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Highlights of This Month’s Edition

- **Bilateral trade:** Due to a lapse in federal funding, the relevant data from the U.S. Bureau of Economic Analysis were not available for a monthly update and analysis.
- **Policy trends in China’s economy:** At the Central Economic Work Conference, Chinese leaders promise increased economic support measures as trade tensions with the United States and flagging domestic consumption weigh on China’s economy; the Chinese government seeks to stabilize growth by cutting the bank’s reserve requirement ratio, increasing infrastructure spending, and expanding local government debt; weak consumer demand heightens attention on surprising official estimates that China’s population could start declining by 2027.
- **In Focus – “Self-reliance” and Chinese import policy:** Some U.S. sales to China of advanced technology products may aid China’s efforts to establish self-sufficiency.

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Bilateral Trade

Due to a lapse in federal funding, the relevant data from the U.S. Bureau of Economic Analysis were not available for a monthly update and analysis.

Policy Trends in China's Economy

Chinese Leaders Promise Increased Economic Support Measures at Central Economic Work Conference

From December 19 to 21, 2018, China held its annual Central Economic Work Conference (CEWC), during which Chinese Communist Party leaders review China's economy over the past year and set the direction of economic policy for the next year.* The conference comes as trade tensions with the United States and weakening domestic consumption increasingly weigh on China's economy.

Although the CEWC's proceedings are kept secret, Chinese state-run media outlet Xinhua publishes an official summary of the conference.¹ Although it is doubtful the readout is fully transparent about the contents of the meeting or the assessment of the assembled group, it reflected a darkened economic outlook, acknowledging “new and worrisome developments” and a “complicated and severe” external environment.² In response, Chinese leaders promised increased economic support measures, with a greater emphasis on fiscal over monetary policy.³ “China will strengthen counter-cyclical adjustments in its macro policy, continue to implement proactive fiscal policy and prudent monetary policy, make preemptive adjustments and fine-tune policies at the proper times, and ensure stable aggregate demand,” the statement said.⁴ Without directly referencing the “Made in China 2025” industrial plan—which the government has been downplaying lately[†]—Chinese leaders identified “high-quality development in manufacturing” as a key economic priority for 2019.⁵

On fiscal policy, Chinese leaders promised larger tax cuts and a “relatively substantial increase” in the issuance of local government bonds to fund infrastructure projects.⁶ In recent months, Beijing has already passed new tax cuts and approved new infrastructure projects to support the weakening economy.⁷ (See “Government Uses Monetary and Fiscal Easing to Boost Flagging Growth.”)

According to the statement, China will keep monetary policy “prudent” while maintaining “reasonably ample” liquidity, improving the monetary policy transmission mechanism, and increasing direct financing for private enterprises.⁸ Analysts believe Beijing's emphasis on improving the monetary policy transmission mechanism means that monetary policy will be more targeted rather than flooding the market with new credit, as China did a decade ago in response to the global financial crisis.⁹ Indeed, in the days following the conference, Sun Guofeng, head of monetary policy at the People's Bank of China (PBOC), said that “monetary policy is still prudent,” adding there “will be no deluge of stimulus.”¹⁰

Chinese leaders repeated previous pledges on structural and social policy issues, to include speeding up state-owned enterprise (SOE) reforms, relaxing market access barriers for foreign investors, and improving “people's well-being” (e.g., investing in education, prioritizing employment, and ensuring food and drug safety).¹¹ However, the

* For highlights from the 2017 Central Economic Work Conference, see U.S.-China Economic and Security Review Commission, *Economics and Trade Bulletin*, January 8, 2018, 4–5. <https://www.uscc.gov/sites/default/files/Research/January%202018%20TB.pdf>.

† In recent months, China has downplayed references to Made in China 2025. With its emphasis on the use of government subsidies and pursuit of intellectual property acquisition to catch up with and surpass the United States and other advanced industrial economies, the plan has been a thorny issue between China and major trading partners like the United States and the European Union. Sidney Leng and Zheng Yangpeng, “Beijing Tries to Play down ‘Made in China 2025’ as Donald Trump Escalates Trade Hostilities,” *South China Morning Post*, September 5, 2018. <https://www.scmp.com/news/china/policies-politics/article/2152422/beijing-tries-play-down-made-china-2025-donald-trump>.

statement did not offer much information to indicate Beijing will take a more proactive stance on pushing through structural reforms.

