

# **Estimated Impacts of Tariffs on the U.S. Economy and Workers**

**Prepared by TRADE PARTNERSHIP WORLDWIDE, LLC**

**for**

**Tariffs Hurt the Heartland**

**November 2018**

## About Trade Partnership Worldwide, LLC

Trade Partnership Worldwide was formed in 2001 by Laura M. Baughman, President, and Drs. Joseph Francois and Dean Spinanger. The firm produces clear, highly-readable assessments of trade issues that are widely used by U.S. policy makers, trade associations, businesses and business coalitions, and foreign organizations.

This study was principally prepared by Dr. Joseph Francois and Laura M. Baughman. Dr. Francois is Managing Director of Trade Partnership Worldwide, LLC, and Professor of Economics, University of Bern, Department of Economics and Managing Director, World Trade Institute. He also holds numerous research fellowships and professorships at think tanks and universities around the world. Dr. Francois formerly was the head of the Office of Economics at the U.S. International Trade Commission, and a research economist at the World Trade Organization. Dr. Francois holds a PhD in economics from the University of Maryland, and economics degrees from the University of Virginia. Baughman is President of Trade Partnership Worldwide, LLC. She holds degrees in economics from Columbia and Georgetown Universities.

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# Estimated Impacts of Tariffs on the U.S. Economy and Workers

## Executive Summary

Beginning in March 2018, the United States began to impose a series of tariffs and then quotas on imports of selected steel and aluminum products from all countries except Australia. Those countries retaliated in kind. The United States also imposed tariffs on a large share of U.S. imports from China, and China retaliated in kind. The United States has threatened to impose additional tariffs on U.S. imports of motor vehicles and parts from selected countries, as well as on the remainder of U.S. imports from China.

This study examines the economic effects of these actual and threatened tariffs on the U.S. economy and U.S. workers one to three years after they have been in effect. We look at four scenarios and find:

- Base Scenario: As of November 1, steel and aluminum tariffs of 25 percent and quotas in effect, tariffs of 25 percent on U.S. imports of selected goods from China (Lists 1, 2 and 3), plus retaliation:

Annual impact on U.S. GDP	-0.37%
Annual impact on family of four	\$767
One-time net impact on U.S. jobs	-934,700
Every state experiences net job losses	
- Base Scenario plus U.S. tariffs of 25 percent on motor vehicles and parts imported from countries *other than* Canada, Mexico, the European Union, Korea, and Japan, plus retaliation:

Annual impact on U.S. GDP	-0.43%
Annual impact on family of four	\$902
One-time net impact on U.S. jobs	-1,040,200
- Base Scenario plus U.S. tariffs of 25 percent on all remaining imports from China, plus Chinese retaliation:

Annual impact on U.S. GDP	-1.01%
Annual impact on family of four	\$2,294
One-time net impact on U.S. jobs	-2,159,500
- All three scenarios combined:

Annual impact on U.S. GDP	-1.04%
Annual impact on family of four	\$2,389
One-time net impact on U.S. jobs	-2,235,400
Every state experiences net job losses	

# Estimated Impacts of Tariffs on the U.S. Economy and Workers

## I. Introduction

Beginning in March 2018, President Trump began to impose a series of tariffs and, later, quotas on selected U.S. steel and aluminum imports from a number of countries, under Section 232 of the Trade Expansion Act of 1962. In addition, on July 6, 2018 President Trump applied the first in a series of tariffs on imports of selected products imported from China, in retaliation for China's refusal to change intellectual property rights-related acts, policies and practices that the Office of the U.S. Trade Representative (USTR) had determined were adversely affecting U.S. companies. In each instance, U.S. trading partners retaliated with tariffs of their own, applied to a range of U.S. exports. As of November 1, 2018, U.S. tariffs affected \$255 billion in U.S. imports and foreign retaliatory tariffs were being applied to \$124 billion in U.S. exports.<sup>1</sup>

The President has also threatened to impose additional tariffs on imports of motor vehicles and parts, but has agreed to remove certain suppliers from coverage, at least for now. The total value of potentially affected motor vehicle and parts trade is \$28 billion, with commensurate retaliation to U.S. exports.

The President has threatened to impose tariffs on the balance of U.S. imports from China if China continues to fail to implement a long list of changes to its intellectual property rights policies and practices, and narrow its trade surplus with the United States. China has again threatened to retaliate in kind. These threatened tariffs would affect an additional \$290 billion in U.S. imports, with commensurate retaliation to U.S. exports.

The escalation of tariffs, both by the United States and by U.S. trading partners, has an impact on U.S. producers and consumers and, as a consequence, U.S. workers. Some of those effects are positive (increased production and output in sectors protected by the tariffs); others are negative (higher costs to consumers – both U.S. manufacturers and households – who must pay the tariffs, for example). This study estimates the comprehensive impacts of announced tariffs and quotas on the U.S. economy and U.S. workers. Section II describes in more detail our tariff scenarios. Section III briefly describes our methodology; a more detailed description is found in Appendix A. Section IV presents our results. Section V concludes.

