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Staff Research Report



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Trends in U.S. Multinational Enterprise Activity in China, 2000–2017

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Executive Summary

From 2000 to 2017, U.S. multinational enterprises' (MNE) operations* in China, while small relative to those in the United States, have been some of the fastest growing globally of all U.S. MNE foreign subsidiaries. U.S. MNE operations in China center on manufacturing, with manufacturing assets accounting for nearly half of all U.S. MNE assets in China. U.S. MNEs have leveraged China's cheap labor force, large economies of scale, low transportation costs, and concentration of global supply chains to build centers of production for global exports and serve China's growing consumer class. U.S. MNE manufacturing in China focuses mostly on the production of computers and electronic products and, increasingly, chemicals. These industries not only contribute to U.S. companies' global economic competitiveness but also figure prominently in China's national development ambitions.

In analyzing the evolution of U.S. MNE operations in China from 2000 to 2017, this report finds they may indirectly erode the United States' domestic industrial competitiveness and technological leadership relative to China. Additionally, as U.S. MNE activity in China increasingly focuses on the production of high-end technologies, the risk that U.S. firms are unwittingly enabling China to achieve its industrial policy and military development objectives rises. Other specific findings on selected measures of U.S. MNE activity in China include:

- **China's vast consumer market and the Chinese government's coercive policies have incentivized many U.S. MNEs to move their manufacturing operations to China.** U.S. Department of Commerce Bureau of Economic Activity (BEA) data explored in this report indicates the major destination for goods and services supplied by U.S. MNEs in China is the Chinese market itself. In 2017, U.S. MNE foreign affiliates in China sold 82 percent of the goods and services produced in China directly to Chinese customers. At the same time, trade barriers, including localization requirements and export restrictions on key raw materials, have further induced production within China. Sales to Chinese consumers may also constitute sales of intermediate goods and services which might be used in final goods for export to the United States.†
- **U.S. MNEs employ more people in China than in any other country outside of the United States, primarily in the assembly of computers and electronic products.** As of 2017, U.S. MNEs employed 1.7 million people in China, a 574.6 percent increase from the 252,000 people employed in 2000. China ranks as the top destination for all U.S. MNE employment across all manufacturing categories with the exception of food and transportation equipment. Outside of manufacturing, U.S. MNE employment in China is second highest in accommodations and food services, likely due to growing disposable income levels of China's rising middle class, who purchase more services.
- **China is the fourth-largest destination for U.S. MNE research and development (R&D) expenditure and increasingly competes with advanced economies in serving as a key research hub for U.S. MNEs.** The growth of U.S. MNE R&D expenditure in China is also comparatively accelerated, averaging 13.6 percent year-on-year since 2003 compared with 7.1 percent for all U.S. MNE foreign affiliates in the same period. This expenditure is highest in manufacturing, particularly in the production of computers and electronic products, but has diversified over time. For example, R&D expenditure on the improved manufacture of chemicals, including pharmaceuticals, surged nearly 30-fold from a low base of \$13 million in 2000 to \$392 million in 2017.
- **U.S. MNE capital expenditure in China has focused on the creation of production sites for technology products.** This development is aided by the Chinese government's extensive policy support to develop China

* The Bureau of Economic Analysis at the U.S. Department of Commerce defines a U.S. MNE as a U.S.-headquartered company with a domestic business in the United States and one or more reportable foreign affiliates whose assets, sales, or net income exceeded \$60 million at any time during the year for which the BEA collects annual financial and operating data. The BEA collects this data from U.S. MNEs' responses to form BE-11, the Annual Survey of U.S. Direct Investment Abroad. U.S. Department of Commerce, Bureau of Economic Analysis, *A Guide to BEA's Direct Investment Surveys*, April 2018, 6. <https://www.bea.gov/sites/default/files/2018-04/a-guide-to-bea-direct-investment-surveys.pdf>.

† Data on the extent to which U.S. and other foreign-invested enterprises serve the Chinese market or whether they primarily operate within an ecosystem supporting major exporters deserves further examination. For example, one study calculated that 60 percent of China's exports to the United States from 2006–2014 originated in foreign-invested enterprises. See Mary E. Lovely and Yang Liang, "Trump Tariffs Primarily Hit Multinational Supply Chains, Harm U.S. Technology Competitiveness," *Peterson Institute for International Economics*, May 2018, 5. <https://www.piie.com/system/files/documents/pb18-12.pdf>.

into a hub for electronics production, address gaps in the domestic production of technology goods, and maximize access to the technical expertise of multinational firms. For example, U.S. MNE capital expenditure in China for the production of semiconductors, a strategically important electronic component, accounted for nearly a third of all U.S. MNE global capital expenditure on semiconductor manufacturing assets in 2017.

- **China has grown from the 20th-highest source of U.S. MNE affiliate value added in 2000 (\$5.5 billion) to the fifth highest in 2017 (\$71.5 billion), driven primarily by the manufacture of computers and electronic products as well as chemicals.** The surge is especially notable in semiconductors and other electronic components, which accounted for \$5.6 billion of total manufacturing value added in 2017, up 250 percent from \$1.6 billion in 2009. Separately, pharmaceutical manufacturing serves as the largest chemical sector in terms of value added, accounting for \$2.6 billion in 2017.

Introduction

Since Deng Xiaoping launched China’s market-opening measures in the early 1990s, U.S. MNEs have leveraged the country’s low-cost labor, well-developed transportation infrastructure, and central location in regional supply chains to build production for export and to serve the domestic market. This engagement has accelerated since China’s accession to the WTO in 2001. The Chinese government has further compelled U.S. companies to expand their manufacturing operations in China by deploying trade restrictions that push them to localize production.* As a result, U.S. MNE activity in China, including employment, investment in manufacturing plants and equipment, and R&D expenditure, has been among the fastest growing globally over the past two decades and cemented China’s role as the world’s factory.

The costs of more than 15 years of deepening U.S. MNE activity in China have surfaced in recent years. Bilateral trade frictions sparked by China’s unfair economic practices, as well as supply chain disruptions wrought by the outbreak of the novel coronavirus COVID-19, have thrown into stark relief the risks to the United States of U.S. MNEs’ China-centric production networks. While these risks introduce an array of implications for U.S. economic and national security, a full assessment of them is beyond the scope of this report, which surveys U.S. business activity and performance in China only through 2017 (the most recent year for which data is available). Instead, in delineating the profile of U.S. MNE activity in China and tracing its evolution since China’s accession to the WTO, this report aims to provide Congress with a reference on the scope of U.S. commercial operations in China and inform relevant policy debate on how to mitigate selected risks associated with U.S.-China economic interdependence.

Note on Research Scope, Data Sources, and U.S. BEA Survey Methodology

This report uses data exclusively from the U.S. Department of Commerce’s BEA[†] to assess the overall profile of U.S. MNE activity in China since its accession to the WTO. Though this data was updated in August 2019, it lags

* The Chinese government sets localization targets mandating that a minimum share of components and finished products must be produced within China’s borders. Such policies can induce foreign manufacturers to establish joint ventures with Chinese firms to meet such requirements. In testimony before the Commission, Linda Menghetti Dempsey, vice president of international economic affairs at the National Association of Manufacturers, said localization policies related to production or technology mandate local testing and certification requirements for information and communications technology and medical products, among others. Analysis from the Mercator Institute for China Studies (MERICS) adds that such policies, most clearly espoused in the “Made in China 2025” initiative, seek to enable Chinese companies to substitute foreign technology with Chinese technology in the long run. See Linda Menghetti Dempsey, written testimony for U.S.-China Economic and Security Review Commission, *Hearing on U.S. Tools to Address Chinese Market Distortions*, June 8, 2018, 2; Jost Wübbke et al., “Made in China 2025: The Making of a High-Tech Superpower and Consequences for Industrial Countries,” *Mercator Institute for China Studies*, December 2016, 20–21. https://www.merics.org/sites/default/files/2017-09/MPOC_No.2_MadeinChina2025.pdf.

[†] The BEA distinguishes between majority-owned foreign affiliates (MOFAs) and foreign affiliates. Affiliates that are at least 10 percent owned by U.S. parents are categorized as foreign affiliates. A MOFA is a foreign business enterprise in which the combined ownership of all U.S. parents, either directly or indirectly, exceeds 50 percent. As of 2017, MOFAs accounted for about 92 percent of all foreign affiliates and 85 percent of the employment by all foreign affiliates. Given the preponderance of MOFAs in all U.S. MNE global activities, as well as the fact that the BEA collects and publishes more detailed data for MOFAs, this report uses data for MOFAs exclusively in describing and assessing U.S. MNE activities in China and other countries. U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises, 2017*, August 23, 2019, 4. <https://www.bea.gov/system/files/2019-08/omne0819.pdf>.

by two years and only covers U.S. MNE activity through 2017, preventing analysis of more recent trends in U.S. business activity abroad.

This report is modeled on an annual report prepared by the BEA on the worldwide activities of U.S. MNEs. The annual report examines the activities of U.S. MNE parent companies (i.e., the domestic operations of U.S. MNEs in the United States) and their foreign affiliates (i.e., the foreign operations of U.S. MNEs) across several measures, including employment, R&D expenditure, capital expenditure, and value added.

The BEA aggregates relevant data on these activities from responses to a series of surveys of U.S. direct investment abroad. The purpose of these surveys is to measure U.S. MNE activity at home and abroad in terms of revenue, business structure, sales, employment, and other financial and operating data. The specific surveys conducted include:

- *BE-11 Annual Survey of U.S. Direct Investment Abroad:* This is the standard annual survey the BEA conducts among U.S. MNEs. Its principal purpose is to report annual financial and operating data of the U.S. reporter and its foreign affiliates. The BE-11 Annual Survey series includes Form BE-11A, filed for the fully consolidated U.S. domestic business enterprise of a U.S. reporter that has a foreign affiliate, as well as Form BE-11B, filed for the majority-owned foreign affiliate (MOFA) that has a net income of more than \$60 million at the end of the fiscal year. The BE-11 Annual Survey series was last conducted for the fiscal year ending in 2018. Results are expected to be published in the latter half of 2020.
- *BE-10 Benchmark Survey of U.S. Direct Investment Abroad:* The BE-10 Survey is the BEA's most comprehensive survey of U.S. MNE activity. It is conducted once every five years in lieu of the BE-11 annual survey. The most recent benchmark survey covered the fiscal year ending in 2014, and MNEs this year will file BE-10 forms for the 2019 Benchmark survey year, with results to be published in the latter half of 2021. In November 2019, the BEA announced it would solicit new information in the 2019 BE-10 survey, including number of R&D personnel employed by foreign affiliates, their compensation, and what share of R&D they perform for the entire enterprise.¹ The BEA believes these questions will allow it to follow the production and use of intellectual property (IP) in global value chains. It will also for the first time collect information on sales, employment, costs, and expenses related to the provision of goods and services via digital platforms.

