



Impacts of Global Supply Chain Changes in the Post-Pandemic Environment in Texas

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TABLE OF CONTENTS

Abstract.....	ii
Global Supply Chain.....	1
Nearshoring.....	4
U.S.-China and Texas-China Trade.....	5
Asia-U.S. and Mexico-U.S. Supply Chains.....	7
U.S.-Mexico and Texas-Mexico Trade and Supply Chains.....	7
Nearshoring Scenarios.....	9

LIST OF FIGURES

Figure 1. World International Trade 1990–2019.....	1
Figure 2. Manufacturing Output for Top Five Countries in 2013.....	2
Figure 3. China Minimum Monthly Wages 2009–2019.....	2
Figure 4. U.S. Imports from China 2019–2020.....	3
Figure 5. U.S. Merchandise Imports from China (1985–2019).....	5
Figure 6. Top 10 U.S. Imports from China.....	6
Figure 7. China-U.S. Commerce Travel Times.....	7
Figure 8. Top 10 2018 Imported Commodities from Mexico.....	8
Figure 9. 2018 U.S. Imports from China and Mexico by Transportation Mode.....	9
Figure 10. 25 Percent Diversion of China’s Exports to the United States Nearshored to Mexico.....	10

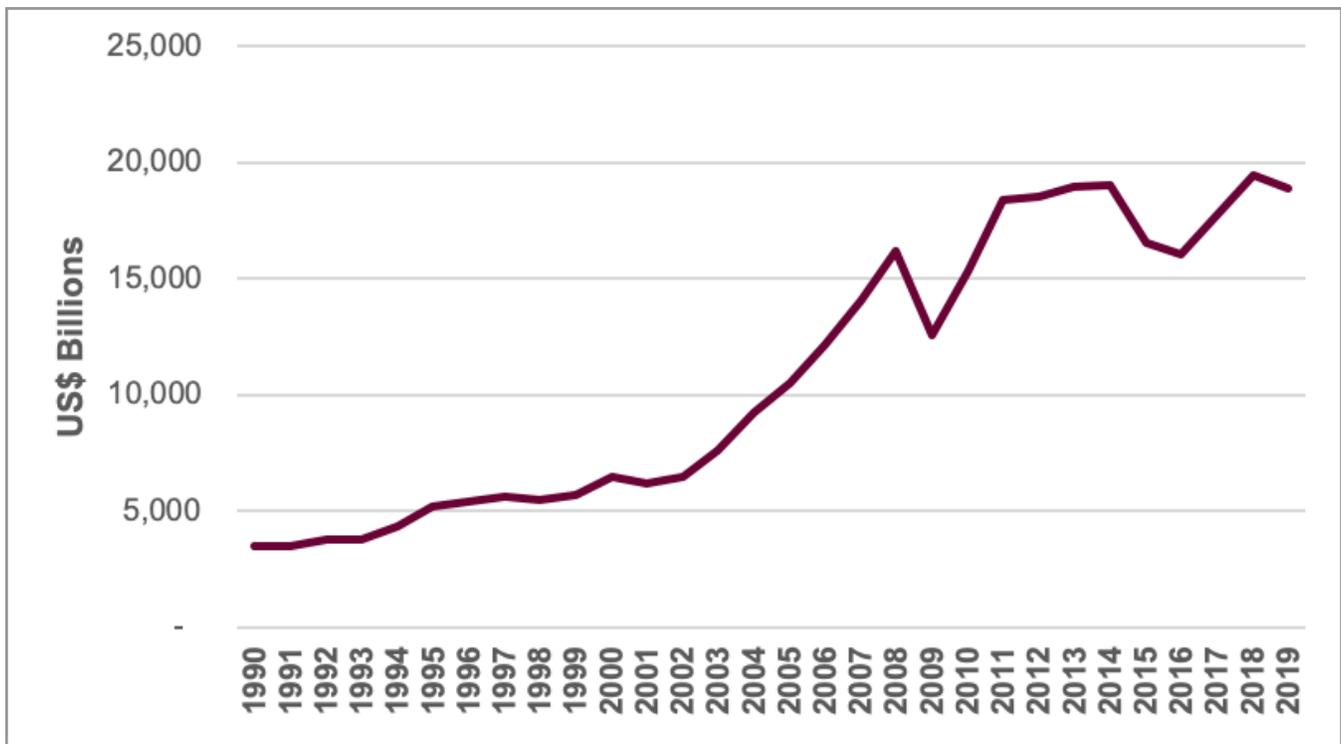
ABSTRACT

COVID-19 is revealing the vulnerabilities and challenges associated with modern supply chains (e.g., single-source locations, lack of redundancy, just-in-time manufacturing, etc.). The current COVID-19 pandemic may therefore change the way many industries will operate in the future. Relying on supplies from China has proven to be ineffective, and many companies are starting to plan their supply chains with different sources of material. These changes will impact Texas's land ports of entry, as well as the highway and rail infrastructure connecting to these ports of entry. An analysis of two scenarios shows that if 15 percent of 2018 U.S. imports were diverted from production facilities in China to Mexico, truck and rail traffic at the Texas-Mexico border would increase 25 percent. If the nearshoring diversion to Mexico was 25 percent of China's exports to the United States, truck and rail traffic at the Texas-Mexico border would increase 42 percent. These figures would be on top of the expected growth due to the implementation of the U.S.-Mexico-Canada trade agreement.