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<sup>1</sup> The value of trade affected by U.S. import and foreign retaliatory tariffs reported here may differ significantly from published accounts of the amount of trade affected by tariffs. One cause is difference in import classification codes for the same product that are different for 2017 and 2018. A product may be on a U.S. tariff list for 2018, but no data show up for it for 2017 because that tariff code did not exist in 2017. Our data reflects the 2018 tariff codes that are missing from 2017 data. For U.S. exports, the value of trade in 2017 may be higher or lower than figures cited in official announcements. The need to use less-detailed categories (6-digit HTS codes) than those used by foreign governments to select retaliatory tariffs may overstate about value of trade covered for certain products, but larger variations (higher or lower) result from foreign governments' use of trade data for periods other than 2017 to select retaliation lists.

## II. Scope of Tariffs to Date, Threatened and Actual

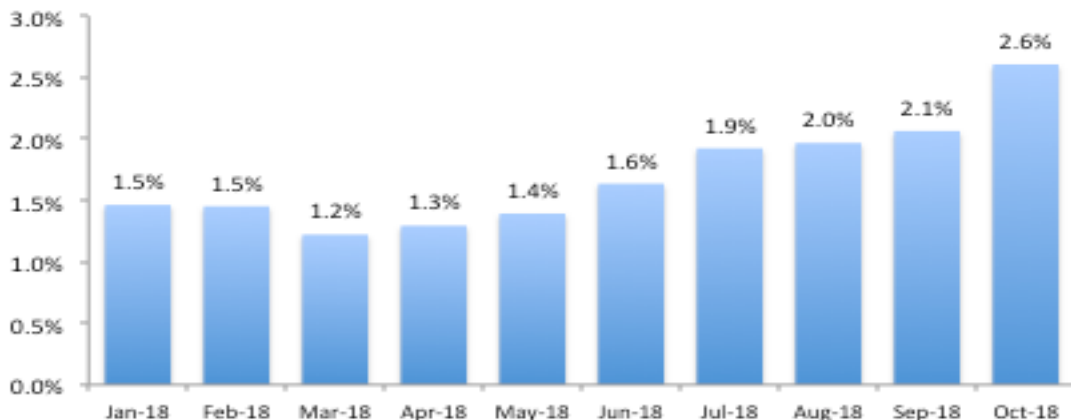
Effective March 8, 2018, President Trump instructed his Administration to impose tariffs and, later, quotas on selected U.S. steel and aluminum imports from a number of countries, under Section 232 of the Trade Expansion Act of 1962. Seven countries and the European Union announced and then imposed retaliatory tariffs on lists of various U.S. exports to their respective markets.

In addition, on July 6 President Trump applied the first in a series of tariffs on imports of selected products (grouped by the Administration as “List 1,” “List 2,” and “List 3”) imported from China, in retaliation for China’s refusal to change intellectual property rights-related acts, policies and practices that the Office of the U.S. Trade Representative (USTR) had determined were adversely affecting U.S. companies. After each new set of tariffs was imposed, China announced its own list of U.S. products that would be subject to retaliatory Chinese duties when imported into China.

As of November 1, 2018, U.S. tariffs affected \$255 billion in U.S. imports and foreign retaliatory tariffs were being applied to \$124 billion in U.S. exports; tariffs affecting \$165 billion in U.S. imports from China are set to increase from 10 percent to 25 percent on March 2, 2019 (see Table 1).

The new tariffs have increased average U.S. tariff rates since they started to take effect in March (Chart 1). The trade-weighted average U.S. tariff paid by U.S. companies – reflecting tariffs paid on goods subject to the new tariffs as well as regular tariffs -- rose from 1.5 percent or less in the first five months of 2018 to 2.6 percent by October 2018, the latest month for which data are available. Given U.S. goods imports of \$2.0 trillion to \$2.5 trillion annually, a 1-percentage point increase in average tariffs paid equates to \$20 billion to \$25 billion in additional tariff costs for U.S. importers.

**Chart 1**  
**Average Tariffs Paid on All U.S. Goods Imports, January – October 2018**



Sources: Rates weighted by trade value. Derived from U.S. Census Bureau data.

**Table 1**  
**Summary of Tariffs in Effect or Announced as of November 1, 2018**  
**Value of 2017**  
**Trade Affected (Millions)**

