

NAFTA Briefing:

Trade benefits to the automotive industry and potential consequences of withdrawal from the agreement



TABLE OF CONTENTS

Acknowledgements	iii
Introduction	1
Background	2
NAFTA Benefits	2
Cross-border Investment Has Created a Strong, Integrated North American Regional Bloc.....	3
Vehicle Production, Exports, and Imports Within and Beyond the NAFTA Region	3
Vehicle Production and Exports.....	4
Non-NAFTA Exports	6
Non-NAFTA Import Substitution.....	7
U.S., Canadian, and Mexican Automotive Supplier and Component Interdependence	7
U.S. Content in Mexican Vehicles	7
Increased Competitiveness of U.S. Industries	8
Higher-wage Jobs Retained and Grown in United States	8
Consequences of a U.S. Withdrawal from NAFTA	8
What Would It Mean to Bring Back Automotive and Auto Parts Manufacturing from Mexico?	8
Michigan Would Be Hard Hit by a U.S. withdrawal from NAFTA.....	10
China, South Korea, and Japan Could Replace Canada and Mexico to be U.S.’s Largest Automotive Parts Importers	10
Lower U.S. Sales Volume and Higher Prices	11
Potential Impact of NAFTA-exit on Trade Between the United States and Canada/Mexico	12
Loss of U.S. Regulatory Leadership.....	14
Non-Automotive Impacts.....	14
Conclusion	15
References	16
Data Appendix	18

ACKNOWLEDGEMENTS

This briefing is the result of a group effort. The authors would like to thank our colleagues at the Center for Automotive Research, Estefania Jurado and Juliana Patterson, for their assistance with this briefing. Additional assistance was provided by Diana Douglass, who coordinated the production of this document. This briefing was funded by the Alliance of Automobile Manufacturers.

Kristin Dziczek, Director, Industry, Labor & Economics Group

Bernard Swiecki, Senior Automotive Analyst, Industry, Labor & Economics Group

Yen Chen, Senior Industry Economist, Industry, Labor & Economics Group

Valerie Brugeman, Senior Project Manager, Transportation Systems Analysis Group

Michael Schultz, Industry Economist, Industry, Labor & Economics Group

David Andrea, Executive Vice President of Research



3005 Boardwalk, Suite 200
Ann Arbor, MI 48108
www.cargroup.org

The Center for Automotive Research, a nonprofit automotive research organization, has performed detailed studies of the contribution of the automotive industry and its value chain in the U.S. economy for more than 35 years.

CAR's mission is to conduct independent research and analysis to educate, inform and advise stakeholders, policy makers, and the general public on critical issues facing the automotive industry, and the industry's impact on the U.S. economy and society.

For citations and reference to this publication, please use the following:

Dziczek, Kristin, Bernard Swiecki, Yen Chen, Valerie Brugeman, Michael Schultz and David Andrea. (2016). *NAFTA Briefing: Trade benefits to the automotive industry and potential consequences of withdrawal from the agreement*. Center for Automotive Research, Ann Arbor, MI.

INTRODUCTION

The North American Free Trade Agreement (NAFTA) among the United States, Canada, and Mexico has been in place since January 1994. For the U.S. automotive industry, NAFTA expanded the integration of the U.S. and Canadian automotive manufacturing footprint created under the Canada-United States Automotive Products Agreement to include Mexico. Continent-wide reduction or elimination of customs tariffs allowed vehicle manufacturers and suppliers to optimize operational structures by locating assembly operations and supply chain manufacturing in best cost location, which helps keep the domestic automotive industry competitive with growing global capacity. NAFTA has attracted billions of dollars of domestic re-investment and new foreign direct investment into the U.S., Canada and Mexico.

President-Elect Donald Trump has signaled his intention to withdraw from NAFTA or to renegotiate major provisions of the agreement. NAFTA has contributed to the growth of integrated automotive production and supply networks within the North American region, and significant changes to the tariff structure will have major ramifications for automotive manufacturers and suppliers. These ramifications range from the vehicle makers' ability to deliver an affordable mix of vehicles consumers demand, to the ability to support supply chain requirements with globally cost-competitive raw materials as well as products that might not have any sources within the United States.

While there are always opportunities to improve the effectiveness of the original intent of trade agreement provisions (such as labor and environmental standards), update agreements to current global competitive conditions, or to augment trade agreements with trade adjustment assistance programs, a wholesale withdrawal from NAFTA could set in motion a series of unintended consequences that would constrain future growth of the U.S. automotive industry.

This briefing outlines the benefits of NAFTA to the automotive industry, automotive consumers, and the economy as a whole, as well as the potential consequences if the United States were to unilaterally withdraw from NAFTA.

BRIEF NAFTA AUTOMOTIVE TRADE FACTS

- Top global vehicle producers:
 - U.S. ranks 2nd
 - Mexico ranks 7th
 - Canada ranks 10th
- NAFTA is a desirable global export base for automotive and parts:
 - U.S. has free trade agreements (FTAs) with 20 countries
 - Mexico has 17 FTAs with individual countries plus the EU
 - Canada has 12 FTAs with individual countries plus the EU
- 40% of U.S. light vehicles *exported* in 2015 were shipped to NAFTA partners
- 50% of U.S. light vehicles *imported* were shipped from NAFTA partners
- 75% of the value of U.S. automotive parts *exports* were shipped to NAFTA partners in 2015 (split roughly evenly between Canada and Mexico)
- 51% of the value of U.S. automotive parts *imports* came from NAFTA partners in 2015 (U.S. parts imports from Mexico represented three-quarters of these imports.)

Sources: (U.S. International Trade Administration, 2016); (World Input-Output Database, 2016) (Wilson C. E., 2011)

BACKGROUND

The automotive industry is highly globally-integrated—global vehicles are built on global platforms (vehicle architecture), utilizing global supply chains, and sold in markets all over the world. This is not a new development. Automakers have been global almost from the very beginning of the industry; in the 1920s and 1930s, many automakers grew by acquiring foreign makers or incorporating foreign subsidiaries.

Global competition in the automotive industry has resulted in an incredibly complex web of corporate relationships and supply chains, and products with parts content sourced from multiple automotive regions. Off-shoring to “best cost” countries is an integral aspect of the global supply network, and contributes to higher productivity levels in the overall industry. This results in lower prices for consumers and return on capital for investors.

The auto industry is supported by both domestic and “near shore” production because transportation costs are high, some parts and systems are especially fragile, production costs are comparably lower in other regions, and there are other advantages of geographic proximity to consumer and industrial markets. Nearshoring within NAFTA has resulted in shared interconnected supply chains in the United States, Canada, and Mexico that continue to create and support employment within the United States. Disadvantaging nearshore production could undermine U.S. employment by encouraging more distant offshoring, and thereby reducing dependence on U.S. value-add of intermediate goods and service producers. The impact of disadvantaging automotive trade with Canada and Mexico would be particularly dramatic if supplier production is relocated to offshore countries such as China. While U.S.-produced parts and components comprise 40 percent of the value of products imported into the United States from Mexico, for goods imported from China, only 4 percent of their value is from U.S. content (Wilson C. E., 2011).

