

18-12 Trump Tariffs Primarily Hit Multinational Supply Chains, Harm US Technology Competitiveness

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Of the many causes of conflict between the United States and China, disagreements over the treatment of American intellectual property may be the most difficult to resolve. In 2017, the Trump administration formally complained that China has been receiving and benefiting from flows of American knowledge it had not properly acquired. The administration charged further that by various means, including forced technology transfers between joint venture partners, reverse engineering, patent violation, and industrial espionage, China has been and continues to subvert global trading rules and norms to unfairly acquire American technology. Such misappropriation, it further alleged, reduces the return to American innovation, diverts American jobs to China, and contributes to the bilateral trade imbalance. To support its contention, in August 2017 the Office of the US Trade Representative (USTR) launched an investigation under Section 301 of the Trade Act of 1974 into “Chinese laws, policies and practices which may be harming

American intellectual property rights, innovation, or technology development.”¹

Seven months after that investigation started, USTR Robert Lighthizer released a report detailing claims that China undermines US rights in the technology sector, and in April 2018 USTR proposed a list of Chinese exports that could be subject to additional US tariffs of 25 percent.² The list targets products in sectors that USTR determined “benefit from China’s industrial plans,” such as Made in China 2025, including aerospace, information and communication technology, robotics, and machinery. In an attempt to minimize the pain for American consumers, USTR excluded products such as textiles and apparel, footwear, laptops, and cell phones from the list.³

This Policy Brief argues that while the problems identified by the USTR report have plagued the bilateral relationship for years, the administration’s tactic of imposing tariffs in the sectors specified by USTR may prove more harmful than effective. Rather than hitting the administration’s intended target—Chinese firms that may have unfairly obtained American technology—the proposed tariffs would actually inflict damage on US high-technology sectors.⁴

We examine the effects of the tariffs through the lens of Richard Baldwin’s “great unbundling,” focusing on the importance of knowledge flows and production fragmenta-

1. USTR, “USTR Announces Initiation of Section 301 Investigation of China,” press release, August 18, 2017, <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2017/august/ustr-announces-initiation-section>.

2. USTR, “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 Property, and Innovation,” <https://ustr.gov/sites/default/files/files/Press/Releases/301FRN.pdf>.

3. USTR, “Under Section 301 Action, USTR Releases Proposed Tariff List on Chinese Products,” press release, April 3, 2018, <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2018/april/under-section-301-action-ustr>.

4. This Policy Brief does not evaluate the Section 301 claims against China. It aims to explain how the proposed tariffs will tax trade flows and where the burden of taxation is likely to fall.

tion to 21st century supply chains.⁵ The proposed tariffs will hit bilateral trade in fast-growing, knowledge-based sectors the hardest. The lion's share of US imports in these sectors originates in Chinese-based affiliates of multinational firms, not Chinese domestic firms.⁶ Further, the products on the

Tariffs are an ineffective response to concerns about China's high-technology aspirations.

tariff hit list are largely inputs used in American production, even when looking beyond formal affiliates of US companies, meaning that the proposed Trump taxes would decrease American competitiveness. The Policy Brief thus argues that tariffs are an ineffective response to concerns about China's high-technology aspirations. Instead, they disadvantage American producers and harm US allies operating in East Asia while missing the mark on penalizing Chinese domestic firms that may have misappropriated US and other advanced economies' technologies.

KNOWLEDGE FLOWS, SUPPLY CHAINS, AND TRADE PATTERNS

Unlike textbook examples of trade, in which goods are completely made within the borders of one country and shipped to another, much of what the United States imports from China contains value created in other locations, including American intellectual property. These relatively new arrangements are highlighted by testimony collected during the Section 301 investigation. Moreover, much of the actual goods exchanged are capital goods or industrial parts and supplies and are themselves destined for further use in production. Understanding this true nature of today's trade flows is essential to assessing the Trump administration's proposed Section 301 tariffs.

As documented by Richard Baldwin,⁷ in the last two decades falling trade frictions and information technology advances propelled production fragmentation. Firms were free to locate different manufacturing stages in different

countries. Reduced costs of directing and managing foreign suppliers, whether operating at arm's length or as affiliates abroad, allowed American corporations to "unbundle" production and arrange manufacturing activity and sourcing across countries in line with comparative costs.