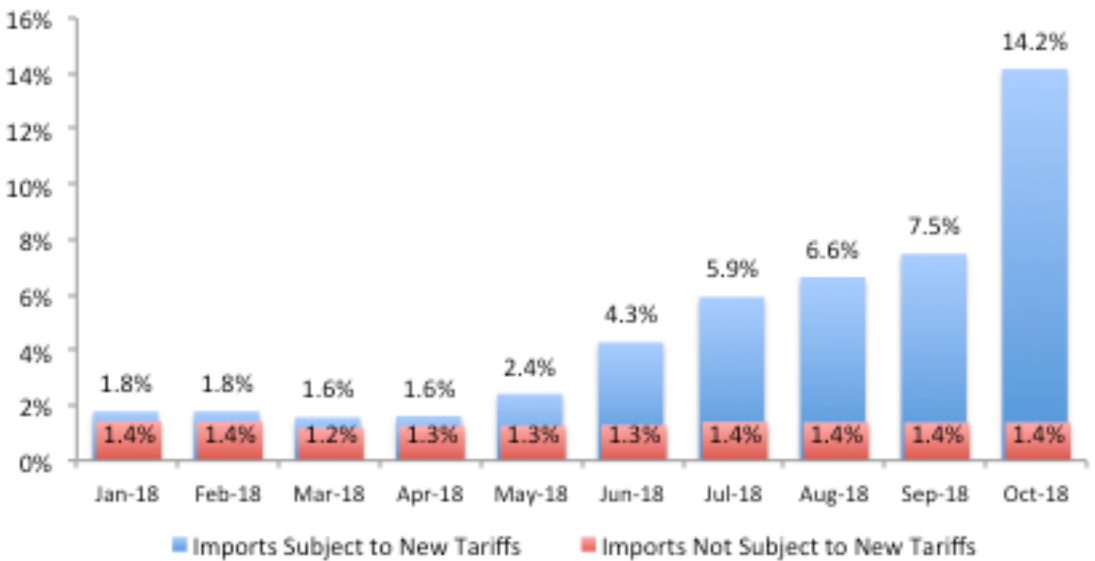
		<b>Imports</b>	
U.S. Aluminum Tariffs			
	All countries <i>except</i> Australia, Argentina	10%	\$16,984
U.S. Aluminum Quotas			
	Argentina	Imports capped at average of 2015-2017 volumes	\$167
U.S. Steel Tariffs			
	Turkey	50%	\$1,192
	All others <i>except</i>		
	Australia, Argentina, Brazil, Korea	25%	\$22,888
U.S. Steel Quotas			
	Argentina	Volume capped at 135 percent of 2015-2017 average	\$56
	Brazil	Semi-finished volume fixed at 2015-2017 average; Finished, 30% cut in import volume from 2015-2017 ave.	\$592
	Korea	30% cut in import volume from 2015-2017 average	\$1,129
U.S. Tariffs on Imports from China			
	List 1 (818 products)	25%	31,936
	List 2 (279 products)	25%	13,712
	List 3 (6,031 products)	10%-25%	165,334
Total Imports Affected		\$254,990	
Share of Total U.S. Imports from All Countries		10.9%	
		<b>Exports</b>	
Steel/Aluminum Retaliation			
	Canada	10-25%	\$17,818
	China	15-25%	2,441
	Mexico	7-25%	6,744
	EU	10-25%	4,230
	Turkey	4-140%	1,563
	India	5-100%	(not in effect yet)
	Japan	TBD	(not in effect yet)
	Russia	25-40%	268
Chinese Tariffs on Imports from the United States			
	Retaliation for List 1 (545 products)	25%	29,172
	Retaliation for List 2 (333 products)	25%	21,878
	Retaliation for List 3 (5,207 products)	5-25%	51,956
Total Exports Affected*		\$124,035	
Share of Total U.S. Exports to All Countries		8.0%	

\* The sum of export values reported for individual countries and actions is higher than value of total exports affected due to double counting of products that are on multiple Chinese retaliation lists. In some cases, a single product is on both the Chinese Section 232 steel/aluminum and Section 301 retaliation lists. In others, it is because multiple products under the same 6-digit HTS code appear on different China Section 301 retaliation lists. The total value affected figure in this Table eliminates such double-counting issues.

Sources: Imports: Steel/aluminum and China import value data from U.S. Census for affected products; for quotas, estimated on the basis of volume impacts of quotas relative to 2017 import values from U.S. Census data. Exports: Country retaliation values from U.S. Census for products included on U.S. Department of Commerce’s Current Foreign Retaliatory Actions page, [https://www.trade.gov/mas/ian/tradedisputes-enforcement/retaliations/tg\\_ian\\_002094.asp#P4\\_161](https://www.trade.gov/mas/ian/tradedisputes-enforcement/retaliations/tg_ian_002094.asp#P4_161) (accessed November 2, 2018)..

Breaking out average tariff rates for products subject to new tariffs from those unaffected by the new tariffs shows that the bulk of the increase in average tariffs paid shown in Chart 1 was in fact driven by the new tariffs (Chart 2). Average tariffs on imports *not* subject to new remedies have remained steady: between 1.2 percent and 1.4 percent all year. In contrast, average tariffs on products subject to new tariffs increased from 1.6 percent in April to 14.2 percent in October. Average tariffs on affected products have increased every month since March, and nearly doubled from September to October, the first full month that “List 3” tariffs on China were in effect.

**Chart 2**  
**Average Tariffs Paid on U.S. Goods Imports by Type, January – October 2018**

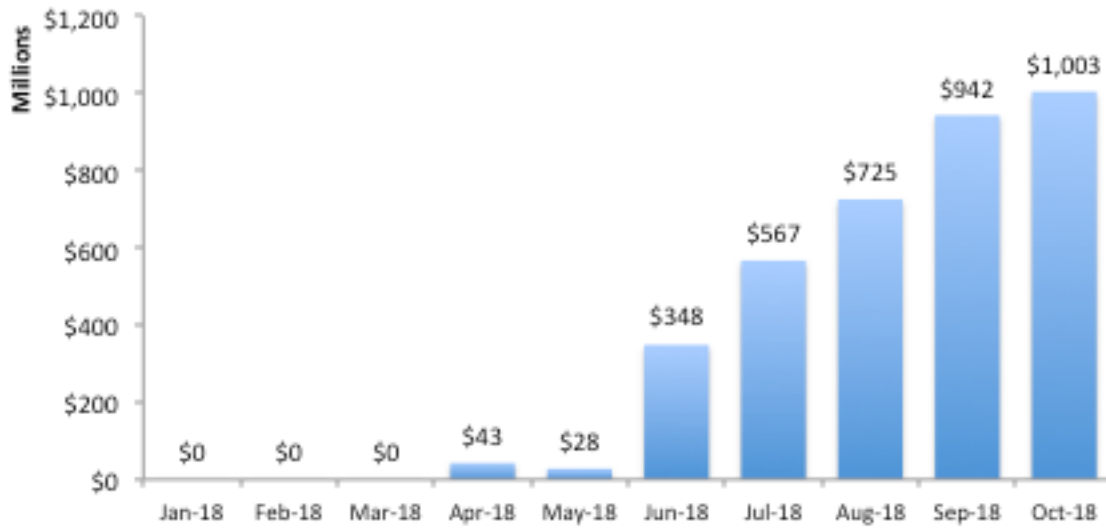


Sources: Rates weighted by trade value. Derived from U.S. Census Bureau data.