GLOBAL SUPPLY CHAIN

Supply chains have evolved to be increasingly global and complex, sourcing and supplying raw materials and intermediate parts from multiple locations that specialize in the supply of specific raw materials and intermediate parts. The globalization of supply chains has grown with increased international trade. Figure 1 shows that global trade increased more than five-fold between 1990 and 2019.

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Source: UNCTAD Stat. <https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx>

Figure 1. World International Trade 1990–2019

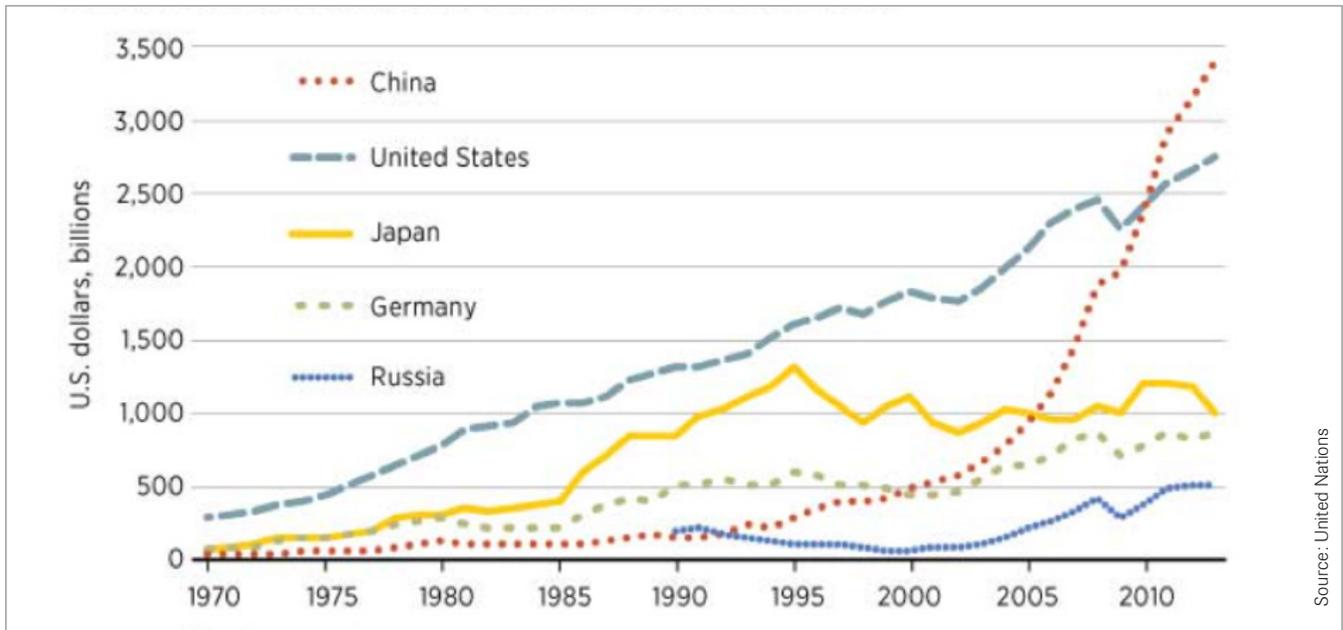
Transportation system efficiency that lowered shipping costs facilitated the increase in international trade. Some companies that manufacture goods with a high value relative to their size and shipping cost have moved production to countries with lower labor, materials, and land costs than in the home country—a practice called offshoring.

In the 1980s, China’s manufacturing sector started to grow as foreign companies started to establish in China to take advantage of lower labor, material, and land costs. By 2010, China surpassed the United States as the Number 1 industrial powerhouse (Figure 2).¹

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¹ Federal Reserve Bank of Saint Louis. China’s Rapid Rise: From Backward Agrarian Society to Industrial Powerhouse in Just 35 years. <https://www.stlouisfed.org/publications/regional-economist/april-2016/chinas-rapid-rise-from-backward-agrarian-society-to-industrial-powerhouse-in-just-35-years>