According to Baldwin (2016), the distinctive feature of this "new globalization" is the massive knowledge flows embedded in the offshoring of purchasing and production. Some of these flows take the form of subcontracting and licensing agreements, in which innovating firms transfer blueprints and technologies to lower-cost locations without investing directly. Other flows occur within the firm as trade between affiliated parties. Trump's proposed tariffs arrive at a time when many Americans doubt the value of this "unbundling" and, in particular, of trade with China. While the so-called China shock is often depicted as the outcome of China's own opening and reform,⁸ this view is at least partially at odds with reality. In fact, American innovation and production stimulate a large share of China's exports to the United States and dictate their pace and scope. While some of this international integration is itself the result of opening, it is misleading to view it as solely driven by improvements in Chinese competitiveness. The clearest indication that knowledge flows and production unbundling from advanced-economy multinationals drive China-US trade flows is the share of total exports that originates in multinational firms operating in China. In 2014, these foreign-invested enterprises (FIEs) were the source of 46 percent of total Chinese exports to the world. The share of China's exports to the United States that originates in FIEs was significantly larger, at 60 percent.⁹ In industries where the benefits of separating innovation and labor-intensive production are particularly large, such as computers and cell phones, the share of Chinese exports coming to the United States from FIEs is even greater.

The evolution of trade patterns, especially between China and the United States, clearly reflects the dramatic extent to which multinational firms have enhanced the value of their innovative activity by using East Asian supply chains. US multinationals, such as Apple and Nike, focus on marketing, design, and innovation, while outsourcing

5. See Baldwin (2016, especially pp. 85-110).

6. Although data limitations do not allow us to isolate exports from specifically US affiliates operating in China, this broader measure captures exports of all multinational affiliates in China and accurately reflects the full supply patterns of US-based companies.

7. The Great Convergence: Information Technology and the New Globalization, presentation by Baldwin at his book launch at the Peterson Institute for International Economics, November 15, 2016, <https://piie.com/events/great-convergence-information-technology-and-new-globalization>.

8. As Autor, Dorn, and Hanson (2013, 2130) describe it, "China's export growth...appears to be strongly related to factors that are China specific. Rapid productivity growth and extensive policy reforms have contributed to a massive increase in the country's absolute and relative manufacturing capacity."

9. The bilateral share was computed by Hongsheng Zhang of Zhejiang University using detailed China Customs Records, which distinguish export destination and the exporting firm type.

stages of the physical production process. Although sometimes viewed negatively, US firms that engage in offshoring use their access to inexpensive production abroad to create greater numbers of higher-paying as well as lower-paying jobs at home (Oldenski 2014). As Moran and Oldenski (2016) argue, “domestic production would not be as strong as it is without access to global supply chains, which reduce costs, raise productivity, expand the global market share of US firms, and allow the United States to focus on what it does best: innovating, researching, and designing the cutting edge goods and services of the future.”

After 2001, three industries—machinery, computers and telecommunication devices, and electrical equipment—experienced rapid unbundling and relocation to China.¹⁰ The processing share of China’s trade in these sectors, defined as trade in which imports enter the country solely for creating exports, remains high, indicating that these exports contain relatively low shares of Chinese domestic value added. China’s processing trade exhibits a triangular pattern (Van Assche 2012). China imports high-value inputs predominantly from the United States and richer East Asian countries and exports processed final goods to the West.¹¹ The innovation, marketing, design, and management that surround production within China occur primarily in the United States and other advanced economies.

For an example of how this triangular trade operates, as well as how American innovation stimulates China’s exports, consider NVidia, a California-based designer of graphic processing units and mobile chip units. NVidia designs its products in the United States and provides technical specifications (i.e., exports knowledge) to Taiwan Semiconductor Manufacturing, which manufactures the units in Taiwan. The units eventually make their way to China, where they are used in assembly of laptop computers. Some of these laptops make their way back to the United States while others go to e-gamers around the world.