The negative impacts of rising tariffs are evident on U.S. exports trends as well. New retaliatory tariffs on U.S. exports have been announced nearly every month: in response to U.S. Section 232 steel and aluminum tariffs, China implemented new tariffs on U.S. exports in April. Mexico, Turkey and the EU similarly imposed new tariffs in June, followed by

Canada in July and Russia in August. Additionally, China imposed new (or even higher) tariffs on U.S. exports in July, August, and September in response to Section 301 tariffs. As a result of the rolling implementation, the value of retaliatory tariffs assessed on U.S. exports has continued to climb (Chart 3).

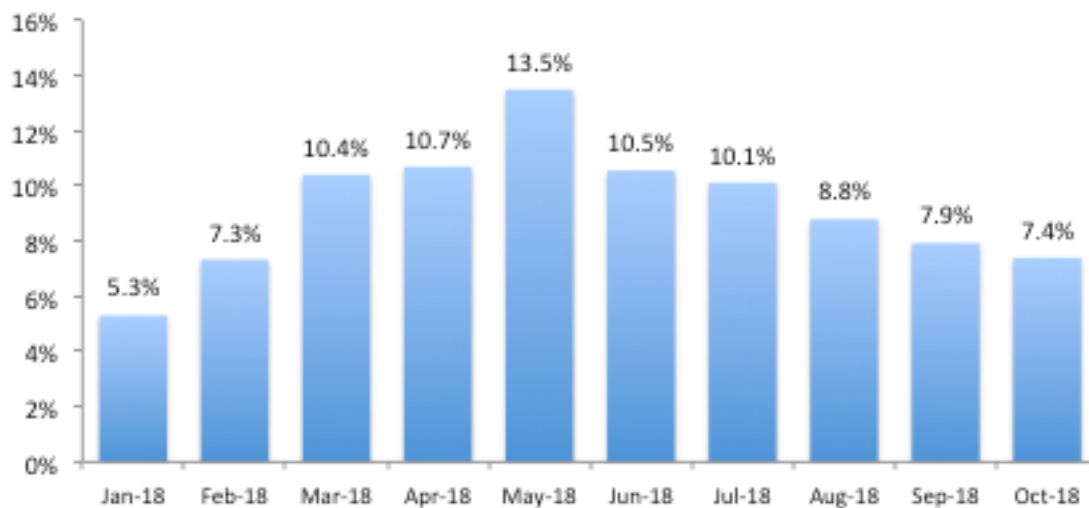
**Chart 3**  
**Estimated Retaliatory Tariffs Assessed on U.S. Goods Exports, January – October 2018**



Sources: Derived from U.S. Census Bureau data.

Limited retaliation by China to Section 232 steel aluminum remedies in April/May ballooned to an estimated \$1 billion in extra tariffs on U.S. exports in October 2018. Increasing retaliatory tariffs have corresponded with a significant slowdown in U.S. goods exports growth (see Chart 4).

**Chart 4**  
**Year-Over-Year Change in U.S. Goods Exports, January – October 2018**

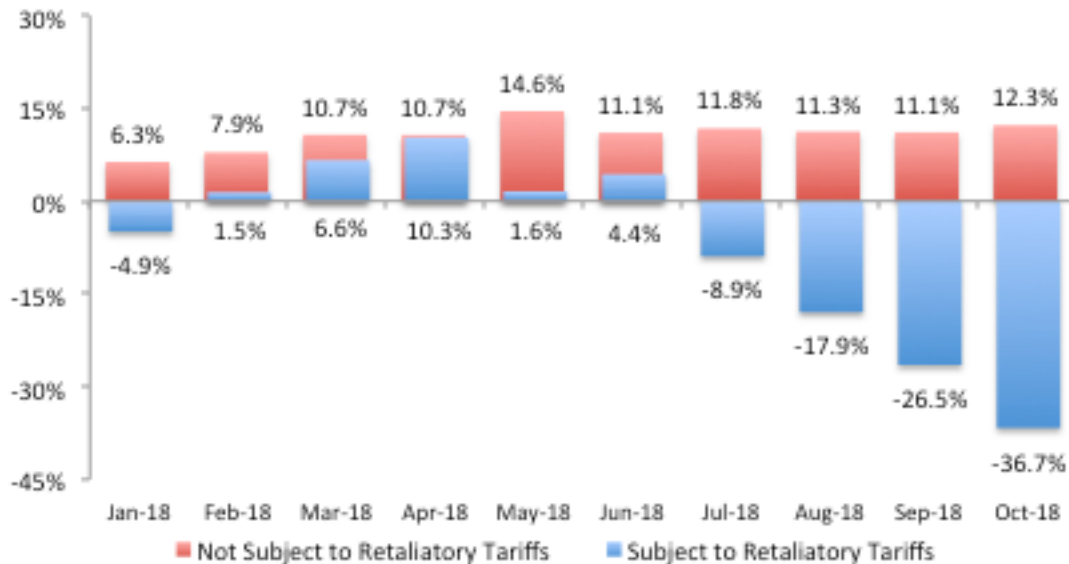




Sources: Derived from U.S. Census Bureau data.

