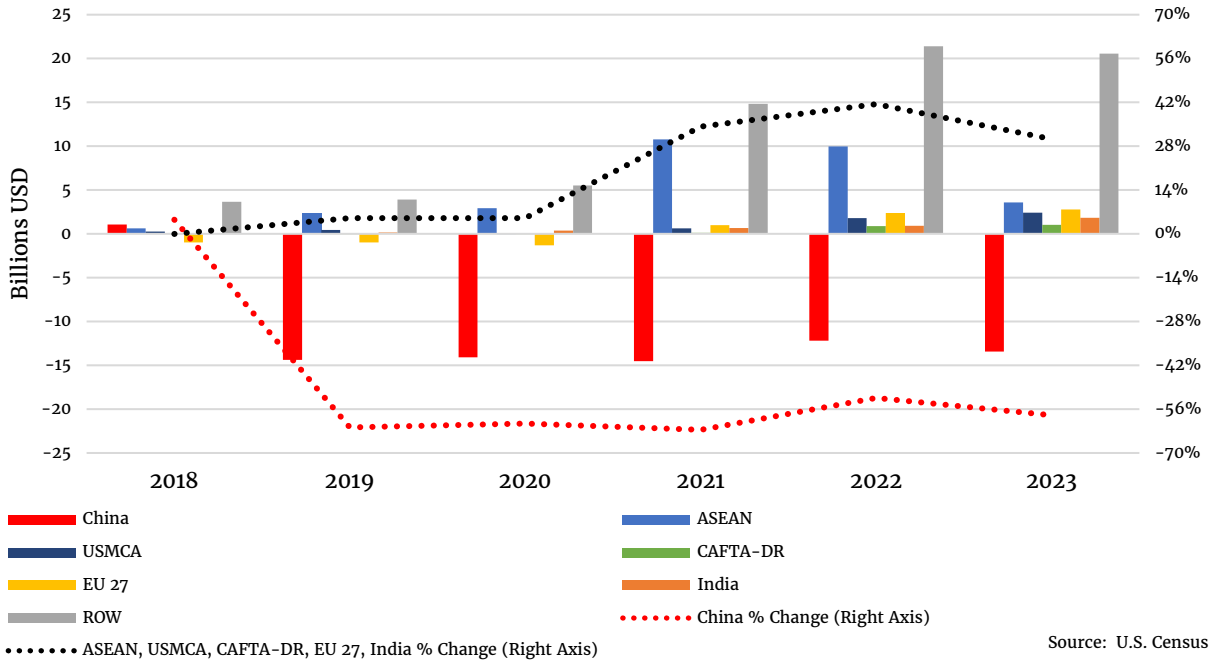
Source: U.S. Census

Electrical Equipment-
Change in Import Value & Percentage Change From 2017



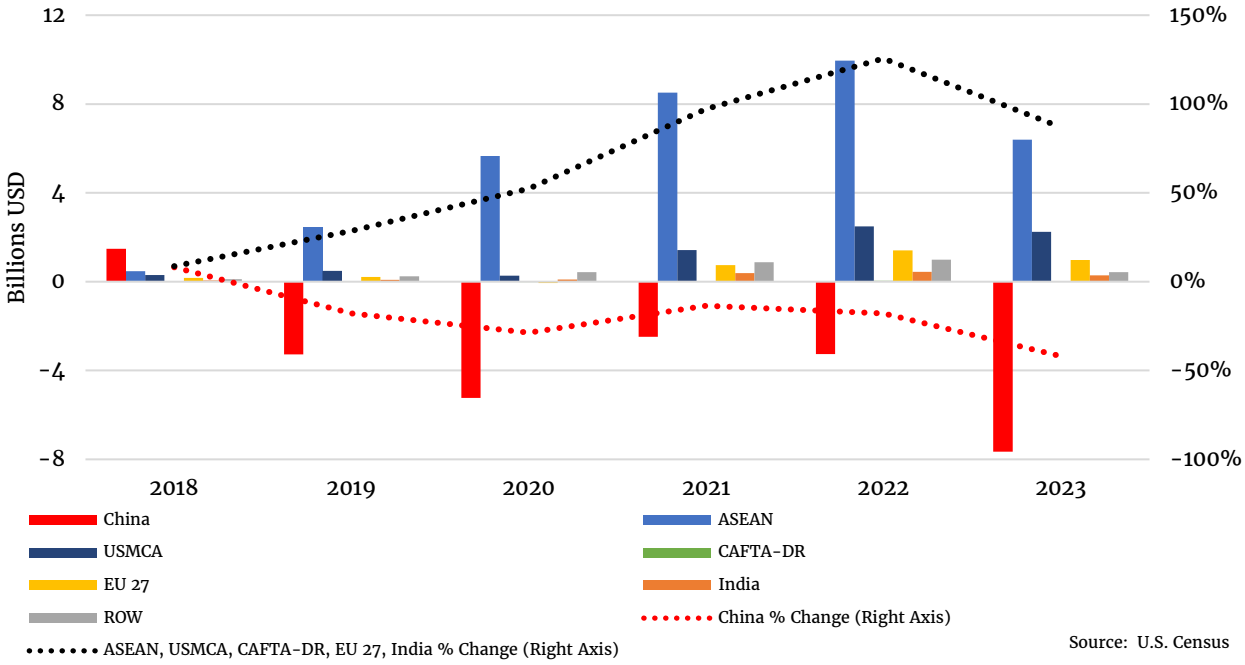
Source: U.S. Census

Semiconductor and Other Electrical Equipment- Change in Import Value & Percentage Change From 2017