NAFTA BENEFITS

NAFTA allows automakers to take advantage of best cost production and lower supply chain risk, thus ensuring automotive production remains in North America. Without NAFTA, large segments of the U.S. automotive industry would have moved to other low-wage countries in Asia, Eastern Europe, or South America (Porter, 2016). By producing cheaper automotive parts and components on the “near shore” in Mexico rather than truly “off-shore,” Mexican automotive plants helped sustain a competitive automotive industry across North America.

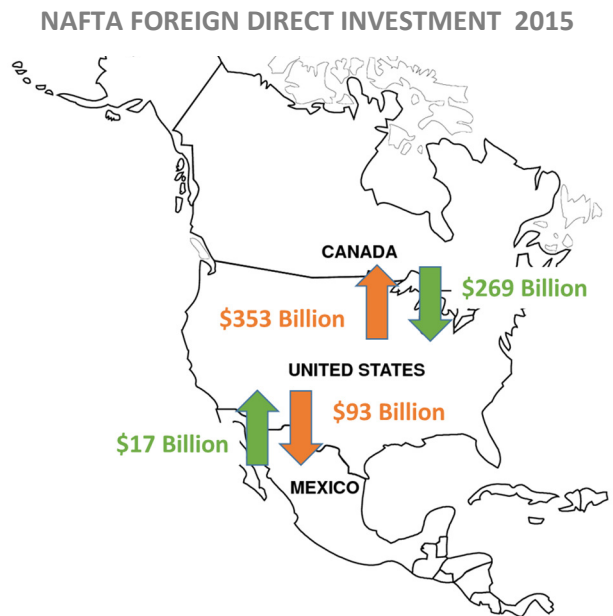
Cross-border Investment Has Created a Strong, Integrated North American Regional Bloc

Companies in Canada, Mexico, and the United States have invested throughout the NAFTA region. In 2015, total U.S. Foreign Direct Investment (FDI) in Canada was \$353B (all industries); Canadian FDI in the United States was \$269B. Total U.S. FDI in Mexico was \$93B; Mexican FDI in the United States was \$17B (U.S. Bureau of Economic Analysis, 2016).

Other nations invest in the NAFTA region, as well. Nearly 90 percent of the new Mexican light vehicle assembly plant investments announced since 2009 are for assembly plants of Japanese and European automakers (Center for Automotive Research, 2016). These global companies are transitioning production from their home regions to North America, and will increasingly rely on existing North American supply chains, given the logistical disadvantage of sourcing parts and components from overseas. Therefore, even new assembly capacity in Mexico will benefit auto suppliers located in the United States, and these supplier companies will continue to gain from a larger North American light vehicle production base.

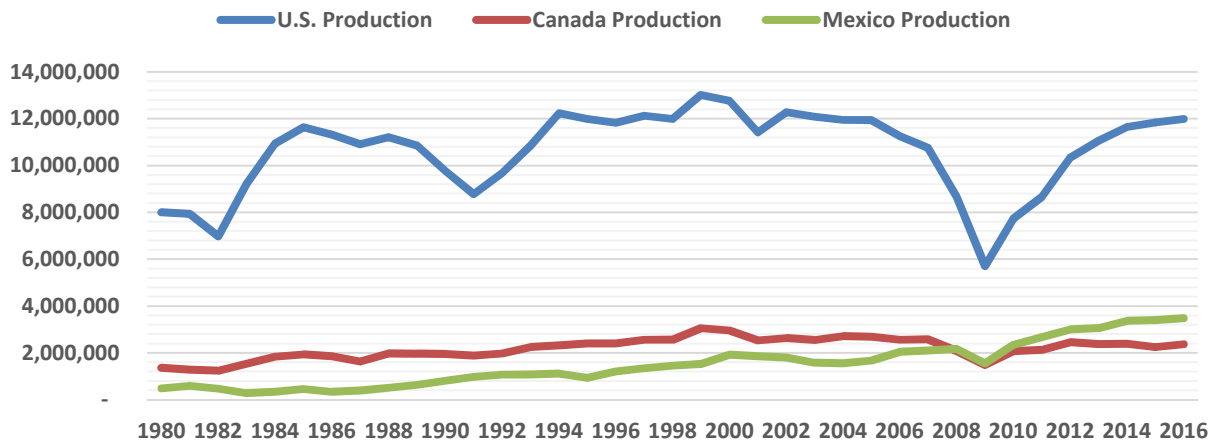
Vehicle Production, Exports, and Imports Within and Beyond the NAFTA Region

Canada, Mexico, and the United States together produced more than 17.8 million light vehicles in 2016, which represents a 2 percent increase over total NAFTA light vehicle production in 2015. U.S. light vehicle production edged up just 1.3 percent between 2015 and 2016; Canada's light vehicle output grew 5.2 percent; and Mexico's production was up 2.5 percent during the same period. Mexican production has outpaced Canada every year since 2008. (Figure 1).



