Submission of the
Semiconductor Industry Association
Regarding

Proposed Determination of Action Pursuant to Section 301: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation

Docket Number: USTR-2018-0018
July 20, 2018

I. Introduction

The Semiconductor Industry Association (SIA) appreciates the opportunity to provide written comments on the proposal to impose 25% tariffs on an additional $16 billion in U.S. goods imports from China as part of the Section 301 investigation into unfair acts, policies and practices of China.

Semiconductors and its value chain are the bedrock of the modern American economy, powering virtually everything digital from cellphones and cars to supercomputers and military systems. U.S. chipmakers lead the world with close to half of the global market share. Semiconductors are America's fourth largest export, with a trade surplus of over $6 billion in 2017.[1] Nearly half of the manufacturing operations of major U.S. semiconductor firms is located here in the United States, across 19 states, directly employing close to 250,000 workers in the U.S. with well-paying jobs. More importantly, we are one of America's top exporting industries and a critical strategic asset that helps to drive U.S. economic competitiveness and technological leadership.

SIA supports the Administration's goal to address discriminatory and burdensome trade practices of the Chinese government.[2] However, as stated in our submission on May 11, 2018, imposing tariffs on semiconductors and semiconductor related products such as semiconductor manufacturing equipment will undermine U.S. technological leadership, cost jobs, and adversely impact U.S. consumers of semiconductor products and the U.S. semiconductor producers while

[1] Official U.S. government trade data, U.S. Department of Commerce, obtained from the U.S. International Trade Commission, Dataweb: https://dataweb.usitc.gov/.
[2] SIA Written Comments to USTR Regarding the Initiation of a Section 301 Investigation into China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation. October 5, 2017.

failing to address the problematic Chinese forced tech transfer and IP theft that was the subject of the Section 301 investigation. [3]

The U.S. has consistently had a semiconductor trade surplus with China, with a surplus of approximately $2 billion in 2017.[4] Indigenous Chinese companies export almost no semiconductors to the U.S. market. In reality, most U.S. semiconductor imports from China are semiconductors designed and/or manufactured in the United States, and shipped to China for the final stage of semiconductor fabrication known as assembly, test and packaging (ATP). This stage in the semiconductor manufacturing process is the least value additive stage of production, comprising about 10% percent of the value of the final product. In addition, ATP does not result in the transfer of valuable IP. Relocating this step in the supply chain would be costly, time consuming, and make our own semiconductor companies less competitive.

The funds required to move a low-value added stage of production out of China could more effectively be invested in U.S. research and development to ensure that U.S. companies continue to lead in developing advanced semiconductor technologies in the face of the stiff challenges posed by China's Made in China 2025 ambitions. All of our competitors are spending billions and competing intensively to capture the next advances in semiconductor technology.

In sum, tariffs on U.S. semiconductor imports from China will have no impact on China's industry nor will they address the issues identified in the Section 301 Report. Instead, they will undermine U.S. leadership in a critical technology, handicap U.S.-based semiconductor firms vis-à-vis our international competitors, threaten U.S. industry market share leadership in China, cost U.S. exports and jobs, and raise the cost of manufactured consumer goods for consumers in the United States.

We therefore request that all semiconductor and semiconductor supply-chain lines be removed from the tariff lists, including all 8-digit HTS subheadings under HS 8542, 8541, and 8486. We remain committed to working with the U.S. government to identify more effective approaches to address China's unfair and discriminatory trade practices.

II. Tariffs on U.S. semiconductor-related imports from China would NOT be practicable or effective to obtain the elimination of China's unfair acts, policies, and practices identified in the Section 301 report.

In the June 15, 2018 Notice, USTR asked commenters to discuss *"whether imposing increased duties on a particular subheading listed in Annex C would be practicable or effective to obtain*

[3] Submission of the Semiconductor Industry Association Regarding Proposed Determination of Action Pursuant to Section 301: China's Acts, Policies and Practices Related to Technology Transfer, Intellectual Property, and Innovation. Docket Number USTR-2018-0005. May 11, 2018.

[4] Source: Official U.S. government trade data, U.S. Department of Commerce, obtained from the U.S. International Trade Commission, Dataweb: https://dataweb.usitc.gov/. U.S. semiconductor export, import and trade balance data is defined as all the HTS subheadings that concord with NAICS code 334413 except for the following five subheadings: 3818000010, 3818000090, 8541402000, 8541406020, 8541406030.