Chinese leaders agreed on how important boosting consumption is to the country's future growth, noting China should accelerate the development of the services industry—including in education, childcare, healthcare, elderly care, culture, and tourism—to build a resilient domestic market.¹² China's recent economic headwinds have soured consumer sentiment and made a dent in household spending. (See “Flagging Confidence Weakens Consumer Demand and Heightens Attention on Demographic Data.”)

China's key economic targets for 2019 will be announced during the annual parliamentary session in March 2019 as part of the government work report. The Chinese Academy of Social Science, a prominent Chinese government think tank, has forecast growth will slow to 6.3 percent in 2019—the weakest pace since 1990.¹³ The World Bank has projected China's growth will decline to 6.2 percent in 2019 as a result of weaker exports.¹⁴ Economists expect China's full-year growth for 2018 will reach 6.6 percent (meeting the official growth target of “around 6.5 percent”), from 6.9 percent in 2017.^{*15}

Government Uses Monetary and Fiscal Easing to Boost Flagging Growth

In line with the government directive to stabilize the economy, on January 4, 2019, the PBOC cut the reserve requirement ratio[†]—the minimum amount capital banks must hold against its outstanding loans—by 1 percentage point.¹⁶ This cut frees \$117.3 billion (renminbi [RMB] 800 billion)[‡] in capital for new lending and investment, the highest amount of funding made available in the last year.¹⁷ This is the fifth cut to banks' reserve requirement ratio since January 2018.¹⁸ Previous cuts occurred in January 2018, April 2018, June 2018, and October 2018, but were largely ineffective in energizing credit growth.¹⁹

The Chinese government has also been increasing spending on infrastructure and expanding local government lending to bolster economic growth.²⁰ In December 2018, after a year-long halt of railway construction due to concerns over excess debt, the Chinese government announced more than \$120 billion in new rail projects.²¹ In addition, the investment firm CLSA found the issuance of China's local government debt for infrastructure projects rose 145 percent year-on-year in 2018.²²

But the higher spending and new debt it creates is at odds with the government's efforts in 2017 and the first half of 2018 to rein in risky borrowing and wasteful government spending.²³ Instead of financing private sector and small and medium-sized businesses that drive China's economic growth, this spending has largely gone to SOEs.[§] ²⁴ On December 19, 2018, the PBOC created the Targeted Medium-Term Lending Facility (TMLF) as a new tool to direct lending to private, small, and medium-sized businesses.²⁵ But Macquarie Group economists Larry Hu and Irene Wu noted, “The (TMLF) could boost market sentiment, but is far from enough to stop the ongoing growth slowdown.”²⁶

* There are longstanding doubts about the reliability of China's official data among most observers. Of note, Xiang Songzuo, a professor at Renmin University's School of Finance, made a splash in December 2018 when he suggested China's GDP could be as low as 1.67 percent in 2018, far below the officially-reported 6.7 percent. Gordon Watts, “China's Economy Shows More Signs of Running out of Gas,” *Asia Times*, January 10, 2019. <http://www.atimes.com/article/chinas-economy-shows-more-signs-of-running-out-of-gas/>.

† In comparison, the United States must hold a share of its capital based on deposits rather than outstanding loans. Frank Tang, “As China's Economy Begins to Stutter, What's Next for its Monetary Policy?” *South China Morning Post*, January 7, 2019. <https://www.scmp.com/economy/china-economy/article/2181043/chinas-economy-begins-stutter-whats-next-its-monetary-policy>.

‡ The exchange rate used is: \$1 = RMB 6.82.

§ For more on the role of SOEs in China's economy, see U.S.-China Economic and Security Review Commission, Chapter 1, Section 2, “State-Owned Enterprises, Overcapacity, and China's Market Economy Status,” in *2016 Annual Report to Congress*, November 2016, 92–103. https://www.uscc.gov/sites/default/files/Annual_Report/Chapters/Chapter%201%2C%20Section%202%20-%20State-Owned%20Enterprises%2C%20Overcapacity%2C%20and%20China%27s%20Market%20Economy%20Status.pdf; Sean O'Connor, “SOE Megamergers Signal New Direction in China's Economic Policy,” *U.S.-China Economic and Security Review Commission*, May 24, 2018. <https://www.uscc.gov/Research/soe-megamergers-signal-new-direction-chinas-economic-policy>.