China-US trade flows over time have become increasingly triangular. In 1997 computers and telecommunication devices, electrical equipment, and machinery together accounted for 33 percent of total US imports from China (table 1, column 1). Over the next 20 years, bilateral trade in these three sectors, especially computers and telecommunication devices, grew more rapidly than overall trade. By 2017, the three sectors together accounted for 54 percent of US imports from China (table 1, column 2). Although not shown, these sectors account for a large share of Chinese

imports as well, indicating the importance of imported inputs in Chinese activity in these areas. The labor-intensive products often associated with China—apparel, textiles, and leather products—accounted for 26 percent of US imports in 1997 but only a much smaller share, 12 percent, by 2017.

SECTORS TARGETED BY PROPOSED SECTION 301 TARIFFS

USTR claims that its proposed list of US imports to tax takes aim at Chinese firms that seek to misappropriate American technological know-how. Chad P. Bown classified all the 1,333 products on the proposed tariff list and found that intermediate inputs and capital equipment comprise almost 85 percent of the \$50 billion of imports subject to the administration’s tariff proposal.¹² The next logical question is whether these targeted sectors are those that benefit from allegedly misappropriated technological property.

To identify industries at risk of intellectual property theft, we refer to a 2012 US Department of Commerce assessment of the patent intensity of US industries.¹³ In the report, patent intensity is defined as patents per 1,000 jobs, and the most patent-intensive sectors are those with patent intensities above the mean (US Department of Commerce 2012, table 1, p. 8). Appendix table A.1 at the end of this Policy Brief lists the US patent-intensive industries from the Commerce Department report.

The identified patent-intensive industries lie within five broader NAICS sectors.¹⁴ Column 3 of table 1 shows the distribution of targeted import values across NAICS sectors. One-third of the total targeted import value lies within

10. North American Industry Classification System (NAICS) codes 333, 334, and 335.

11. The origin and destination of China’s processing trade are detailed in Van Assche (2012, table 1).

12. Chad P. Bown, “The Element of Surprise is a Bad Strategy for a Trade War,” *Harvard Business Review*, April 16, 2018, <https://piie.com/commentary/op-eds/element-surprise-bad-strategy-trade-war>.

13. The US Department of Commerce (2012) analyzes patent intensity using NAICS 4-digit industries as well as some individual 3-digit industries and combinations of 3- or 4-digit industries. The US Patent and Trademark Office has NAICS-based patent data covering the period from 1963 to 2008.

14. These sectors are NAICS 325, 333, 334, 335, and 339. US Department of Commerce (2012, 7) notes that “the four most patent-intensive industries all have intensity rates that are one standard deviation above the mean patent-intensity cutoff, and are all classified in computer and electronic product manufacturing (NAICS 334). This three-digit NAICS industry includes computer and peripheral equipment; communications equipment; other computer and electronic products; semiconductor and other electronic components; and navigational, measuring, electro-medical, and control instruments. This is unsurprising when one also looks at the recent top ten US companies ranked by granted patents. This group of companies includes Intel, Hewlett-Packard, Micron Technology, and Texas Instruments, each of which is closely associated with computer and computer peripheral manufacturing.”

Table 1 Shares of all and targeted US imports from China, by industrial sector, 1997 and 2017 (percent)

NAICS code	Description	Share of US imports, 1997	Share of US imports, 2017	Share of targeted 2017 imports
111	Agricultural products	0.16	0.12	0
112	Livestock and livestock products	0.04	0.01	0
113	Forestry products	0.1	0.05	0
114	Fish, fresh/chilled/frozen, and other marine products	0.43	0.43	0
211	Oil and gas	0.12	0	0
212	Minerals and ores	0.18	0.03	0
311	Food and kindred products	0.61	0.76	0
312	Beverages and tobacco products	0.01	0.01	0
313	Textiles and fabrics	0.5	0.99	0
314	Textile mill products	1.79	2.23	0
315	Apparel and accessories	9.87	5.45	0
316	Leather and allied products	14.06	3.7	0.76
321	Wood products	0.8	0.82	0.04
322	Paper	0.57	0.67	0
323	Printed matter and related products	0.59	0.53	0
324	Petroleum and coal products	0.21	0.08	0
325	Chemicals	1.85	3.07	1.52
326	Plastic and rubber products	2.47	3.52	0.05
327	Nonmetallic mineral products	2.36	2.01	0.02
331	Primary metals	1.23	0.82	2.97
332	Fabricated metal products	3.19	4.97	4.94
333	Machinery, except electrical	4.62	9.18	32.72
334	Computer and electronic products	20.84	36.93	33.38
335	Electrical equipment, appliances and components	7.9	8.01	8.84
336	Transportation equipment	1.36	2.6	10.7
337	Furniture and fixtures	3.18	3.42	0
339	Miscellaneous manufacturing	19.53	8.63	3.91
910	Waste and scrap	0.02	0.04	0
930	Used or second-hand merchandise	0.21	0.19	0.15
990	Other special classification provisions	0.79	0.74	0
	All sectors	100	100	100