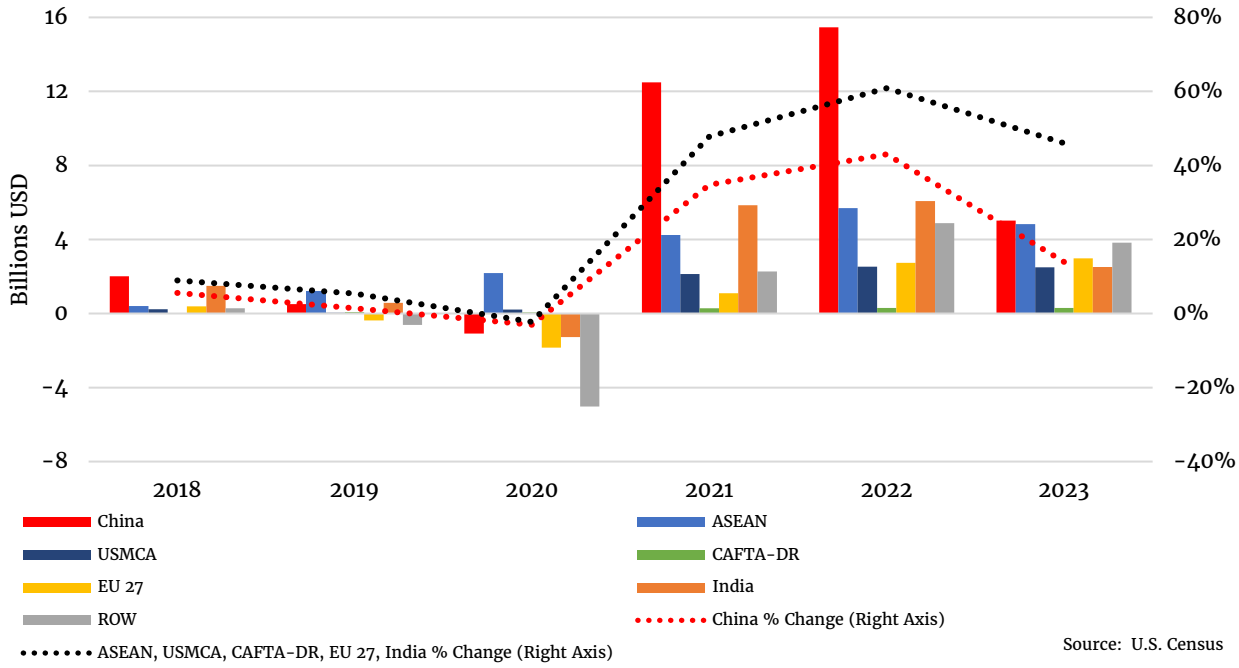
Source: U.S. Census

Furniture & Cabinets- Change in Import Value & Percentage Change From 2017



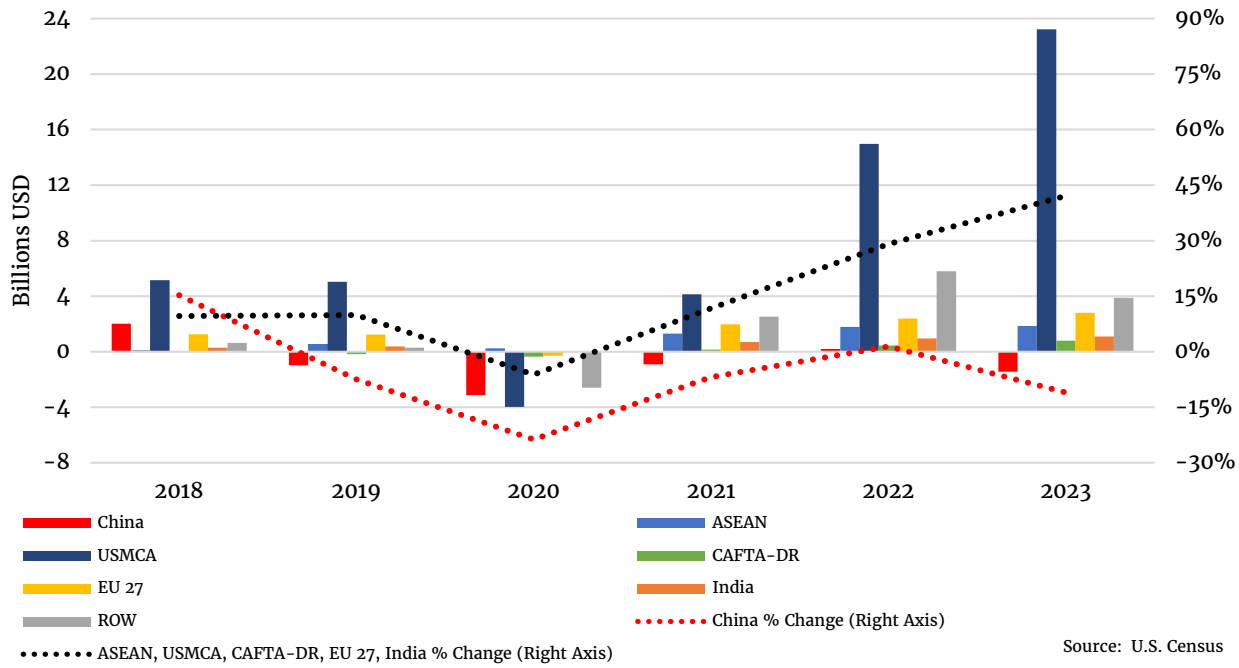
Source: U.S. Census

Misc. Manufactured Commodities-
Change in Import Value & Percentage Change From 2017



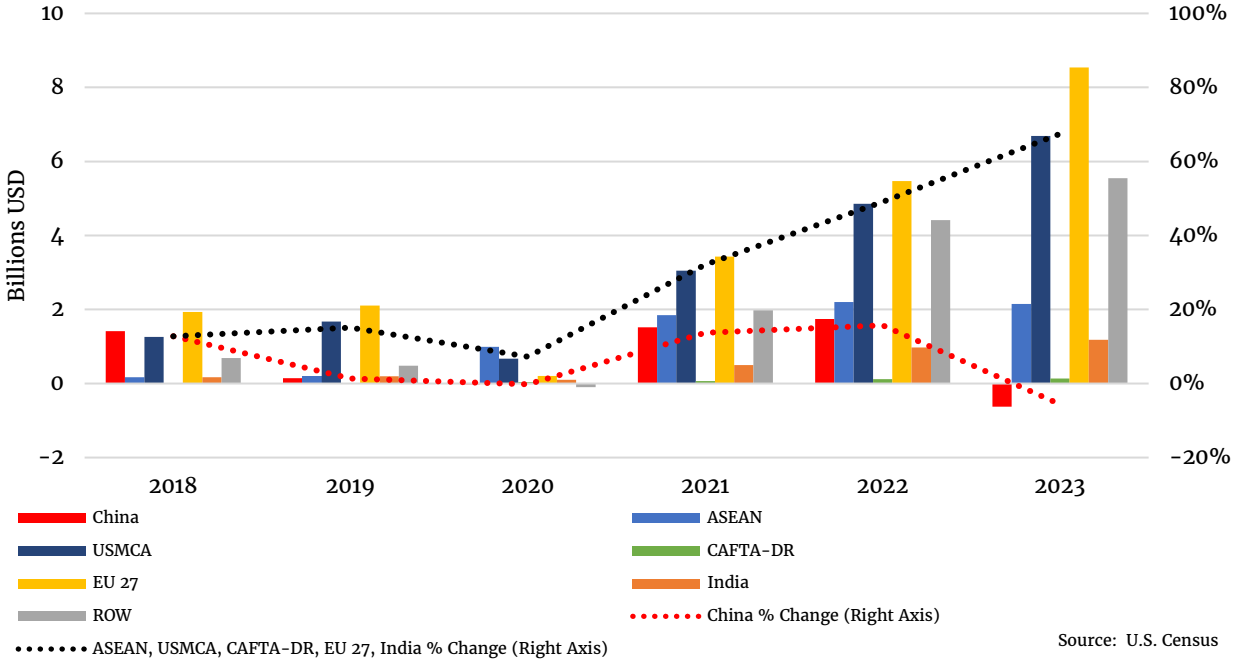
Source: U.S. Census

Motor Vehicle Parts-
Change in Import Value & Percentage Change From 2017



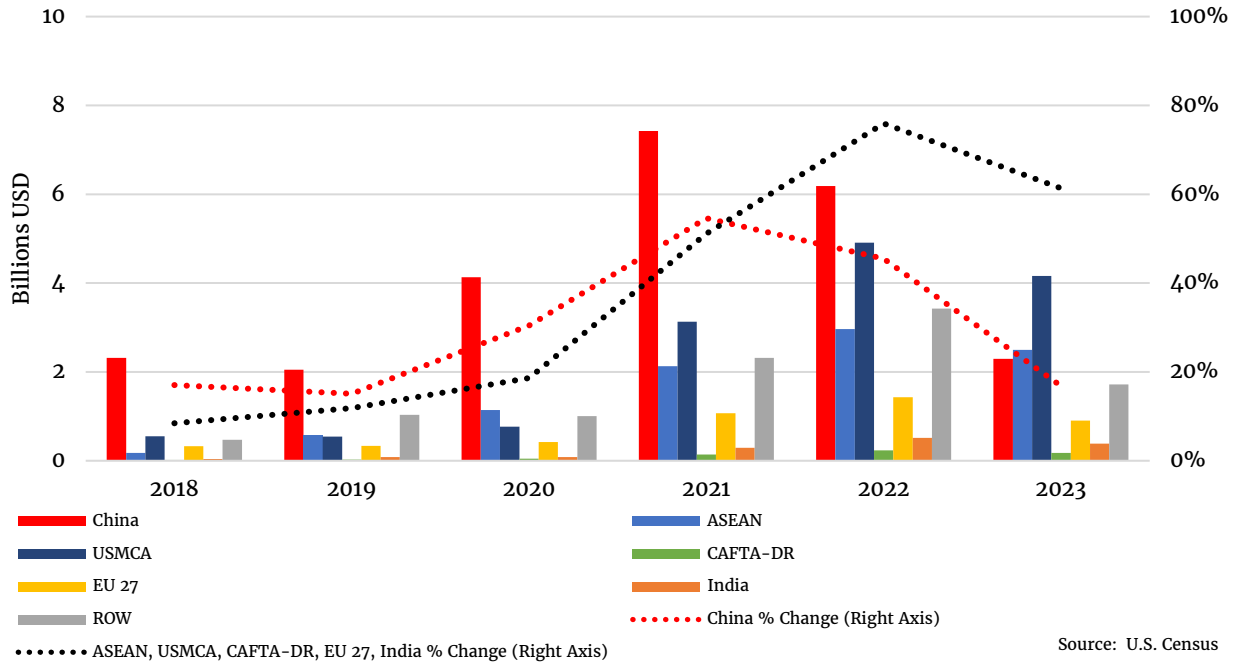
Source: U.S. Census

Other General Purpose Machinery-
Change in Import Value & Percentage Change From 2017