Flagging Confidence Weakens Consumption, Heightens Attention on Demographics

A series of indicators, including retail spending, new car sales, and real estate purchases, suggest falling Chinese consumer confidence has led to weaker demand through November 2018.²⁷ The Organization for Economic Cooperation and Development (OECD) reports Chinese consumer confidence as peaking in February 2018.²⁸ Though retail spending grew 14 percent year-on-year in November 2018, it did not match 22 percent growth in November 2017, or 23 percent in November 2016.²⁹ New car sales, which began to decline in July,³⁰ fell by about 14 percent year-on-year in November 2018 after 12 percent declines in September and October.³¹ This weak consumer demand helped lead to lower consumer price inflation, as China's consumer price index fell 0.3 percent between October and November 2018.³²

Shaky economic indicators have heightened attention on newly released demographic estimates of China's aging population, a challenge to China's long-term economic development. In the *Green Book of Population and Labor* report released January 3, 2019, China Academy of Social Sciences (CASS) researchers predict China's population will start declining as early as 2027 if the birthrate remains at 1.6 children per woman.³³ World Bank data indicate China's birthrate—about 1.62 children per woman in 2016—has remained below 1.7 since 1995.³⁴ CASS researchers stated that although the number of families having two children rose by 11 percent in 2017 following the government's 2016 revision of the “one-child” policy, the total number of births fell by as much as two million in 2018 (15 to 16 million births relative to 17.2 million births in 2017).³⁵ As demographer He Yafu noted, 15 million would represent the third-lowest total births since the founding of the People's Republic of China in 1949.³⁶

Economists have pointed to the low birthrate's implications for China's labor force and fiscal balance sheets. At the end of 2017, China's population over age 60 stood at 17.3 percent.³⁷ UN forecasts predict that by 2045, China's elderly-to-working-age population ratio—currently at 15 percent—will resemble Japan's current elderly-to-working-age population ratio of around 43 percent.³⁸ China's aging population also places pressure on its social insurance system, whose outlays exceeded social insurance payroll tax revenues by about \$68 billion in 2017.³⁹ CASS social insurance expert Bingwen Zheng remarked in November 2018 that the budget shortfall for pensions in China, administrated by local governments, poses increasing fiscal risks.⁴⁰ In response, China has moved to gradually increase the retirement age, currently set at age 60 for men and age 50 to 55 for women, to 65 by about 2040.⁴¹ In June 2018, China's government also introduced a measure to balance pension funds across provinces and is considering the creation of a unified pension management system.⁴² Whether these actions can fill the pension gap is dubious, however. The pension system suffers from underinvestment by local provinces and corporate failure to comply with Chinese social insurance laws and to contribute, and the difference between social insurance outlays and payroll tax revenues has been projected to nearly quadruple by 2020.⁴³

In Focus: China's Tactic of Importing to Achieve Self-Sufficiency

Since 2014, China's government has embarked on a broad-based, well-funded effort to achieve self-reliance in semiconductor manufacturing, rapidly increasing purchases of U.S. exports of high-precision machinery required to produce memory chips and other semiconductors. China's new semiconductor manufacturing facilities aim to ultimately help it decrease dependency on semiconductor imports.

While many nations embark on largely unsuccessful “self-sufficiency” quests, the scale and coordination of China's indigenization efforts stand out. Chinese policymakers have an established practice of coupling support for domestic industries with importing select technologies to pursue broader import substitution regimes. State planners actively guide and promote this calculated intermediate dependence on other countries' technology, while at the same time

* Some researchers argue that China's population is already in decline. Peking University professor Su Jian and University of Wisconsin at Madison researcher Yi Fuxian believe the 2018 fertility rate to be as low as 1.05, or about 10 million births in 2018 relative to 11.6 million deaths, marking 2018 as the first year of population decline. Ren Quiyu, “China's Population Could Already Be Shrinking, Experts Say,” *Caixin*, January 4, 2019. <https://www.caixinglobal.com/2019-01-04/chinas-population-could-already-be-shrinking-experts-say-101366715.html>.

striving to ensure import consumption prioritizes policy rather than commercial objectives. As the case of the semiconductor industry shows, China's policy-driven pursuit of self-reliance can threaten to disturb global industrial ecosystems, even if China falls short on its industrial goals.