Sources: 1997 and 2017 US imports by NAICS sector are from USITC Dataweb, <https://dataweb.usitc.gov>. Targeted shares calculated using imports from China of products targeted by the Section 301 tariffs, <https://piie.com/system/files/documents/bown2018-04-04-1.xlsx>, matched to NAICS industries using Pierce and Schott, "A Concordance Between Ten-Digit U.S. Harmonized System Codes and SIC/NAICS Product Classes and Industries," http://faculty.som.yale.edu/peterschott/files/research/papers/hs_sic_38.pdf. Different versions of HS codes matched using Pierce and Schott (2012).

NAICS 334, computer and electronic products. Another third of the targeted import value lies within NAICS 333, nonelectrical machinery, which accounts for only 9 percent of Chinese exports to the United States. Electrical equipment, appliances, and components (NAICS 335) account for 9 percent of the targeted value. Outside of these three patent-intensive sectors, only transportation equipment

(NAICS 336) stands out as subject to the tariff, accounting for about 11 percent of the targeted import value, including aviation products.

When we match the five patent-intensive sectors to the proposed tariff list, we find that 80 percent of the targeted trade (by value) falls within the industries identified as patent-intensive in the 2012 Department of Commerce

Table 2 Characteristics of US imports from China in patent-intensive NAICS sectors (percent)

NAICS sector	Industry description	Share of sector's imports from China, 2017	Share of sector's imports that are US related-party trade, 2016	Estimated share of sector's imports from all FIEs, 2017	Estimated share of sector's imports from HMT-funded firms, 2017	Estimated share of sector's imports from other foreign-funded firms, 2017
325	Chemicals	6.97	30.43	39.54	12.02	27.52
333	Machinery, except electrical	27.31	31.65	64.56	18.95	45.61
334	Computer and electronic products	46.39	40.96	68.09	23.78	44.31
335	Electrical equipment, appliances and components	36.31	21.54	63.13	32.12	31
339	Miscellaneous manufacturing commodities	35.43	17.93	59.6	34.09	25.51

Sources: See table 1 for source of trade data. US Census data are used to calculate "related-party trade": <https://relatedparty.ftd.census.gov/>. Imports from foreign-invested enterprises (FIEs) refer to imports shipped to the United States by FIEs operating in China, including those registered in Hong Kong, Macau, and Taiwan (HMT). See text for method used to estimate HMT-funded and foreign-funded enterprise shares.

report.¹⁵ In this sense, USTR does primarily take aim at Chinese exports in sectors where American firms rely on intellectual property to support American jobs. This literal matching up, however, does not mean that the administration's policy will have its intended effect. In today's world of global supply chains what matters is who ultimately pays the taxes imposed. The result is actually counterproductive for US technological competitiveness.

TARGETED SECTORS ENGAGE HEAVILY IN SUPPLY CHAIN TRADE

Several indicators of multinational involvement show the extent to which trade in the five patent-intensive sectors reflects global supply chains. China is an important source for many of these sectors (table 2, column 1). It is a particularly important source of computers and electronic devices, providing 46 percent of American imports. China supplies 36 percent of electrical equipment, appliances, and components, and 35 percent of imports categorized as miscellaneous manufacturing, which includes medical equipment and supplies, comes from China. In comparison, nonelectrical machinery is somewhat less reliant on China, yet it supplies 27 percent of US imports in this sector. China remains a relatively minor source of imported chemicals.

Column 2 reveals that related-party trade accounts for a large share of trade in these sectors. Related-party transactions include transactions between (1) a parent company and its subsidiary; (2) subsidiaries of a common parent; (3) an entity and its principal owners; and (4) affiliates. Related-party trade comprises an average of 28.5 percent of imports in all five sectors, accounting for 41 percent of trade in computers and electronic equipment. These shares are large

when compared with the overall share of related-party trade in other sectors, which is consistent with a significant share of import activity in these sectors being directly related to the business operations of US-based entities.