Source: U.S. Census

Plastics Products-
Change in Import Value & Percentage Change From 2017



Source: U.S. Census

APPENDIX I

Appendix I: U.S. Company Statements Attributing Production Shifts to Tariffs

No.	Company	Date	Quote
1	Alphabet Inc. (Google)	8/28/2019	On August 28, 2019, press reporting indicated that, "Google is moving aggressively to shift production of its Pixel smartphone from China to Vietnam…. The push to develop a Vietnamese production base reflects the twin pressures of higher Chinese labor costs and the spiraling tariffs resulting from the trade war between Washington and Beijing."[1]
2	CommScope Holding Inc.	8/8/2019	During an August 8, 2019, earnings call, CommScope CEO Marvin S. Edwards stated, "[T]he antenna products that we make, much of the ARRIS product had been moved out of China into the Philippines, Vietnam and Indonesia. That was generally behind us, accomplished in the first part of the year. List 4 [of section 301 tariffs] covers some of our DAS [distributed antenna system] products that we have to relocate…all of which will be done by the end of the year."[2]
3	Electriq Power Holdings Inc.	11/13/2023	In a November 2023 regulatory filing, Energy storage and management company Electriq Power Holdings Inc. explained that because of tariff-related risks, "We have secured or are evaluating second sources for our main components both inside and outside of China as a way to diversify our supply chain, ensure production capabilities and lower costs and mitigate any potential supplier risks."[3]

[1] *Google to Shift Pixel Smartphone Production From China to Vietnam*, NIKKEI ASIA, Aug. 28, 2019, https://asia.nikkei.com/Spotlight/Tech-scroll-Asia/Google-to-shift-Pixel-smartphone-production-from-China-to-Vietnam.
[2] *CommScope Holding Company Inc. (COMM) CEO Eddie Edwards on Q2 2019 Results - Earnings Call Transcript*, SEEKING ALPHA, Aug. 8, 2019, https://seekingalpha.com/article/4283346-commscope-holding-company-inc-comm-ceo-eddie-edwards-on-q2-2019-results-earnings-call.
[3] Electriq Power Holdings Inc., Supplemental Prospectus (Form 424B3) (Nov. 13, 2023).

No.	Company	Date	Quote
4	Flexsteel Industries Inc.	10/27/2020	In an October 2020 Flexsteel Industries Inc. earnings call, CFO and COO Derek Paul Schmidt said, "When tariffs were imposed on imported furniture items from China, the change was highly disruptive and costly to the global furniture supply chain. Flexsteel, like many furniture companies, pivoted quickly to reduce its exposure to China by reallocating production to other Asian countries, most notably, Vietnam."[4]
5	G-III Apparel Group	6/5/2019 3/28/2019	At a June 5, 2019, earnings call, G-III Apparel Group CEO Morris Goldfarb stated that the New York apparel manufacturer, which owns brands such as Levi's, Calvin Klein, and Tommy Hilfiger, was planning to move production out of China in response to U.S. tariffs. He said that U.S. tariffs on Chinese goods affected approximately 7 percent of their annual net sales for fiscal year 2019.[5] The company's March 2019 annual report stated, "We have engaged in a number of efforts to mitigate the effect on our results of operations of increases in tariffs on products imported by us from China, including diversifying our sourcing network by arranging to move production out of China."[6]
6	GoPro Inc.	8/1/2019	On an August 1, 2019, earnings call, GoPro executives stated that GoPro's "decision to move most of our U.S.-bound production to Mexico supports our goal to mitigate the possible impact of tariffs as well as recognize some cost savings and efficiencies in our supply chain."[7]

[4] *Flexsteel Industries, Inc. (FLXS) CEO Jerry Dittmer on Q1 2021 Results - Earnings Call Transcript*, SEEKING ALPHA, Oct. 27, 2020, https://seekingalpha.com/article/4381725-flexsteel-industries-inc-flxs-ceo-jerry-dittmer-on-q1-2021-results-earnings-call-transcript.
[5] *Q1 2020 GIII Apparel Group Ltd Earnings Call - Final*, CQ FD DISCLOSURE, Jun. 5, 2019.
[6] G-III Apparel Group, Ltd., 2019 Annual Report (Form 10-K) (Mar. 28, 2019).
[7] *Q2 2019 GoPro Inc Earnings Call - Final*, CQ FD DISCLOSURE, Aug. 1, 2019.

No.	Company	Date	Quote
7	Juniper Networks Inc.	7/25/2019	On a July 2019 earnings call, Ken Miller, CFO of Juniper Networks, stated, "We have made substantial progress mitigating the impact of the incremental China tariffs and will continue to further optimize our supply chain. These factors, along with sequential second half revenue growth; and strong cost management should enable us to deliver improved profitability in the back half of 2019."[8]
8	Kadant Inc.	11/8/2023	In a November 2023 regulatory filing, Massachusetts-headquartered industrial processing technology and systems company Kadant Inc. stated, "we have worked to mitigate the impact of tariffs through pricing and sourcing strategies."[9]
9	Masonite International Corp.	11/3/2020	On a November 3, 2020, earnings call, President and CEO Howard Carl Heckes of door manufacturer Masonite International cited 301 tariffs as well as COVID-19 and an antidumping investigation on wood products from China as factors influencing the company's supply chain diversification efforts, stating, "… our sourcing team is working hard to mitigate with alternative supply and have been after 301 tariffs in China."[10]
10	Methode Electronics Inc.	12/6/2018	During a December 6, 2018, earnings call for the Illinois-based company, Methode Electronics Inc. President, CEO and Director Donald W. Duda stated, "[W]e are working actually quite hard to move some of that manufacturing as appropriate to other locations that will not be impacted by the tariffs. ... We have operations in Mexico, in Malta, in Egypt. So we have the ability to, for the most part, mitigate the tariffs. It's not something that you can do overnight, but we are working to do that. … [T]he 10 percent [tariff] we think is likely to stay for a

[8] *Juniper Networks Reports Preliminary Second Quarter 2019 Financial Results*, GLOBENEWSWIRE, Jul. 25, 2019, https://www.globenewswire.com/news-release/2019/07/25/1888367/0/en/Juniper-Networks-Reports-Preliminary-Second-Quarter-2019-Financial-Results.html.
[9] Kadant Inc., Q2 Report (Form 10-Q) (Nov. 8, 2023).
[10] *Masonite International Corporation (DOOR) CEO Howard Heckes on Q3 2020 Results - Earnings Call Transcript*, SEEKING ALPHA, Nov. 3, 2020, https://seekingalpha.com/article/4384609-masonite-international-corporation-door-ceo-howard-heckes-on-q3-2020-results-earnings-call.