China's Policy-Directed Import Regime

The Chinese government actively encourages Chinese enterprises to import equipment and technologies in support of China's industrial objectives via the Catalogue on Encouraged Imported Technology and Products (the Catalogue), which is jointly compiled by China's National Development and Reform Commission, Ministry of Finance, and Ministry of Commerce. A proposed revision to the 2017 Catalogue, for example, identifies 212 technologies and 162 types of equipment enterprises should import to support the development of 66 industries.*⁴⁴ Local governments and agencies also release guidance on encouraged imports that in some cases may be even more prescriptive. For instance, the 2017 Catalogue for Zhuhai, a wealthy city bordering Macau, includes 607 types of equipment, 148 products and materials, 254 advanced technologies, and 56 consumption goods encouraged for import.†

The national Catalogue evolves year to year with occasional gaps as policymakers refine industrial and technology goals.‡ For instance, between 2016 and 2017 the Catalogue maintained the same 66 industries, many of which are encouraged in Made in China 2025, The Internet Plus Plan, and the 12th and 13th Five-Year Plans.⁴⁵ However, it added 34 new categories of imports, the majority of which included components and equipment to build domestic industrial capacity.⁴⁶

Xu Guangrui, deputy director of China's National New Future Science Research Institute, explained that new components included in the 2017 Catalogue elevate the importance of automobile, aircraft, and satellite manufacturing, as well as engine construction and solar energy.⁴⁷ Six advanced technologies on the list include imports in advanced energy technology and biotechnology and biopharmaceuticals, as well as Liquefied Natural Gas (LNG) carriers.⁴⁸ Overall, Xu indicated the revisions reflect state planners' increased emphasis on building China's intelligent manufacturing capabilities and show more explicit direction by policymakers.⁴⁹

Although the United States runs a substantial deficit with China in advanced technology products (ATP), most of the deficit is due to U.S. imports of information and communications technology (ICT) products. Excluding ICT products, U.S. high-tech exports to China have traditionally been a bright spot in the bilateral trading relationship.⁵⁰

Nonetheless, while the Chinese government's import policy indicates a sustained demand for U.S. ATP exports, it also shows how the state is guiding such purchases to deepen China's economic self-sufficiency. For instance, the focus on intelligent manufacturing noted above has been a key focus of early implementation of Made in China 2025, as Chinese policymakers believe it is "a key tool for challenging the technological dominance of industrial

* "Industry" is not defined by the Catalogue, but has a narrow meaning. For instance, various farming equipment is categorized according to different industries if it is used at different stages of the planting cycle. National Development and Reform Commission of the People's Republic of China, Ministry of Finance of the People's Republic of China, and Ministry of Commerce of the People's Republic of China, *Catalogue on Encouraged Imported Technology and Products (2017 Edition), Draft Seeking Comment*, November 23, 2017. Translation. http://www.ndrc.gov.cn/gzdt/201711/t20171123_867551.html.

† The Zhuhai Catalogue is more specific than the national Catalogue, so a greater number of encouraged imports does not necessarily mean a greater quantity of imports: many of the items in the Zhuhai Catalogue are detailed to a ten-digit Harmonized System tariff code, where more items in the national Catalogue are outlined to a more general four- or six-digit code. Department of Commerce of Zhuhai City, *Zhuhai Catalogue on Encouraged Imported Technology and Products*, October 10, 2017. Translation. <http://www.doumen.gov.cn/tzdm/xzzq/201801/01644cc1d2e7443092289f7a28999133.shtml>; National Development and Reform Commission of the People's Republic of China, Ministry of Finance of the People's Republic of China, and Ministry of Commerce of the People's Republic of China, *Catalogue on Encouraged Imported Technology and Products (2017 Edition), Draft Seeking Comment*, November 23, 2017. Translation. http://www.ndrc.gov.cn/gzdt/201711/t20171123_867551.html.