While related-party trade provides one measure of how these flows reflect US-based activity, it must understate the degree of supply-chain-related trade. Significantly, related-party shares do not include trade between US entities and unaffiliated multinational firms operating in China, even when their production activities are closely linked. For example, related-party trade shares will fail to capture imports from a Taiwanese subcontractor who produces parts using the specifications of an American manufacturer, if they do not share a legal parent or affiliate relationship. To capture these other important supply chain flows, column 3 provides an estimate of how much of each sector's imports originates in a foreign-invested enterprise (FIE) operating in China. While these flows will reflect some value added by domestic Chinese suppliers to these FIEs, the trade itself is, by definition, the result of multinational sourcing and supply decisions.

An FIE is a foreign-funded enterprise operating in China, including those domiciled in Hong Kong, Macau, and Taiwan (HMT). China Customs Records allow us to estimate the share of exports originating in foreign-funded enterprises. These records provide the FIE share of trade at the most detailed, internationally shared level of disaggregation, Harmonized System 6-digit level (HS6). We use data from 2006, the most recent year available to us. Thus, this method assumes that FIE shares did not change much between 2006 and 2017. This assumption seems reasonable given how little FIE shares of China's exports to the United States changed over the period. In 2006, 60 percent of these exports originated in FIEs, a share that remained virtually unchanged in 2014.

China Customs distinguishes between exports that originate in an HMT-funded enterprise and exports from

15. To do the match, we assign each targeted Harmonized Tariff Schedule (HTS) 8-digit product to its NAICS 4-digit sector. We then calculate how much of the targeted trade value, identified at the 8-digit level, lies within these sectors.

Table 3 Characteristics of targeted US imports from China in patent-intensive NAICS sectors, 2017 (percent)

NAICS sector	Industry description	Share of US imports in sector targeted by Section 301 tariffs	Estimated share of targeted US imports from FIEs
325	Chemicals	4.56	14.56
333	Machinery, except electrical	32.79	59.35
334	Computer and electronic products	8.32	85.62
335	Electrical equipment, appliances and components	10.15	63.17
339	Miscellaneous manufacturing	4.17	68.44

Sources: See table 1 for source of trade data. Imports from foreign-invested enterprises (FIEs) refer to imports shipped to the United States by FIEs operating in China, including those registered in Hong Kong, Macau, and Taiwan. See text for method used to estimate FIE share.

non-HMT foreign enterprises, called (somewhat confusingly) foreign-funded.¹⁶ A foreign investor may enter China by creating a wholly owned foreign enterprise (WFOE) or by setting up a joint venture with a domestic Chinese partner, both of which are included in the FIE trade shares.¹⁷ Unfortunately, China Customs Records do not provide enough information to identify separately flows originating in American firms operating in China, although the related-party trade reported above provides a useful upper bound on the extent of that activity.

Applying the China Customs shares to US import data in each HS6 sector provides an estimated share of Chinese exports to the United States originating in FIEs.¹⁸ For shares at an industry level, each HS6 sector is mapped to a unique NAICS code, resulting in the FIE shares shown in column 3 of table 2 for the five patent-intensive NAICS sectors.¹⁹

More than half of US imports in each sector, except chemicals, originates in an FIE. In the most patent-intensive sector, computer and electronic products, 68 percent of US

imports come from multinational firms operating in China. FIEs in China are a significant source of US imports of nonelectrical machinery (65 percent), electrical equipment, appliances, and components (63 percent), and miscellaneous manufactured goods (60 percent).

Column 4 in table 2 shows estimated shares of imports that originate in HMT-funded enterprises. But because total FIE shares may include investment by mainland Chinese firms through Hong Kong, as when so-called round-tripping of investment occurs, table 2 also provides estimated shares of imports that originate in foreign-funded (i.e., non-HMT) enterprises (column 5). Interestingly, at least one-half to two-thirds of FIE exports to the United States come from these non-HMT foreign-funded affiliates. For example, of the 68 percent of computer and electronics imports that originate in FIEs, foreign-funded enterprises account for almost two-thirds (44.31/68.09). Given historical patterns of foreign direct investment, Japanese, American, South Korean, and European multinational firms primarily own these affiliates. In short, these are exports of US foreign affiliates or of US military and political allies.