After rising steadily in the beginning of 2018, growth in U.S. exports peaked at 13.5 percent in May and has fallen every month since then. Breaking out U.S. export growth for products subject to retaliation – as opposed to those unaffected by it – shows a particularly stark difference in the negative impact on export growth of retaliatory tariffs (see Chart 5). Growth trends for U.S. goods exports *not* subject to retaliatory tariffs have remained remarkably consistent: generally increasing by 11 percent to 12 percent in each month from March to October. Conversely, exports subject to retaliation have declined each month since July. Declines have accelerated as tariffs have remained in place, including a 37 percent decline in October.

**Chart 5**  
**Year-Over-Year Change in U.S. Goods Exports by Type, January – October 2018**



Sources: Derived from U.S. Census Bureau data.

Clearly, retaliatory tariffs likely are behind slowing growth of U.S. goods exports. If the primary cause were general factors, such as a strong dollar or weakening global growth, one would expect to see slowing growth for non-affected products as well. Estimating the actual extent of this impact is one of the aims of this research.

The stories told in the succession of Charts above could get worse. The President has also threatened to impose additional tariffs on imports of motor vehicles and parts,<sup>2</sup> but has also agreed to remove certain suppliers from coverage, at least for now. Mexico and Canada negotiated, in the pending U.S.-Mexico-Canada Agreement (USMCA) large quotas for autos and parts that are designed to have little or no impact on their exports of those products to the United States if Section 232 tariffs are ultimately imposed; the President has also agreed to not subject the European Union and Japan to Section 232 tariffs as long as those parties continue to negotiate trade agreements with the United States. Finally, Korea believes it has an understanding that Section 232 tariffs on autos or parts will not affect U.S. imports of those products from Korea (Korean legislators have promised to not approve the revised U.S.-Korea free trade agreement if such tariffs ultimately do impact Korea's autos and parts). This means that possible Section 232 tariffs would affect a relatively small share of U.S. motor vehicle and parts imports, and commensurate retaliation.

The President has also threatened to impose tariffs on the balance of U.S. imports from China if China continues to fail to implement a long list of changes to its intellectual property rights policies and practices, and narrow its trade surplus with the United States. China has again threatened to retaliate in kind. These threatened tariffs could affect and additional \$291 billion in U.S. imports and \$145 billion in U.S. goods and services exports (see Table 2).

**Table 2**  
**Summary of Potential Additional Tariffs**

	<b>Tariff Rate</b>	<b>Value of 2017 Trade (Million)</b>
<b>Imports</b>		
U.S. Motor Vehicles & Parts All suppliers <i>other than</i> Canada, Mexico, EU, Japan, Korea	25%	\$28,020
U.S. Tariffs on Imports from China List 4	25%	\$291,180
<b>Exports</b>		
Retaliation by suppliers affected by motor vehicles and parts tariffs	0.7%	\$297,704
Chinese retaliation for tariffs on List 4 products		

<sup>2</sup> At the President's instruction, the Commerce Department has begun a Section 232 investigation focused on motor vehicles and parts. The President has suggested he could impose tariffs of up to 25 percent on U.S. imports of these products at the conclusion of that investigation. U.S. trading partners have said they will retaliate if those tariffs are imposed.

Goods*	25%	\$87,103
Services	10-25%	\$57,628

\* Includes products not subject to any current Section 301 retaliation as well as products on List 3 whose current retaliatory tariffs are less than 25 percent.

Sources: U.S. Department of Commerce, Census Bureau and Bureau of Economic Analysis.

To examine the actual and potential economic effects of these tariffs on the U.S. economy, we have grouped them into four scenarios.

- (1) **Base Scenario: Announced Tariffs and Quotas.** This scenario examines the impacts of all tariffs (U.S. and retaliatory) and quotas in effect or announced as of November 1, 2018. This scenario groups together U.S. steel and aluminum tariffs of 25 percent and quotas, with retaliation on selected U.S. exports at the tariffs indicated by trading partners; U.S. tariffs of 25 percent on imports of China included on Lists 1, 2 and 3, and China’s announced retaliation on U.S. exports at the tariff rates announced.
- (2) **Possible Motor Vehicle and Parts Section 232 tariffs.** This scenario adds to the Base Scenario additional U.S. tariffs of 25 percent on U.S. imports of motor vehicles and parts, , *except* Canada, Mexico, Korea, the European Union and Japan, with reciprocal retaliation based on the dollar value of tariffs imposed on U.S. motor vehicle imports (for top remaining supplier countries to the U.S.), divided by the dollar value of U.S. exports to those same markets.
- (3) **All Goods Trade with China.** This scenario adds to the Base Scenario additional U.S. tariffs of 25 percent on U.S. imports of all remaining products imported from China (dubbed “List 4”), plus expected retaliation by China. As China has already raised duties on virtually all its goods imports from the United States, Its new options include raising duties on all U.S. imports to 25 percent where they are currently lower than that, and/or taking non-tariff actions that have the effect of restricting trade (e.g., slowing import processing or making the purchase of U.S. services more expensive). We assume here that China imposes the equivalent of a 25 percent tariff on U.S. services transactions with China (in the form of increased costs for operating in the Chinese market), as well as border and customs nuisance costs equal to an additional 2 percent of the value U.S. goods exports.<sup>3</sup>

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<sup>3</sup> Caroline Freund, Michael Farrantino, Maryla Maliszewska, and Michele Ruta, “Impacts on Global Trade and Income of Current Trade Disputes,” Macroeconomics, Trade and Investment MTI Practice Notes, World Bank Group, No. 2, July 2018, <http://documents.worldbank.org/curated/en/685941532023153019/pdf/128644-MTI-Practice-Note-2-Final-3.pdf>.