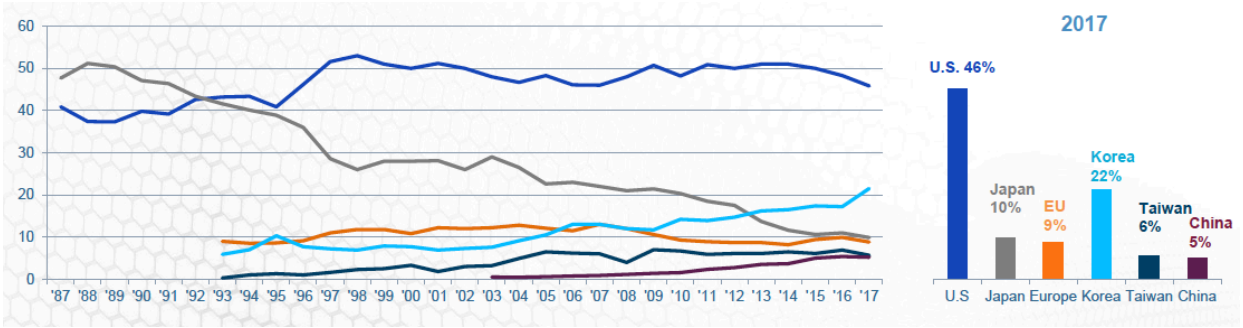
the elimination of China's acts, policies, and practices…" The plain answer to that question, particularly as it relates to semiconductors, semiconductor manufacturing equipment, and related products, is no.

As explained in more detail below, tariffs on U.S. semiconductor and related products imports from China will conversely cause economic harm to U.S. manufacturers and innovators, but will have little to no negative economic impact on Chinese practices identified in the Section 301 Report. Although semiconductors and related products are identified in China's "Made in China 2025" initiative, the effect of imposing tariffs on them will hurt U.S. companies significantly more than Chinese companies, so it will not advance the Administration's policy goals articulated in Section 301 findings. While certainly "feasible" in terms of a policy response authorized by the statute, U.S. tariffs on these products are neither "appropriate" nor will they be "effective" in putting any real pressure on China to change its trade practices.

III. Tariffs on U.S. semiconductor-related imports from China would cause U.S. companies to pay tariffs on their own products.

The U.S. semiconductor industry leads the world with nearly half of global market share, making it one of the U.S. economy's most dynamic industries (Table 1). While nearly half of U.S. semiconductor companies' manufacturing base is here in the United States, more than 80% of U.S. company sales are outside of the United States. This has made semiconductors the nation's 4th largest export, after aircraft, refined oil, and automobiles. [5]

Table 1: The U.S. semiconductor industry has nearly half of global market share. China's indigenous semiconductor industry captures only 5% of global market



Source: SIA, World Semiconductor Trade Statistics (WSTS). Note: Data based on company headquarters.

The U.S. has a semiconductor trade surplus with China of approximately $2 billion in 2017.[6] According to official U.S. Census Bureau data, nearly 60% of U.S. imports of semiconductors from China **are actually U.S. semiconductors imported back to the United States by U.S. companies from themselves.**[7] The remainder are most likely semiconductors exported by South

[5] This number includes manufacturing operations direcly owned by U.S. companies, and does not account for fabless firms that use outsourced foundry production partners.
[6] Source: Official U.S. government trade data, U.S. Department of Commerce.
[7] Official U.S. government trade data, U.S. Department of Commerce, U.S. Census Bureau, Related Party Trade Database: https://relatedparty.ftd.census.gov/. Based on U.S. Census Bureau methodology for calculating related-party trade for semiconductors. Related-party total goods is based on imports for consumption and total exports

Korean, Taiwanese, European, and Japanese affiliates in China (which often have U.S. components themselves), not Chinese-domestically produced semiconductors, given their currently very small share of the worldwide market.

As of 2017, China's domestic semiconductor industry only captures 5 percent of the global semiconductor market, and most of its semiconductors are produced and sold in China, not exported. Thus, the proposed tariffs will have no impact on China's domestic semiconductor industry or the related industrial policies identified in the Section 301 Report. Instead, the impact will be adversely felt by the U.S. semiconductor industry. The majority of U.S. semiconductor imports from China are U.S.-designed and/or -manufactured semiconductors which are exported to China in semi-finished form for final assembly, test, and packaging (ATP), which is the lowest value-additive stage of semiconductor production. While a crucial step in the semiconductor supply chain, as depicted in Table 2, ATP only comprises approximately 10% of the final chip value.[8] Because of this production dynamic, U.S. import statistics for semiconductors from China can be a very misleading metric, because the majority of the value of these chip imports are 1) not from Chinese-owned firms and 2) not actually created in China.[9]