‡ The Catalogue is not updated every year. The last five updates were issued in 2009, 2011, 2014, 2015, 2016, and 2017.

countries and simultaneously defending China's low-end industries against growing competition from developing countries."⁵¹

For some key industries, the state-led import regime may be combined with coercive or discriminatory tactics. While numerous encouraged aerospace and automotive imports appear in the Catalogue, China has long pressured foreign companies in both these industries to transfer technology as a condition for various forms of market access, including selling into China and allowing foreign imports to compete on equal footing with domestic products.⁵² For instance, in 2011 General Motors reported Chinese officials demanded it transfer technology in exchange for allowing imports of the Volt hybrid, newly manufactured in the United States that year, to receive nearly \$20,000 in purchase subsidies offered to competing Chinese hybrids.⁵³

Other encouraged imports may not be used to reduce import dependency, but rather challenge U.S. interests in other ways. China is actively purchasing LNG carriers from South Korea in spite of state-backed efforts to build up its own ship-building industry—an effort now driven by State Council policy to reduce China's dependence on foreign shipping, according to the Chief Technology Officer (CTO) of one of China's leading shipbuilding firms. A fleet of LNG tankers would also enhance China's ability to purchase LNG from energy-rich economies on which the United States has imposed sanctions, such as Russia and Iran. China has turned to both LNG exporters in 2018 while drastically reducing imports of U.S. LNG due to a 10 percent retaliatory tariff. In 2017, China was the third-largest export destination for U.S. producers; although the United States has a short history of exporting LNG, continued industry growth and ability to fund ongoing exploration projects could depend on sustaining exports at similar volumes, with or without China as an export market.⁵⁴

In general, the risk for U.S. exporters is that the long-term effects and intentions of China's policy-driven import regime will not be immediately apparent, because China's need for technology benefits U.S. technology exporters in the short term.⁵⁵ However, once domestic capacity is established, policymakers will resort to a familiar strategy of erecting barriers and tilting the playing field in favor of local firms, as has happened in many areas for which China initially welcomed foreign investment.⁵⁶ A study by the Mercator Institute of China Studies on Made in China 2025 concludes that industrial policy does not need to be broadly successful, but rather only produce a handful of champions to be substantially impactful to non-Chinese firms' global competitiveness.⁵⁷

Case Study: Semiconductor Manufacturing Equipment

Semiconductor production, an industry where the United States has long been a global leader in the most value-added segments of the supply chain, is chief among the industries in which China is actively encouraging imports to develop domestic capacity.

Building local semiconductor production capabilities has been a policy priority for the Chinese government since the Eighth Five-Year Plan in the mid-1990s, but in the past several years the government has notably increased the ambition of its goals, elevating their priority and revising its strategy. In June 2014, China's State Council launched a plan to replicate the entire semiconductor supply chain domestically through a multipronged strategy of aggressively acquiring overseas expertise, providing state-funding and policy benefits to local champions, and designating a permanent government task force to oversee implementation.⁵⁸ The Made in China 2025 Key Area Technology Roadmap, a detailed implementation plan released in 2015 by a think tank under the State Council and chaired by Vice Premier Ma Kai, reiterated goals to dominate the top of the supply chain and set additional numerical targets for local production and self-sufficiency.⁵⁹ The targets were revised upward in 2017 (see Table 1).⁶⁰ (See "The Global Semiconductor Supply Chain and China's Ambitions for Self-Reliance" for more details.)

Table 1: Semiconductor Production and Self-Sufficiency Targets

	2015 Roadmap Target	2017 Revision Target
Domestic Industry Size by 2020	\$85 billion	\$140 billion
Domestic Consumption Satisfied by Local Producers by 2020	49 percent	58 percent
Domestic Industry Size by 2030	\$183 billion	\$305 billion
Domestic Consumption Satisfied by Local Producers by 2030	75 percent	80 percent