- (4) **Trade War.** This scenario combines all of the scenarios into one: steel/aluminum tariffs/quotas plus retaliation; tariffs on all U.S. imports from China plus retaliation, and tariffs plus retaliation on U.S. motor vehicles and parts from foreign suppliers other than Canada, Mexico, Korea, the European Union and Japan.

### III. Methodology

Tariffs have both positive and negative effects on the U.S. economy. Their first impact is to raise the costs of imports, forcing purchasers to either bear the higher costs or shift sourcing to unaffected suppliers. Their options are U.S. producers, where available, or producers in other countries, where available. So tariffs have a positive impact on U.S. producers by shifting some foreign sourcing to the United States, and a positive impact on third country suppliers by shifting other sourcing from the countries subject to tariffs to those that are not subject to tariffs.

But tariffs have a negative impact on U.S. buyers who must pay higher prices. The cost of foreign products that are subject to tariffs rises, and if the U.S. buyer must continue to source from those suppliers, the U.S. buyer must pay the tariffs. If the U.S. buyer can shift supply to another foreign – or U.S. – producer, the cost of that alternative source of supply will be higher, as well, and shifting supply also costs time and money. These higher costs get passed on to other buyers in the supply chain and, eventually to the final consumer.

These impacts ripple through the U.S. economy. U.S. producers who win new sales need to purchase more inputs to production, which sends new business to their suppliers. Companies along the U.S. producer supply chain may need to hire more workers. This additional U.S. spending ripples further through the economy in positive ways – all the way to such sectors as education (workers increase their use of day care services, for example) or entertainment (workers go out to dinner more).

But the higher costs of imports also have impacts on U.S. companies who need to continue to import because U.S. producers are not available or otherwise are not a viable option for them. The final purchaser of goods that now cost more will buy less of them. Sales declines eventually lead to employment cuts. Employment cuts result in lower consumer spending on a range of goods and services: instead of a new car, the family buys a used car; workers go out to dinner less often, and unemployed workers cut out even more discretionary purchases. Optional health care expenses are postponed. Each of these decisions in turn has employment impacts on workers in the affected sectors.

We use a methodology, which is detailed in Appendix B, that enables us to capture all of these impacts. Briefly stated, it explores the direct and indirect effects of tariffs on U.S. imports, the direct and indirect effects of retaliatory tariffs on U.S. exports, and the effects of trade-induced spending increases and decreases on U.S. output and consumption and, consequently, jobs. It reflects the differences in price, quantity and quality between imported goods and U.S.-produced goods. It also captures the jobs directly and indirectly related to the process of importing goods and services into the United States (e.g., jobs associated with transporting imports from the ports to warehouses, jobs at the warehouses, or retail jobs that sell the imported goods if they are finished consumer products). Finally, our methodology also considers the positive and negative effects of trade on jobs, and results reported are therefore “net” job impacts.

Our results focus on the short-term (one to three years) impacts of the tariffs. We assume the available pool of labor is tight.

## IV. Results

Our ability to capture the economy-wide impacts of the various tariff scenarios shows that they have some positive impacts on some sectors, and negative impacts on others. In every instance examined, the negative impacts outweigh the positive impacts.

### A. Base Scenario: Announced Tariffs and Quotas

We find that U.S. tariffs and quotas (referred to for ease here as simply “tariffs”) coupled with foreign retaliatory tariffs now affecting U.S. exports have net negative impacts on the U.S. economy and U.S. workers. Tariffs reduce U.S. GDP by 0.36 percent, a reduction that will occur each year the tariffs are in effect (Table 3). The average America family of four will have to find an extra \$767 to pay for higher costs for goods and services resulting from the tariffs, for every year they are in effect.

U.S. exports of goods and services overall decline by 5.6 percent, or \$131.7 billion annually based on 2017 levels, as a result of the tariffs. This is due primarily to the impact of the U.S. duties on imports rather than retaliation by U.S. exporters. The largest declines to the world (not just the retaliating countries, in terms of percentage reductions) are felt by U.S. exporters of iron and steel (-42.7 percent, heavily retaliation-related), oilseeds (-15.7 percent, largely retaliation-related), footwear and other leather products (-18.6 percent, largely due to U.S. tariff effects making U.S. output less competitive internationally), wood products (-13.3 percent, split between U.S. tariff and retaliation impacts), and nonferrous metals (aluminum, -12.8 percent, largely due to the impacts of the U.S. tariffs).