No.	Company	Date	Quote
			while and we're making necessary adjustments and working with our customers."[11]
11	Northern Technologies International Corp.	7/9/2019	On a July 9, 2019, earnings call, Northern Technologies International Corp CFO Matt Wolsfeld stated that the Minnesota-based manufacturer of compostable bioplastics was considering shifting its production from China to India by the end of 2019 to mitigate the effects of U.S. tariffs.[12] During a November 2020 earnings call, Wolsfeld said that the increased expenses in India were the result of the company moving to make India the center for its Asian operations. He said, "And so during the past year, we invested in certain equipment, certain extrusion equipment, certain general expenses to make that a key base of operations, especially given the issues that we were seeing with the Chinese tariffs…"[13]
12	Plexus Corp.	3/7/2022	During a March 2022 presentation to institutional investors, Plexus Corp. leadership stated, "it's fairly straightforward to be able to transition … between Plexus facilities. And we saw that play out early when the tariffs started within China. We were able to transition business from China into our facilities in Malaysia, for instance."[14]
13	Regal Rexnord Corp.	11/5/2018	During a November 9, 2018, earnings call and quarterly presentation, Regal Rexnord Corp. COO Jonathan Schlemmer stated that the American manufacturer had begun production of industrial motors at its Mexican facility after "transferring production to Regal facilities outside of China" in response to U.S. tariffs.[15]

[11] *Q2 2019 Methode Electronics Inc. Earnings Call – Final*, MOTLEY FOOL, Dec. 6, 2018, https://www.fool.com/earnings/call-transcripts/2019/12/05/methode-electronics-inc-mei-q2-2020-earnings-call.aspx.
[12] *Q3 2019 Northern Technologies International Corp Earnings Call – Final*, CQ FD DISCLOSURE, Jul. 9, 2019.
[13] *Northern Technologies International Corp (NTIC) CEO Patrick Lynch on Q4 2020 Results - Earnings Call Transcript*, SEEKING ALPHA, Nov. 13, 2020, https://seekingalpha.com/article/4388999-northern-technologies-international-corp-ntic-ceo-patrick-lynch-on-q4-2020-results-earnings.
[14] *Plexus Corp at Raymond James Institutional Investors Conference – Final*, VIQ FD DISCLOSURE, Mar. 7, 2022.
[15] *Regal Beloit Corp Q3 2018 Earnings Conference Call Transcript*, MOTLEY FOOL, Nov. 5, 2018, https://www.fool.com/earnings/call-transcripts/2018/11/05/regal-beloit-corp-rbc-q3-2018-earnings-conference.aspx.

No.	Company	Date	Quote
14	Sonos Inc.	5/12/2021	During a May 2021 earnings call, audio product company Sonos Inc.'s CFO Brittany Bagley said that, "[W]e have been actively diversifying into Malaysia. It is part of our long-term manufacturing strategy, and it very much continues to be relevant and important to us. … you can see from the magnitude of the tariff numbers that we have this quarter relative to what we were talking about a year ago that we have significantly mitigated the impact of tariffs through that Malaysia strategy."[16]
15	Valmont Industries Inc.	10/24/2019	During an October 24, 2019, earnings call, President, CEO, and Director of Nebraska-based Valmont Industries Inc. Stephen G. Kaniewski stated, "China is now one of those places that we cannot sell any kind of utility products that are now coming to the U.S., it simply off limits based on the political environment, the trade environment that many other companies have discussed as well. … So we are now making adjustments to move production or to enhance our production just to get back to par in North America, and that will be a combination of both Mexico and the U.S."[17] The company produces irrigation equipment and lighting, traffic, and steel utility poles.

[16] *Second Quarter Fiscal 2021 Prepared Conference Call Remarks and Q&A Session*, SONOS, May 12, 2021, https://s22.q4cdn.com/672173472/files/doc_financials/2021/q2/FINAL-SONO-2Q21-Earnings-Call-Transcript-5.12.21.pdf.

[17] *Valmont Industries, Inc., 2019 Q3 – Results – Earnings Call Presentation*, SEEKING ALPHA, Oct. 25, 2019, https://seekingalpha.com/article/4299178-valmont-industries-inc-2019-q3-results-earnings-call-presentation.

APPENDIX J

Appendix J: Estimated Changes in Value of U.S. Imports by Source for Most Directly Affected Industries (Billions USD)

Industry	2018	2019	2020	2021	Period Average
Cut and Sew Apparel Manufacturing					
China	0.0	-4.1	-10.1	-13.1	-6.8
Vietnam	0.0	0.9	2.5	2.9	1.6
Bangladesh	0.0	0.4	1.0	1.4	0.7
Indonesia	0.0	0.3	0.7	0.8	0.5
All Other Sources	0.0	2.3	5.4	7.3	3.7
Semiconductors and Other Electronic Components					
China	-4.6	-21.0	-27.6	-28.8	-20.5
Malaysia	0.9	4.1	5.0	5.2	3.8
Taiwan	0.4	2.1	2.7	3.5	2.2
Korea	0.4	1.7	2.6	2.8	1.9
All Other Sources	1.5	6.6	8.5	9.4	6.5
Computer Equipment					
China	-0.8	-3.4	-4.4	-3.9	-3.1
Mexico	0.4	1.6	1.9	1.6	1.4
Taiwan	0.0	0.4	0.6	0.5	0.4
Thailand	0.1	0.3	0.5	0.5	0.3
All Other Sources	0.2	0.7	0.9	0.8	0.6
Household and Institutional Furniture and Kitchen Cabinets					
China	-0.8	-4.3	-5.4	-6.6	-4.3
Vietnam	0.1	0.7	1.1	1.4	0.8
Mexico	0.0	0.2	0.2	0.4	0.2
Canada	0.0	0.2	0.2	0.3	0.2
All Other Sources	0.1	0.8	1.1	1.4	0.9
Motor Vehicle Parts					
China	-1.7	-10.7	-12.7	-15.4	-10.1
Mexico	0.4	2.7	3.2	3.8	2.5
Canada	0.1	0.7	0.8	1.0	0.7
Japan	0.1	0.5	0.6	0.9	0.5
All Other Sources	0.2	1.5	1.8	2.5	1.5
Other Electrical Equipment and Components (*e.g.*, Batteries and Fiber Optic Cable)					
China	-1.6	-6.9	-8.7	-10.6	-7.0
Mexico	0.3	1.2	1.3	1.7	1.2
Korea	0.1	0.3	0.5	0.7	0.4
Japan	0.1	0.4	0.4	0.6	0.4
All Other Sources	0.4	2.2	3.2	3.8	2.4
Other Miscellaneous Manufacturing					
China	-0.1	-2.0	-5.1	-6.7	-3.5
India	0.0	0.3	0.8	1.4	0.6
Israel	0.0	0.2	0.3	0.4	0.2
Mexico	0.0	0.1	0.2	0.3	0.1
All Other Sources	0.0	0.8	2.2	3.0	1.5

Industry	2018	2019	2020	2021	Period Average
Audio and Video Equipment					
China	-0.2	-2.5	-6.6	-8.2	-4.4
Mexico	0.1	1.6	3.7	4.1	2.4
Vietnam	0.0	0.1	0.9	1.6	0.6
Thailand	0.0	0.2	0.4	0.5	0.3
All Other Sources	0.0	0.6	1.4	1.6	0.9
Other General-Purpose Machinery					
China	-3.2	-9.4	-11.8	-13.7	-9.5
Germany	0.3	0.9	1.1	1.3	0.9
Mexico	0.2	0.7	1.0	1.2	0.8
Canada	0.2	0.7	0.8	0.9	0.7
All Other Sources	1.0	2.9	3.7	4.6	3.1
Plastics Products					
China	-0.7	-4.2	-6.8	-7.4	-4.7
Canada	0.0	0.2	0.4	0.5	0.3
Mexico	0.0	0.1	0.2	0.3	0.2
Korea	0.0	0.1	0.1	0.1	0.1
All Other Sources	0.1	0.4	0.7	0.9	0.5
Ten-Industry Total					
China	-13.6	-68.6	-99.3	-114.4	-74.0
All Sources Other Than China	8.2	42.8	64.7	77.8	48.4