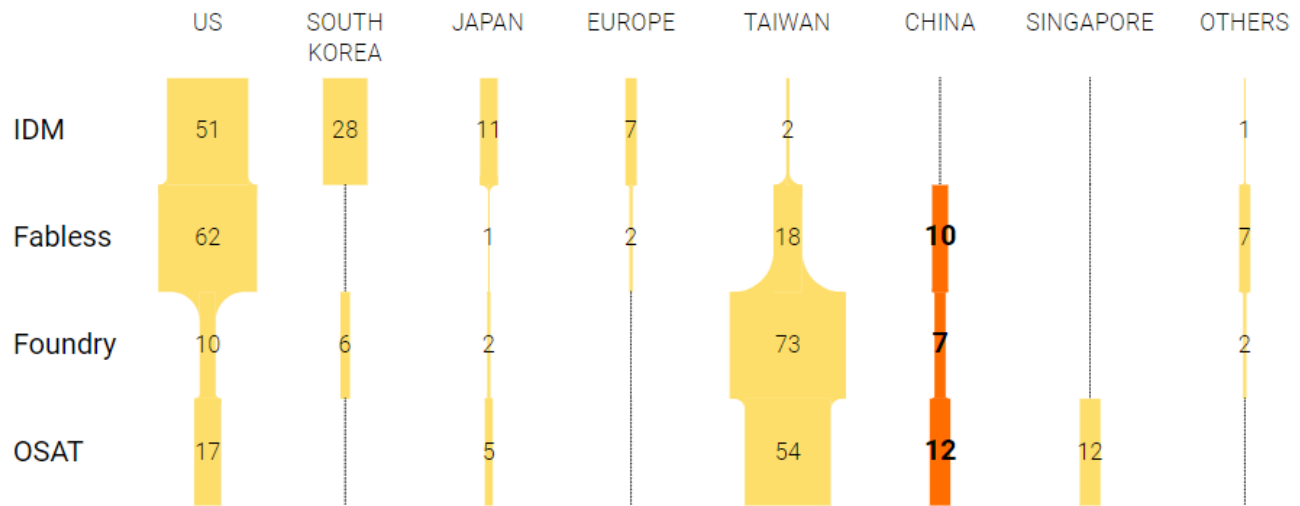
Source: Various.⁶¹

These targets are incredibly ambitious: according to the China Semiconductor Association, the semiconductor industry size—including all segments of the supply chain—was \$57 billion in 2015, compared to global production totaling \$335 billion the same year, according to the Semiconductor Industry Association;⁶² in 2014, the year the initial plan was launched, *China Daily* reported that 90 percent of China’s semiconductor consumption was imported.⁶³

The Global Semiconductor Supply Chain and China’s Ambitions for Self-Reliance

Semiconductor production consists of four broad stages: design, manufacturing, assembly, and testing and packaging.* There are two main production models, each accounting for roughly half of global revenue: firms that combine all functions, called “integrated design manufacturing” (IDM), and firms that design semiconductors (called “fabless” in industry parlance) and then outsource manufacturing (“foundry”) and assembly, testing, and packaging (“OSAT”).⁶⁴ The United States has consistently maintained an advantage in the later stages, accounting for 51 and 62 percent of global revenue for IDM and fabless design, respectively, in 2015; South Korea maintains a distant second in IDM (see Figure 1).⁶⁵ China and Taiwan account for 66 percent of global manufacturing and 81 percent of assembly, testing, and packaging, leveraging economies of scale to perform each function more cost effectively.⁶⁶ This division of labor has resulted in a global supply chain.

* This four-staged schema combines purification of raw materials, slicing of wafers, printing integrated circuits on wafers, and cutting wafers into semiconductors into “manufacturing.” It does not include research and semiconductor manufacturing equipment production, which are also part of the industrial ecosystem. Semiconductor Industry Association, *What Is a Semiconductor?* <https://www.semiconductors.org/semiconductors-101/what-is-a-semiconductor/>; Marcelo Duhalde and Yujing Liu, “‘Made in China 2025’: How Beijing Is Boosting its Semiconductor Industry,” *South China Morning Post*, September 25, 2018. <https://multimedia.scmp.com/news/china/article/2165504/china-2015-semiconductors/index.html>; U.S.-China Economic and Security Review Commission, *Hearing on China’s 13th Five-Year Plan*, written testimony of Jimmy Goodrich, April 27, 2016, 3. https://www.uscc.gov/sites/default/files/Jimmy%20Goodrich_Written%20Testimony%20042716.pdf.

Figure 1: Percent of Global Revenue by Manufacturing Stage

Source: Marcelo Duhalde and Yujing Liu, “‘Made in China 2025’: How Beijing Is Boosting its Semiconductor Industry,” *South China Morning Post*, September 25, 2018. <https://multimedia.scmp.com/news/china/article/2165504/china-2015-semiconductors/index.html>.