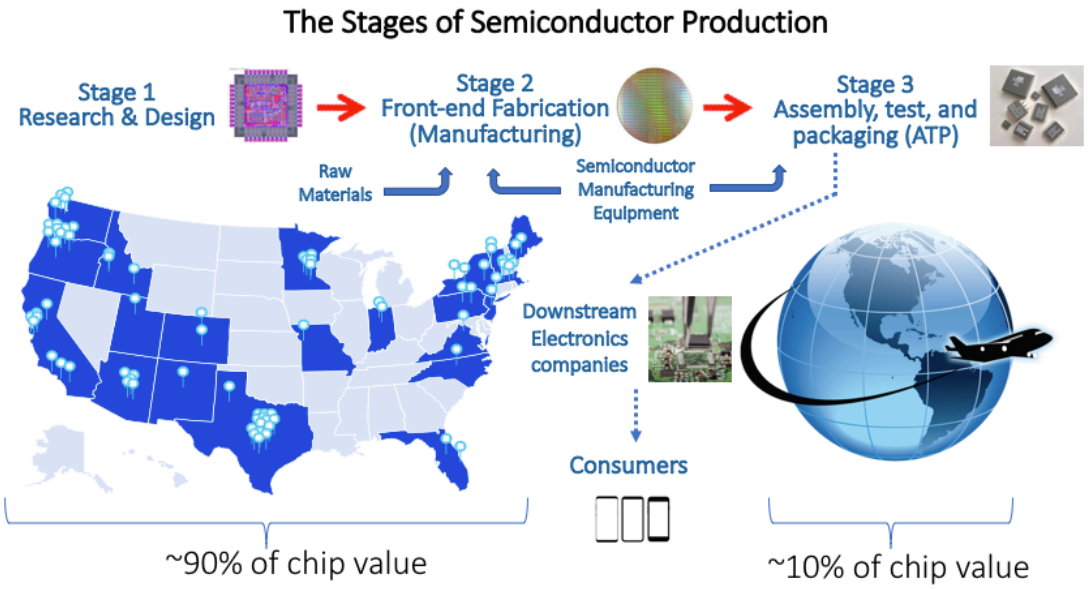
Similarly, some U.S. based suppliers of semiconductor manufacturing parts and accessories conduct low-value-add assembly and production in Asia, including China. Low-value assembly has been located in Asia for decades and has allowed the U.S. semiconductor and semiconductor manufacturing equipment industries to maintain leadership positions by focusing on higher-value R&D, design and advanced manufacturing in the United States. By enabling cost competitiveness in the global market, this model promotes investments in research and development and keeps innovation, intellectual property generation, and high-value jobs in the United States. If impacted with additional tariffs, SIA member companies would be forced to choose between spending less on high-value R&D activity in the U.S. or passing the tariff cost on to their U.S. customers in the semiconductor industry.

(domestic and foreign). Related-party trade includes trade by U.S. companies with their subsidiaries abroad as well as trade by U.S subsidiaries of foreign companies with their parent companies. The related-party trade figure for semiconductors, under NAICS 334413 is 57 percent, though this is likely underestimated because the NAICS 334413 code includes a few non-semiconductor related products such as solar cells. Excluding these products, we believe the percentage of related party U.S. made semiconductor goods imports as a share of total imports from China would be higher, likely 65-70%.

[8] Brookings Trade Forum, 2005, and industry experts
https://pdfs.semanticscholar.org/1bd2/fe8bfee360c4dc6f28e92fee0c99ebe23e03.pdf

[9] For more information about how bilateral trade statistics in semiconductors can be a misleading metric to evaluate industry leadership, please see: U.S. International Trade Commission, Executive Briefing on Trade, March 2018: Global Value Chains: Explaining U.S. Bilateral Trade Deficits in Semiconductors: https://www.usitc.gov/publications/332/executive_briefings/ebot-semiconductor_gvc_final.pdf.

Table 2: Approximately 90% of final chip value comes from research, design, and/or front-end manufacturing, much of which is performed in the U.S.



IV. Tariffs on U.S. imports from China of semiconductors and semiconductor manufacturing equipment would harm American manufacturers targeted by the Made in China 2025 Plan.

Chinese industrial policy has in some cases led to significant value reduction for producers in a large number of industry sectors, including aluminum, steel, LCD displays, solar, wind, LED lighting, and high speed rail, to name a few.[10] However, tariffs are an ineffective tool for addressing Made in China 2025 industrial policies for sectors that are still in the nascent development phase within China. The sectors targeted by Made in China 2025 are aspirational, not a reflection of current manufacturing prowess. As the Peterson Institute aptly stated,"*It is impossible to hit tomorrow's exports with today's tariffs."*[11] Instead, tariffs will hit today's Chinese exports of semiconductors and semiconductor manufacturing equipment, which as noted above, are overwhelmingly owned by U.S. companies and consist primarily of U.S.-origin value.