TARGETED CHINESE EXPORTS ORIGINATE IN FOREIGN AFFILIATES

It is possible that particular products *within* these sectors are less likely to originate in FIEs than suggested by our analysis of the sector's trade as a whole. This possibility is of interest, given the stated objective of USTR to aim tariffs at Chinese firms benefitting from allegedly misappropriated American technology. As shown in table 3, column 1, the share of imports from China potentially subject to new US tariffs varies widely by sector. These shares are small, except for NAICS 333, nonelectrical machinery, where about one-third of imports from China are potentially subject to taxation. Perhaps these differences reflect USTR's focus on Chinese producers, which is missed when examining shares of all trade in the sector.

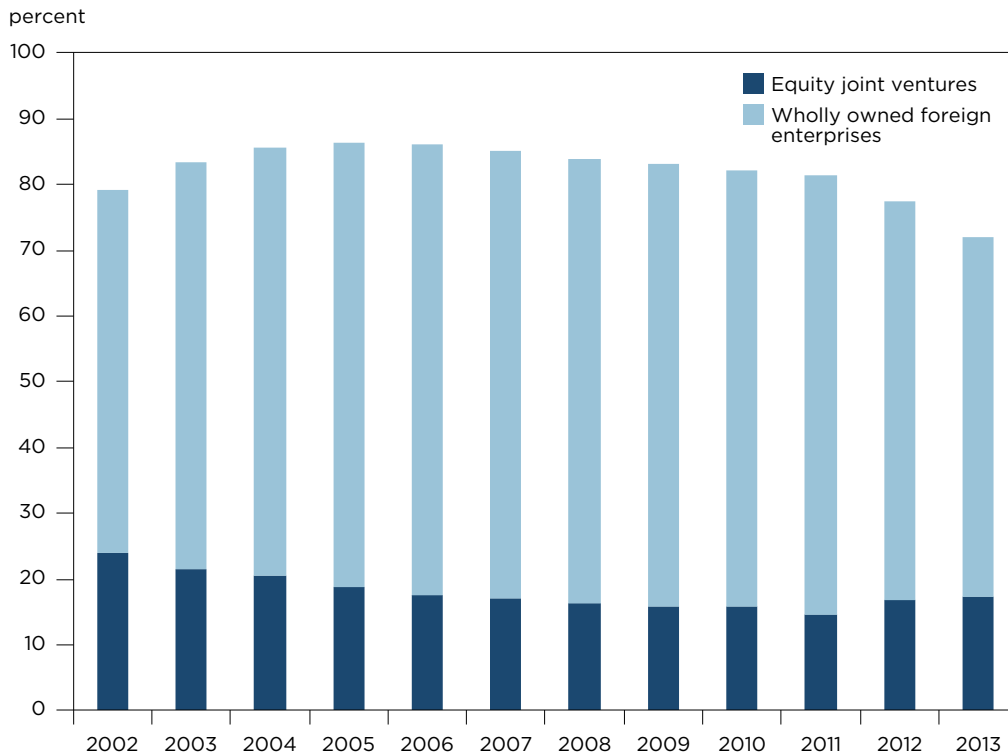
16. While this distinction is interesting, as some differences in behavior have been found depending on investor origin country, in fact any investment made through a Hong Kong-based affiliate, even if the affiliate is owned by a non-Chinese parent, is labeled an HMT enterprise.

17. One aspect of the Section 301 investigation is the contention that China forces investors to transfer technology to domestic partners within joint ventures. We do not have information on the share of trade in each sector that originates in joint ventures between a domestic Chinese enterprise and a foreign enterprise.

18. US trade data are from the US International Trade Commission's Dataweb, <https://dataweb.usitc.gov/>. Concordance between different versions of HS provided by Pierce and Schott (2012).

19. The concordance used to map between HS and NAICS is provided by Pierce and Schott, "A Concordance Between Ten-Digit U.S. Harmonized System Codes and SIC/NAICS Product Classes and Industries," http://faculty.som.yale.edu/peterschott/files/research/papers/hs_sic_38.pdf.