Considered in aggregate, the data compiled through the BEA's surveys of U.S. direct investment abroad provides details on the operations of U.S. multinationals in the United States and foreign markets.* (For definitions of key terms used in this report, see the Appendix.)

U.S. MNE Activity at a Glance

The majority of U.S. MNE activities is concentrated in the United States (see Figure 1).² In 2017, U.S. MNE parents in the United States employed 28.1 million workers, accounting for 66.1 percent of worldwide U.S. MNE employment; performed \$298.3 billion worth of R&D, accounting for 84.1 percent of worldwide U.S. MNE R&D expenditure; spent \$653.6 billion on capital, accounting for 76.6 percent of worldwide U.S. MNE capital expenditure; and had a value added of \$3.9 trillion, or 73.6 percent of worldwide U.S. MNE value added.³

* For more information on the BEA's surveys of U.S. direct investment abroad, see U.S. Department of Commerce, Bureau of Economic Analysis, *A Guide to BEA's Direct Investment Surveys*. <https://apps.bea.gov/surveys/pdf/a-guide-to-bea-direct-investment-surveys.pdf>.

Figure 1: Activities of U.S. MNEs, Selected Years



Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

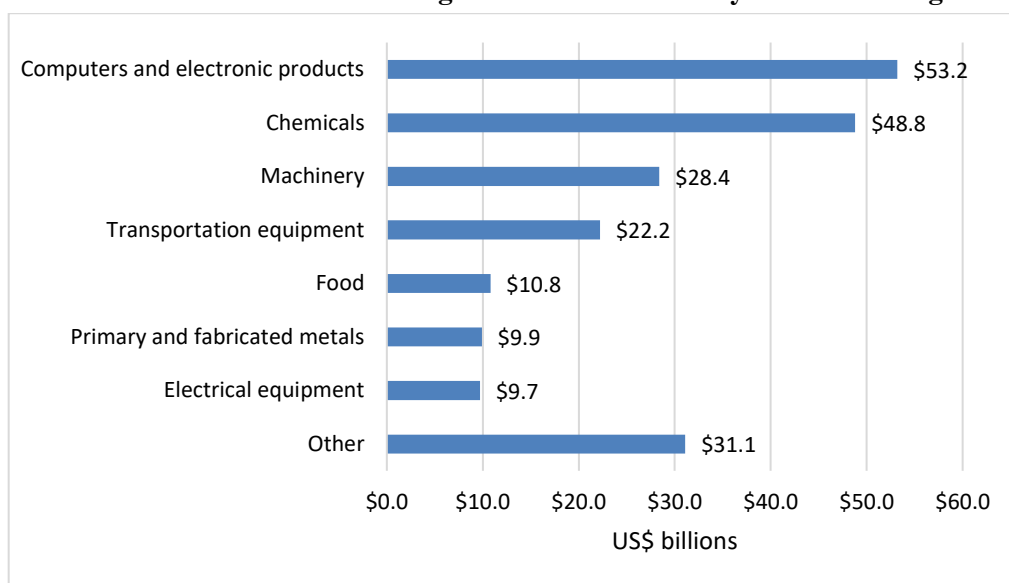
Though U.S. MNE parents comprise the bulk of worldwide U.S. MNE activity, foreign affiliates’ activities have grown across all major markets, most dramatically in China (see Table 1).⁴ For example, U.S. MNE foreign affiliate assets in China surged nearly 15-fold from \$29.3 billion in 2000 to \$446.7 billion in 2017.⁵ Sales in China grew at a similarly rapid pace, rising 13-fold from \$26.4 billion in 2000 to \$375.6 billion in 2017.⁶

Table 1: Selected Measures of U.S. MNE Affiliate Activity, 2017

	China Affiliates	All affiliates
Number of Affiliates	1,727	35,374
Percent change over 2000	+277.1%	+66.2%
Assets	\$446.7 billion	\$27.9 trillion
Percent change over 2000	+1,426.8%	+488.2%
Sales	\$375.6 billion	\$6.2 trillion
Percent change over 2000	+1,325.2%	+148.1%

Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

As of 2017, manufacturing assets account for the largest share (48 percent) of U.S. MNE assets in China.⁷ Across sectors, computers and electronic products, chemicals, and machinery dominate U.S. MNE manufacturing investment in China (see Figure 2).⁸

Figure 2: Total Assets of U.S. MNE Foreign Affiliates in China by Manufacturing Sector, 2017

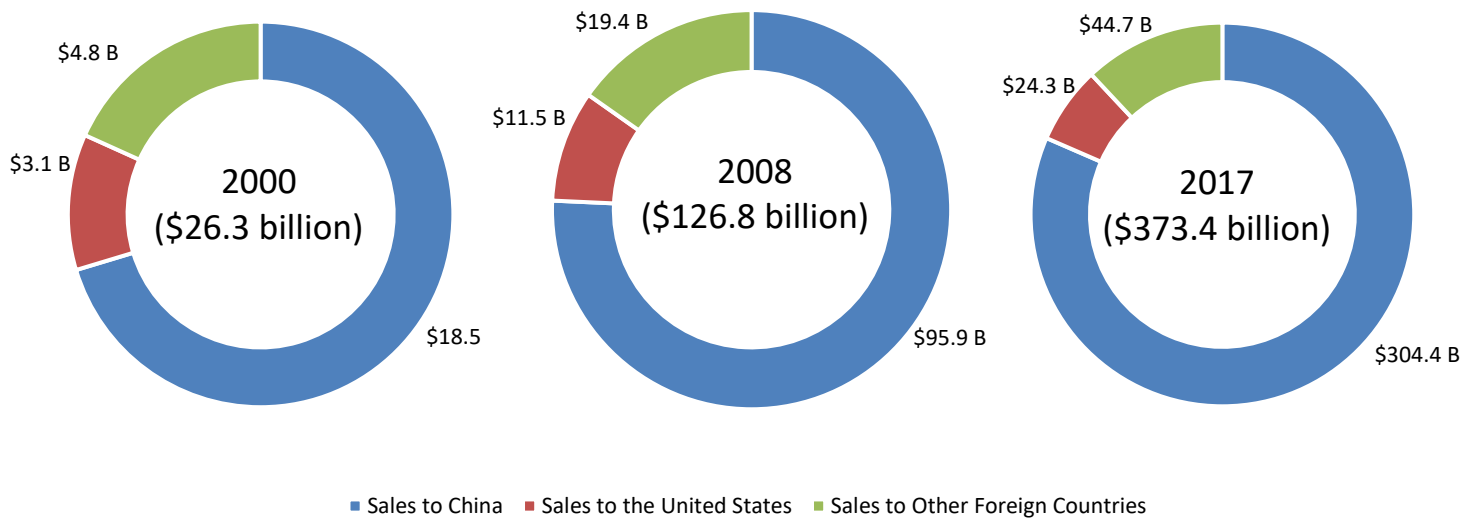
Note: Within the chemicals category, U.S. MNE manufacturing assets are largest for basic chemicals (\$14.7 billion, or 30.1 percent of total chemicals manufacturing assets), followed by pharmaceuticals and medicines (\$9.2 billion, or 18.7 percent of total chemicals manufacturing assets).

Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

Key drivers of U.S. MNE investment in China include relatively lower labor and overhead costs, flexible production and benefits from economies of scale, decreased transportation costs, and proximity to global supply chains.⁹ The Chinese government's industrial policies and related trade restrictions have also coerced foreign companies into expanding their manufacturing operations in China. For example, between 2005 and 2010 Beijing steadily reduced export quotas on rare earth elements, often used in the production of electronic components, making it necessary for many information and communications technology (ICT) equipment manufacturers to locate production in China.¹⁰ As a result, U.S. MNE ICT manufacturing assets in China grew 61.7 percent from \$14.1 billion in 2005 to \$22.8 billion in 2010.¹¹

Production also increasingly serves Chinese consumers. According to BEA data, in 2000 U.S. MNE foreign affiliates in China sold 70 percent of the goods and services they produced in China to the Chinese market; by 2017, the proportion grew to 82 percent (see Figure 3).¹² In addition, though U.S. affiliates in China accounted for only 1.6 percent of U.S. MNE worldwide assets in 2017, they comprised 6 percent of worldwide sales, a number some analysts estimate could grow to 15 percent in 2020.¹³

Figure 3: Destination of Goods and Services Sold by U.S. MNE Foreign Affiliates in China, Selected Years



Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

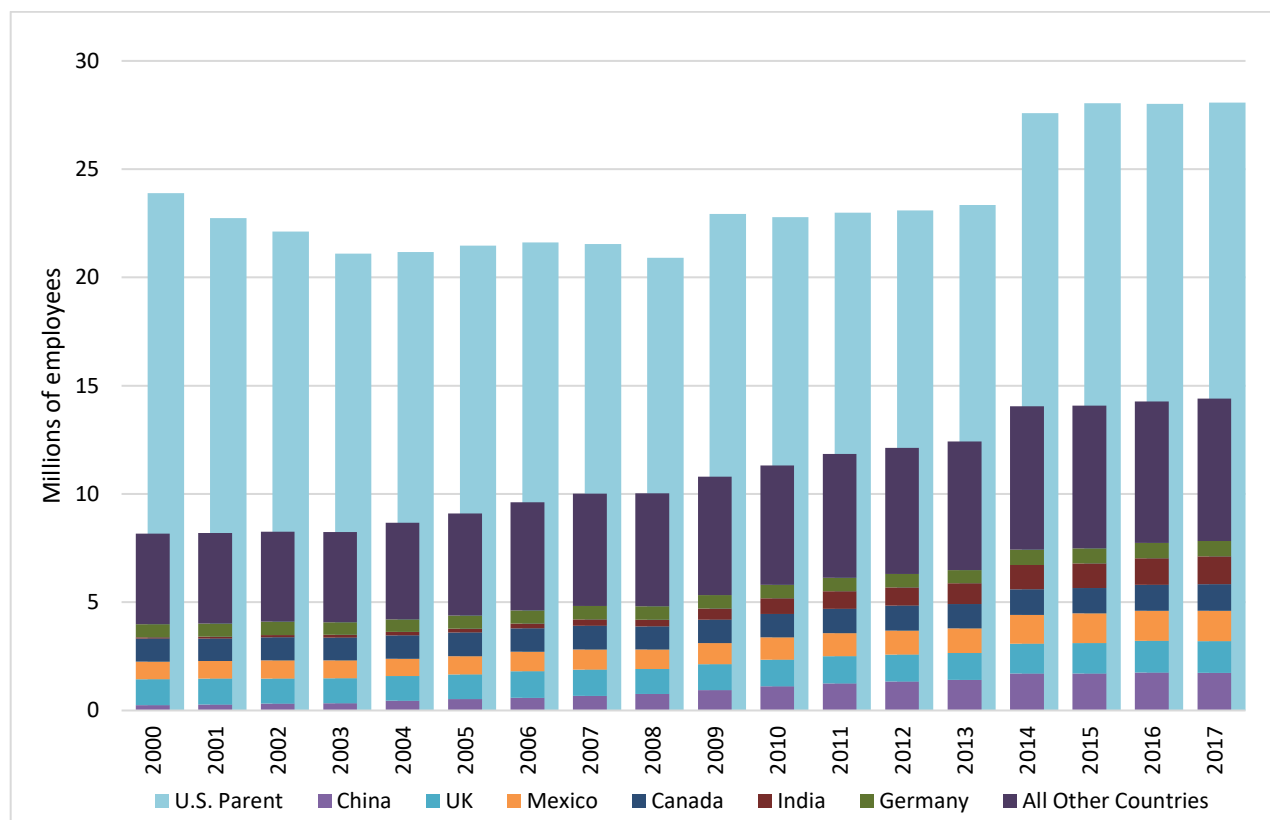
U.S. MNE Activity in China

China Top Destination for U.S. MNE Employment Abroad

U.S. multinationals are proportionally hiring more abroad. In 2017, 34 percent of U.S. MNE employees were employed outside the United States, compared to 25 percent in 2000.¹⁴ Between 2000 and 2017, overall foreign employment* by MNEs grew from 8.2 million people to 14.4 million, a 76 percent increase.¹⁵ As of 2017, China was the single largest foreign destination for U.S. MNE employment: approximately one in ten of these employees, or 1.7 million, were based there (see Figure 4).¹⁶ This represents a six-fold increase from 252,000 employees in 2000.¹⁷ By comparison, total U.S. MNE employment in the United States, though significantly higher at 28.1 million people as of 2017, grew by a more modest 17.5 percent from 23.9 million in 2000.¹⁸

* The data reported by the BEA accounts only for employees directly hired by U.S. MNEs and does not account for employment with third-party companies contracting with U.S. multinationals either at home or abroad.

Figure 4: U.S. MNE Employment by Country, 2000–2017



Note: Data from 2009 and 2014 on U.S. MNE employment abroad is based on “benchmark surveys” of U.S. direct investment abroad. Benchmark surveys, which are conducted every five years, are the BEA’s most comprehensive surveys in terms of coverage of companies. Consequently, the marked increase in U.S. MNE foreign affiliate employment from 2008 to 2009 and 2013 to 2014 reflects the improved and expanded coverage of these activities in the benchmark surveys. U.S. Department of Commerce, Bureau of Economic Analysis, *Worldwide Activities of U.S. Multinational Enterprises: Revised Results from the 2014 Benchmark Survey*, November 2017. <https://www.bea.gov/system/files/methodologies/MNE%2014-R%20Methodology.pdf>.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

The sharp uptick in U.S. MNE employment in China is partly due to the emergence of China’s consumer class, with U.S. MNEs investing in the production of goods and services in China to satiate Chinese demand. China’s disposable income per capita surged nearly six-fold from \$521.88 (renminbi [RMB] 3,721.34) in 2000 to \$3,642.58 (RMB 25,973.79) in 2017.*¹⁹ U.S. MNE employment in China tracked this growth trajectory, increasing 574.6 percent from just 252,000 people employed in 2000 to 1.7 million people in 2017.^{† 20}

Nearly half of total U.S. MNE employment in China is concentrated in manufacturing, primarily the assembly of computers and electronic products (see Figures 5 and 6).²¹ In 2017, U.S. MNEs employed 763,500 persons in manufacturing jobs in China. According to the Deloitte Global Manufacturing Competitiveness Index, in addition to China’s growing consumer class, the country’s robust raw material supply base[‡] and well-developed physical infrastructure serve as major draws for U.S. MNE manufacturing investment in China.²² As a result, China ranks as

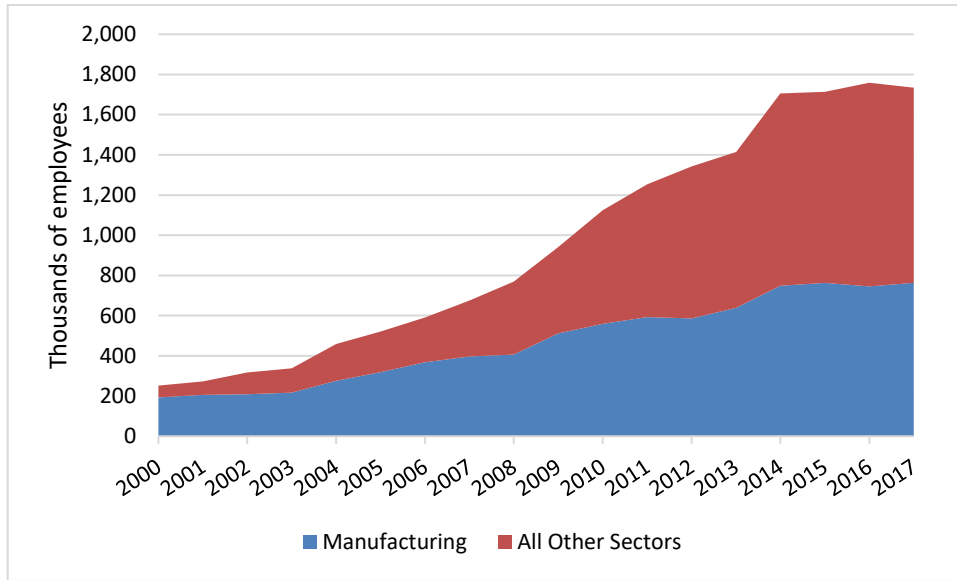
* This estimate is based on an exchange rate of \$1 = renminbi (RMB) 7.13.

† The only other major country to experience similar growth is India, where 1.3 million employees worked in 2017, a 1,736 percent surge from a low base of 70,800 employees in 2000. U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

‡ In its 2019 report on China’s WTO compliance, the United States Trade Representative noted China is the world’s top producer for a range of raw materials used in manufacturing. The Chinese government has historically controlled exports of raw materials where it holds this leverage, in turn pressuring foreign producers to move operations, jobs, and technology to China. See Office of the U.S. Trade Representative, *2019 Report to Congress on China’s WTO Compliance*, March 2020, 35. https://ustr.gov/sites/default/files/2019_Report_on_China%E2%80%99s_WTO_Compliance.pdf.

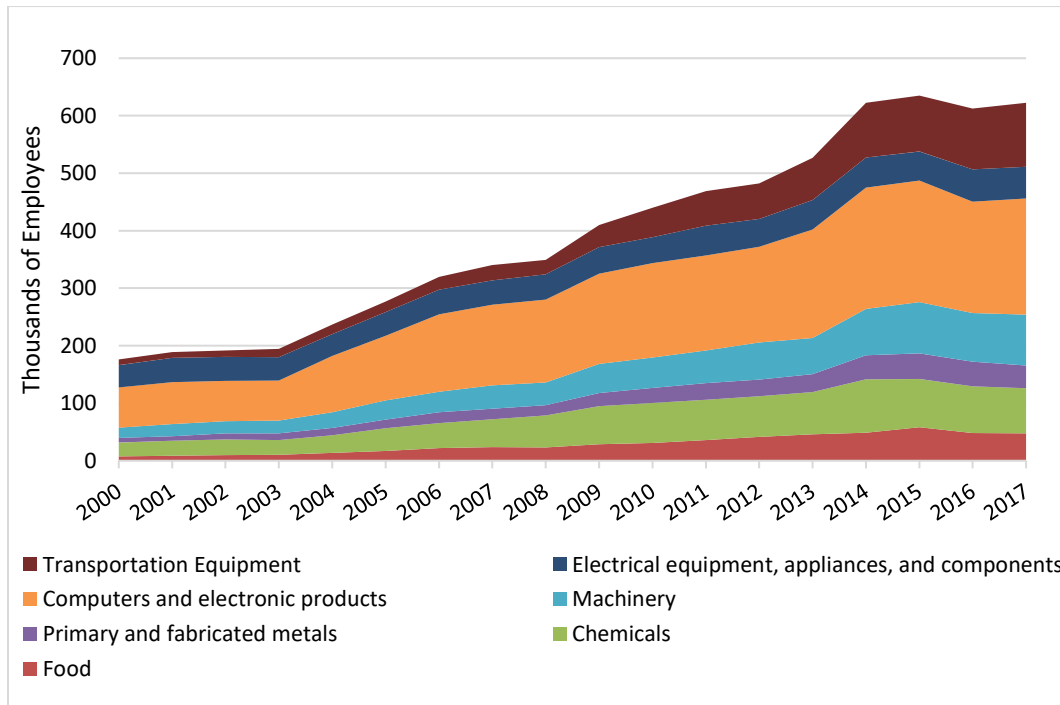
the top destination for U.S. MNE employment abroad for all manufacturing categories, excluding food and transportation equipment, where Mexico takes the lead.²³

Figure 5: U.S. MNE Employment in China, Manufacturing and All Other Sectors, 2000–2017



Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

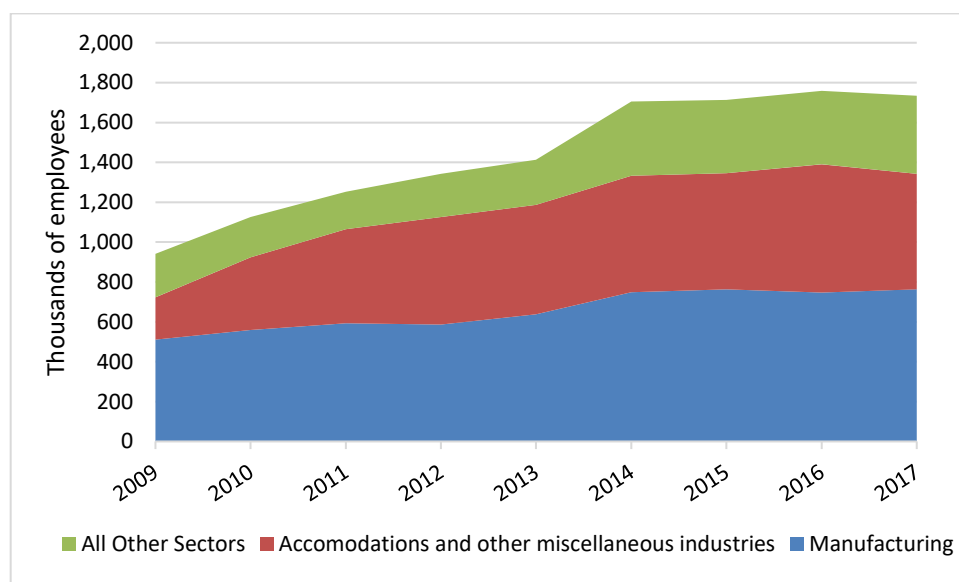
Figure 6: U.S. MNE Manufacturing Employment in China by Sector, 2000–2017



Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

Outside of manufacturing, U.S. MNE employment in China is highest in hospitality industries such as accommodations and food services* (see Figure 7).²⁴ In 2017, U.S. MNEs employed over 440,000 persons in accommodations and food services in China.[†] ²⁵ By comparison, U.S. MNEs employed only 145,000 persons in accommodations and food services in the entire Western Hemisphere (excluding the United States)[‡] in 2017, making China the largest single market for U.S. MNE employment abroad in this category.²⁶ The trend may be attributable to an uptick in domestic Chinese tourism: according to data from China’s Ministry of Culture and Tourism, more than five million Chinese citizens traveled domestically for leisure or business in 2017, up 572 percent from 744,500 in 2000.²⁷

Figure 7: U.S. MNE Employment in China, Manufacturing and Accommodations and Other Miscellaneous Industries, 2009–2017



Note: BEA data does not report subindustry figures from before 2009. The Accommodations and Other Miscellaneous Industries category contains accommodation and food services; agriculture, forestry, fishing, and hunting; construction; utilities; transportation and warehousing; real estate and rental and leasing; management of nonbank companies and enterprises; administration, support, and waste management; healthcare and social assistance; and miscellaneous services.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

China Emerging as a Competitive Research Hub for U.S. Companies

Though U.S. MNE parent R&D expenditure[§] in 2017 (\$298.3 billion) greatly overshadowed that of China (\$3.7 billion), R&D activity in China has grown at a comparatively accelerated rate. In 2000, the year before China’s accession to the WTO, U.S. MNE R&D expenditure in China was tenth highest globally, at \$506 million.²⁸ U.S. MNE R&D expenditure in China ballooned 631.2 percent to \$3.7 billion in 2017, with China surpassing advanced

* The BEA defines accommodation and food services as a sector comprising establishments that provide customers with lodging and/or that prepare meals, snacks, and beverages for immediate consumption. The sector includes both accommodation and food services establishments because the two activities are often combined at the same establishment, such as in hotels. U.S. Department of Commerce, Bureau of Economic Analysis, *Guide to Industry Classifications for International Surveys 2017*, April 2018, 90. <https://www.bea.gov/sites/default/files/2018-04/2017-industry-code-guide.pdf>.

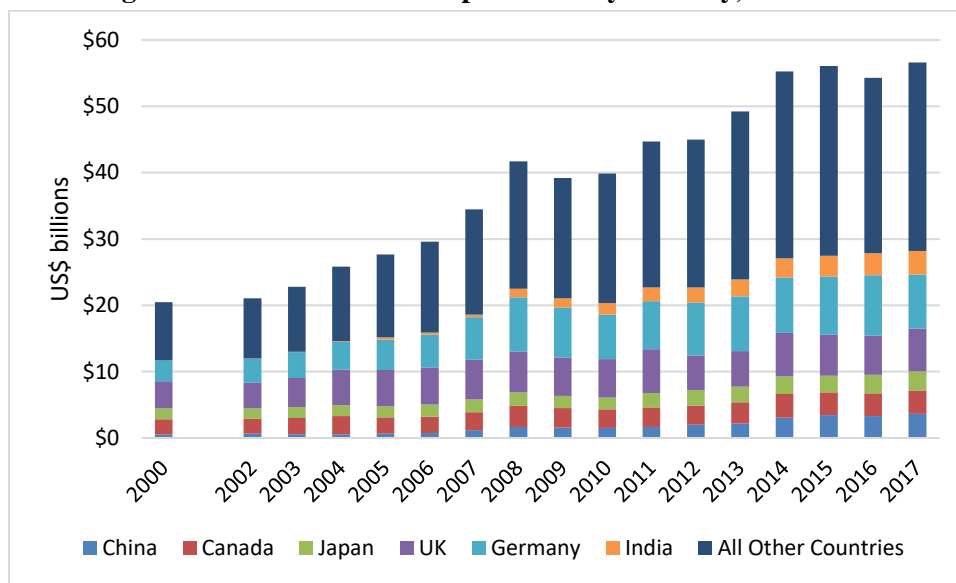
† BEA data for U.S. MNE accommodations and food services employment in China is suppressed to avoid disclosure of data of individual companies. Though the precise number of persons is not reported, the BEA reports ranges in which employment numbers fall. The number reported here is a minimum calculated by Commission staff based on available BEA data.

‡ Western hemisphere here refers to Canada and countries in Latin America and the Caribbean.

§ Total R&D expenditures cover employee compensation expenses (including stock-based compensation), materials and supplies, depreciation expense, computer software, utilities, travel, professional dues, taxes, insurance, maintenance and repair, and allocated company overhead. Kassu Hossiso, “Activities of U.S. Multinational Enterprises in 2017,” *Survey of Current Business* 99:9 (September 2019): 16. <https://apps.bea.gov/scb/2019/09-september/pdf/0919-multinational-enterprises.pdf>.

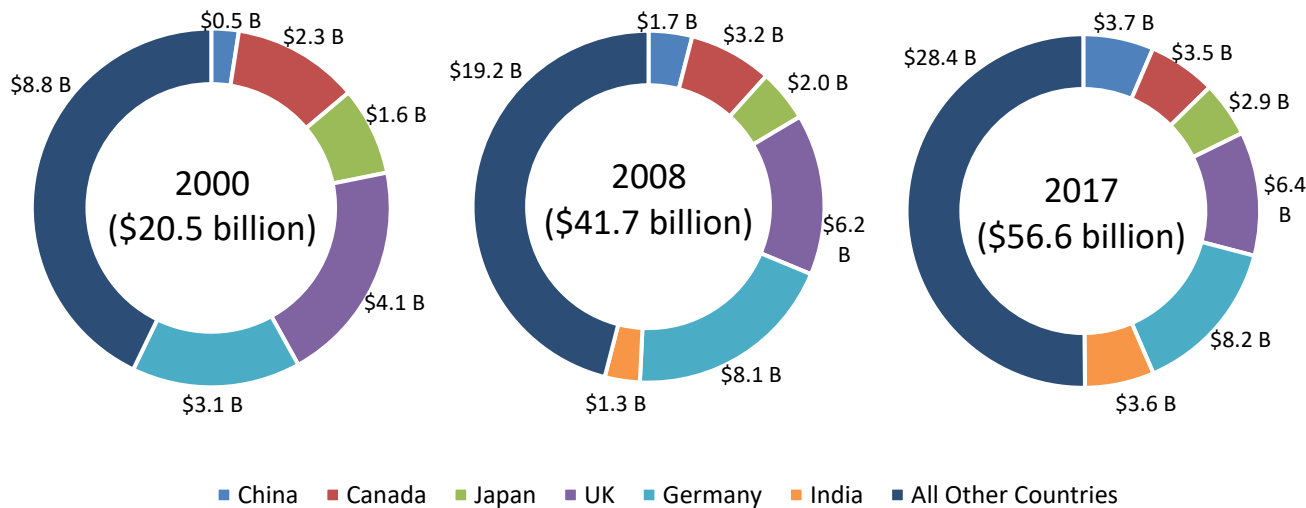
economies such as Canada, Japan, and France to become the fourth-largest destination for U.S. MNE R&D expenditure abroad that year.²⁹ U.S. MNE R&D expenditure is also growing faster in China, averaging 13.6 percent year-on-year growth since 2003* compared with 7.1 percent for all U.S. MNE foreign affiliates and just 5 percent for U.S. MNE parents in the United States in the same period (see Figures 8 and 9).³⁰

Figure 8: U.S. MNE R&D Expenditure by Country, 2000–2017



Note: BEA data for U.S. MNE MOFA R&D expenditure in China in 2001 is suppressed to avoid disclosure of data of individual companies. Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

Figure 9: U.S. MNE Foreign R&D Expenditure, Selected Years



Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

The uptick in U.S. MNE R&D expenditure since 2000 has coincided with Beijing’s concerted efforts to promote innovation and encourage the development of higher-value-added industries. For example, the State Council’s *National Medium- and Long-Term Program for Science and Technology Development*, published in 2006, outlined

* BEA data for U.S. MNE R&D expenditure in China in 2001 is suppressed to avoid disclosure of data of individual companies. Given the unavailability of the data, the average annual growth rate for U.S. MNE MOFAs in China versus U.S. MNE MOFAs worldwide is calculated from 2003.

an array of goals to elevate China’s global leadership in science and innovation. These included the establishment of “world-caliber contingents of scientists and research teams” as well as “world-competitive R&D centers.”³¹ Crucially, the plan states that “without emphasizing assimilation, absorption, and re-innovation,” efforts to advance R&D capabilities will falter.³² Beijing has encouraged foreign companies’ investment in R&D operations in China in sectors where it lacks the capacity, expertise, and technological know-how to conduct advanced research or manufacture advanced technology.³³ For example, major U.S. pharmaceutical and biotechnology firms such as Pfizer, Merck, and AbbVie have established R&D centers in China.³⁴