APPENDIX K

Appendix K: Tariff Lines Proposed for Inclusion in Machinery Exclusion Process

HTSUS Subheading	Product Description
8417.10.00	Furnaces and ovens for the roasting, melting or other heat treatment of ores, pyrites or of metals
8417.80.00	Industrial or laboratory furnaces and ovens nesoi (not elsewhere specified or included), including incinerators, nonelectric
8418.69.00	Refrigerating or freezing equipment nesoi
8419.33.00	Lyophilization apparatus; freeze drying units; spray dryers, for agricultural products
8419.33.00	Lyophilization apparatus; freeze drying units; spray dryers, other than for agricultural products, nesoi
8419.34.00	Other dryers for agricultural products (other than lyophilization apparatus; freeze drying units; spray dryers)
8419.35.00	Dryers for wood
8419.35.00	Dryers for paper pulp, paper or paperboard
8419.39.00	Other dryers other than of a kind used for domestic purposes, nesoi (other than lyophilization apparatus; freeze drying units; spray dryers)
8419.40.00	Distilling or rectifying plant, not used for domestic purposes
8419.50.00	Brazed aluminum plate-fin heat exchangers
8419.50.00	Heat exchange units, nesoi
8419.60.00	Machinery for liquefying air or gas containing brazed aluminum plate-fin heat exchangers
8419.60.00	Machinery for liquefying air or gas, nesoi
8419.89.00	Machinery and equipment for the treatment of materials (by a process which changes temperatures), for making paper pulp, paper or paperboard
8419.89.00	Industrial machinery, plant or equip. for the treat. of mat., involving a change in temp., for molten-salt-cooled acrylic acid reactors
8419.89.00	Industrial machinery, plant or equipment for the treatment of materials, by process involving a change in temperature, nesoi

HTSUS Subheading	Product Description
8420.10.00	Textile calendering or rolling machines
8420.10.00	Calendering or similar rolling machines for making paper pulp, paper or paperboard
8420.10.00	Calendering or other rolling machines, other than for metals or glass, nesoi
8420.91.00	Cylinders for textile calendering or rolling machines
8420.91.00	Cylinders for paper pulp, paper or paperboard calendering or rolling machines
8420.91.00	Cylinders for calendering and similar rolling machines, nesoi
8422.19.00	Dishwashing machines other than of the household type
8422.20.00	Machinery for cleaning or drying bottles or other containers
8422.30.00	Can-sealing machines
8422.30.00	Machinery for filling,closing,sealing, capsuling or labeling bottles,cans, boxes or other containers;machinery for aerating beverages; nesoi
8422.40.00	Machinery for packing or wrapping pipe tobacco, candy and cigarette packages; combination candy cutting and wrapping machines
8422.40.00	Packing or wrapping machinery, nesoi
8429.11.00	Self-propelled bulldozers and angledozers, for track laying
8429.19.00	Self-propelled bulldozers and angledozers other than track laying
8429.20.00	Self-propelled graders and levelers
8429.30.00	Self-propelled scrapers
8429.40.00	Self-propelled tamping machines and road rollers
8429.51.00	Self-propelled front-end shovel loaders, wheel-type
8429.51.00	Self-propelled front-end shovel loaders, other than wheel-type
8429.52.00	Self-propelled backhoes, shovels, clamshells and draglines with a 360 degree revolving superstructure
8429.52.00	Self-propelled machinery with a 360 degree revolving superstructure, other than backhoes, shovels, clamshells and draglines
8429.59.00	Self-propelled backhoes, shovels, clamshells and draglines not with a 360 degree revolving superstructure

HTSUS Subheading	Product Description
8429.59.00	Self-propelled machinery not with a 360 degree revolving superstructure, other than backhoes, shovels, clamshells and draglines
8430.10.00	Pile-drivers and pile-extractors
8430.31.00	Self-propelled coal or rock cutters and tunneling machinery
8430.39.00	Coal or rock cutters and tunneling machinery, not self-propelled
8430.41.00	Self-propelled boring or sinking machinery
8430.49.00	Offshore oil and natural gas drilling and production platforms
8430.49.00	Boring or sinking machinery, not self-propelled, nesoi
8430.50.00	Self-propelled peat excavators
8430.50.00	Self-propelled machinery for working earth, minerals or ores, nesoi
8430.61.00	Tamping or compacting machinery, not self-propelled
8430.69.00	Machinery for working earth, minerals or ores, not self-propelled, nesoi
8432.10.00	Plows for soil preparation or cultivation
8432.21.00	Disc harrows for soil preparation or cultivation
8432.29.00	Harrows (other than disc), scarifiers, cultivators, weeders and hoes for soil preparation or cultivation
8432.31.00	No-till direct seeders, planters and transplanters
8432.39.00	Seeders, planters and transplanters, nesoi
8432.41.00	Manure spreaders
8432.42.00	Fertilizer distributors
8432.80.00	Agricultural, horticultural or forestry machinery for soil preparation or cultivation, nesoi; lawn or sports ground rollers
8433.30.00	Haymaking machinery other than mowers
8433.40.00	Straw or fodder balers, including pick-up balers
8433.51.00	Combine harvester-threshers
8433.52.00	Threshing machinery other than combine harvester-threshers
8433.53.00	Root or tuber harvesting machines
8433.59.00	Harvesting machinery or threshing machinery, nesoi

HTSUS Subheading	Product Description
8433.60.00	Machines for cleaning, sorting or grading eggs, fruit or other agricultural produce
8435.10.00	Presses, crushers and similar machinery used in the manufacture of wine, cider, fruit juices or similar beverages
8436.10.00	Machinery for preparing animal feeds
8436.21.00	Poultry incubators and brooders
8436.29.00	Poultry-keeping machinery
8436.80.00	Agricultural, horticultural, forestry or bee-keeping machinery, nesoi
8437.10.00	Machines for cleaning, sorting or grading seed, grain or dried leguminous vegetables
8437.80.00	Machinery used in the milling industry or for the working of cereals or dried leguminous vegetables, other than farm type machinery
8438.10.00	Bakery machinery and machinery for the manufacture of macaroni, spaghetti or similar products, nesoi
8438.20.00	Machinery for the manufacture of confectionery, cocoa or chocolate, nesoi
8438.30.00	Machinery for sugar manufacture, nesoi
8438.40.00	Brewery machinery, nesoi
8438.50.00	Machinery for the preparation of meat or poultry, nesoi
8438.60.00	Machinery for the preparation of fruits, nuts or vegetables, nesoi
8438.80.00	Machinery for the industrial preparation or manufacture of food or drink, nesoi
8439.10.00	Machinery for making pulp of fibrous cellulosic material
8439.20.00	Machinery for making paper or paperboard
8439.30.00	Machinery for finishing paper or paperboard
8441.10.00	Cutting machines of all kinds used for making up paper pulp, paper or paperboard
8441.20.00	Machines for making bags, sacks or envelopes of paper pulp, paper or paperboard

HTSUS Subheading	Product Description
8441.30.00	Machines for making cartons, boxes, cases, tubes, drums or similar containers, other than by molding, of paper pulp, paper or paperboard
8441.40.00	Machines for molding articles in paper pulp, paper or paperboard
8441.80.00	Machinery for making up paper pulp, paper or paperboard, nesoi
8442.30.00	Machinery, apparatus and equipment of heading 8442
8442.50.00	Printing plates
8442.50.00	Printing type, blocks, cylinders and other printing components; blocks, cylinders and lithographic stones, prepared for printing purposes
8444.00.00	Machines for extruding, drawing, texturing or cutting man-made textile materials
8445.11.00	Carding machines for preparing textile fibers
8445.12.00	Combing machines for preparing textile fibers
8445.13.00	Drawing or roving machines for preparing textile fibers
8445.19.00	Machines for preparing textile fibers, nesoi
8445.20.00	Textile spinning machines
8445.30.00	Textile doubling or twisting machines
8445.40.00	Textile winding (including weft-winding) or reeling machines
8445.90.00	Machinery for producing textile yarns nesoi; machines for preparing textile yarns for use on machines of heading 8446 or 8447
8446.10.00	Weaving machines (looms) for weaving fabrics of a width not exceeding 30 cm
8446.21.00	Shuttle type power looms for weaving fabrics of a width exceeding 30 cm, but not exceeding 4.9 m
8446.29.00	Weaving machines for weaving fabrics of a width exceeding 30 cm, shuttle type, nesoi
8446.30.00	Shuttleless type power looms, for weaving fabrics of a width exceeding 4.9 m, nesoi
8446.30.00	Shuttleless type weaving machines (looms), for weaving fabrics of a width exceeding 30 cm, nesoi