Source: U.S. Bureau of Economic Analysis

Figure 1: U.S., Canada, and Mexico Light Vehicle Production: 1980-2016

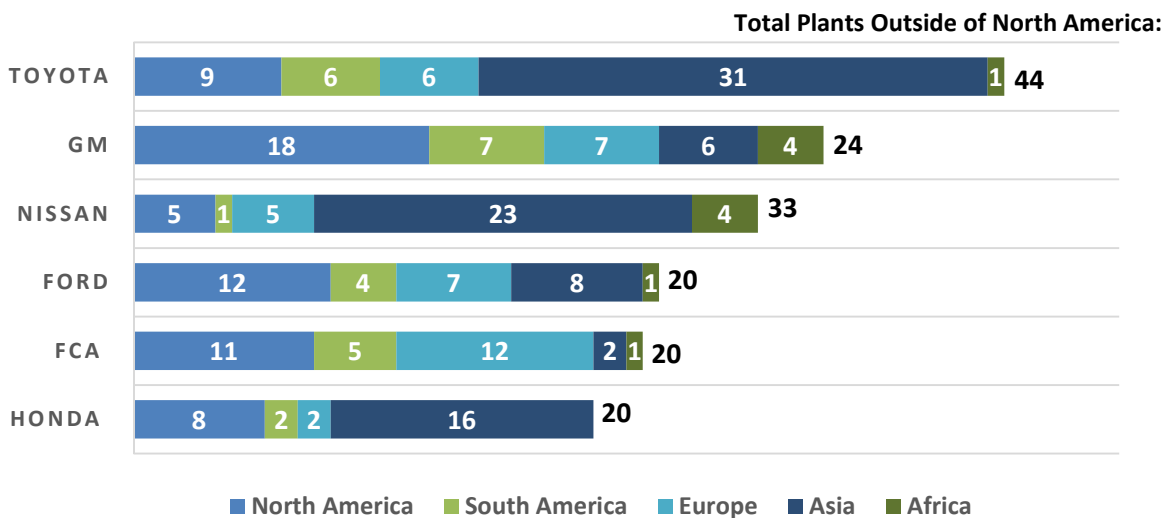


Source: Ward's Automotive

Vehicle Production and Exports

Due to the global nature of vehicle production and vehicle component sourcing, automakers have options around the world for replacing vehicles sold in the United States but built in Mexico with products from around the world. Each of the six major automakers producing vehicles in Mexico for sale in the United States has a developed and mature global manufacturing base. Toyota, for example, has 44 assembly plants outside of North America. FCA, Ford, GM, Honda, and Nissan likewise have developed global manufacturing bases, and the extensive global supply chains that naturally support global and regional production. (Figure 2.)

Figure 2: Global Locations of Top Six Automakers by Region, 2016



Source: Ward's Automotive

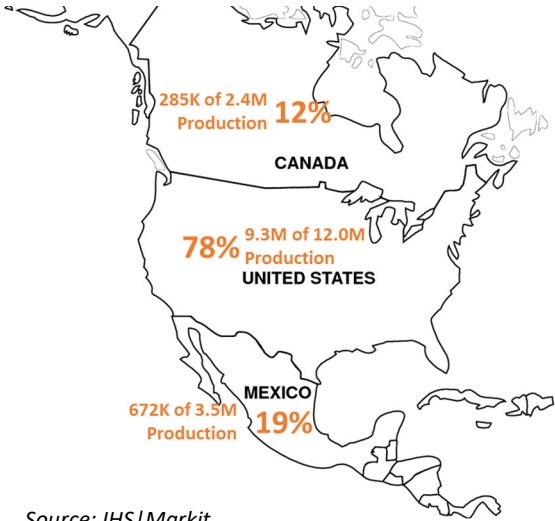
In the event vehicle imports from Mexico into the United States should be limited, it is clear that the automotive industry enjoys many alternative locations that would provide ready sourcing options outside the United States. This global capacity, and the expertise the automakers possess in flexing production within it, erode the likelihood that the United States would exclusively benefit in securing replacement production of vehicles or production of parts that had been imported from Mexico with any future trade restriction initiatives the United States may consider.

While it is a well-publicized fact that Mexico’s domestic consumption is less than 20 percent of the vehicles it manufactures, Mexico is not North America’s only export powerhouse. Canada is even more dependent on exporting outside its own borders, with domestic consumption of just 12 percent of the vehicles it manufactures within its borders. For both Mexico and Canada, the chief destination for these vehicles is the United States (IHS|Markit, 2016).

Limiting the flow of vehicles from Mexico into the United States will not automatically create the replacement manufacturing capacity for those vehicles in the United States. Canada serves as an obvious likely replacement source of capacity. In fact, current exchange rate makes Canadian labor costs lower than those in the United States.

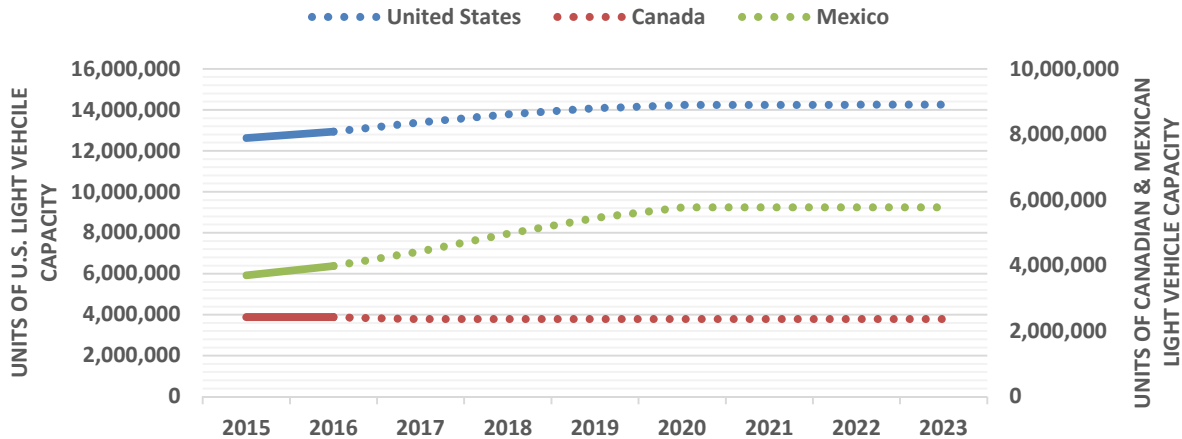
Overall, NAFTA light vehicle capacity is projected to grow from 19.3 million units of capacity in 2016 to just over 22.5 million units by 2023. While U.S. capacity is forecast to grow by nearly 11 percent between 2016 and 2023, Canadian capacity will remain flat, and the majority of the growth will happen in Mexico, where light vehicle capacity will grow by 45 percent. (Figure 3).