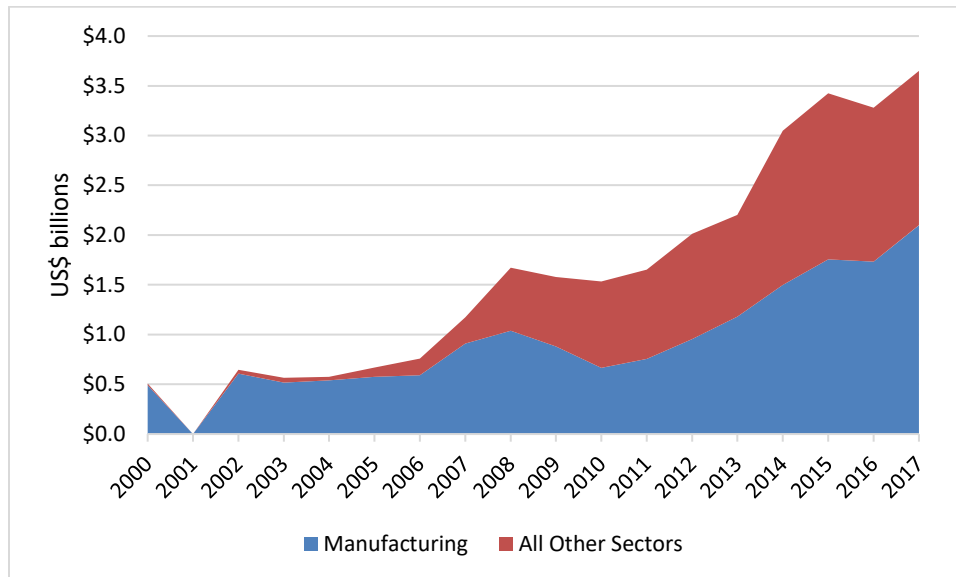
Increased U.S. MNE R&D activity in China enables U.S. companies to better tailor their products to the Chinese market. According to a 2018 survey conducted by the American Chamber of Commerce in Shanghai,^{*} 75 percent of U.S. MNEs cite meeting the demands of the Chinese market as a primary reason for establishing R&D operations in China.³⁵ U.S. MNEs also take advantage of China’s relatively high number of science and engineering professionals, a talent pool Beijing has worked to cultivate.[†] Data from the U.S. National Science Board reveals that the number of undergraduate science and engineering degrees granted by Chinese universities quadrupled from 360,000 in 2000 to 1.7 million in 2015, while those awarded in the United States grew a more modest 50 percent from 503,467 to 751,195 in the same period.³⁶

U.S. MNE R&D expenditure in China has been highest in manufacturing, growing 328 percent from \$491 million in 2000 to \$2.1 billion in 2017 (see Figure 10).³⁷ Among manufacturing sectors, R&D expenditure is highest in computers and electronic products, but it has diversified over time as China’s pool of science and engineering talent has expanded (see Figure 11). For example, R&D expenditure in the chemicals sector has grown nearly 30-fold from a low base of \$13 million in 2000 to \$392 million in 2017.³⁸

^{*} The survey solicited information from 52 member companies conducting R&D in China. The largest group of respondents were high-end manufacturers (42 percent of total respondents) followed by biopharmaceutical firms (19.2 percent). The remaining respondents represented the IT, chemical, and consumer goods industries. The majority of firms surveyed (67.3 percent) had conducted R&D in China for more than ten years. Doug Strub and Veomayoury Baccam, “Chasing Innovation: R&D Barriers and Incentives in China,” *Viewpoint*, April 2018, 2. https://www.amcham-shanghai.org/sites/default/files/2018-04/R%26D%20viewpoint%202018%20April%20Final%20EN_0.pdf.

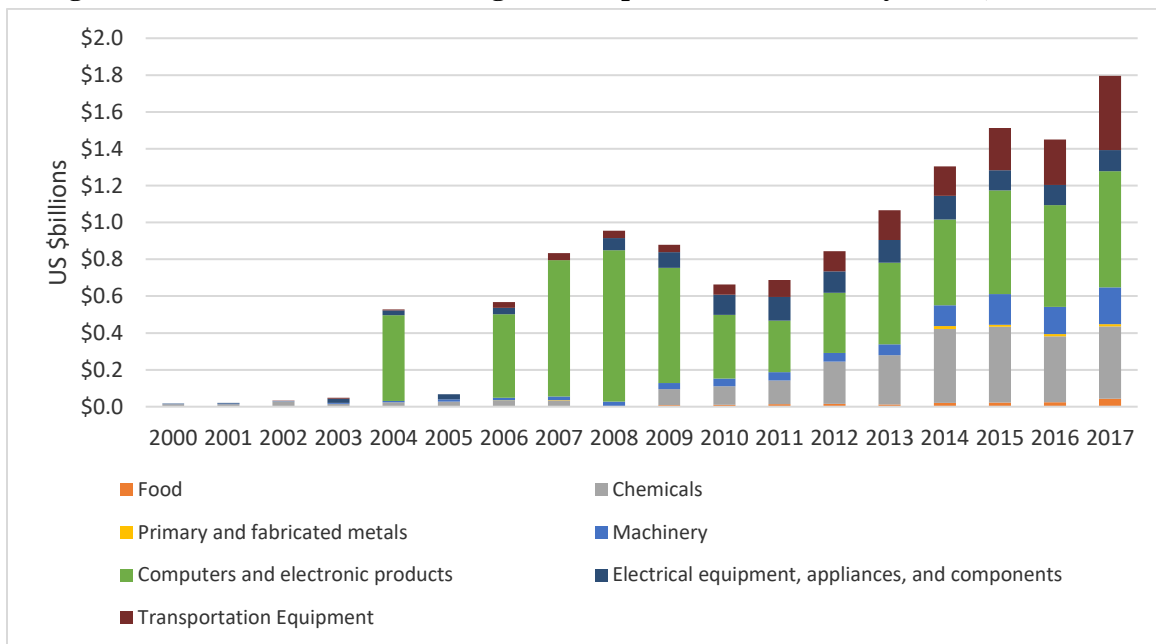
[†] The rapid growth in science and engineering talent in China is attributable to the top-level attention paid by China’s government to developing such expertise. The State Council’s *National Plan for Science and Technology Talent Development (2010–2020)* states that China should strengthen and cultivate talent for R&D personnel in the business sector. Separately, in early 2020 China’s Ministry of Education launched a pilot program to steer more students into courses relevant to integrated circuits and new materials, among others. See Remco Zwetsloot, “China’s Approach to Tech Talent Competition: Policies, Results, and the Developing Global Response,” *Brookings Institution*, April 2020, 2. https://www.brookings.edu/wp-content/uploads/2020/04/FP_20200427_china_talent_policy_zwetsloot.pdf; Nick Marro, “Foreign Company R&D: In China, For China,” *China Business Review*, June 1, 2015. <https://www.chinabusinessreview.com/foreign-company-rd-in-china-for-china/>.

Figure 10: U.S. MNE R&D Expenditure in China, Manufacturing and All Other Sectors, 2000–2017



Note: BEA data for U.S. MNE R&D expenditure in all sectors in 2001 is suppressed to avoid disclosure of data of individual companies. U.S. MNE R&D expenditure for total manufacturing in the years 2009 and 2010 is suppressed to avoid disclosure of data of individual companies, though the BEA does provide data on U.S. MNE R&D expenditure in selected manufacturing sectors in those years. Commission staff estimated approximate U.S. MNE R&D expenditure in total manufacturing in 2009 and 2010 by summing the values for those manufacturing sectors for which BEA data is available. These values were then subtracted from BEA estimates of total U.S. MNE R&D expenditure to calculate approximate U.S. MNE R&D expenditure in all other sectors in 2009 and 2010. Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

Figure 11: U.S. MNE Manufacturing R&D Expenditure in China by Sector, 2000–2017



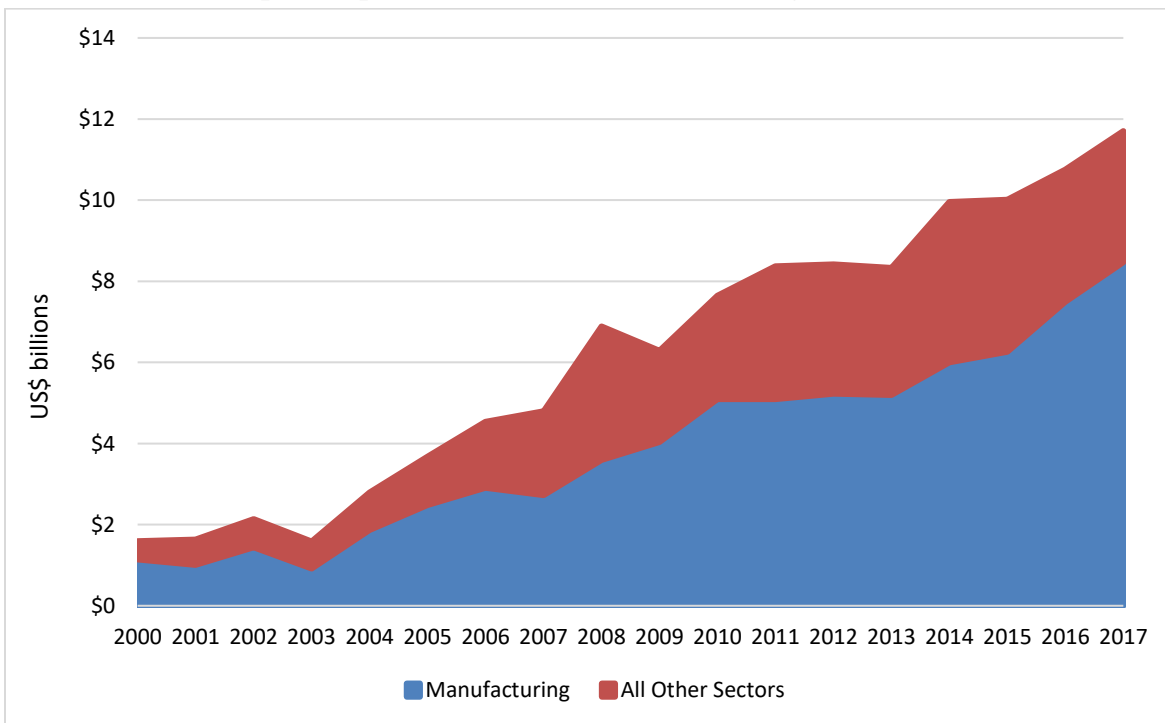
Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

U.S. Investment Fortifies China’s Position in Global Technology Supply Chains

While U.S. MNE parent capital expenditure in the United States (\$653.6 billion) dwarfs U.S. MNE foreign affiliate expenditure in China (\$11.7 billion), the rate of expenditure in China is dramatically higher.³⁹ U.S. MNE capital expenditure in China increased 631.3 percent from \$1.6 billion in 2000 to \$11.7 billion in 2017 (see Figure 12).⁴⁰ Additionally, since China’s WTO accession in 2001, the average annual growth rate for U.S. MNE capital expenditure in China (14.5 percent) has outstripped that of all U.S. MNE foreign affiliates (3.9 percent).⁴¹

As with other measures of U.S. MNE activity in China, U.S. MNE capital expenditure is highest in manufacturing.⁴² An array of factors explain the unique resilience of U.S. MNE expenditure on manufacturing equipment in China, despite the maturation of China’s economy and emergence of other lower-cost centers of production such as Vietnam. For one, China’s scale, robust local supply chains, and increasing adoption of advanced manufacturing capabilities* sustain its competitiveness as a production base.⁴³ The continued expansion of China’s consumer market also serves as a draw. Oxford Economics, for example, has estimated that the contribution of exported goods to manufacturing gross domestic product (GDP) fell from 57 percent in 2007 to 46 percent in 2017, suggesting evidence of internal market growth.⁴⁴ Lastly, localization requirements also compel foreign companies to manufacture a share of their inputs in China or source locally, further incentivizing U.S. MNEs to deepen their operations in the Chinese market.⁴⁵