The Administration's proposed tariffs impact roughly **$3.6 billion** in U.S. semiconductor chip imports from China.[12] The proposed tariffs also impact another **$2.7 billion** in products related to semiconductors and our supply chain.[13] Combined, the total amount of U.S. semiconductor and

[10] European Chamber of Commerce in China. "China Manufacturing 2025: Putting Industrial Policy Ahead of Market Forces." 2017. http://docs.dpaq.de/12007-european_chamber_cm2025-en.pdf
[11] Lovely, Mary and Yang Liang. "Trump Tariffs Primarily Hit Multinational Supply Chains, Harm US Technology Competitiveness." May 2018, Peterson Institute for International Economics.
[12] Semiconductor imports refer to all 8-digit HTS subheadings in HS 8541 and 8542 except the two subheadings in 8541 that provide for LEDs (85414020) and solar cells (the vast majority of 85414060).
[13]Semiconductor-related products" refer to the 8-digit subheadings identified by SIA members in its 301 submission dated May 11, 2018 batch that are NOT in 8541, and all 8-digit HTS subheadings in HS 8486 for SME.

semiconductor-related imports from China impacted by the proposed tariffs total **$6.3 billion** (See Annex 1). If faced with an additional 25% tariff, U.S. importers of semiconductors and semiconductor manufacturing equipment will face increased costs, which will conversely make it more expensive to conduct advanced manufacturing in the United States.

Semiconductor manufacturing facilities are immensely capital-intensive, costing upwards of $10 billion and relying on hundreds of specialized tools, machines and equipment, many of which cost millions of dollars a piece. Leading edge etching equipment, for example, can cost anywhere from $5-10 million. The domestic U.S. semiconductor equipment industry supplies about half (47%) of the global market for production tools, but even U.S. manufacturers rely on imports of components that are integrated into manufacturing tools. Imposing a 25% tariff on imports of the parts and components that go into U.S.-made semiconductor manufacturing equipment and other products in the semiconductor supply chain would substantially increase the cost of semiconductor manufacturing in the United States, and therefore disincentivize investments in U.S. manufacturing.

Additionally, since semiconductors are a critical intermediate input, tariffs will raise U.S. manufacturing costs in downstream sectors that rely on semiconductor technology, including the very industry sectors listed in the Made in China 2025 plan that the 301 tariffs are meant to assist: aerospace, ICT, robotics, industrial machinery, new materials, and automobiles. Rather than incentivizing manufacturing in the United States and bolstering competitiveness vis-a-vis China, tariffs and other trade restrictions imposed on semiconductor imports could actually push American firms to consider undesirable mitigation measures as means to offset cost increases.

V. Location of low-value semiconductor assembly test and packaging in China is essential to maintain U.S. competitiveness

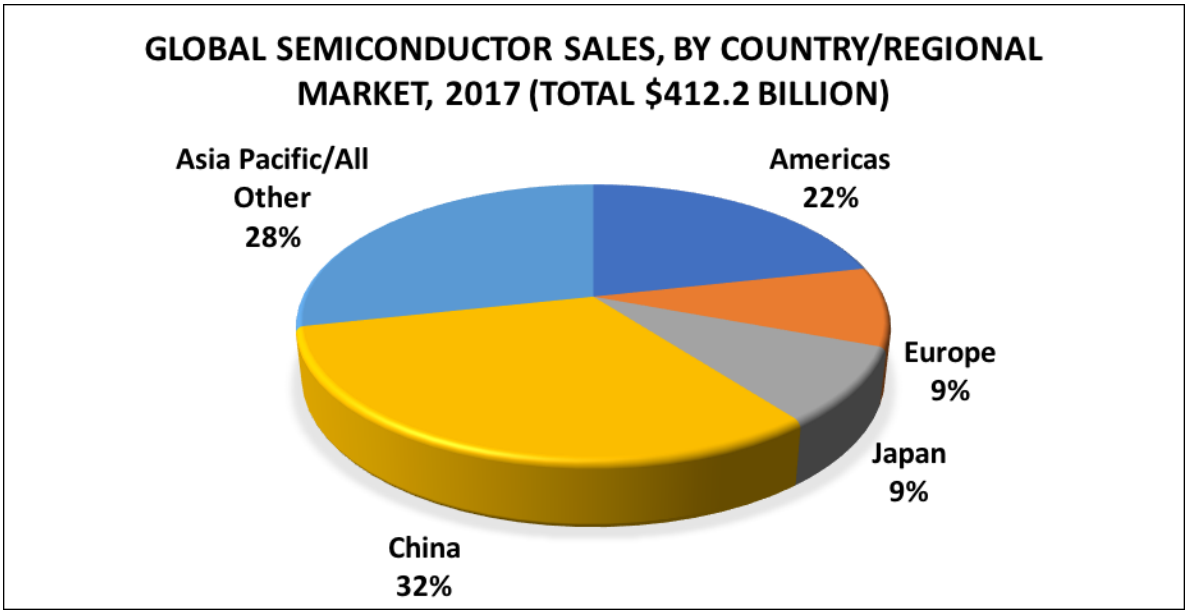
As the world's largest exporter of electronic goods powered by semiconductors, China is at the center of the global supply chain for the vast majority of the customers of American semiconductor firms. Thus it is essential that U.S. semiconductor firms be able to serve that market by locating the final stage of production - assembly, test and packaging- as close as possible to our customers.