SHARE OF EACH COUNTRY’S PRODUCTION SOLD IN THE SAME COUNTRY, 2015



Source: IHS|Markit

Figure 3: Canada, Mexico & U.S. Light Vehicle Capacity Forecast, 2015-2023

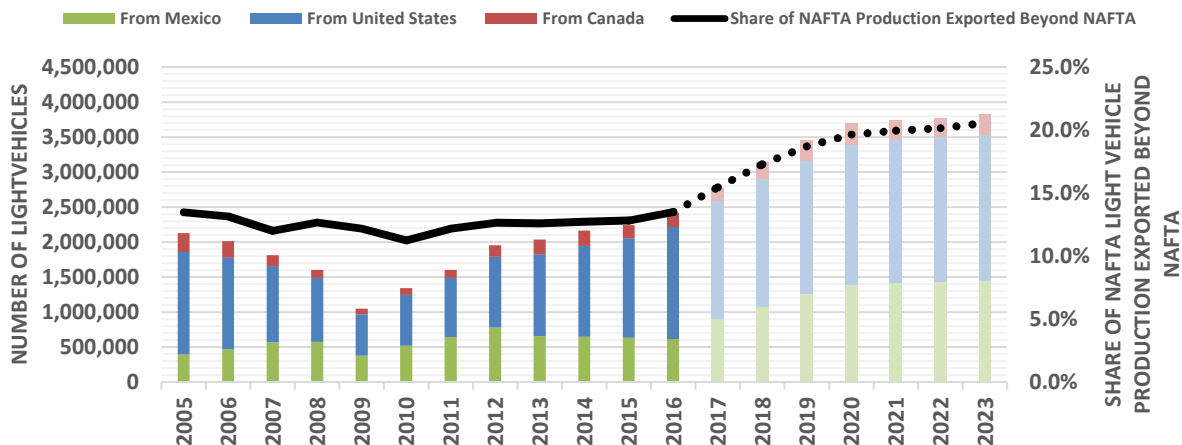


Source: LMC Automotive

Non-NAFTA Exports

Exports from the U.S., Canada, and Mexico to non-NAFTA countries are projected to grow from 12.8 percent of total light vehicle production in 2015 to 20.6 percent of total NAFTA light vehicle assembly output by 2023 (IHS|Markit, 2016). Mexico is becoming an export base for global automakers to supply non-NAFTA markets. As over 2 million units of new light vehicle productive capacity is forecast to come on-line in Mexico by 2023 (see Figure 3), Mexico’s non-NAFTA exports are projected to grow from 18.6 percent of production in 2015 to 29.1 percent in 2023—representing a 129 percent growth in Mexico’s non-NAFTA exports through 2023 (Figure 4) (IHS|Markit, 2016).

Figure 4: Growth of Non-NAFTA Exports from Canada, Mexico & the United States: 2005-2023



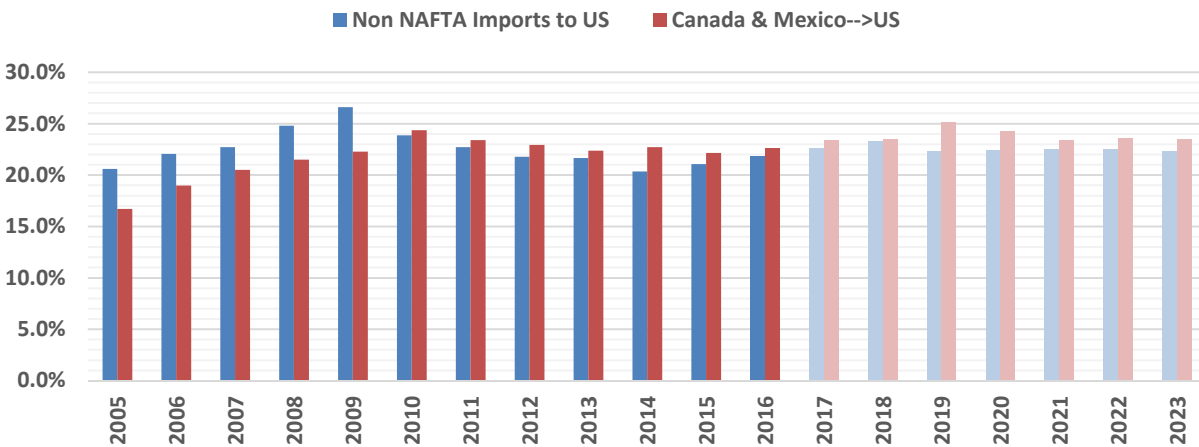
Source: IHS|Markit and Center for Automotive Research

If the cost and risk structure in the United States were to change, U.S. exports to Canada, Mexico, and non-NAFTA regions could be at risk.

Non-NAFTA Import Substitution

International automakers who establish a vehicle assembly presence in Canada or Mexico often substitute their NAFTA-made sales in the United States for those vehicles previously imported from other countries. Overall the import share of U.S. sales has been increasing slightly since 2009 (IHS|Markit, 2016), but beginning in 2010, Canadian and Mexican imports comprised a larger share of U.S. sales than did imports coming to the United States from all other producers. This trend is expected to continue through at least 2023 as Canadian- and Mexican-built light vehicles substitute for non-NAFTA imports in the U.S. market (Figure 5) (IHS|Markit, 2016).

Figure 5: Canada & Mexico and Non-NAFTA Imports to the United States (Share of U.S. Sales): 2005-2023



Source: IHS|Markit and Center for Automotive Research

International automakers and suppliers that have built U.S. capacity predicated on an integrated NAFTA market may shift production elsewhere if the U.S. cost and risk structure were to change.

U.S., Canadian, and Mexican Automotive Supplier and Component Interdependence

Within NAFTA, automakers and suppliers are dependent on inputs from throughout the trading region. In fact, between 80 and 90 percent of U.S. automotive trade is intra-industry (Wilson C. E., 2011). The United States, Canada, and Mexico produce and assemble automotive parts and components, and these parts and components may cross the NAFTA countries' borders as many as eight times before being installed in a final assembly plant in one of the three partner countries (Wilson C. E., 2011). This integration compounds the effects of any impediments to free trade.

U.S. Content in Mexican Vehicles

Rising international automotive production in Mexico will be a net gain for U.S. employment, as many parts and components produced in the United States are inputs for Mexican production facilities. For example, U.S. content of imported vehicles from Mexico was only 5 percent before NAFTA; today, that

number is 40 percent (Wharton School, 2014). U.S. suppliers have benefited from increased automotive assembly capacity throughout North America.

Increased Competitiveness of U.S. Industries

When multi-national corporations based in the United States expand internationally, their home-country operations benefit as well. For example, overall U.S.-Mexico trade data show that, on average, a 10 percent increase in employment at a Mexican affiliate operation leads to a 1.3 percent increase in U.S. employment, a 1.7 percent increase in U.S. exports, and a 4.1 percent increase in U.S. R&D spending (Moran and Oldenski, 2014). While a 10 percent to 1.3 percent employment growth ratio doesn't seem like much, the U.S. employment base is generally much larger. For a company that might add 500 additional jobs in Mexico for a total of 5,500 jobs in that country (10 percent), the 1.3 percent U.S. jobs gain could be more than 500 if the U.S. corporation has employment greater than 38,500.

Automakers in every part of the world utilize best-cost country production. NAFTA allows global companies based in the United States to maximize their investments and be more competitive with other automakers on the global stage. This is especially important to retain NAFTA small car production.

Higher-wage Jobs Retained and Grown in United States

Product and process technological changes have done more to increase productivity gains and shift employment than has trade; an estimated 87 percent of U.S. manufacturing job losses are due to technology (Wilson & Woods, 2016). Outsourcing explains 15 percent of the increase in the U.S. relative wage of nonproduction workers during the period 1979 to 1990. Wages of nonproduction employees increased faster than wages of production employees, which implies a reduction in the relative demand for production workers and a shift towards more highly-skilled workers (De La Cruz, Koopman, & Wang, 2011).