GLOBAL SUPPLY CHAIN

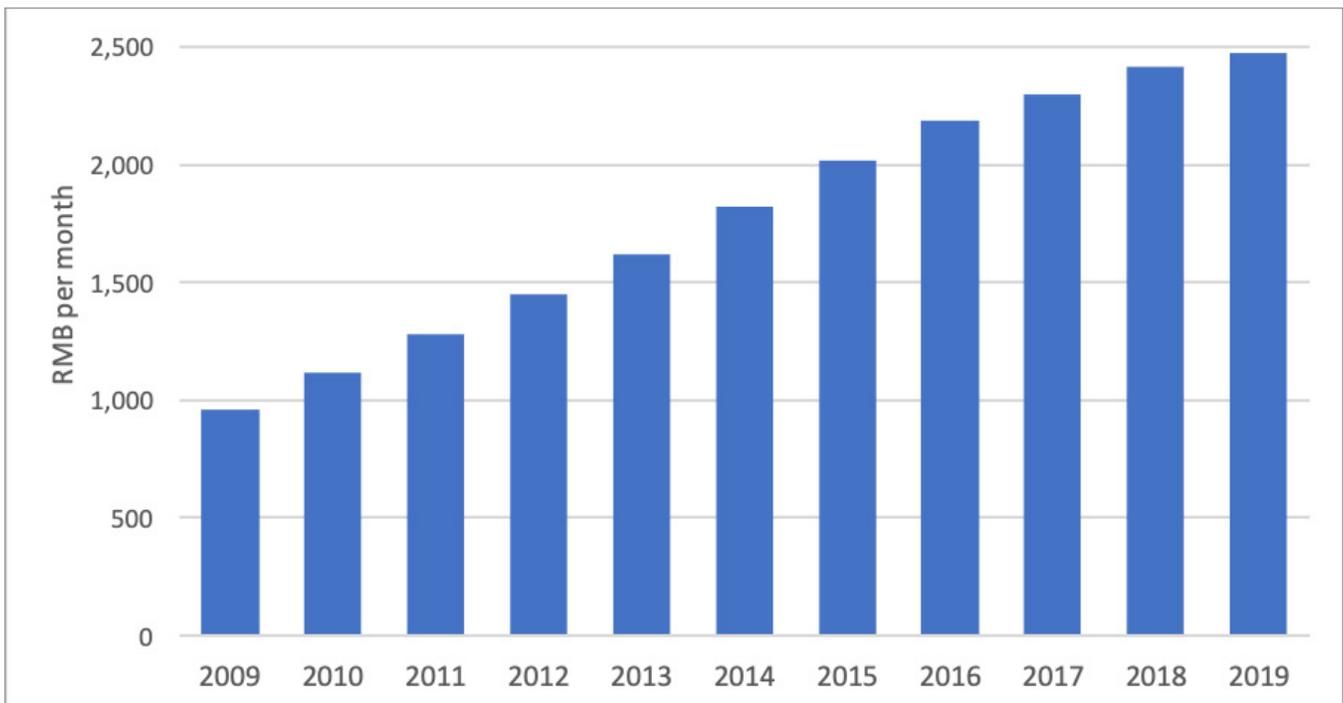


Source: United Nations

Figure 2. Manufacturing Output for Top Five Countries in 2013

In the last 20 years, however, wages for Chinese workers in urban areas have increased considerably (Figure 3), and there is less land available for manufacturing, particularly in coastal cities. Even pre-COVID-19, some multinational companies started to diversify global supply chains outside of China.

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Source: Internships China. <https://internshipschina.com/average-salary-in-china/>

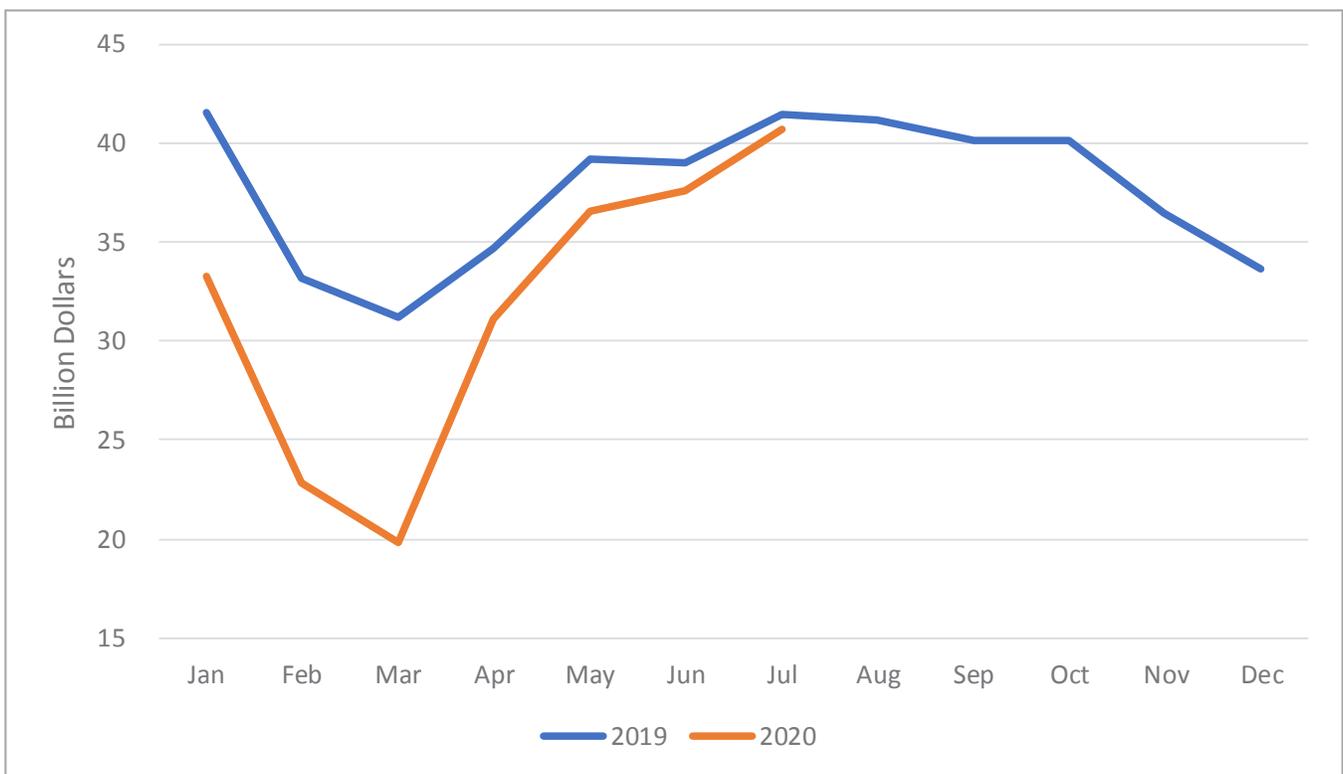
Figure 3. China Minimum Monthly Wages 2009–2019