In 2017 alone, China exported to the world $600 billion in electronic goods powered by semiconductors, representing nearly a third of all Chinese exports.[14] This includes $142 billion in personal computers and $219 billion in smartphones produced in China in 2017.[15] Correspondingly, China is the fastest growing and single largest country market for semiconductors, accounting for 32 percent of global semiconductor sales in 2017 (see Chart 1). It is also a leading destination for U.S. semiconductor exports (see Table 3). The growth in ATP

[14] General Administration of Customs, People's Republic of China, found at: http://www.gov.cn/xinwen/2018-01/12/content_5255987.htm#1.
[15] Ministry of Industry and Information Technology of the People's Republic of China, found at: http://www.miit.gov.cn/n1146312/n1146904/n1648373/c6048688/content.html.

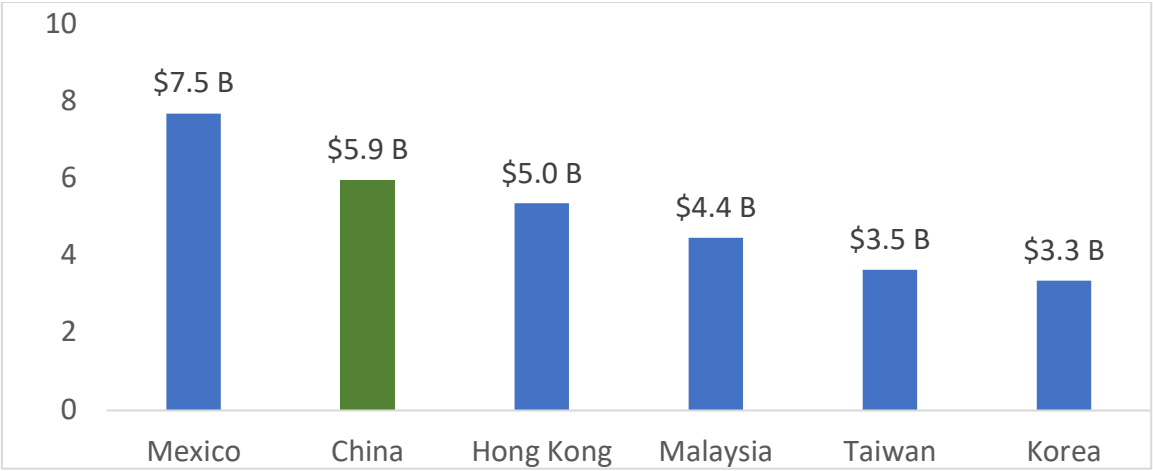
facilities in China corresponds with this growing customer base. As such, China is an irreplaceable market for the U.S. semiconductor industry.

Chart 1: China is the single largest market for semiconductors



Source: World Semiconductor Trade Statistics and SIA Estimates.

Table 3: China is a top export destination for U.S. semiconductors



Source: Official U.S. government trade data, U.S. Department of Commerce, obtained from the U.S. International Trade Commission, Dataweb: https://dataweb.usitc.gov/. Dollar figures are annual totals for 2017.

Today, the U.S. semiconductor industry is the leader in the China market with 50.5 percent of China market sales in 2017, totaling $66.4 billion. This is the highest market share that the U.S. industry enjoys in any region (See Table 4).[16] At a time when international competition in China and elsewhere is increasing, U.S. firms need to be best positioned to serve the customer as efficiently as possible in order to maintain their competitive edge, and proximity of the final stage of production to the end market is critical to maintaining the competitive position of the semiconductor industry in the U.S.

Table 4: The U.S. Semiconductor Industry has a higher market share in China than in any other country/region

U.S. Semiconductor Industry Sales and Market Share, by Region (2017)

Region	Rev. ($ bil)	U.S. Market Share
Americas	31.5	35.6%
Europe	19.1	49.8%
Japan	14.6	40.0%
China	**66.4**	**50.5%**
Asia Pacific/All Other	57.3	48.8%

Source: World Semiconductor Trade Statistics and SIA Estimates.