U.S. automakers and suppliers that increase global manufacturing employment also see employment growth in high-wage engineering and R&D jobs, as well as in other headquarters and administrative functions in the United States. Expanding NAFTA manufacturing anchors the automakers' and suppliers' engineering and R&D in the region—largely within the United States.

CONSEQUENCES OF A U.S. WITHDRAWAL FROM NAFTA

If it were possible to completely withdraw from NAFTA, the immediate benefit would not necessarily be a retrenchment of automotive assembly and supplier jobs back to the United States.

What Would It Mean to Bring Back Automotive and Auto Parts Manufacturing from Mexico?

Automakers

In 2016, 55 percent of light vehicles produced in Mexico were exported to the United States (1.8 million) (IHS|Markit, 2016). Automakers could choose to supply the U.S. market from U.S. factories or from production based outside of the NAFTA region. The latter option is particularly likely for small car production (micro, compact, and subcompact)—which comprises 45 percent of all automakers' exports from Mexico to the United States (848,000) (IHS|Markit, 2016).

Assuming that small cars are produced elsewhere, and that production facilities in Mexico that export to non-U.S. markets remain in Mexico, the net add would be roughly 1 million additional units of U.S. capacity across ten automakers, and an estimated 22,200 total automotive manufacturing related employees (of which 17,640 were hourly/production—including contract/temp workers).¹ In 2016, U.S. production-weighted capacity utilization in automotive assembly was 94 percent. There is little open capacity, which means it would not be possible to simply shift production from Mexico to existing U.S. plants—new capacity would have to be built. This takes time, and would amount to an estimated \$4.7B to \$6.5B in new capital costs (CAR analysis); costs could go higher since this added U.S. capacity would potentially be spread across the ten automakers that produce vehicles in Mexico.

It is worth noting that over half of Mexico's light vehicle output is produced by foreign automakers—FCA, Ford, and GM combined produced just 47.8 percent of the light vehicles made in Mexico in 2015 (IHS|Markit, 2016).² Foreign manufacturers may have fewer incentives to move production currently located in Mexico to the United States.

Suppliers

In 2015, Canada ranked as the largest export market for U.S. automotive parts with \$22.0B in parts value exported; Mexico was a close second, with \$20.2B in U.S. parts value exported (U.S. International Trade Administration, 2016). U.S. auto suppliers make up 19 percent of the number of auto supplier firms in Mexico, with 18 percent from Japan, and 12 percent from Germany, and most of these companies have U.S. operations, as well (U.S. International Trade Administration, 2016).

Automotive suppliers have made significant commitments to production in Mexico. Indeed, 65 percent of all Mexican foreign direct investment across all industries is automotive supplier-related (U.S. International Trade Administration, 2016). Mexico's auto supply industry employed just over 500,000 people in 2015 (of which nearly 460,000 were production/hourly workers—including contract/temp workers).

It is not possible to distinguish Mexican parts and components production for original equipment (OE) installation versus production for the aftermarket, so it is difficult to determine how much of the Mexican supply base would potentially move or shift production back to the United States to support the 1 million additional units of capacity needed. The suppliers that would potentially move back to the United States to follow relocated vehicle production would be few—mainly those tied to the just-in-time plants and jobs manufacturing other bulky, fragile, or otherwise difficult to ship parts and components.

¹ Mexico's automotive assembly industry employed just over 74,000 total people in 2015; nearly 58,000 of the people who work in Mexican automotive assembly are production/hourly workers (8,200 of these are contract employees, so automaker direct hourly employment is just under 50,000 workers).

² The same holds true for Canada, where nearly all light vehicle output is produced by non-Canadian companies (the Ford GT produced by Multimatic Motorsports is the only exception). Nearly 80 percent of the vehicles produced in Canada are exported to the United States.

Dealers

Dealer employment would be impacted should automakers decide to curtail or halt production, curtail importing vehicles, or should the price of vehicles increase significantly as a result of a tariff or other increased cost of trade within North America.

Michigan Would Be Hard Hit by a U.S. withdrawal from NAFTA

The Detroit metropolitan area is in the heart of the U.S. automotive industry, and was the sixth largest metro area for all exports in 2015 (\$44.3B) (U.S. International Trade Administration, 2016). That same year, transportation was the Detroit's top export category, accounting for nearly 60 percent of the area's exported goods (\$25.3B) (U.S. International Trade Administration, 2016).

Mexico and Canada are the top foreign markets for Detroit exports; in 2016, 39 percent of the value of Detroit Metropolitan Statistical Area (MSA)'s goods exports were bound for Mexico (\$17.3B), and 34 percent were exported to Canada (\$15.1B) (U.S. International Trade Administration, 2016). Detroit's exports to Mexico are greater in both absolute value and in share than those of any other U.S. city (U.S. International Trade Administration, 2016).

Michigan's high concentration of engineering and automotive-related employment could be at risk to foreign countries if production shifts outside the NAFTA region.

China, South Korea, and Japan Could Replace Canada and Mexico to be U.S.'s Largest Automotive Parts Importers

In 2015, the United States automotive industry consumed \$44.3B in Mexican-produced automotive parts, and consumed \$14.9B of Canadian-produced auto parts (all data in this section from U.S. International Trade Administration, 2016). These parts are also produced and imported from other countries, as detailed below:

- **Engines and engine parts:** 2015 U.S. imports of engines and engine parts from Mexico and Canada totaled \$6.0B and \$3.5B respectively (\$9.5B, or 59.8 percent of all engine and engine parts imports combined). In addition to Mexico and Canada, the United States also imported engines and engine parts from Japan (\$1.8B, 11.3 percent of total), Germany (\$0.9B, 5.7 percent), and South Korea (\$0.8B, 5.3 percent).
- **Transmission and powertrain parts:** 2015 U.S. imports of transmission and powertrain parts from Mexico and Canada totaled \$5.6B and \$1.7B respectively (\$7.3B, or 47.0 percent of all transmission and powertrain parts imports combined). In addition to Mexico and Canada, the United States also imported transmission and powertrain parts from Japan (\$3.7B, 23.5 percent of total), Germany (\$1.1B, 7.0 percent), and South Korea (\$1.2B, 7.4 percent).
- **Electrical and electronic equipment:** 2015 U.S. imports of electrical and electronic equipment from Mexico was \$8.9B, or 60.7 percent of all electrical and electronic equipment imports combined. The United States also imported electrical and electronic equipment from Japan (\$1.5B, 10.0 of total), China (\$1.2B, 8.8 percent), and Philippines (\$0.6B, 4.2 percent).
- **Steering and suspension parts:** 2015 U.S. imports of steering and suspension parts from Mexico and Canada totaled \$2.8B and \$1.1B respectively (\$3.9B, or 52.8 of all steering and suspension parts

combined). In addition to Mexico and Canada, the United States also imported steering and suspension parts from China (\$0.8B, 11.0 percent of total), South Korea (\$0.7B, 10.1 percent), and Japan (\$0.7B, 9.4 percent).