Figure 1 Share of exports by wholly foreign-owned enterprises and equity joint venture in high-tech manufacturing, 2002-13



Source: Ministry of Commerce (2016, 47), with translation and formatting by Zixuan Huang, PIIE.

To investigate this possibility, we use the FIE shares taken from China Customs Records, as described above, to estimate the share of targeted products within these sectors that originate in foreign affiliates. As shown in table 3, column 2, except for chemicals, targeted imports are sourced primarily from foreign affiliates operating in China. Indeed, the share of targeted imports in computers and electronic products is overwhelmingly from multinational subsidiaries: We estimate that 86 percent of these targeted imports come from FIEs.

Another possibility is that Section 301 tariffs tax exports to the United States of joint ventures operating in China. USTR might pursue such a strategy if joint ventures are seen as a main vehicle through which technology is misappropriated. US tariffs on joint venture exports, therefore, could be considered a justifiably targeted response to Chinese technology-appropriating behavior.

Whatever the validity of such logic, however, joint ventures probably provide only a small share of high-technology imports from China. While no information is available on the joint venture share of Chinese exports to the United States alone, China provides such information for its overall high-tech exports to the world, which can illuminate this point. Chinese statisticians identify five manufacturing

sectors as high-tech: medicines; aircraft and spacecraft; electronic and communication equipment; computers and office equipment; and medical and measuring instrument.²⁰ There is a large overlap between these categories and the patent-intensive sectors identified by the US Department of Commerce (2012). Figure 1 shows the share of total exports from these sectors that originates in foreign-invested equity joint ventures and in wholly owned foreign enterprises. In 2013, only 17 percent of total high-tech exports originated in joint ventures. The largest share, 55 percent, originated in WOFEs. Given that trends in the WOFE share of new direct investment from the United States are similar to those of other source countries, it is likely that WOFEs dominate FIE exports of high-tech goods to the United States.

SECTION 301 TARIFFS TAX INPUTS FOR AMERICAN MANUFACTURERS

Trump tariffs largely tax the exports of foreign enterprises operating in China, whether US-owned or with parents domiciled in other advanced economies (all US allies). The Trump administration may be sanguine about the pain inflicted by

20. In a 2013 revision, the manufacture of electronic chemicals was added to this list.

Table 4 Distribution of targeted trade value and estimated share of targeted trade originating in a foreign-invested enterprise, by broad economic category, 2017 (percent)

Broad economic category	Distribution of targeted value across categories	Estimated share of targeted value in category that comes from FIEs
1. Food and beverages	0	0
2. Industrial supplies not elsewhere specified	7.28	44.36
3. Fuels and lubricants	0	0
4. Capital goods (except transportation equipment), and parts and accessories	72.85	70.27
41. Capital goods (except transportation equipment)	43.43	74.41
42. Parts and accessories	29.42	64.16
5. Transportation equipment and parts and accessories	8.55	63.22
6. Consumer goods not elsewhere specified	11.3	75.61
7. Goods not elsewhere specified	0.03	51.01

Sources: Trade values translated from Harmonized Schedule (HS) categories to United Nations' classification of broad economic categories using the concordance found at <https://unstats.un.org/unsd/trade/classifications/correspondence-tables.asp>. Share of targeted value from foreign-invested (FIEs) is the estimated share of targeted trade value shipped from FIEs operating in China, including those registered in Hong Kong, Macau, and Taiwan.

its proposed tariffs on the affiliates of allies, but it should be concerned at least about potential damage on American businesses and their employees. US firms rely on global supply chains to remain internationally competitive. To the extent that the tariffs land directly on productive inputs, they raise the cost of manufacturing goods in the United States, push American firms offshore, and handicap US-based exporters selling in foreign markets. Given the unilateral nature of the proposed tariffs, competitors based in other countries will not face the same taxes on their production and inputs.

To investigate the extent to which the proposed Section 301 tariffs land on capital and intermediate goods purchased by US-based producers, targeted tariff lines can be viewed through the lens of the United Nations' broad economic categories (BEC).²¹ The BEC groups transportable goods according to their main end use, separating consumer goods from other products.

The largest targeted trade value is in BEC category 4 (table 4, column 1).²² Capital goods, parts, and accessories are most likely to be subject to new taxes. This broad category can be further divided into two subgroups: Capital goods account for 43 percent of the targeted value, and parts and accessories account for 29 percent of the total.