Figure 12: U.S. MNE Capital Expenditure in China, Manufacturing and All Other Sectors, 2000–2017



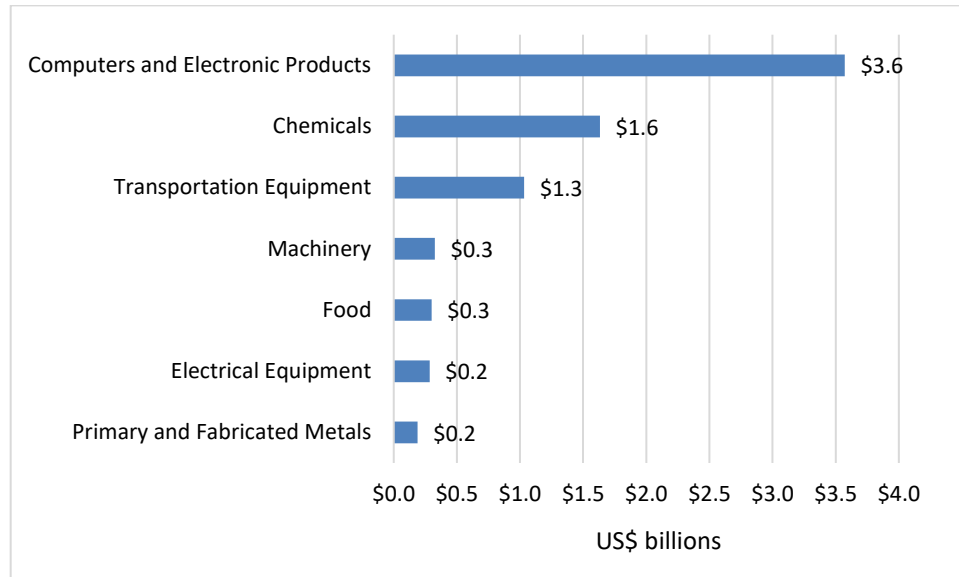
Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

Among manufacturing sectors, U.S. MNE capital expenditure is most strongly focused in computers and electronic products (see Figure 13).⁴⁶ Together with low labor costs and China’s central position in Asian supply chains, the Chinese government’s policy support for the computers and electronics industry has increasingly led U.S.

* For example, China has served as the world’s largest industrial robot market since 2013 and accounted for more than one-third of total installations globally in 2017 and 2018. International Federation of Robotics, “Robot Investment Reaches Record \$16.5 Billion,” September 18, 2019. https://ifr.org/downloads/press2018/2019-09-18_Press_Release_IFR_World_Robotics_2019_Industrial_Robots_English.pdf.

multinational ICT manufacturers to invest in production facilities in China.* This dynamic is especially pronounced for semiconductors. U.S. MNE expenditure on semiconductor manufacturing assets has jumped 166.7 percent from \$1.2 billion in 2010 (the earliest year for which complete BEA data is available) to \$3.2 billion in 2017, accounting for 90 percent of all U.S. MNE expenditure on computers and electronic products manufacturing assets in China (see Figure 14).⁴⁷

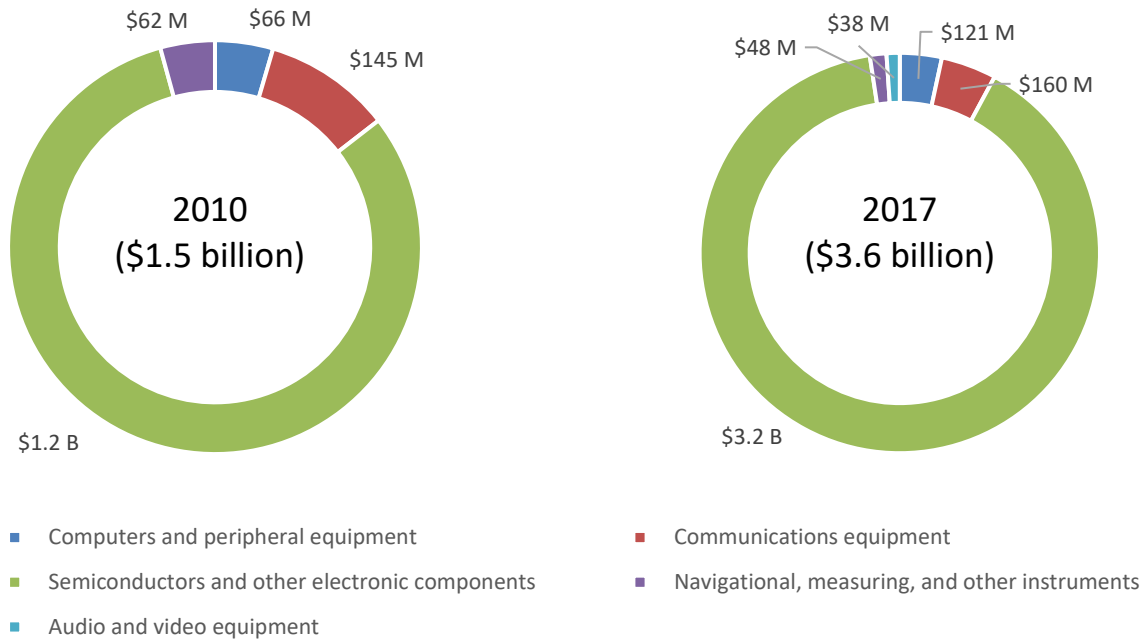
Figure 13: U.S. MNE Capital Expenditure in China by Manufacturing Sector, 2017



Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

* National, provincial, and local funding made available through Beijing’s industrial policy initiatives, such as the 2014 National Integrated Circuit Investment Fund, has incentivized MNEs to establish joint ventures or expand existing business partnerships. One study found that multinational semiconductor manufacturers Intel and Samsung, for example, took advantage of subsidized loans from the Chinese government to expand their existing operations in China. See John VerWey, “Chinese Semiconductor Industrial Policy: Past and Present,” *U.S. International Trade Commission Journal of International Commerce and Economics*, July 2019, 17. https://www.usitc.gov/publications/332/journals/chinese_semiconductor_industrial_policy_past_and_present_jice_july_2019.pdf.

Figure 14: U.S. MNE Capital Expenditure in China, Computers and Electronic Products Manufacturing Sectors, Selected Years

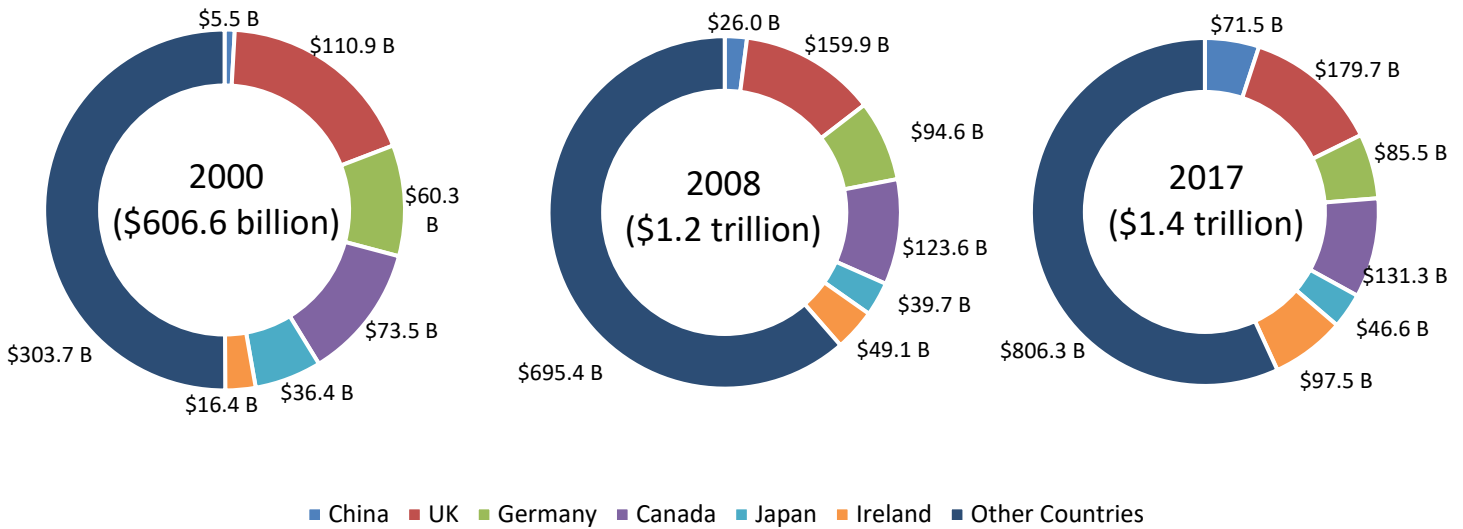


Note: The BEA calculates U.S. MNE capital expenditure on audio and video equipment manufacturing assets in 2010 to be a nonzero value that is rounded to zero. In 2017, U.S. MNE capital expenditure on audio and video equipment manufacturing assets was \$38 million.
Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

China Moving Up the Value-Added Chain

In the last 20 years, China has become a significant source for added value to U.S. MNE activities. As of 2017, China was the fifth-highest source of affiliate value added to U.S. MNEs, contributing 5 percent of all international value-added gross product, up from 20th in 2000 when China contributed just 0.9 percent (see Figure 15).⁴⁸

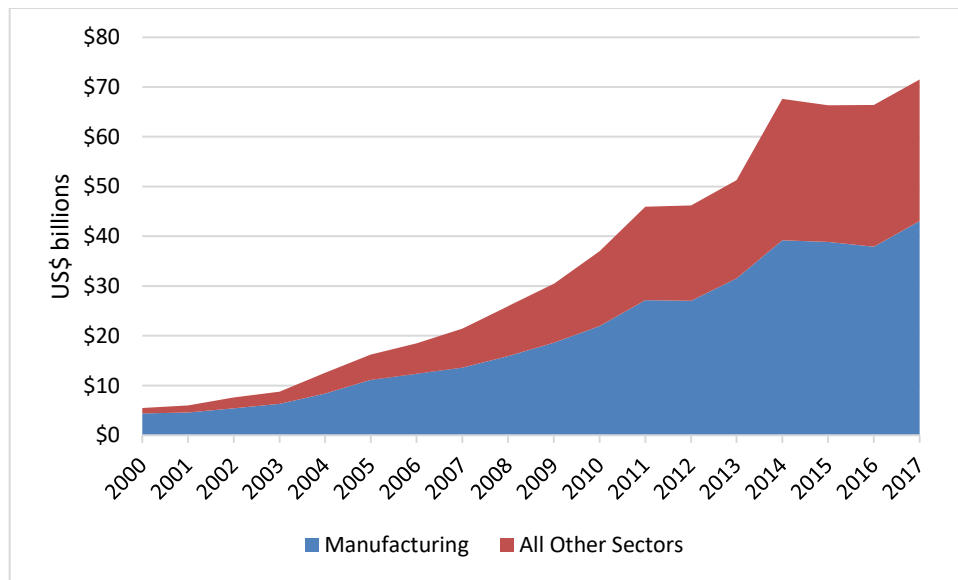
Figure 15: U.S. MNE Foreign Affiliate Value Added by Country, Selected Years



Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

The majority of Chinese affiliates’ value added is in manufacturing (see Figure 16), although this share has decreased from approximately 80 percent of all value added in 2000 to 60 percent in 2017.⁴⁹

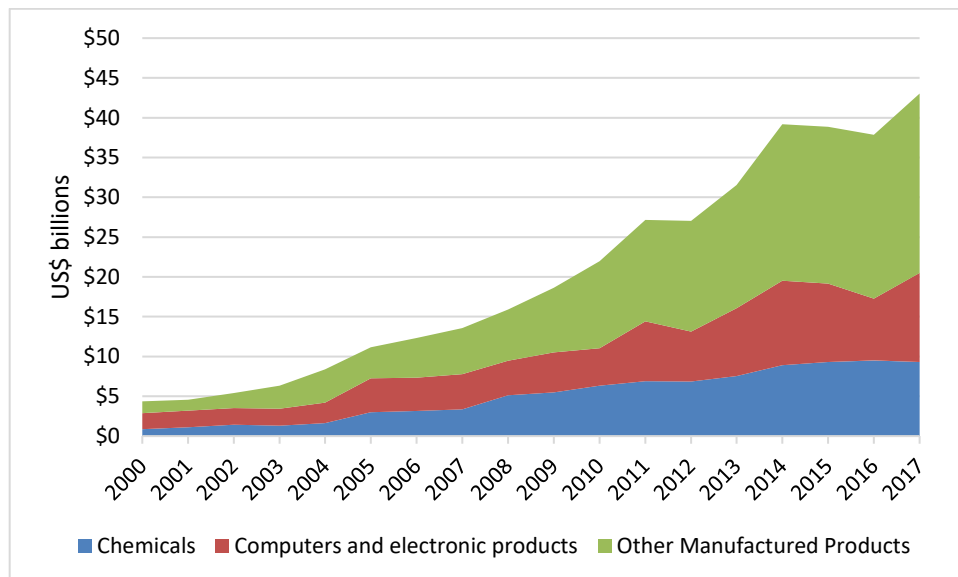
Figure 16: U.S. MNE Value Added in China, 2000–2017



Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

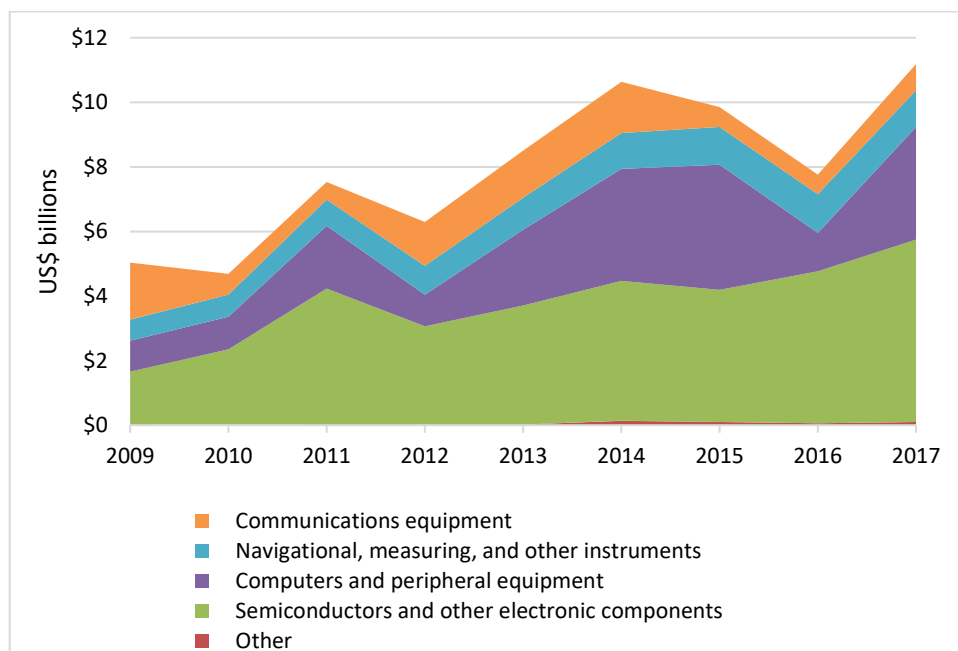
Within manufacturing, value added is driven primarily by computers and electronic products as well as chemicals (see Figure 17).⁵⁰ By subcategory, semiconductors and other electronic components made up the largest portion of manufacturing value added, contributing \$5.6 billion in 2017, 243 percent higher than in 2009.⁵¹ By comparison, the next-largest contributor was computers and peripheral equipment manufacturing, totaling \$3.5 billion in 2017, 266 percent higher than in 2009 (see Figure 18).⁵²

Figure 17: U.S. MNE Value Added in China by Manufacturing Sector, 2000–2017



Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

Figure 18: U.S. MNE Value Added in China, Computers and Electronics Manufacturing, 2009–2017

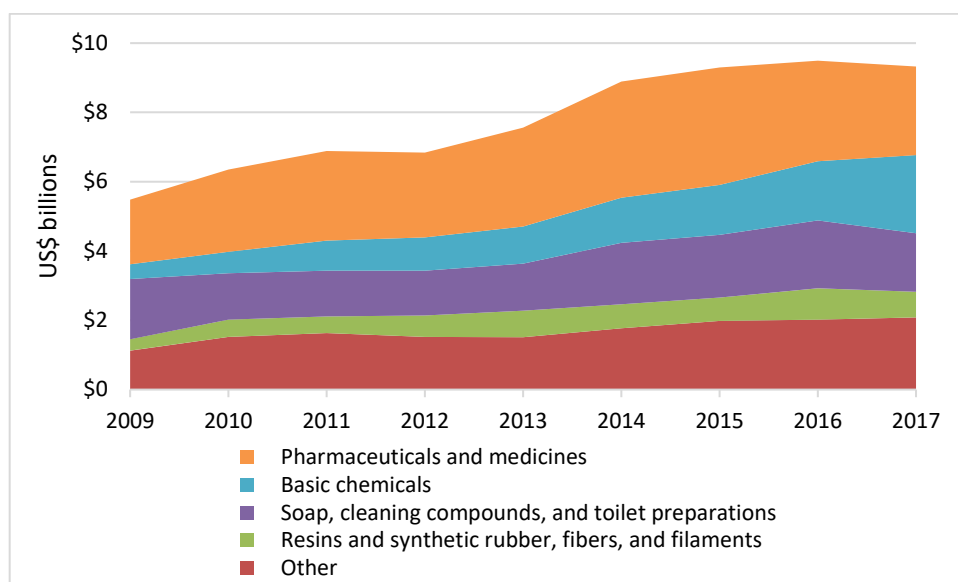


Note: BEA data does not report subindustry figures from before 2009.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

Pharmaceutical manufacturing is the largest chemical sector in terms of value added, accounting for \$2.55 billion in 2017, 37 percent higher than in 2009.⁵³ Basic chemicals value added is close behind at \$2.26 billion in 2017, a 430 percent increase since 2009 (see Figure 19).⁵⁴

Figure 19: U.S. MNE Value Added in China, Chemical Manufacturing, 2009–2017



Note: The BEA does not report subindustry figures from before 2009.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.

Considerations for Congress

While U.S. business operations in China focus principally on manufacturing, higher-value-added activities such as R&D have grown in recent years across a broader array of industries. To the extent that such activities are coerced by Beijing as a price for market access, U.S. companies run the risk of losing their competitiveness in high-technology and other industries in the long term.

Congress should consider approaches to preserve and protect U.S. innovative capacity and leadership as strategic competition between the United States and China heightens. The development of such approaches may necessitate more granular data on the scope of U.S. MNE activity in China, particularly around R&D expenditures. Currently, BEA surveys only require U.S. MNEs to report their level of expenditure on R&D, but not any further information on what kind of research that spending is going toward. Though the current 2019 Benchmark Survey will require MNEs to report the number of R&D personnel employed at foreign affiliates, their compensation, and what share of R&D they perform for the entire enterprise, more detail on the nature of this research and its results (e.g., basic vs. applied; value of IP produced) would be useful to policymakers.

Other features of U.S.-China economic interdependence as facilitated by U.S. commercial operations in China that warrant congressional attention include:

- **Shocks to China’s economy and uneven regulatory enforcement have outsized impacts on the commercial health of U.S. businesses.** As this report finds, U.S. MNEs rely on China as a key source of production of goods for global export and, increasingly, as a driver of global sales. Given China’s growing importance to U.S. MNEs’ global operations, transportation, supply, and labor market disruptions may have a disproportionate impact on their operations and revenue. According to a survey conducted by the Institute for Supply Management,* for example, nearly 75 percent of U.S. companies operating in China report supply chain disruptions in some capacity due to COVID-19-related transportation restrictions, and more than 80 percent believe their business will experience negative impacts beyond the first quarter of 2020.⁵⁵ Such disruptions

* The Institute for Supply Management is a nonprofit professional supply management organization representing 47,000 companies in more than 90 countries. The survey was completed by 628 member U.S. companies with manufacturing (52 percent) and nonmanufacturing (48 percent) operations from February 22 to March 5. Institute for Supply Management, “COVID-19 Survey: Impacts on Global Supply Chains,” March 11, 2020. http://ism.files.cms-plus.com/ISMReport/ISM_Coronavirus%20Survey%20Release_3.11.20_FINAL.pdf.

compound perennial challenges of uneven regulatory enforcement. In its annual survey* of China's business climate, the American Chamber of Commerce in China found that 55 percent of U.S. companies continue to cite inconsistent regulatory interpretation and enforcement as the top challenge of doing business in China in 2019, up from 47 percent in 2015.⁵⁶