GLOBAL SUPPLY CHAIN

The COVID-19 pandemic revealed the vulnerability of supply chains that are highly dependent on intermediate and final products sourced predominantly from Asia. As Asian shipments were stopped, cross-Pacific supply chains were grounded. The automotive, electronics, and pharmaceutical industries were significantly impacted since these supply chains depend on components from China.

Figure 4 shows that during the first quarter of 2020, U.S. imports from China decreased considerably, with the highest decline in March, which was 36 percent below 2019 figures. However, by July 2020, China's exports to the United States were almost at the 2019 level.

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Source: U.S. Census Bureau. <https://usatrade.census.gov/data/Perspective60/View/dispview.aspx>

Figure 4. U.S. Imports from China 2019–2020

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NEARSHORING

COVID-19 has highlighted the risk of reliance on a single, specialized source and the lack of redundancy in supply chains resulting from just-in-time (JIT) manufacturing processes. It is anticipated that COVID-19 and associated uncertainty will result in companies reevaluating and minimizing risks to their supply chain and building redundancy into the supply chain.² The pandemic, together with trade tensions around the world, will therefore most likely result in multinational industries reevaluating current sourcing patterns, “shortening” supply chains to increase control and diversifying parts and finished product sources. According to the *South China Morning Post*, a poll of 200 companies with global supply chains conducted in June 2020 found that 95 percent of respondents in the United States planned to change suppliers away from China due to the confluence of current issues and the uncertainty of future trading patterns.³

Mexico is well positioned to attract multinational companies with a well-developed industry base and a good road and rail transportation network connecting to the U.S.-Mexico border. The nearshore alternative—closer to home—can deliver significant cost efficiencies. Some of the key reasons why Mexico could be the preferred alternative for U.S. companies aiming at further diversifying intermediate and final product sources are:

- 1. Time and geographic proximity.** The time zone and physical proximity of Mexico to the United States provide a significant advantage over more distant locations, such as Asia.
- 2. Cultural similarities.** The similarity in culture between the United States and Mexico enables the establishment of binational teams.
- 3. Labor pool.** Mexico has a large and qualified labor pool that brings productivity gains. Cities close to the U.S.-Mexico border, such as Ciudad Juarez, Monterrey, and Tijuana, have a large, high-quality labor force.
- 4. Cost attractiveness.** Some Asian locations continue to be the lowest labor cost alternative globally. Mexico, however, still enjoys significantly lower labor and operating expenses compared to the United States.

Additionally, the newly implemented United States-Mexico-Canada Agreement (USMCA) supports North American manufacturing and mutually beneficial trade, creating a more balanced, reciprocal trade that supports economic growth in the region. The trade deal requires more locally sourced inputs for tariff-free exports to the United States. The official implementation of USMCA removes uncertainty for multinational companies, allowing them to develop supply chain plans that could include sourcing in Mexico.

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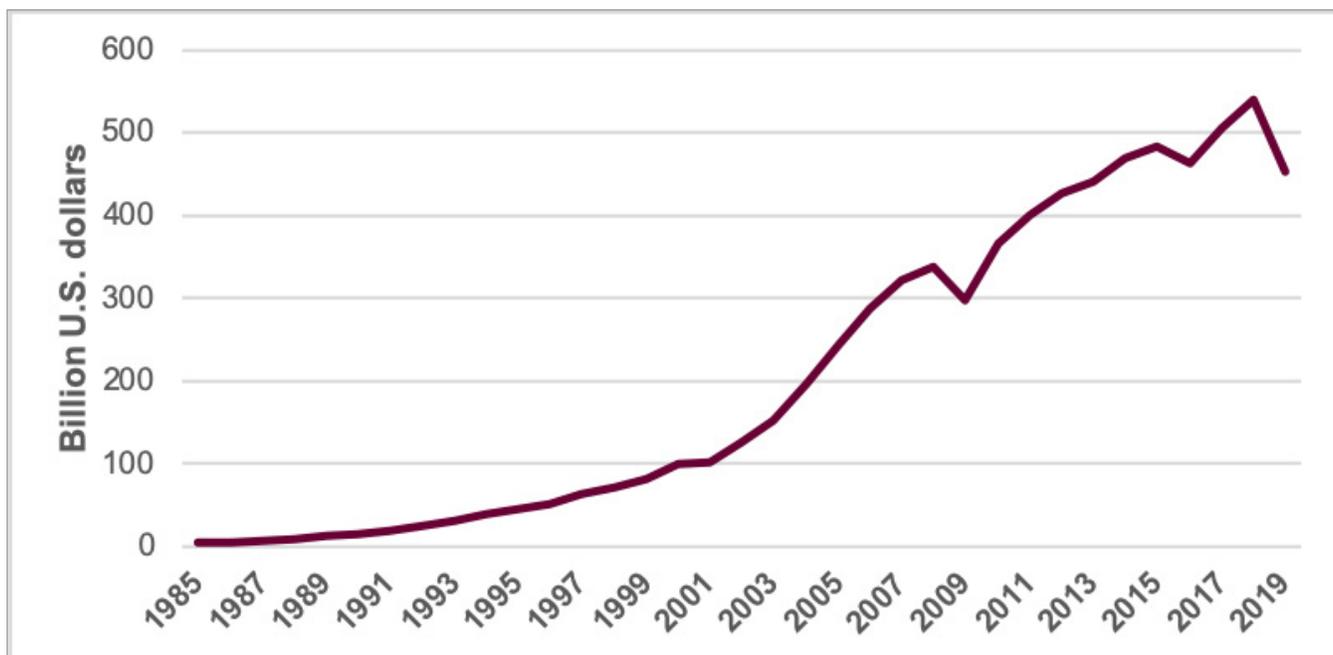
Mexico is well positioned to attract multinational companies with a well-developed industry base and a good road and rail transportation network connecting to the U.S.-Mexico border.