China accounts for 22% of the total number of worldwide ATP facilities[17]. This activity is conducted either by wholly-owned subsidiaries of semiconductor manufacturers or by outsourced semiconductor assembly and test companies (OSATs). [18] While Chinese OSATs are beginning to acquire advanced packaging capabilities, they are still far behind compared to other global competitors (mostly from Taiwan), who dominate the advanced packaging space.[19] Forcing relocation of low-value ATP will raise the cost of, and therefore reduce the U.S. competitive edge in, more advanced and high-value research, design and manufacturing, much of which already takes place in the U.S. supporting roughly 250,000 American jobs. Researchers have found that locating inexpensive production across diverse geographies has helped keep greater numbers of jobs at home. According to a 2016 Peterson Institute for International Economic (PIEE) report, "domestic production would not be as strong as it is without access to

[16] U.S. total exports of semiconductors in 2017 were $44 billion, of which $5.9 billion go to China directly. Due to global supply chains and the prominence of the fabless-foundry business model, most U.S. semiconductors are not sold or shipped directly to China.

[17] PwC, China's Impact on the Semiconductor Industry: 2016 Update. Outsourced ATP, also known as OSAT, is a business model in which firms specialize exclusively in ATP and doing this activity on a contract basis for other semiconductor companies. This contrasts with Integrated Device Manufacturers (IDMs) which conduct all three stages of semiconductor production (design, production, and ATP) in house.

[18] In 2017, China was the top single country destination for assembly and packaging equipment (37 percent of total global sales), as well as the top single country destination for total ATP (25 percent of total global sales). Source: Semiconductor Equipment and Materials International (SEMI), Worldwide Semiconductor Equipment Market Statistics (WWSEMS), Equipment Market Database, ATP billings 2017.

[19] http://www.yole.fr/AdvPackaging_China_PlayersAnalysis.aspx#.WzKkNRJKhmB

global supply chains, which reduce costs, raise productivity, expand the global market share of U.S. 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.[20] Another report from the Institute for Research on Labor and Employment (IRLE) notes that chip assembly provides an example where diversification of the value chain to reduce costs was important for maintaining competitive advantage against international rivals.[21] Disrupting U.S. semiconductor companies' supply chains that have enabled them to become globally competitive and support high-value production at home will ultimately hurt, not help, the U.S. economy, jobs, and ultimately, the U.S. semiconductor industry itself.

In addition, the proposed tariff burden will be almost entirely on American integrated device manufactuers (IDMs) with established operations in China. This is because while China is a large and growing provider of ATP services, nearly 40% of ATP activity in China is done by the firms most likely to be impacted by the 301 tariffs.[22] The rest is done by OSATs, 56% of which are indigenous Chinese firms. Global competitors will continue ATP in China, while the U.S. industry will lose its comparative advantage that has supported higher value-add manufacturing in the United States.

Finally, aside from the cost of producing in a more expensive business environment, shifting efficient supply chains will impose substantial costs on U.S. companies. First, the cost required to move or replace ATP infrastructure would be substantial. These additional costs would reduce the capital available to invest in R&D, could cause delays in previously planned investments in the United States, and would likely be passed on to U.S. consumers in the form of increased prices. For companies without manufacturing operations (fabless companies), relocating ATP would first require an alternate ATP provider with sufficient capacity and capability to be available. Fabless firms would then incur significant costs in breaking contracts with existing ATP firms and realigning global supply chains with new ATP facilities in new locations. Second, there are significant financial and opportunity costs associated with changing ATP facilities. Customers will require semiconductor chips from new ATP facilities to be requalified for their end products to meet technical specifications. This is a complex and costly process that will disadvantage U.S. companies compared to competitors whose supply chains are not disrupted.. And of course, relocating ATP facilities away from the final customer will likely result in lost sales and loss of competitiveness.

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[20] Moran, Theodore H. and Lindsay Oldenski. 2016. How Off-shoring and Global Supply Chains Enhance the global Economy. PIEE Policy Brief 16-5. Washington. Peterson Institute for International Economics.

[21] Clair Brown and Greg Linden. (2005). "Offshoring in the Semiconductor Industry: Historical Perspectives. IRLE Working Paper No 120-05. http://irle.berkeley.edu/workingpapers/120-05.pdf

[22] Most IDMs with ATP facilities located in China are foreign owned firms. China's IDM industry is currently very small, with $1.6 billion in revenue in 2015, ranking behind indigenous OSAT, foundry and fabless industries which had sales totalling $19.2 billion in 2015. For more information on the various segments of China's semiconductor industry, please see PwC China Report at: https://www.pwc.com/gx/en/industries/technology/chinas-impact-on-semiconductor-industry.html.