*Net* U.S. jobs decline by 934,700. Table 4 shows that some workers in some sectors find new jobs thanks to the tariffs. These include workers in the steel industry, as expected. Workers in steel-consuming sectors are hurt by higher costs associated with steel and aluminum tariffs, but benefit more from protection received from tariffs that cut imports from China of the products they make. Overall, 126,900 workers gain jobs as a result of the tariffs; however, 1,061,400 lose jobs – more than eight for every job gained. In short, the tariffs cost the U.S. economy \$490,900 for every job gained.

**Table 3**  
**Announced Tariffs and Quotas: National impacts, 1-3 Years After Tariffs Imposed**

Annual change in real U.S. GDP	-0.37%
Annual change in real U.S. national income (billions)	-\$62.3
Annual change in U.S. exports to the world	-5.6
Annual change in U.S. imports from the world (percent)	-6.5
Annual cost per U.S. family of four	\$767
One-time net impact on U.S. jobs	-934,700

**Table 4**  
**Announced Tariffs and Quotas: Net National Employment impacts by Sector, 1-3 years**  
**After Tariffs Imposed**  
(Thousands)

<b>Total</b>	<b>-934.7</b>
Agriculture	-59.3
Forestry	-1.8
Fishing	-1.0
Oil and gas	-2.9
Other mining	-3.6
<b>Manufacturing</b>	<b>+83.8</b>
Processed foods	-5.3
Beverages and tobacco	-4.9
Textiles	+3.9
Apparel	-1.5
Leather products	+1.9
Wood products	-2.6
Paper products and publishing	+0.6
Petroleum, coal products	-0.1
Chemicals, rubber, plastic products	+0.5
Other mineral products	+5.8
Iron and steel	+22.0
Nonferrous metals (including aluminum)	-0.7
Fabricated metal products	+22.0
Motor vehicles and parts	-16.9
Other transportation equipment	-11.1
Electronic equipment	+20.6
Machinery	+33.4
Other manufactures	+16.2
<b>Services</b>	<b>-949.7</b>
Construction	-209.5
Wholesale and retail trade	-216.4
Transportation	-27.4
Finance	-31.7
Insurance	-14.7
Communications	-23.8
Business and professional services	-154.9
Personal and recreational services	-38.6
Other services (e.g. utilities, educ., health, gov't, etc.)	-232.7

See Appendix Table A.1 for sector descriptions

**Table 5**  
**Announced Tariffs and Quotas: Net Employment impacts by State**

Alabama	-12,400	Montana	-4,000
Alaska	-2,400	Nebraska	-7,000
Arizona	-18,500	Nevada	-9,100
Arkansas	-7,800	New Hampshire	-3,600
California	-112,900	New Jersey	-25,500
Colorado	-19,200	New Mexico	-5,900
Connecticut	-10,600	New York	-58,800
Delaware	-2,900	North Carolina	-27,300
District of Columbia	-4,200	North Dakota	-3,300
Florida	-61,000	Ohio	-29,100
Georgia	-29,600	Oklahoma	-11,200
Hawaii	-5,000	Oregon	-11,900
Idaho	-5,500	Pennsylvania	-32,900
Illinois	-33,500	Rhode Island	-2,800
Indiana	-15,100	South Carolina	-12,700
Iowa	-9,900	South Dakota	-3,200
Kansas	-9,700	Tennessee	-19,300
Kentucky	-12,900	Texas	-85,100
Louisiana	-14,100	Utah	-9,600
Maine	-4,400	Vermont	-2,200
Maryland	-18,800	Virginia	-26,300
Massachusetts	-21,700	Washington	-24,000
Michigan	-25,100	West Virginia	-4,500
Minnesota	-16,100	Wisconsin	-14,100
Mississippi	-7,700	Wyoming	-2,300
Missouri	-18,700	TOTAL*	-943,700

\* The sum of the states does not add precisely to the total because of rounding.



**B. Announced Tariffs and Quotas Plus Possible Motor Vehicle and Parts Section 232 Tariffs**

Not surprisingly, the net impacts on the U.S. economy and workers worsen if the United States imposes tariffs under Section 232 on imports of motor vehicles and parts, and exporting countries retaliate in kind against U.S. exports – even if the scope of those tariffs is limited to countries that are not major suppliers of motor vehicles and parts to the United States. [Again, we have excluded from tariffs imports from and retaliation by Canada, Mexico, the European Union, Japan and Korea.]

Tariffs on steel, aluminum, and Lists 1-3 of goods imported from China, plus retaliation, plus tariffs on selected motor vehicle and parts imports and retaliation annually reduce U.S. GDP by 0.43 percent (Table 6). The average America family of four will pay over \$900 more for higher costs for goods and services resulting from the tariffs, for every year they are in effect.

U.S. exports of goods and services overall decline by 5.8 percent, or \$136.4 billion annually based on 2017 levels, as a result of the tariffs. The same sectors as in the base scenario continue to be the leading “losers” of exports to the world, and for the same reasons: iron and steel (-42.9 percent), oilseeds (-15.7 percent), footwear and other leather products (-18.8 percent), wood products (-13.3 percent), and nonferrous metals (aluminum, -13.2 percent).

Net U.S. jobs decline by 1,040,200. Table 7 shows that fewer workers in some sectors (3,000 less) find new jobs thanks to the additional motor vehicle and parts tariffs (workers in the chemicals, rubber and plastics sectors become net losers from the additional tariffs). Overall, 123,600 workers gain jobs as a result of the tariffs. But 1,063,600 lose jobs – more than nine for every job gained. The tariffs now cost the U.S. economy \$592,136 for every job gained.