HTSUS Subheading	Product Description
8447.11.00	Circular knitting machines with cylinder diameter not exceeding 165 mm, for knitting hosiery
8447.11.00	Circular knitting machines with cylinder diameter not exceeding 165 mm, other than for knitting hosiery
8447.12.00	Circular knitting machines with cylinder diameter exceeding 165 mm, for knitting hosiery
8447.12.00	Circular knitting machines with cylinder diameter exceeding 165 mm, other than for knitting hosiery
8447.20.00	V-bed flat knitting machines, power driven, over 50.8 mm in width
8447.20.00	V-bed flat knitting machines, nesoi
8447.20.00	Warp knitting machines
8447.20.00	Flat knitting machines, other than V-bed or warp; stitch-bonding machines
8447.90.00	Braiding and lace-braiding machines
8447.90.00	Embroidery machines
8447.90.00	Knitting machines other than circular or flat knitting; machines for making gimped yarn, tulle, trimmings or net; machines for tufting
8448.11.00	Dobbies and Jacquards, card reducing, copying, punching or assembling machines for use with machines of heading 8444, 8445, 8446 or 8447
8448.19.00	Auxiliary machinery for machines of heading 8444, 8445, 8446 or 8447, nesoi
8448.31.00	Card clothing as parts and accessories of machines of heading 8445 or of their auxiliary machinery
8448.33.00	Spindles, spindle flyers, spinning rings and ring travellers of machines of heading 8445 or of their auxiliary machines
8448.42.00	Reeds for looms, healds and heald-frames of weaving machines (looms) or their auxiliary machinery
8448.51.00	Latch needles for knitting machines
8448.51.00	Spring-beard needles for knitting machines

HTSUS Subheading	Product Description
8448.51.00	Needles for knitting machines other than latch needles or spring-beard needles
8448.51.00	Sinkers, needles and other articles used to form stitches, nesoi, for machines of heading 8447
8449.00.00	Finishing machinery for felt or nonwovens and parts thereof
8449.00.00	Machinery for making felt hats; blocks for making hats; parts thereof
8451.29.00	Drying machines for yarns, fabrics or made up textile articles, each of a dry linen capacity exceeding 10 kg
8451.30.00	Ironing machines and presses (including fusing presses) for textile fabrics or made up textile articles
8451.40.00	Washing, bleaching or dyeing machines for textile yarns, fabrics or made up textile articles
8451.50.00	Machines for reeling, unreeling, folding, cutting or pinking textile fabrics
8451.80.00	Machinery for the handling of textile yarns, fabrics or made up textile articles, nesoi
8452.21.00	Sewing machines specially designed to join footwear soles to uppers, automatic
8452.21.00	Sewing machines, automatic, nesoi
8452.29.00	Sewing machines, other than automatic, specially designed to join footwear soles to uppers
8452.29.00	Sewing machines, other than automatic, nesoi
8453.10.00	Machinery for preparing, tanning or working hides, skins or leather
8453.20.00	Machinery for making or repairing footwear
8453.80.00	Machinery, nesoi, for making or repairing articles of hides, skins or leather
8454.10.00	Converters of a kind used in metallurgy or in metal foundries
8454.20.00	Ingot molds and ladles, of a kind used in metallurgy or in metal foundries
8454.30.00	Casting machines, of a kind used in metallurgy or in metal foundries
8455.10.00	Metal-rolling tube mills
8455.21.00	Metal-rolling mills, other than tube mills, hot or combination hot and cold

HTSUS Subheading	Product Description
8455.22.00	Metal-rolling mills, other than tube mills, cold
8455.30.00	Rolls for metal-rolling mills
8456.11.00	Machine tools operated by laser, for working metal
8456.11.00	Machine tools operated by laser, of a kind used solely or principally for manufacture of printed circuits
8456.11.00	Machine tools operated by laser, nesoi
8456.12.00	Machine tools operated by light or photon beam processes, for working metal
8456.12.00	Machine tools operated by light or photon beam processes, of a kind used solely or principally for the manufacture of printed circuits
8456.12.00	Machine tools operated by light or photon beam processes, nesoi
8456.20.00	Machine tools operated by ultrasonic processes, for working metal
8456.20.00	Machine tools operated by ultrasonic processes, other than for working metal
8456.30.00	Machine tools operated by electro-discharge processes, for working metal
8456.30.00	Machine tools operated by electro-discharge processes, other than for working metal
8456.40.00	Machine tools operated by plasma arc process, for working metal
8456.40.00	Machine tools operated by plasma arc process, other than for working metal
8456.50.00	Water-jet cutting machines
8456.90.00	Machine tools operated by electro-chemical or ionic-beam processes, for working metal
8456.90.00	Machine tools operated by electro-chemical or ionic-beam processes, other than for working metal
8457.10.00	Machining centers for working metal
8457.20.00	Unit construction machines (single station), for working metal
8457.30.00	Multistation transfer machines for working metal

HTSUS Subheading	Product Description
8458.11.00	Horizontal lathes (including turning centers) for removing metal, numerically controlled
8458.19.00	Horizontal lathes (including turning centers) for removing metal, other than numerically controlled
8458.91.00	Vertical turret lathes (including turning centers) for removing metal, numerically controlled
8458.91.00	Lathes (including turning centers), other than horizontal or vertical turret lathes, for removing metal, numerically controlled
8458.99.00	Vertical turret lathes (including turning centers) for removing metal, other than numerically controlled
8458.99.00	Lathes (including turning centers), other than horizontal or vertical turret lathes, for removing metal, other than numerically controlled
8459.10.00	Way-type unit head machines for drilling, boring, milling, threading or tapping by removing metal, other than lathes of heading 8458
8459.21.00	Drilling machines, numerically controlled, nesoi
8459.29.00	Drilling machines, other than numerically controlled, nesoi
8459.31.00	Boring-milling machines, numerically controlled, nesoi
8459.39.00	Boring-milling machines, other than numerically controlled, nesoi
8459.41.00	Boring machines, numerically controlled, nesoi
8459.49.00	Boring machines, not numerically controlled, nesoi
8459.51.00	Milling machines, knee type, numerically controlled, nesoi
8459.59.00	Milling machines, knee type, other than numerically controlled, nesoi
8459.61.00	Milling machines, other than knee type, numerically controlled, nesoi
8459.69.00	Milling machines, other than knee type, other than numerically controlled, nesoi
8459.70.00	Other threading or tapping machines, numerically controlled
8459.70.00	Other threading or tapping machines nesoi
8460.12.00	Flat-surface grinding machines, numerically controlled
8460.19.00	Flat-surface grinding machines, not numerically controlled