China views its dependence on other countries for parts of this supply chain as a critical weakness, however, and hopes to build end-to-end production capabilities domestically.⁶⁷

Where China’s previous attempts to build domestic production capacity focused on achieving technology parity in research, the *Guideline for the Promotion of the Development of the National Integrated Circuit Industry*, issued by the State Council in June 2014, is far more focused on downstream commercial competitiveness.⁶⁸ The Guideline calls for systematically developing capacity to design semiconductors for specific applications, one application at a time.⁶⁹ Implementation has also sought to address directly the shortcomings of previous policy: where earlier efforts were stymied due to poor coordination and fragmented execution among local governments, China now aims to elevate a limited number of national champions.⁷⁰ China has also launched a \$150 billion fund to foster growth and embarked on construction of several new large foundries.⁷¹ If successful in its ambitions, China would become a global heavyweight in fabless design and develop manufacturing facilities capable of producing the most specialized chips, while the United States would lose its primary export market.⁷²

Initial results have been mixed. Overall growth in China’s semiconductor industry averaged 22 percent in 2015–2017 to reach \$83 billion in 2017, making the ambitious targets in the Roadmap seem attainable.⁷³ At first glance, the growth has been well distributed: fabless design accounted for the largest portion of revenue among segments of the supply chain within China during 2017, growing 26.1 percent to \$32 billion, while similar levels of growth in manufacturing and packaging and testing are being driven by process improvements.⁷⁴ Perhaps more impressively, China’s semiconductor design capabilities for mobile devices are now on par with market leaders, although China must outsource manufacture of these semiconductors.⁷⁵

By and large, however, semiconductors produced in China are still second tier compared to U.S. competitors, with no indication they will make headway in the market for the most advanced applications.⁷⁶ Large government investment may also create a surplus of lower-tier production capability, particularly as demand from smartphone manufacturing slows in the next two years. At the same time, advancing to become a technology leader will require far more than government plans and capital: Chinese producers must overcome new managerial challenges, from training, recruiting, and retaining top global talent to managing complex intellectual property (IP) and research and development (R&D) systems.⁷⁷

China’s Purchases of U.S. Semiconductor Manufacturing Equipment Fill a Critical Gap

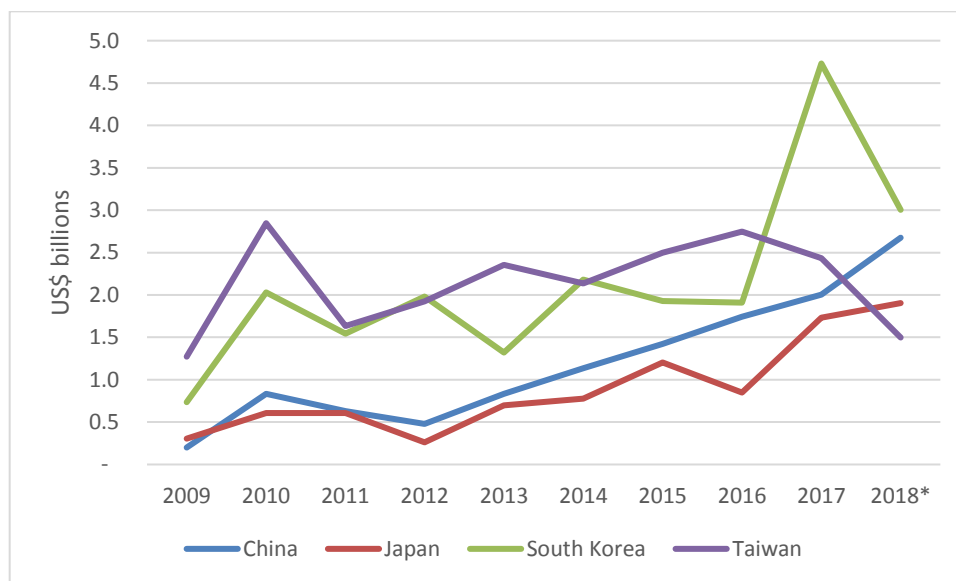
After two decades of policy failure in cultivating a domestic semiconductor industry, China’s renewed top-down approach has had a telling effect on U.S. semiconductor manufacturing equipment (SME) exports to China.* A sharp, policy-driven uptick in purchases highlights a key bright spot in bilateral trade relations, but also creates a long-term vulnerability for one of the United States’ key industries (see “Implications for the United States”).