VI. A tariff-free trading environment is vital to the past success and future growth of the U.S. semiconductor industry

More than 80% of U.S. semiconductor industry sales are in overseas markets, making free and open markets a critical element to the success of the U.S. semiconductor industry. While the U.S. semiconductor industry is a major exporting powerhouse, our industry also relies on a complex and global supply chain for raw materials, semiconductor manufacturing equipment, R&D, human talent, testing, and distribution (See Table 2 for an overview of the semiconductor value chain). Further, global diversification of the industry's supply chain is necessary for financial market and operational stability in the event of a geographic crisis, such as a natural or man-made disaster. The intermediate nature of our products also requires the import and re-export of semiconductor products to meet constantly changing customer needs. These factors, combined with the high-capital costs and short product life-cycles of our cutting-edge technologies, mean that our industry's success and competitiveness have depended on the ability to move semiconductors at all stages of production freely, efficiently, and quickly across borders.

A tariff-free environment has been and continues to be critical for the success and competitiveness of the U.S. semiconductor industry, and down-stream industries that rely on semiconductor technology. The U.S. semiconductor industry is America's top contributor to labor productivity growth, as semiconductor technology has made virtually all sectors of the U.S. economy—from farming to manufacturing—more effective and efficient.[23] Because semiconductors and Information Communication Technology (ICT) products generally contribute greater benefits to economic growth, tariffs on our industry "hurt the nations that impose them by raising the costs of ICT goods and services, thus causing businesses and individuals to invest less in ICT, which lowers their productivity."[24] One estimate has found that a 25% tariff on Chinese ICT imports would slow the growth of U.S. output by $332 billion over the next ten years. This is because the "vast majority of economic benefits from ICT, over 80 percent, stem from their adoption as productivity- and innovation-enhancing capital goods and services." The largest negative effects of tariffs "would be on the wide array of businesses, non-profits, and government organizations that rely on ICT goods in their production processes. As prices increase, these organizations would invest less in these ICT-based capital goods, lowering their rate of productivity growth."[25]

VII. The U.S. semiconductor industry requires policies that help the industry ecosystem outpace competitors.

In sum, while the Chinese government is ramping up to help its semiconductor industry pedal faster, including by spending $150 billion to develop its domestic industry, we are perplexed

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[23] SIA Factbook https://www.semiconductors.org/clientuploads/Industry%20Statistics/SIA_One_Pager_May_2018.pdf

[24] Ezell, Stephen. "Boosting Exports, Jobs, and Economic Growth by Expanding the ITA." 2012. http://www2.itif.org/2012-boosting-exports-jobs-expanding-ita.pdf?_ga=2.198966119.955729815.1530023326-164466365.1528737389

[25] Atkinson, Ezell and Wu. "Why Tariffs on Chinese ICT Imports Would Harm the U.S. Economy." Information Technology & Innovation Foundation. http://www2.itif.org/2018-ict-tariffs-china.pdf

why the U.S government is considering tariffs and other policies that would raise the costs for U.S. chipmakers. The bottom line is that, in the absence of any reasonable expectation that the proposed action will result in policy change in China, the proposed U.S. tariffs on semiconductors and related products will only have the effect of punishing U.S. companies for operating in the global economy.

SIA recognizes USTR's concerns about Chinese government policies and practices that can pressure U.S. semiconductor companies to disclose or transfer their intellectual property to Chinese entities or develop IP in China. These are longstanding concerns, raised by many sectors, and which have remained despite a decade of dialogue. In particular, SIA remains concerned with several especially acute aspects of Chinese industrial policy that often lead to forced technology transfer, including insufficient protection of IP, discriminatory cybersecurity rules, "secure and controllable" initiatives that require the disclosure of IP to qualify products, quid-pro-quo technology transfer for market access, preferential government and SOE procurement practices, and the potential for compulsory licensing of essential IP in applying China's anti-monopoly regime for protectionist purposes.

Unfortunately, misdirecting penalties at the U.S. semiconductor industry, the proposed tariffs fail to curtail Chinese discriminatory trade and unlawful IP practices or provide the United States with meaningful leverage to press China to change its behavior.

As an alternative to counterproductive tariffs, SIA calls on the U.S. government to utilize more effective and targeted policies, such as combatting IP theft, greater utilization of the WTO, and strengthened multilateral action with allied countries to address problematic aspects of Chinese industrial policy.

Annex 1: 301 Tariffs Impacting Semiconductors and the Semiconductor Supply Chain

Tariffs Impact $3.6 Billion in U.S. Semiconductor Imports[26]