- **Seating and interior trim:** 2015 U.S. imports of seating and interior trim from Mexico and Canada totaled \$4.7B and \$0.9B respectively (\$5.6B, or 76.0 percent of all seating and interior trim imports combined). In addition to Mexico and Canada, the United States also imported seating and interior trim from the United Kingdom (\$0.5B, 0.7 percent of total), China (\$0.4B, 0.5 percent), and Germany (\$0.2B, 0.3 percent).
- **Brake systems:** 2015 U.S. imports of brake systems from Mexico and Canada totaled \$1.4B and \$0.5B respectively (\$1.8B, or 36.9 percent of all brake systems imports combined). In addition to Mexico and Canada, the United States also imported brake systems from China (\$1.6B, 31.5 percent of total), Japan (\$0.4B, 7.2 percent), and South Korea (\$0.3B, 5.3 percent).
- **Automotive lighting equipment:** 2015 U.S. imports of automotive lighting equipment from Mexico and Canada totaled \$1.3B and \$0.2B respectively (\$1.5B, or 37.8 percent of all automotive lighting equipment imports combined). In addition to Mexico and Canada, the United States also imported automotive lighting equipment from China (\$0.8B, 21.2 percent of total), Taiwan (\$0.7B, 16.9 percent), and Japan (\$0.3B, 8.1 percent).
- **Motor vehicle parts, not elsewhere specified or included (NESOI):** 2015 U.S. imports of motor vehicle parts (NESOI) from Mexico and Canada totaled \$11.7B and \$6.3B respectively (\$18.1B, or 55.9 percent of all motor vehicle parts NESOI combined). In addition to Mexico and Canada, the United States also imported motor vehicle parts NESOI from China (\$6.1B, 18.8 percent of total), South Korea (\$2.4B, 7.3 percent), and Japan (\$1.8B, 5.6 percent).

Lower U.S. Sales Volume and Higher Prices

If the U.S. were to enact a 35 percent tariff on light vehicles imported from Mexico, CAR estimates the sales impact would be 450,000 units in the United States, and an implied loss of nearly 6,700 North American assembly jobs. These 6,700 North American assembly jobs lost from the higher price of Mexican imported light vehicles are just the tip of the iceberg, however. When it comes to U.S. employment, the impact could be much larger.

Mexican-assembled vehicles contain U.S. parts, engines, transmissions, and other content—in 2015, Mexican vehicle exports contained an average of 40.3 percent U.S. content. The U.S. parts employment impact of the lost Mexican import sales would result in approximately 20,000 U.S. parts jobs lost. Automakers who assemble in the United States utilize Mexican parts and components that would also be subject to this tax. U.S. vehicle production contains an average of 11.7 percent Mexican parts and components content. Since the price of the Mexican parts content in U.S. light vehicle production would rise by 35 percent, that would result in approximately 11,000 additional U.S. assembly jobs lost.

At least 31,000 U.S. jobs could be lost—in addition to some proportion of the 6,700 North American job loss—as a result of a 35 percent tariff on light vehicles and parts imports from Mexico. There are two factors that could raise the jobs impact even further:

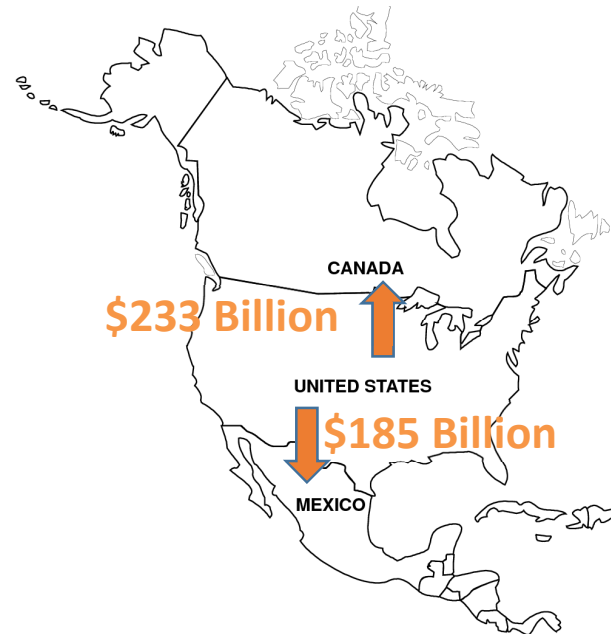
- Many parts and components cross the U.S.-Mexico border multiple times before being installed at a final assembly plant in either country for sale in the United States; taxing these parts at each border crossing would multiply the impact of the tariff.
- Job losses would not be evenly distributed and would have an impact on individual automakers' and suppliers' capacity utilization, which could lead to plant closures and broader job impacts.

Potential Impact of NAFTA-exit on Trade Between the United States and Canada/Mexico

Each global automotive region is comprised of globally-competitive automakers and supported by their extensive supply chains. If the United States ceases participation in NAFTA, global manufacturers will undoubtedly fill the void that is created.

In 2015, the United States exported over \$419.2B worth of goods to Mexico (\$185.3B) and Canada (\$233.9B). Over \$67.3B of this trade with U.S. NAFTA partners is automotive-related (see Table 1 & Table 2 in the Appendix). If the U.S. leaves NAFTA, companies in Mexico and Canada may seek alternate, more affordable places to purchase these goods, such as China, India, and other regions with large, international U.S. competitors. In 2015, motor vehicle parts were the largest dollar-value item Mexico purchased from the U.S. at over \$20B, and motor vehicles and parts were the largest items Canada purchased from the United States, totaling \$47B. Thus, U.S.-based automotive assembly and parts manufacturers will inevitably be hurt if they lose Canada and Mexico as key export destinations.

U.S. EXPORTS TO CANADA AND MEXICO, 2015



Source: International Trade Commission

Mexican light vehicle and parts imports contain ten times more U.S. content than do the same import categories from China (Table 1).