- **U.S. MNEs' reliance on China as a source of sales and a pivotal hub for global manufacturing poses a risk of solidifying dependencies for selected industries that bear on U.S. national security. Furthermore, such reliance threatens to heighten the cost of supply chain diversification.** U.S. MNE activity in China focuses chiefly on manufacturing, particularly of computers and electronic products, some of which may be dual use in nature and are critical to global economic competitiveness in the 21st century. China's large market for and dominance of computers and electronic products manufacturing has entrenched it in global computers and electronics value chains. According to a study conducted by the McKinsey Global Institute, China's share of global production of computers and electronic products grew from 21 percent in 2003–2007 to 44 percent in 2013–2017.⁵⁷ China also serves as a top consumer of such products, accounting for 40 percent of global mobile phone sales and 19 percent of global computer sales.⁵⁸ China's centrality in computer and electronics supply chains contributes to the Chinese government's ability to coerce technology or IP from multinationals keen to engage with the Chinese market and make use of its extensive manufacturing networks.⁵⁹ As research prepared for the Commission has noted, U.S. ICT firms' surrender of technology or other proprietary information to Chinese entities as a condition of market access potentially opens them, and the U.S. ICT networks they serve, to Chinese cyberespionage efforts.⁶⁰ Separately, the gradual rise in value added by U.S. MNEs' manufacture of pharmaceutical products in China suggests U.S. MNEs' departure from China as a production hub for pharmaceutical drugs must be carefully assessed alongside the significant presence China occupies in U.S. pharmaceutical supply chains.[†]
- **The Chinese government's access to U.S. innovation is rising in tandem with U.S. MNE activity in China, raising the possibility of increased spillovers in critical technologies and inadvertent U.S. commercial advancement of China's military development.** Many U.S. MNEs prefer to conduct manufacturing R&D in China due to its extensive manufacturing networks, cheaper access to materials and components, and relative abundance of lower-cost science, technology, engineering, and mathematics (STEM) workers and engineers.⁶¹ Manufacturing industry representatives also report that conducting R&D closer to where goods are produced facilitates innovations in both products and their production processes.⁶² These factors together explain the sharp uptick in U.S. MNE R&D activity in China. Data explored in this report suggests this shift accompanies greater capital expenditure in manufacturing assets for ICT equipment, and greater reliance on value-added gross product in key sectors, like pharmaceuticals. The deepening and diversification of U.S. MNE research and production in such high-technology products in China is occurring as the Chinese Communist Party sharpens its influence among private businesses, including MNEs,[‡] and increasingly predicates market access

* The survey was completed by 314 member companies representing large, medium, and small-sized enterprises from a range of industries, including aerospace, healthcare, technology, automotive, energy, consumer products, and financial services, among others, from November 13 to December 16, 2018. American Chamber of Commerce in China, "2019 China Business Climate Survey Report," February 2019, 12–14. <https://www2.deloitte.com/content/dam/Deloitte/au/Documents/international-specialist/deloitte-amcham-2019-china-business-climate-survey-report-bilingual-190301.pdf>.

† As the Commission reported in its *2019 Annual Report to Congress*, China is a key global source of critical generic drugs and pharmaceutical ingredients, with nearly 15 percent of all U.S. drug imports by import line originating directly from China in 2018. Experts estimate a much higher percentage of active pharmaceutical ingredients (APIs) from China—key inputs into finished drugs—are further upstream in the U.S. pharmaceutical supply chain. This dependence on drugs and pharmaceutical ingredients produced in China exacerbates the risk of supply disruptions. The COVID-19 outbreak has brought this risk into sharper relief, with multinational pharmaceutical producers grappling with shortages of Chinese-made pharmaceutical ingredients caused by extended factory closures. Stephen Findlay, Hannah Kuchler, and Sarah Neville, "Drugmakers Braced for Coronavirus Disruption to China Supplies," *Financial Times*, February 12, 2020. <https://www.ft.com/content/8630c51c-4cc0-11ea-95a0-43d18ec715f5>; U.S.-China Economic and Security Review Commission, Chapter 3, Section 3, "Growing U.S. Reliance on China's Biotech and Pharmaceutical Products," in *2019 Annual Report to Congress*, November 2019, 248–282.

‡ According to the U.S.-China Business Council, some U.S. companies in joint venture agreements with state-owned enterprises have reported requests to alter corporate articles of association to support Party cells and allow critical issues to be approved by Party cells before presenting them to the board. Jake Laband, "Fact Sheet: Communist Party Groups in Foreign Companies in China," *U.S.-China Business Council*, May 31, 2018. <https://www.chinabusinessreview.com/fact-sheet-communist-party-groups-in-foreign-companies-in-china/>.

on R&D collaboration.* Heightened Chinese Communist Party influence and forced transfer of technology to Chinese entities may result in U.S. MNE commercial innovation in China being leveraged to realize industrial policy ambitions and aid China’s military development, per Beijing’s military-civil fusion strategy.† The *Next Generation Artificial Intelligence (AI) Development Plan*, for example, explicitly calls on local governments to push foreign artificial intelligence enterprises to establish R&D centers in China.⁶³

Further Reading

- **COVID-19 impact on U.S. supply chains:** Kaj Malden and Suzanna Stephens, “Cascading Economic Impacts of the COVID-19 Outbreak in China,” *U.S.-China Economic and Security Review Commission*, April 21, 2020.
- **Challenges posed by Chinese industrial policies:** U.S.-China Economic and Security Review Commission, “U.S.-China Commercial Relations,” in *2019 Annual Report to Congress*, November 2019.
- **U.S. reliance on China’s pharmaceutical products:** U.S.-China Economic and Security Review Commission, “Growing U.S. Reliance on China’s Biotech and Pharmaceutical Products,” in *2019 Annual Report to Congress*, November 2019.
- **IP leakage risks in military-applicable critical technologies:** U.S.-China Economic and Security Review Commission, “Emerging Technologies and Military-Civil Fusion - Artificial Intelligence, New Materials, and New Energy,” in *2019 Annual Report to Congress*, November 2019.
- **China’s forced technology transfer:** Sean O’Connor, “How Chinese Companies Facilitate Technology Transfer from the United States,” *U.S.-China Economic and Security Review Commission*, May 6, 2019.
- **Limitations of China’s IP system:** U.S.-China Economic and Security Review Commission, “Tools to Address U.S.-China Economic Challenges,” in *2018 Annual Report to Congress*, November 2018.
- **China’s coercive foreign investment climate:** U.S.-China Economic and Security Review Commission, “Foreign Investment Climate in China,” in *2015 Annual Report to Congress*, November 2015.

* For example, U.S. pharmaceutical company Eli Lilly was afforded access to the Chinese market only after it formed an R&D partnership with Shanghai-based Innovent Biologics in 2015 to codevelop cancer drugs. Mark Kazmierczak et al., “China’s Biotechnology Development: The Role of U.S. and Other Foreign Engagement,” *Gryphon Scientific* (prepared for the U.S.-China Economic and Security Review Commission), February 14, 2019, 64.

† The Chinese government’s military-civil fusion strategy aims to mobilize private sector innovation in modernizing China’s military capabilities, raising the risk that U.S. MNE business partnerships and collaborations in China could aid China’s military development. For example, the *Financial Times* reported that Microsoft Research Asia, Microsoft’s Beijing-based unit for Asia-Pacific R&D activity, collaborated with researchers affiliated with China’s National University of Defense Technology on artificial intelligence research that could be used for surveillance and censorship. Madhumita Murgia and Yuan Yang, “Microsoft Worked with Chinese Military University on Artificial Intelligence,” *Financial Times*, April 10, 2019. <https://www.ft.com/content/9378e7ee-5ae6-11e9-9dde-7aedca0a081a>.

Appendix: Definitions

U.S. multinational enterprise (MNE): The U.S. parent and its foreign affiliates.

U.S. parent: A person, partnership, corporation, or other organization residing in the United States that owns 10 percent or more of a foreign business enterprise, referred to as its foreign affiliate. In this report, all references to U.S. parent activities refer to the domestic operations and activities of U.S. MNEs in the United States. The worldwide operations of a U.S. MNE reflect both its domestic operations, represented by the U.S. parent company, and its foreign operations, represented by the foreign affiliates.

Foreign affiliates: Affiliates that are at least 10 percent owned by U.S. parents.

Majority-owned foreign affiliate (MOFA): A foreign business enterprise in which the combined ownership of all U.S. parents, either directly or indirectly, exceeds 50 percent. In 2017, MOFAs accounted for about 92 percent of all foreign affiliates and 85 percent of the employment by all foreign affiliates.

- Given the preponderance of MOFAs in all U.S. MNE global activities, as well as fact that the U.S. Department of Commerce's Bureau of Economic Analysis (BEA) collects and publishes more detailed data for MOFAs, this report uses data for MOFAs exclusively in describing and assessing U.S. MNE activities in China and other countries.

Employment: The total number of full-time and part-time employees on the payroll at the end of the year.

Research and development (R&D) expenditures: The expenditures for R&D performed by the U.S. parent or its foreign affiliate, whether the R&D was for their own use or for use by others and irrespective of the source of funding.

Value added: The value of final goods and services produced by a firm's labor and property. It represents the firm's contribution to gross domestic product (GDP) in the firm's country of residence. The measure is calculated by summing cost and profit data collected by the BEA's surveys of U.S. MNEs' direct investment abroad.

Capital expenditure: The expenditure for property, plant, and equipment, and covers total expenditures for land and depreciable structures and equipment. These expenditures are gross any sales, retirements, or transfers of previously owned and tangible assets.

Endnotes

- ¹ U.S. Department of Commerce, Bureau of Economic Analysis, “Direct Investment Surveys: BE-10, Benchmark Survey of U.S. Direct Investment Abroad,” *Federal Register* 84:218 (November 12, 2019). <https://www.federalregister.gov/documents/2019/11/12/2019-24414/direct-investment-surveys-be-10-benchmark-survey-of-us-direct-investment-abroad>.
- ² U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.
- ³ U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.
- ⁴ U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.
- ⁵ U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.
- ⁶ U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.
- ⁷ U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.
- ⁸ U.S. Department of Commerce, Bureau of Economic Analysis, *Activities of U.S. Multinational Enterprises*, August 23, 2019. <https://www.bea.gov/data/intl-trade-investment/activities-us-multinational-enterprises-mnes>.
- ⁹ Alexander Hammer, “Why Have U.S. Firms Offshored to China,” *U.S. International Trade Commission Executive Briefings on Trade*, June 2017, 1–2.
- ¹⁰ Wayne M. Morrison and Rachel Tang, “China’s Rare Earth Industry and Export Regime: Economic and Trade Implications for the United States,” *Congressional Research Service*, April 30, 2012, 17. <https://fas.org/sgp/crs/row/R42510.pdf>; Keith Bradsher, “Chasing Rare Earths, Foreign Companies Expand in China,” *New York Times*, August 24, 2011. <https://www.nytimes.com/2011/08/25/business/global/chasing-rare-earths-foreign-companies-expand-in-china.html>.
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