From 2009 to October 2018, China has gone from the fifth-largest destination of U.S. SME exports to the second largest, increasing imports from \$200 million in 2009 to \$2.7 billion in the first ten months of 2018. By comparison, Taiwan, the largest importer in 2009, has only increased imports from \$1.3 billion to \$1.5 billion over the same period; South Korea, the second fastest growing of top importers, increased imports from \$735 million to \$3 billion, although its imports were already \$2 billion by 2010.

In a clear sign of coordinated Chinese government action, U.S. SME exports have also been spared from China’s retaliatory tariffs despite being the United States’ sixth-largest export to China in 2017; China was the single-largest importer of U.S. SMEs for the months of May through August 2018, with imports growing 311 percent year on year to \$480 billion in July—more than twice the amount it imported annually in 2009—when the first round of tariffs took effect (see Figure 2).⁷⁸ South Korea’s imports during the same month shrank 68 percent to \$135 billion.

Since China included SME in the Catalogue in 2011, annual SME imports have increased more than 2,000 percent as of October 2018; the increase has been linear with virtually no market fluctuation. By contrast, global revenue for final semiconductor sales over the same period increased roughly 50 percent.⁷⁹ While other top importers of semiconductor manufacturing equipment have also increased imports, this is much more closely correlated with their current production capacity, particularly in the case of the largest importer, South Korea.⁸⁰

Figure 2: Top Destination Countries for U.S. SME Exports, 2009–2018 YTD



Note: * Data for 2018 are through October.

Source: U.S. Census Bureau, *USA Trade Online*, January 8, 2019. <https://usatrade.census.gov/>.

* Semiconductor manufacturing equipment is defined as “machines and apparatus for the manufacture of semiconductor devices or of electronic integrated circuits,” code 848620 of the Harmonized Schedule, and unless otherwise noted excludes equipment used in refining basic materials into wafers. United States International Trade Commission, “Nuclear Reactors, Boilers, Machinery and Mechanical Appliances; Parts Thereof,” in *Harmonized Tariff Schedule of the United States (2015) (Rev.2)*, 84–115.

Implications for the United States

The U.S. Department of Commerce's International Trade Administration forecast in mid-2016 that Chinese imports of U.S. semiconductors would be strong but slowing in the next few years. However, it concluded China's "potentially discriminatory policies implemented to support its industry to become self-sufficient pose a real long-term threat to not only U.S. firms but the entire global semiconductor ecosystem."⁸¹ Furthermore, policy-driven demand could create excess SME capacity once demand collapses after China's industrial goals have been fulfilled.⁸²

Shifts in the global electronics demand structure are likely to further disadvantage U.S. semiconductor manufacturers. Marginal innovation in semiconductor manufacturing capability will be much more costly as precision increases down to the nanometer.⁸³ The performance gains of such increases will not be cost effective for many commercial applications, so China's advantage in economies of scale will allow it to address markets and compete with U.S. semiconductor manufacturers, even as the latter maintain an absolute technical advantage.⁸⁴ In short, China's increasing ability to design and manufacture its own chips in foundries built from U.S. SME exports may undermine the United States' global market share in semiconductors.

Lastly, supply chain fears following the U.S. sanctions on ZTE have prompted increased nationalist rhetoric, with both Chinese officials and industry insiders urging expediting local capacity building.⁸⁵ Despite reports indicating China is willing to roll back overt industrial policy objectives to ease trade tensions with the United States, rhetoric may divert from policy: Chinese President and General Secretary of the Chinese Communist Party Xi Jinping twice stressed the "self-reliance" of the Chinese people in his 2019 New Year's address, a term he has invoked in the past to encourage reducing economic dependence on other countries, particularly the United States in the face of escalating trade tensions.⁸⁶ Even if the Chinese government enacts and intends to follow through with policy concessions, Chinese manufacturers may be incentivized to cultivate local sources as a precaution against future bilateral tensions impacting supply chains.⁸⁷

Still, China remains a few generations behind in manufacturing capability and designing semiconductors for the most advanced applications.⁸⁸ As China also has ambitions of becoming a dominant producer of technologies that use these chips, it will need to continue importing from the United States and outsourcing manufacturing to Taiwan to have a chance at realizing some of its other industrial goals.

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