² W.C. Shih. 2020. Global Supply Chains in a Post-Pandemic World. Harvard Business Review. September–October. <https://hbr.org/2020/09/global-supply-chains-in-a-post-pandemic-world>

³ South China Morning Post. Coronavirus, US-China trade war see 95 percent of American firms wanting to ditch Chinese suppliers. <https://www.scmp.com/economy/china-economy/article/3092640/coronavirus-us-china-trade-war-see-95-cent-american-firms>

U.S.-CHINA AND TEXAS-CHINA TRADE

U.S. merchandise imports from China increased by 117 times since 1985. Between 2009 and 2018, U.S. merchandise imports from China increased by 60 percent, from \$296 to \$540 billion. Between 2018 and 2019, China's exports to the United States decreased to \$452.24 billion. This is potentially attributable to the U.S.-China trade war (Figure 5).



Source: U.S. Census Bureau, Economic Indicators Division

Figure 5. U.S. Merchandise Imports from China (1985–2019)

Texas's imports from China were \$44.3 billion in 2018, or 8 percent of the total U.S. imports from China.

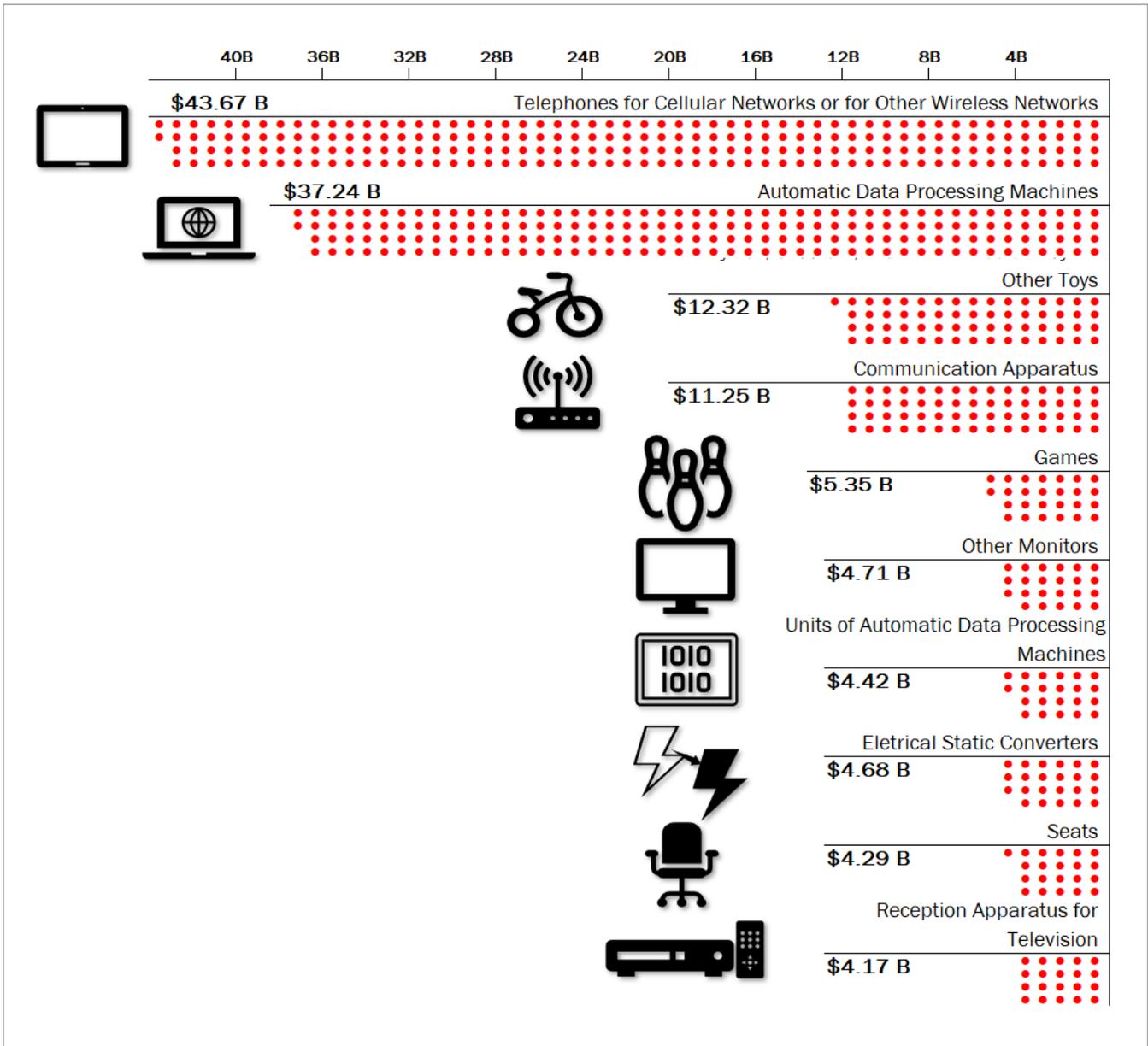
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U.S.-CHINA AND TEXAS-CHINA TRADE