HTSUS Subheading	Product Description
8460.22.00	Centerless grinding machines, numerically controlled
8460.23.00	Other cylindrical grinding machines, numerically controlled
8460.24.00	Other grinding machines, numerically controlled
8460.29.00	Other grinding machines, other than numerically controlled
8460.31.00	Sharpening (tool or cutter grinding) machines for working metal or cermets, numerically controlled
8460.39.00	Sharpening (tool or cutter grinding) machines for working metal or cermets, other than numerically controlled
8460.40.00	Honing or lapping machines for working metal or cermets, numerically controlled
8460.40.00	Honing or lapping machines for working metal or cermets, other than numerically controlled
8460.90.00	Other machine tools for deburring, polishing or otherwise finishing metal or cermets, nesoi, numerically controlled
8460.90.00	Other machine tools for deburring, polishing or otherwise finishing metal or cermets, nesoi, other than numerically controlled
8461.20.00	Shaping or slotting machines for working by removing metal or cermets, numerically controlled
8461.20.00	Shaping or slotting machines for working by removing metal or cermets, other than numerically controlled
8461.30.00	Broaching machines for working by removing metal or cermets, numerically controlled
8461.30.00	Broaching machines for working by removing metal or cermets, other than numerically controlled
8461.40.00	Gear cutting machines for working by removing metal or cermets
8461.40.00	Gear grinding or finishing machines for working by removing metal or cermets
8461.50.00	Sawing or cutting-off machines for working by removing metal or cermets, numerically controlled

HTSUS Subheading	Product Description
8461.50.00	Sawing or cutting-off machines for working by removing metal or cermets, other than numerically controlled
8461.90.00	Machine-tools for working by removing metal or cermets, nesoi, numerically controlled
8461.90.00	Machine-tools for working by removing metal or cermets, nesoi, other than numerically controlled
8462.11.00	Hot forming machines for forging, die forging (including presses) and hot hammers, closed die forging machines
8462.19.00	Other hot forming machines for forging, die forging (including presses) and hot hammers (other than closed die forging machines), nesoi
8462.22.00	Profile forming machines
8462.23.00	Numerically controlled press brakes
8462.24.00	Numerically controlled panel benders
8462.25.00	Numerically controlled roll forming machines
8462.26.00	Other numerically controlled bending, folding, straightening or flattening machines (o/t press brakes, panel benders, roll forming machines)
8462.29.00	Other bending folding straightening or flattening machines (other than numerically controlled or profile forming machines), nesoi
8462.32.00	Numerically controlled sitting lines and cut-to-length lines
8462.32.00	Sitting lines and cut-to-length lines (other than numerically controlled), nesoi
8462.33.00	Numerically controlled shearing machines
8462.39.00	Shearing machines (other than numerically controlled), nesoi
8462.42.00	Numerically controlled punching, notching or nibbling machines (excluding presses) for flat products
8462.49.00	Other punching, notching or nibbling machines (excluding presses) for flat products, other than numerically controlled
8462.51.00	Numerically controlled machines for working tube, pipe, hollow section and bar (excluding presses)

HTSUS Subheading	Product Description
8462.59.00	Other machines for working tube, pipe, hollow section and bar (excluding presses), other than numerically controlled
8462.61.00	Hydraulic presses, numerically controlled
8462.61.00	Hydraulic presses, not numerically controlled
8462.62.00	Numerically controlled mechanical cold metal working presses
8462.62.00	Other mechanical cold metal working presses, other than numerically controlled
8462.63.00	Numerically controlled cold metal working servo-presses
8462.63.00	Other cold metal working servo-presses, other than numerically controlled
8462.69.00	Numerically controlled other cold metal working presses, nesoi
8462.69.00	Other cold metal working presses, other than numerically controlled, nesoi
8462.90.00	Other numerically controlled machines tools for working metal, nesoi
8462.90.00	Other machines tools for working metal, other than numerically controlled, nesoi
8463.10.00	Draw-benches for bars, tubes, profiles, wire or the like, for working metal or cermets, without removing material
8463.20.00	Thread rolling machines for working metal or cermets, without removing material
8463.30.00	Machines for working wire of metal or cermets, without removing material
8463.90.00	Machine tools for working metal or cermets, without removing material, nesoi
8464.10.00	Sawing machines for working stone, ceramics, concrete, asbestos-cement or like mineral materials or for cold working glass
8464.20.00	Grinding or polishing machines for working stone, ceramics, concrete, asbestos-cement or like mineral materials, or glass, nesoi
8464.90.00	Machine tools for working stone, ceramics, concrete, asbestos-cement or like mineral materials or for cold working glass, nesoi
8465.10.00	Machines for working certain hard materials which can carry out different types of machining operations w/o tool change between operations

HTSUS Subheading	Product Description
8465.20.00	Machine centers for sawing, planing, milling, molding, grinding, sanding, polishing, drilling or mortising
8465.20.00	Machine centers for bending or assembling
8465.20.00	Machine centers, nesoi
8465.91.00	Sawing machines for working wood, cork, bone, hard rubber, hard plastics or similar hard materials
8465.92.00	Planing, milling or molding (by cutting) machines for working wood, cork, bone, hard rubber, hard plastics or similar hard materials
8465.93.00	Grinding, sanding or polishing machines for working wood, cork, bone, hard rubber, hard plastics or similar hard materials
8465.94.00	Bending or assembling machines for working wood, cork, bone hard rubber, hard plastics or similar hard materials
8465.95.00	Drilling or mortising machines for working wood, cork, bone, hard rubber, hard plastics or similar hard materials
8465.96.00	Splitting, slicing or paring machines for working wood, cork, bone, hard rubber, hard plastics or similar hard materials
8465.99.00	Machine tools for working wood, cork, bone, hard rubber, hard plastics and similar hard materials, nesoi
8468.20.00	Gas-operated machinery, apparatus and appliances, hand-directed or -controlled, used for soldering, brazing, welding or tempering, nesoi
8468.20.00	Gas-operated machinery, apparatus and appliances, not hand-directed or -controlled, used for soldering, brazing, welding or tempering, nesoi
8468.80.00	Machinery and apparatus, hand-directed or -controlled, used for soldering, brazing or welding, not gas-operated
8468.80.00	Machinery and apparatus other than hand-directed or -controlled, used for soldering, brazing or welding, not gas-operated
8474.10.00	Sorting, screening, separating or washing machines for earth, stones, ores or other mineral substances in solid form

HTSUS Subheading	Product Description
8474.20.00	Crushing or grinding machines for earth, stones, ores or other mineral substances
8474.31.00	Concrete or mortar mixers
8474.32.00	Machines for mixing mineral substances with bitumen
8474.39.00	Mixing or kneading machines for earth, stones, ores or other mineral substances, nesoi
8474.80.00	Machinery for agglomerating, shaping or molding solid mineral fuels, or other mineral products; machines for forming sand foundry molds
8475.10.00	Machines for assembling electric or electronic lamps, tubes or flashbulbs, in glass envelopes
8475.21.00	Machines for making glass optical fibers and preforms thereof
8475.29.00	Machines for manufacturing or hot working glass or glassware, nesoi
8477.10.00	Injection-molding machines for manufacturing shoes of rubber or plastics
8477.10.00	Injection-molding machines for use in the manufacture of video laser discs
8477.10.00	Injection-molding machines of a type used for working or manufacturing products from rubber or plastics, nesoi
8477.20.00	Extruders for working rubber or plastics or for the manufacture of products from these materials, nesoi
8477.30.00	Blow-molding machines for working rubber or plastics or for the manufacture of products from these materials
8477.40.00	Vacuum-molding and other thermoforming machines for working rubber or plastics or for manufacture of products from these materials, nesoi
8477.51.00	Machinery for molding or retreading pneumatic tires or for molding or otherwise forming inner tubes
8477.59.00	Machinery for molding or otherwise forming rubber or plastics other than for molding or retreading pneumatic tires, nesoi
8477.80.00	Machinery for working rubber or plastics or for the manufacture of products from these materials, nesoi
8478.10.00	Machinery for preparing or making up tobacco, nesoi