Table 1: Value of U.S. Content in Imports from Select Economies, 2010

Country	Share of U.S. Content Value in Imports (percent)
Mexico	40
Canada	25
Malaysia	8
Korea	5
China	4
Brazil	3
European Union	2
Japan	2
India	2
Russia	1

Source: National Bureau of Economic Research Working Paper No. 16426

Canada and Mexico May Purchase Machinery and Intermediate Goods Elsewhere

In 2014, the United States automotive industry consumed \$19.5B in Mexican-produced intermediate inputs, and Mexico consumed \$22.4B of U.S.-produced intermediate inputs (Timmer, 2015). That trade in intermediate goods included:

- **Machinery:** 2015 U.S. exports of machinery to Canada and Mexico totaled \$7.5B and \$4.8B respectively (\$12.3B combined). The United States is the world's third largest exporter of machinery, comprising 11.0 percent of the total \$5.8T in global machinery exports. If Canada and Mexico reduced purchases of U.S.-made machinery, China (18.3 percent of global machinery exports), Germany (11.3 percent), Japan (6.3 percent), and Hong Kong (5.4 percent) would be possible benefactors (U.S. International Trade Administration, 2016).
- **Chemicals:** 2015 U.S. exports of basic chemicals to Canada and Mexico totaled \$6.3B and \$8.3B respectively (\$14.6B combined). The United States is the world's second largest exporter of chemicals, comprising 11.1 percent of the total \$1.9T in global basic chemicals exports. If Canada and Mexico reduced purchases of U.S.-made chemicals, Germany (11.4 percent of global chemicals exports), China (7.0 percent), Belgium (6.5 percent), Netherlands (5.1 percent), and France (5.1 percent) would be possible benefactors (U.S. International Trade Administration, 2016).
- **Iron & steel:** 2015 U.S. exports of iron and steel to Canada and Mexico totaled \$5.3B and \$4.2B respectively (\$9.5B combined). The United States is the world's seventh largest exporter of iron and steel, comprising 4.2 percent of the \$378B in global iron and steel exports. If Canada and Mexico reduced purchases of U.S.-made iron and steel, China (16.9 percent of global iron and steel exports), Japan (8.0 percent), Germany (7.0 percent), South Korea (6.2 percent), and Italy (4.4 percent) would be possible benefactors (U.S. International Trade Administration, 2016).

Mexico could enact retaliatory tariffs on U.S.-made goods

Mexico currently purchases over \$185B worth of products from the United States. These products

involve everything from automotive parts, iron, plastics, and chemicals to agricultural products and computers. A U.S. withdrawal from NAFTA might prompt Mexico to place a retaliatory tariff on all U.S. imports to that country, making these goods more expensive for producers in Mexico to purchase them. When U.S. goods become more costly due to increased tariffs, companies will look to suppliers in other countries—and Mexico has favored nation trading status with 46 other countries through that country's existing free trade agreements.

China would become a more dominant player in automotive parts, components, and intermediate goods if the U.S. withdraws from NAFTA

With a large low-cost automotive sector, slowing domestic market growth, and an established global position in trade in automotive parts and components, specialized machinery, and materials, China is poised to step in to automotive markets that may open up if the United States were to withdraw from NAFTA.

Loss of U.S. Regulatory Leadership

Automakers look at NAFTA as a 20 million unit light vehicle market. Without NAFTA, the United States is only a 17 million unit light vehicle market, and is dwarfed by China and the EU. The United States is currently the largest automotive market in terms of total sales value, and nearly every large global automaker or supplier is present here, but, should the United States pull out of NAFTA, that could change. Vehicle prices would increase, which—all other things equal—will cause the U.S. market to shrink. In a smaller market, U.S. regulatory standards—for fuel economy, safety, or anything else—will become less relevant. Global companies may instead look to the EU and China for regulatory leadership, and in terms of environmental regulations, California has already signaled the state will not necessarily follow the direction set in Washington, D.C. The 13 other states and the District of Columbia that have adopted the California standards could choose to continue to ally themselves with California on air quality regulations.³ Together, vehicles registered in California and these 13 states and the District make up roughly one-third of all vehicles on U.S. roads.

Non-Automotive Impacts

While the automotive sector is one of the largest traded between the United States and Mexico, other manufacturing sectors make up significant portions of total dollars Mexico spends on U.S. products. In 2015, Mexico purchased over \$30B in other U.S. manufactured goods. Absent NAFTA, U.S. plastic products, semiconductors and other electronic components, electrical equipment and components, general purpose machinery, and computer equipment will likely face a tariff, increasing the likelihood that Mexico will purchase these manufactured goods from countries other than the United States (Table 2). Mexico has free trade agreements with 45 countries other than the United States; Mexico has plenty of choices for sources of its manufacturing inputs.

³ Arizona, Connecticut, Maine, Maryland, Massachusetts, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Rhode Island, Vermont, Washington, and the District of Columbia.

Table 2: All Export Commodities: FAS Value by FAS Value for Mexico, 2015*

Sector	2015 Value (\$US in Millions)
Plastics Products	6,240
Semiconductors & Other Electronic Components	5,349
Electrical Equipment & Components	4,960
General Purpose Machinery	4,826
Computer Equipment	4,812
Electrical Equipment	3,891
Total	30,078

Source: International Trade Commission; * Free Alongside

Additionally, the United States is a net importer of agricultural products and energy from Mexico, and without free trade, prices in both of these sectors will increase for American consumers and businesses (Table 3).

Table 3: U.S. Mexico Trade Balance in 2015

Sector	2015 Value (\$US in Millions)
Agriculture	-3,426
Energy (Oil and Gas)	-9,537

Source: International Trade Commission

CONCLUSION

NAFTA allows automakers to take advantage of best cost production and lower supply chain risk, thus ensuring automotive production remains in North America. With automotive parts and components being two-thirds the value of the finished vehicle the opportunity to have a best cost location of this content on the “near shore” in Mexico rather than truly “off-shore,” supports and sustains a competitive automotive industry across North America, of which the United States dominates in terms of vehicle production and parts manufacturing.

Any move by the United States to withdraw from NAFTA or to otherwise restrict automotive vehicle, parts and components trade within North America will result in higher costs to producers, lower returns for investors, fewer choices for consumers, and a less competitive U.S. automotive and supplier industry. Counter to the incoming Trump Administration’s goal of creating manufacturing jobs the withdrawal from NAFTA or the implementation of punitive tariffs could result in the loss of at least 31,000 U.S. automotive and parts jobs.