The top ten import commodities from China into the United States are shown in Figure 6. Figure 6 shows that two-thirds of the top 10 Chinese imports are electronic products.

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Source: Observatory of Economic Complexity (OEC), <https://www.visualcapitalist.com/visualized-ranking-the-goods-most-traded-between-the-us-and-china/>

Figure 6. Top 10 U.S. Imports from China

ASIA-U.S. AND MEXICO-U.S. SUPPLY CHAINS

Shipping of products from Asia to the United States is done by ocean or air. Ocean freight has the longest shipping time, at about 20 to 40 days door to door. Total ocean shipping travel time includes not only the sailing time but also the load/unload time, port dwell time, and document preparation time that is mandated by U.S. and international agencies. When the price of oil is higher, ocean liners move slower to save fuel.

An ocean shipment from Asia to the United States can be shipped using one of several routes/modes. It can be shipped to a West Coast port and transferred to intermodal rail or truck. Intermodal rail is used when the final destination is not on the West Coast. Truck is used for time-sensitive shipments or for destinations on the West Coast. When intermodal rail is used, shipments are transferred from the port to a rail terminal (drayage), where an intermodal train is assembled that moves the shipment to the destination intermodal terminal. A drayage truck will pick up the load at the intermodal terminal and transport it to a distribution center or a receiving facility.

The expansion of the Panama Canal allows large vessels to travel through the Panama Canal to the U.S. East Coast (all water trip). This journey could be longer than the rail intermodal alternative, depending on the final destination. Other factors affecting ocean freight include port congestion and weather.

Standard air freight between China and the United States usually takes between 8 and 10 days (Figure 7). Express air freight reduces the standard air freight transit time by about 3 days.



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Figure 7. China-U.S. Commerce Travel Times