As shown in table 4, column 2, targeted imports overwhelmingly come from FIEs. An estimated 74 percent of targeted capital goods come from FIEs and an estimated 64

percent of targeted parts and accessories come from FIEs. It is, therefore, fair to describe the tariffs as taxes on American productive inputs purchased from affiliates of foreign firms operating in China, many of them wholly owned foreign subsidiaries. Manufacturers from other advanced economies, such as Germany, Japan, or South Korea, will be able to purchase their capital goods and supplies from China untaxed and use them to build final goods that compete directly with American producers thus disadvantaged by the Trump tariffs.

CONCLUSION: TRUMP'S SECTION 301 TARIFFS ARE AN OWN GOAL

The evidence overwhelmingly supports the conclusion that the proposed Section 301 tariffs target multinational supply chains. They drive up costs for US-based manufacturers and disadvantage American workers competing in global markets. The tariff lines marked by USTR do capture trade in high-technology goods. Information from China Customs Records, however, suggests that much of this trade originates in foreign-invested enterprises, the Chinese-based affiliates of multinational firms. Moreover, because the targeted products are largely capital and intermediate goods used for domestic production, the Section 301 tariffs are taxes on manufacturing in America.

Global trade patterns present American policymakers with two unavoidable features of the commercial landscape. First, given China-US trade patterns, any proposal that affects a substantial share of bilateral trade will hit high-technology supply chains, which US multinational companies utilize to produce high-value added innovative and profitable services and inputs. Second, any proposal that includes

21. We use the United Nations' concordance to take the HS data into the BEC, <https://unstats.un.org/unsd/trade/classifications/correspondence-tables.asp>.

22. These estimates rely on China Customs Records data, as described above.

tariffs on a substantial share of trade will negatively affect the Chinese operations of Americans or American allies. In both ways, the tariffs spell trouble for American businesses and foreign relations.

President Trump's Section 301 tariffs are a commercial own goal in that they harm American interests more than their intended targets. That the tariffs fail to hurt Chinese firms directly should not be a surprise. There remains an enormous knowledge gap between China and the United States, even if this gap is closing. Indeed, without this gap, allegations of technology misappropriation and theft would make no sense. USTR's desire to use trade policy to hurt the recipients of China's industrial policy must be considered in light of this reality. *Made in China 2025* remains

an aspiration, not a reflection of current manufacturing prowess. It is impossible to hit tomorrow's exports with today's tariffs.

President Trump's Section 301 tariffs are a prime example of 20th century tools aimed at the knowledge-embodiment trade flows of the 21st century. Tariffs and quotas are ineffective at stemming knowledge flows between innovative countries and developing nations. Beyond the immediate damage to American competitiveness, trade restrictions push high-technology firms to locate elsewhere in the future. Tariffs can diminish trade flows, but ideas are easily relocated. American workers would bear the burden if high-value activity moves offshore due to the ill-conceived tariffs of the Trump administration.

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APPENDIX

Table A.1 US patent-intensive industries, by NAICS code

NAICS code	Industry title
3251	Basic chemical manufacturing
3252	Resin, rubber, and artificial fibers
3253	Agricultural chemical manufacturing
3254	Pharmaceutical and medicine manufacturing
3255	Paint, coating, and adhesive manufacturing
3256	Soap, cleaning compound, and toiletries
3259	Other chemical product and preparations
3331	Agriculture construction, and mining machinery manufacturing
3332	Industrial machinery manufacturing
3333	Commercial and service industry manufacturing
3334	HVAC and commercial refrigeration
3335	Metalworking machinery manufacturing
3336	Turbine and power transmission equipment manufacturing
3339	Other general purpose machinery manufacturing
3341	Computer and peripheral equipment
3342	Communications equipment manufacturing
3343	Audio and video equipment manufacturing
3344	Semiconductor and electronic component manufacturing
3345	Electronic instrument manufacturing
3346	Magnetic media manufacturing and reproducing
3351	Electric lighting equipment manufacturing
3352	Household appliance manufacturing
3353	Electrical equipment manufacturing
3359	Other electrical equipment and components
3391	Medical equipment and supplies manufacturing
3399	Other miscellaneous manufacturing

Source: US Department of Commerce (2012). Adapted from table 10 on pages 36–38.

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