REFERENCES

- (2016). Retrieved from World Input-Output Database: <http://www.wiod.org/home>
- Center for Automotive Research. (2016). Book of Deals.
- De La Cruz, J., Koopman, R. B., & Wang, Z. (2011). *Estimating Foreign Value-added in Mexico's Manufacturing Exports*. . Washington, D.C.: U.S. International Trade Commission, Office of Economics.
- Koopman, Powers, W, Zhi Wang, Z. & Wei, S. (2011) *Give Credit Where Credit is Due: Tracing Value Added In Global Production Chains*. National Bureau of Economic Research Working Paper No. 16426, Cambridge, Massachusetts: September 2010, revised March 2011, p. 38.
- Moran, T. H., & Oldenski, L. (2014). How U.S. Investments in Mexico have increased investment and jobs at home. In *NAFTA, 20 Years Later*. Washington, D.C.: Peterson Institute for International Economics.
- Moran, T. H., & Oldenski, L. (2014). *The U.S. Manufacturing Base: Four Signs of Strength*. Washington, D.C.: Peterson Institute for International Economics.
- Porter, E. (2016, March 29). "NAFTA May Have Saved Many Autoworkers' Jobs. *The New York Times*. Retrieved from http://www.nytimes.com/2016/03/30/business/economy/nafta-may-have-saved-many-autoworkers-jobs.html?_r=3
- Timmer, M. D. (2015). An Illustrated User Guide to the World Input-Output Database: the Case of Global Automotive Production. *Review of International Economics*, 23, pp. 575-605.
- U.S. Bureau of Economic Analysis. (2016). *U.S. Direct Investment Abroad, U.S. Direct Investment Position Abroad on a Historical-Cost Basis*. Retrieved from Balance of Payments and Direct Investment Position Data.
- U.S. International Trade Administration. (2016). Retrieved from Trades Stats Express: <http://trade.gov/mas/ian/tradestatistics/index.asp>
- U.S. International Trade Administration. (2016). *2016 Top Markets Report: Automotive Parts, Country Case Study--Mexico*. Washington, D.C.: U.S. Department of Commerce.
- U.S. International Trade Administration. (2016). Detroit-Warren-Dearborn Merchandise Exports in 2015. Washington, D.C.
- Wharton School. (2014, February 19). NAFTA, 20 Years Later: Do Benefits Outweigh Costs? *Knowledge@Wharton*. Retrieved from <http://knowledge.wharton.upenn.edu/article/nafta-20-years-later-benefits-outweigh-costs/#>

Wilson, C. (2016). *Growing Together: A Regional Manufacturing Platform*. Retrieved from Growing Together: A Regional Manufactur<https://www.wilsoncenter.org/publication/growing-together-regional-manufacturing-platform#sthash.ObALK4bc.dpuf>

Wilson, C. E. (2011). *Working Together: Economic Ties Between the United States and Mexico*. Washington, D.C.: Woodrow Wilson International Center for Scholars.

Wilson, C., & Woods, D. (2016, September 26). *Growing Together: Economic Ties Between the U.S. and Mexico*. Washington, D.C.: Woodrow Wilson International Center for Scholars. Retrieved from Wilson Center, Mexico Institute.

DATA APPENDIX

Table 4: All U.S. Export Commodities by FAS* Value for Canada, Annual, 2014 and 2015; Year-to-Date January-September 2015-2016 Comparison

NAICS/Description	2014	2015	2015 YTD	2016 YTD	Percent Change
	In \$US Millions				
3361 MOTOR VEHICLES	26,479	25,171	19,316	20,145	4.30
3363 MOTOR VEHICLE PARTS	22,527	22,005	16,149	17,279	7.00
2111 OIL & GAS	16,694	10,479	8,598	4,534	-47.30
3241 PETROLEUM & COAL PRODUCTS	15,296	10,010	7,696	6,348	-17.50
9900 OTHER SPECIAL CLASSIFICATION PROVISIONS	8,383	7,541	5,314	6,472	21.80
3339 OTHER GENERAL PURPOSE MACHINERY	8,262	7,524	5,817	5,110	-12.20
3364 AEROSPACE PRODUCTS & PARTS	6,563	7,160	4,876	4,757	-2.40
3331 AG & CONSTRUCTION & MACHINERY	8,831	7,102	5,703	4,468	-21.70
3251 BASIC CHEMICALS	7,359	6,269	4,876	4,406	-9.70
3252 RESIN, SYN RUBBER, ARTF & SYN FIBERS/FIL	6,756	5,885	4,537	4,221	-7.00
3261 PLASTICS PRODUCTS	5,916	5,511	4,224	4,132	-2.20
3311 IRON & STEEL & FERROALLOY	7,203	5,333	4,166	3,622	-13.10
3329 OTHER FABRICATED METAL PRODUCTS	5,175	4,668	3,593	3,159	-12.10
3336 ENGINES, TURBINES & POWER TRANSMN EQUIP	4,667	4,524	3,515	2,939	-16.40
3222 CONVERTED PAPER PRODUCTS	4,389	4,187	3,165	3,083	-2.60
Subtotal :	154,498	133,370	101,544	94,674	-6.80
All Other:	108,965	100,504	76,330	71,974	-5.70
Total	263,463	233,875	177,874	166,647	-6.30

Source: U.S. Department of Commerce and the International Trade Commission; * Free Alongside NAICS - The North American Industry Classification System

Table 5: All U.S. Export Commodities by FAS Value for Mexico, Annual, 2014 and 2015; Year-to-Date January-September 2015-2016 Comparison

NAICS/Description	2014	2015	2015 YTD	2016 YTD	Percent Change
	In \$US Millions				
3363 MOTOR VEHICLE PARTS	17,792	20,168	15,089	13,970	-7.40
3241 PETROLEUM & COAL PRODUCTS	19,009	14,746	11,248	11,600	3.10
3251 BASIC CHEMICALS	9,870	8,311	6,435	5,859	-8.90
3252 RESIN, SYN RUBBER, ARTF & SYN FIBERS/FIL	8,388	7,925	6,033	5,782	-4.20
9900 OTHER SPECIAL CLASSIFICATION PROVISIONS	7,594	7,362	5,567	5,251	-5.70
3261 PLASTICS PRODUCTS	6,066	6,240	4,710	4,667	-0.90
3336 ENGINES, TURBINES & POWER TRANSMN EQUIP	6,584	5,628	4,443	3,968	-10.70
3344 SEMICONDUCTORS & OTHER ELECTRONIC COMPONENTS	5,709	5,349	3,989	4,042	1.30
3359 ELECTRICAL EQUIPMENT & COMPONENTS, NESOI	4,868	4,960	3,769	3,538	-6.10
1111 OILSEEDS & GRAINS	5,429	4,881	3,701	3,878	4.80
3339 OTHER GENERAL PURPOSE MACHINERY	5,281	4,826	3,637	3,347	-8.00
3329 OTHER FABRICATED METAL PRODUCTS	4,792	4,826	3,684	3,553	-3.50
3311 IRON & STEEL & FERROALLOY	4,733	4,210	3,338	2,742	-17.90
3341 COMPUTER EQUIPMENT	3,945	4,182	3,093	3,062	-1.00
3353 ELECTRICAL EQUIPMENT	3,839	3,891	2,988	2,732	-8.60
Subtotal :	113,899	107,506	81,723	77,989	-4.60
All Other:	78,780	77,801	58,450	54,029	-7.60
Total	192,679	185,307	140,173	132,018	-5.80

Source: U.S. Department of Commerce and the International Trade Commission; * FAS – Free Alongside NAICS - The North American Industry Classification System