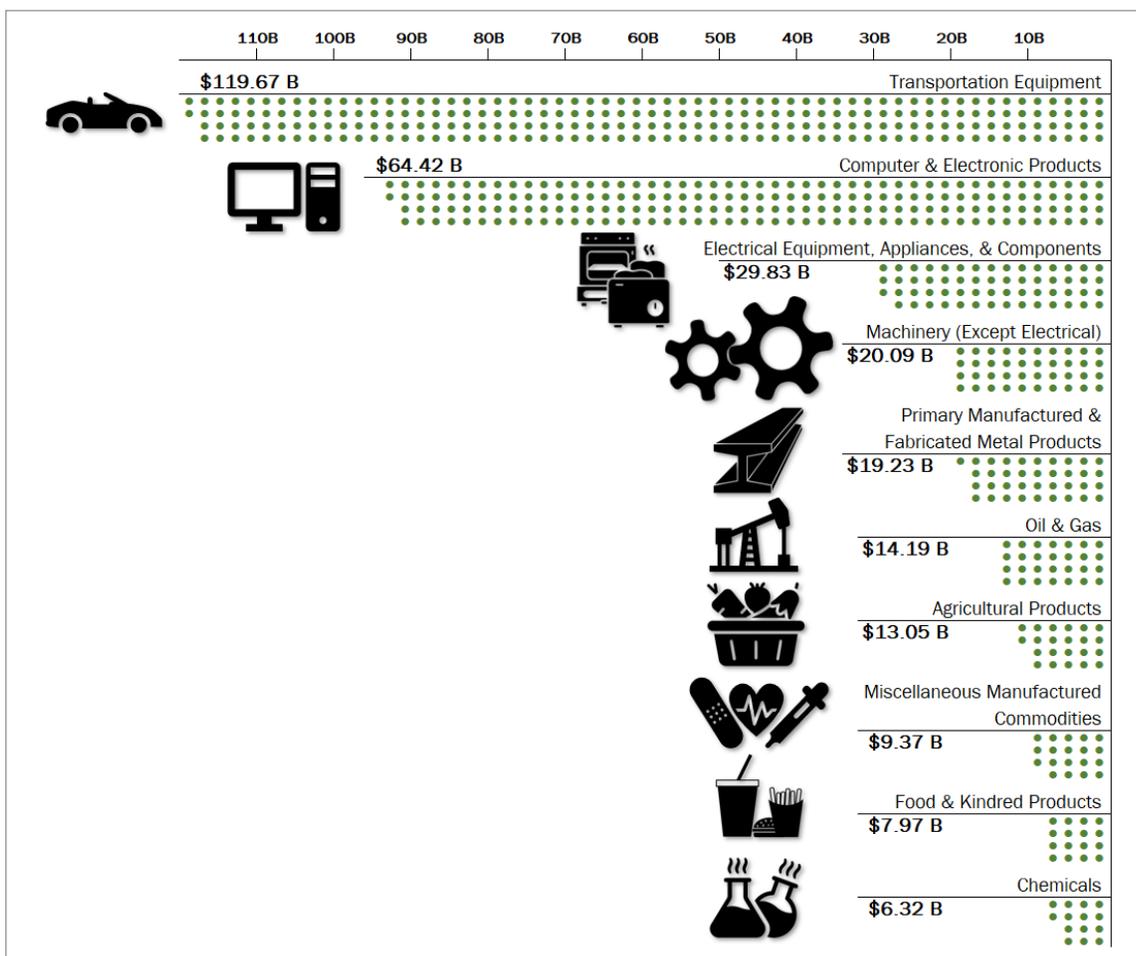
U.S.-MEXICO AND TEXAS-MEXICO TRADE AND SUPPLY CHAINS

U.S. imports from Mexico by air, pipeline, rail, truck, and vessel were \$302.64 billion in 2018. Texas' land ports of entry handled three quarters of the U.S. trade with Mexico by value. About 81 percent of the value of U.S.-Mexico trade is moved by truck. Texas' land ports handled \$179 billion worth of goods by truck and \$44.28 billion by rail.⁴

The main commodities imported from Mexico into the United States are (1) transportation equipment; (2) computers and electronic products; (3) electrical equipment, appliances, and components; and (4) machinery. These four commodity groups account for almost 70 percent of the total U.S. imports from Mexico. Computers and electronic products is the second largest commodity group imported from Mexico as well as from China. Mexican manufacturing facilities are already prepared to take on additional manufacturing volumes in this industry. There are other industries that would require investment and will help diversify Mexican exports to the United States. Figure 8 shows the top 10 commodities imported from Mexico.

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3. electrical equipment, appliances, and components; and
4. machinery.



Source: USA Trade Online, <https://usatrade.census.gov/index.php?do=login>

Figure 8. Top 10 2018 Imported Commodities from Mexico

⁴Bureau of Transportation Statistics. TransBorder Freight Data. <https://www.bts.gov/transborder>

U.S.-MEXICO AND TEXAS-MEXICO TRADE AND SUPPLY CHAINS

Travel times from Mexico to consumption and distribution centers in the United States are lower than those from Asia. For example, a truck trip from Monterrey to Chicago takes 6 days, or 8 days from Toluca to Atlanta. From the border region, travel times are even shorter, and some border cities in Mexico, such as Ciudad Juarez and Tijuana, have well-developed manufacturing and technology centers.

Costs are lower to ship from Mexico than from China, and given that shipments from Mexico are done mostly by truck, the visibility is higher than any other multimodal option that requires transloading from one mode to another. Furthermore, most rail and truck carriers have implemented tracking and tracing systems.

Figure 9 illustrates the 2018 U.S. imports from China and Mexico by transportation mode.

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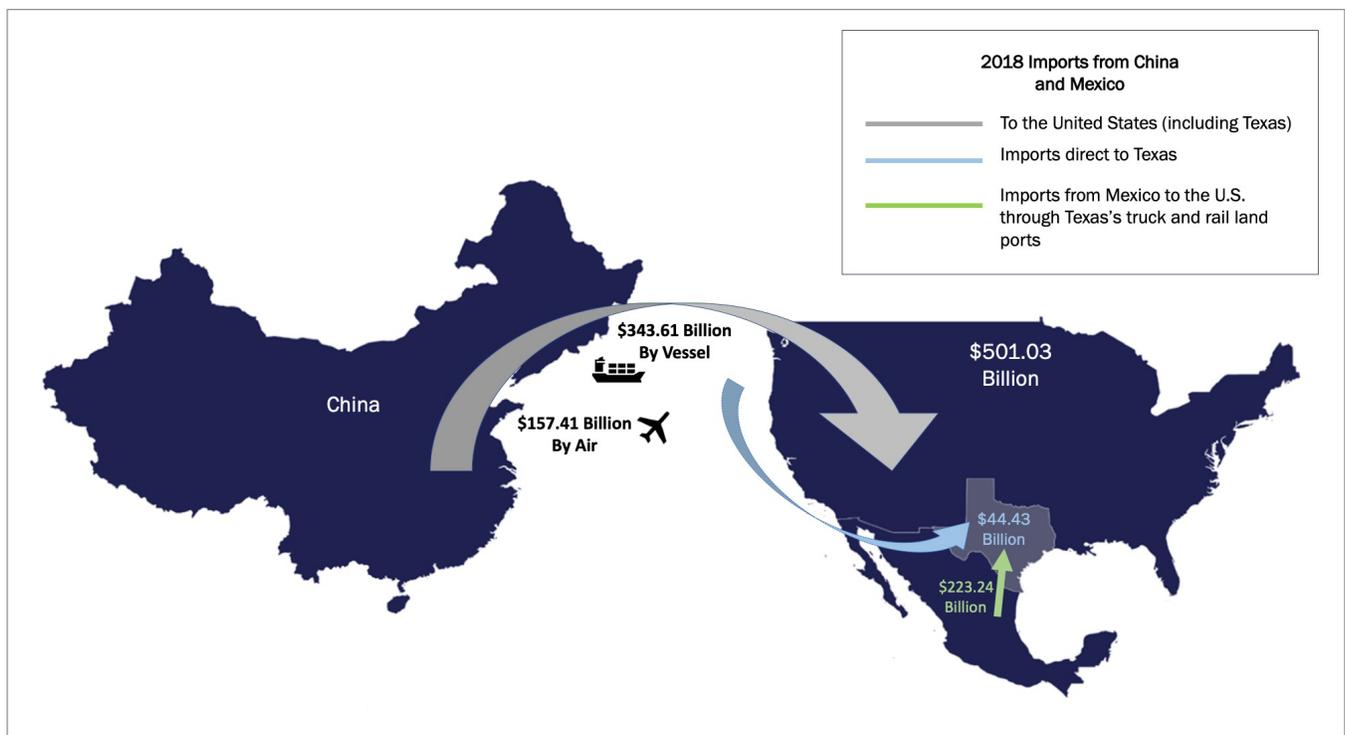