HTS Subheading	Product Description	U.S. Imports from China ($), 2017
1. 85411000	Dioes, other than photo-senstitive or light-emitting diodes	280,180,147
2. 85412100	Transistors, other than photosensitive transistors, with a dissipation ration of less than 1 W	71,825,627
3. 85412900	Transistors, other than photosensitive transistors, with a dissipation rating of 1 W or more	206,784,700
4. 85413000	Thyristors, diacs and triacs, other than photosenstitive devices	28,261,170
5. 85414070	Photosensitive transistors	1,477,946
6. 85414080	Photosensitive semiconductor devices nesi, optical coupled isolators.	52,770,732
7. 85414095	Photosensitive semiconductor devices nesi, other	13,608,607
8. 85415000	Semiconductor devices other than photosensitive semiconductor devices, nesi	34,773,678
9. 85416000	Mounted piezoelectric crystals	167,863,911
10. 85419000	Parts of diodes, transistors, similar semiconductor devices, photosensitive semiconductor devices, LED's and mounted piezoelectric crystals	36,095,350
11. 85423100	Processors and controllers, whether or not combined with memories, converters, logic circuits, amplifiers, clock and timing circuits, or both	1,116,314,795
12. 85423200	Memories	754,186,972
13. 85423300	Amplifiers	92,173,409
14. 85423900	Electronic Integrated Circuits, NESOI	705,100,510
15. 85429000	Parts of electronic integrated circuts and microassemblies	65,740,397
TOTAL		**3,627,157,951**

Source: Official U.S. government trade data, U.S. Department of Commerce, obtained from the U.S. International Trade Commission, Dataweb: https://dataweb.usitc.gov/.

[26] Semiconductor imports refer to all 8-digit HTS subheadings in HS 8541 and 8542 except the two subheadings in 8541 that provide for LEDs (85414020) and solar cells (the vast majority of 85414060).

Tariffs Impact $2.7 Billion in U.S. Semiconductor-Related Imports[27]

HTS Subheading	Product Description	U.S. Imports from China ($), 2017
1. 84569031	Machine tools operated by electro-chemical or ionic-beam processes, for working metal	5,074,821
2. 84569071	Machine tools operated by electro-chemical or ionic-beam processes, other than for working metal	2,196,673
3. 84717060	ADP storage units other than magnetic disk, not in cabinets for placing on a table, etc., not entered with the rest of a system	412,603,195
4. 84861000	Machines and apparatus for the manufacture of boules or warfers	1,167,788
5. 84862000	Machines and apparatus for the manufacture of semiconductor devices or electronic integrated circuits	287,613,046
6. 84863000	Machines and apparatus for the manufacture of flat panel displays	564,489
7. 84864000	Machines and apparatus for the manufacture of masks and reticles; for the assembly of electronic integrated circuits; or for the lifting, ha	10,189,970
8. 84869000	Parts and accessories of the machines and apparatus for the manufacture of semiconductor devices, electronic integrated circuits, and flat panel displays	479,867,832
9. 85044040	Electrical speed drive controllers for electric motors (static converters)	261,567,056
10. 85049075	Printed circuit assemblies of electrical transformers, static converters and inductors, nesoi	39,242,042
11. 85369040	Electrical terminals, electrical splicers and electrical couplings, wafer probers, for a voltage not exceeding 1,000 V	146,200,351
12. 85369085	Other electrical apparatus nesi, for switching or making connections to or in electrical circuits, for a voltage not exceeding 1,000 V, nesoi	194,986,720
13. 85447000	Optical fibre cables made up of individually sheathed fibres, whether or not containing electric conductors or fitted with connectors	283,379,997
14. 90248000	Machines and appliances for testing the mechanical properties of materials other than metals	6,084,485
15. 90303338	Other instruments and apparatus, nesi, for measuring or checking electrical voltage, current, resistance or power, without a recording device	64,667,296

[27]Semiconductor-related products" refer to the twenty-eight 8-digit subheadings identified by SIA members in its 301 submission dated May 11, 2018 batch excluding the nine subheadings from HTS 8541, plus all five 8-digit HTS subheadings in HS 8486 for SME.

16. 90308200	Instruments and apparatus for measuring or checking semiconductor wafers or devices	32,240,256
17. 90309025	Printed circuit assemblies for instruments and apparatus for measuring or detecting ionizing radiation	3,966,747
18. 90309066	Printed circuit assemblies for subheadings and apparatus of 9030.40 & 9030.82	24,953,836
19. 90309068	Printed circuit assemblies, NESOI	12,447,119
20. 90309084	Parts and accessories for instruments and apparatus for measuring or checking semiconductor wafers or devices, nesoi	35,547,026
21. 90309089	Parts and accessories for instruments and apparatus for measuring or checking semiconductor wafers or devices	27,419,382
22. 90314100	Optical measuring/checking instruments/appliances for inspecting semiconductor wafers/devices or photomasks/reticle used to mfg such devices	1,745,459
23. 90318040	Electron beam microscopes fitted with equipment specifically designed for the handling and transport of semiconductor devices or reticles	299,768
24. 90328960	Automatic regulating or controlling instruments and apparatus, nesi	335,738,422
TOTAL:		**2,669,763,776**

Source: Official U.S. government trade data, U.S. Department of Commerce, obtained from the U.S. International Trade Commission, Dataweb: https://dataweb.usitc.gov/.