HTSUS Subheading	Product Description
8479.10.00	Machinery for public works, building or the like, nesoi
8479.20.00	Machinery for the extraction or preparation of animal or fixed vegetable fats or oils, nesoi
8479.30.00	Presses for making particle board or fiber building board of wood or other ligneous materials, and mach. for treat. wood or cork, nesoi
8479.40.00	Rope- or cable-making machines nesoi
8479.50.00	Industrial robots, nesoi
8479.81.00	Machines and mechanical appliances for treating metal, including electric wire coil-winders, nesoi
8479.82.00	Machines for mixing, kneading, crushing, grinding, screening, sifting, homogenizing, emulsifying or stirring, nesoi
8479.83.00	Cold isostatic presses, nesoi
8479.89.00	Machines for the manufacture of optical media
8479.89.00	Automated electronic component placement machines for making printed circuit assemblies
8479.89.00	Other machines and mechanical appliances having individual functions, not specified or included elsewhere in chapter 84, nesoi
8486.10.00	Machines and apparatus for the manufacture of boules or wafers
8486.20.00	Machines and apparatus for the manufacture of semiconductor devices or electronic integrated circuits
8486.30.00	Machines and apparatus for the manufacture of flat panel displays
8486.40.00	Machines and apparatus for the manufacture of masks and reticles and for the assembly of electronic integrated circuits
8514.11.00	Hot isostatic presses
8514.19.00	Other resistance heated industrial or laboratory furnaces and ovens, other than hot isostatic presses
8514.20.00	Industrial or laboratory microwave ovens for making hot drinks or for cooking or heating food
8514.20.00	Industrial or laboratory microwave ovens, nesoi

HTSUS Subheading	Product Description
8514.20.00	Industrial or laboratory furnaces and ovens (other than microwave) functioning by induction or dielectric loss
8514.31.00	Electron beam furnaces for making printed circuits or printed circuit assemblies
8514.31.00	Electron beam furnaces, other than for making printed circuits or printed circuit assemblies
8514.32.00	Plasma and vacuum arc furnaces for making printed circuits or printed circuit assemblies
8514.32.00	Plasma and vacuum arc furnaces, other than for making printed circuits or printed circuit assemblies
8514.39.00	Other industrial furnaces and ovens for making printed circuits or printed circuit assemblies
8514.39.00	Other industrial or laboratory electric industrial or laboratory furnaces and ovens nesoi
8514.40.00	Industrial or laboratory induction or dielectric heating equipment nesoi
8515.11.00	Electric soldering irons and guns
8515.19.00	Electric brazing or soldering machines and apparatus, other than soldering irons and guns
8515.21.00	Electric machines and apparatus for resistance welding of metal, fully or partly automatic
8515.29.00	Electric machines and apparatus for resistance welding of metal, other than fully or partly automatic
8515.31.00	Electric machines and apparatus for arc (including plasma arc) welding of metals, fully or partly automatic
8515.39.00	Electric machines and apparatus for arc (including plasma arc) welding of metals, other than fully or partly automatic
8515.80.00	Electric welding apparatus nesoi,and electric machines and apparatus for hot spraying metals or sintered metal carbides

HTSUS Subheading	Product Description
8543.30.00	Electrical machines and apparatus for electroplating, electrolysis, or electrophoresis for making printed circuits
8543.30.00	Other electrical machines and apparatus for electroplating, electrolysis, or electrophoresis
8543.70.00	Physical vapor deposition apparatus, nesoi
8543.70.00	Electrical machines and apparatus nesoi, designed for connection to telegraphic or telephonic apparatus, instruments or networks
8543.70.00	Electric luminescent lamps
8543.70.00	Plasma cleaner machines that remove organic contaminants from electron microscopy specimens and holders
8543.70.00	Other electrical machines and apparatus, having individual functions, nesoi

APPENDIX L

Appendix L: Proposed Exclusions for Certain Solar Manufacturing Equipment

Exclusion Product Description
Silicon growth furnaces, including Czochralski crystal growth furnaces, designed for growing monocrystalline silicon ingots (boules) of a mass exceeding 700 kg, for use in solar wafer manufacturing (described in statistical reporting number 8486.10.0000).
Band saws designed for cutting or slicing cylindrical monocrystalline silicon ingots (boules) of a mass exceeding 700 kg into square or rectangular ingots (boules), for use in solar wafer manufacturing (described in statistical reporting number 8486.10.0000).
Machines designed to align and adhere monocrystalline silicon ingots (boules) of a mass exceeding 400 kg to plastic support boards on metal mounting plates to provide support during diamond wire sawing, for use in solar wafer manufacturing (described in statistical reporting number 8486.10.0000).
Diamond wire saws designed for cutting or slicing silicon ingots (boules) of a mass exceeding 400 kg into solar wafers of a thickness not exceeding 200 micrometers (described in statistical reporting number 8486.10.0000).
Wire guide roller machines, presented with diamond wire saws designed for slicing monocrystalline silicon ingots (boules) of a mass exceeding 400 kg into solar wafers of a thickness not exceeding 200 micrometers, all of the foregoing for use in solar wafer manufacturing (described in statistical reporting number 8486.10.0000).
Coolant fluid recycling machines, presented with diamond wire saws designed for slicing monocrystalline silicon ingots (boules) of a mass exceeding 400 kg into solar wafers of a thickness not exceeding 200 micrometers, all of the foregoing for use in solar wafer manufacturing (described in statistical reporting number 8486.10.0000).
Degumming machines designed to remove adhesives from solar wafers (described in statistical reporting number 8486.10.0000).
Texturing and cleaning machines designed to repair, clean, and texture the solar wafer substrate, whether or not containing automation equipment for transferring solar wafers from one process station to the next, for use in solar wafer manufacturing (described in statistical reporting number 8486.20.0000).
Thermal diffusion quartz-tube furnaces and boat loading machines, designed to diffuse dopant impurities into square or rectangular silicon wafers, for use in solar cell manufacturing (described in statistical reporting number 8486.20.0000).
Plasma enhanced chemical vapor deposition machines designed to deposit amorphous or nanocrystalline layers on one or both surfaces of a solar wafer, whether or not containing automation equipment for transferring solar wafers from one process station to the next, for use in solar cell manufacturing (described in statistical reporting number 8486.20.0000).
Physical vapor deposition (PVD) machines, designed to deposit a thin film of transparent conducting oxide on one or both surfaces of a solar wafer, whether or not containing automation equipment for transferring solar wafers from one process station to the next, for use in solar cell manufacturing (described in statistical reporting number 8486.20.0000).

Exclusion Product Description
Screen printing line machines, including sintering furnaces for printing conducting contacts on both surfaces of a solar wafer, whether or not containing automation equipment for transferring solar wafers from one process station to the next, and whether or not containing equipment for solar cell testing, for use in solar cell manufacturing (described in statistical reporting number 8486.20.0000).
Cell interconnection machines designed to electrically solder solar cells to each other to form a complete electrical circuit, for use in solar module manufacturing (described in statistical reporting number 8486.20.0000).
Module encapsulant preparation machines designed for encapsulant cutting and placement, butyl dispensing equipment, and equipment for the transport of encapsulant materials, all the foregoing for use in solar module manufacturing (described in statistical reporting number 8486.20.0000).
Machines designed to laminate an interconnected cell string and to attach junction boxes, all the foregoing for use in solar module manufacturing (described in statistical reporting number 8486.20.0000).
Frame attachment machines designed for attaching metal frames to the perimeter or rear surface of solar modules (described in statistical reporting number 8486.20.0000).
Machines designed for transporting polysilicon material to growth furnaces and machines designed for transporting monocrystalline ingots (boules) and wafers throughout the solar wafer manufacturing process, including machines for loading or unloading solar wafers during the diamond wire slicing process (described in statistical reporting number 8486.40.0030).
Machines designed for lifting, handling, loading, or unloading of solar wafers of a thickness not exceeding 200 micrometers, for use in solar wafer manufacturing (described in statistical reporting number 8486.40.0030).
Machines designed for lifting, handling, loading, or unloading in the assembly of solar modules (described in statistical reporting number 8486.40.0030).