Figure 9. 2018 U.S. Imports from China and Mexico by Transportation Mode

⁵ YRC. Transit Times in Mexico. <https://yrc.com/services/mexico/transit-times-in-mexico/>

NEARSHORING SCENARIOS

Given the new global trade and logistics paradigms that call for risk reduction and redundancy, multi-national companies may be seeking to move some production to Mexico. It is important to understand the potential impact of moving production facilities from China to Mexico on the Texas border and the transportation corridor infrastructure that serves the border.

An analysis shows that if 15 percent of 2018 U.S. imports were diverted from production facilities in China to Mexico, truck and rail traffic at the Texas-Mexico border would increase 25 percent. If 25 percent of China's exports to the U.S. were sourced from Mexico, truck and rail traffic at the Texas-Mexico border would increase 42 percent.



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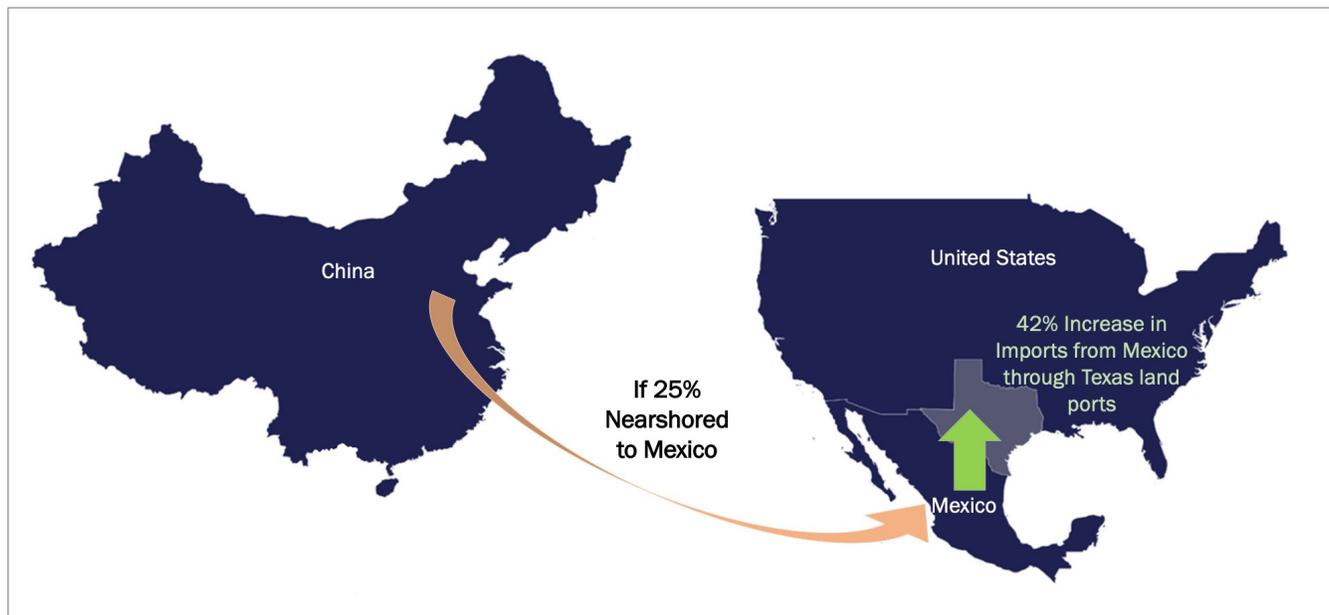


Figure 10. 25 Percent Diversion of China's Exports to the United States Nearshored to Mexico

These scenarios do not consider cross-border traffic growth forecasted due to the implementation of USMCA. Some border crossings are already at capacity, and wait times and delays are costly. Transportation corridors serving land border crossings are also experiencing substantial traffic growth, with demand exceeding capacity in urban areas.





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