**Table 6**  
**Announced Tariffs and Quotas Plus Motor Vehicle and Parts Section 232 Tariffs: National impacts, 1-3 Years After Tariffs Imposed**

Annual change in real U.S. GDP	-0.43%
Annual change in real U.S. national income (billions)	-\$73.2
Annual change in U.S. exports to the world	-5.8
Annual change in U.S. imports from the world (percent)	-6.9
Annual cost per U.S. family of four	\$902
One-time net impact on U.S. jobs	-1,040.2

**Table 7**  
**Announced Tariffs and Quotas Plus Motor Vehicle and Parts Section 232 Tariffs:**  
**Net National Employment impacts by Sector, 1-3 Years After Tariffs Imposed**  
(Thousands)

<b>Total</b>	<b>-1,040.2</b>
Agriculture	-60.0
Forestry	-2.0
Fishing	-1.0
Oil and gas	-3.1
Other mining	-3.7
<b>Manufacturing</b>	<b>+89.1</b>
Processed foods	-6.1
Beverages and tobacco	-5.1
Textiles	+4.0
Apparel	-1.4
Leather products	+1.9
Wood products	-3.2
Paper products and publishing	+0.1
Petroleum, coal products	-0.2
Chemicals, rubber, plastic products	-0.3
Other mineral products	+5.5
Iron and steel	+22.3
Nonferrous metals (including aluminum)	-0.6
Fabricated metal products	+23.0
Motor vehicles and parts	-5.7
Other transportation equipment	-11.9
Electronic equipment	+19.6
Machinery	+31.9
Other manufactures	+15.3
<b>Services</b>	<b>-1,059.5</b>
Construction	-230.1
Wholesale and retail trade	-242.2
Transportation	-28.7
Finance	-35.1
Insurance	-16.0
Communications	-26.5
Business and professional services	-165.2
Personal and recreational services	-45.2
Other services (e.g. utilities, educ., health, gov't, etc.)	-270.3

See Appendix Table A.1 for sector descriptions

### C. Announced Tariffs and Quotas Plus All Other Goods Trade with China

Imposing tariffs on the balance of U.S. imports from China (the so-called “List 4” items), with retaliation by China really amplifies the costs to the U.S. economy and U.S. workers of currently-announced tariffs and quotas on steel and aluminum, imports from China on Lists 1-3, and retaliation (our base scenario).

The annual reduction in U.S. GDP more than doubles from the base scenario, to -1 percent (Table 8). To put this in perspective: the impact of the duties erases the estimated gains to U.S. GDP from tax reform in its first years.<sup>4</sup> The average America family of four will pay nearly \$2,300 more for higher costs for goods and services resulting from the tariffs, for every year they are in effect. This more than consumes the estimated gains from tax reform of \$1,336 per taxpayer.<sup>5</sup>

U.S. exports of goods and services overall decline by 8.4 percent, or \$197.5 billion annually based on 2017 levels, as a result of the tariffs. The impacts of U.S. duties on exports to the world outweigh the negative impacts of retaliatory tariffs. In short: U.S. policy has a greater negative impact on U.S. exports than reactions by foreign trading partners. Sectors experiencing the largest declines in exports to the world include those primarily feeling the brunt of retaliation (forestry product, -20.5 percent; oilseeds, -17.1 percent; non-bovine animal products, -20.5 percent; iron and steel, -43.4 percent, wood products, -19.5 percent), but also many other sectors that are now less competitive internationally due to U.S. tariffs (electronic equipment, -22.9 percent; metals, -12.9 percent; textiles, -12.6 percent; clothing, -20.4 percent; and, again, footwear and leather products, -35.9 percent).

*Net* U.S. jobs decline by more than double the losses in the base scenario, by 2,159,500. Table 9 shows that more manufacturing workers benefit from the additional tariffs as they force more production back to the United States. Overall, 334,900 workers gain jobs as a result of the tariffs. But higher costs, especially for consumers, multiplies the jobs lost in other sectors, primarily services. A total of 2,494,500 workers lose jobs, seven for every job gained. The tariffs cost the U.S. economy \$555,584 for every job gained.

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<sup>4</sup> The Tax Foundation estimated that Tax Cut and Jobs Act would increase U.S. GDP by an average of 0.8 percent over its first three years. See Table 2 of Huaqun Li and Kyle Pomerleau, “the Distributional Impact of the Tax Cuts and Jobs Act Over the Next Decade,” The Tax Foundation, June 28, 2018, <https://taxfoundation.org/the-distributional-impact-of-the-tax-cuts-and-jobs-act-over-the-next-decade/>.

<sup>5</sup> Huaqun and Pomerleau estimate (Ibid.) that by 2022 after-tax income for all taxpayers will increase by 2.1 percent (Table 3). Applying that percentage to 2017 after-tax income published in the Consumer Expenditure Survey by the Bureau of Labor Statistics yields a savings from tax reform of \$1,336.

**Table 8**  
**Announced Tariffs and Quotas Plus Tariffs on All Goods Trade with China: National impacts, 1-3 Years After Tariffs Imposed**

Annual change in real U.S. GDP	-1.01%
Annual change in real U.S. national income (billions)	-\$186.1
Annual change in U.S. exports to the world	-8.4
Annual change in U.S. imports from the world (percent)	-11.1
Annual cost per U.S. family of four	\$2,294
One-time net impact on U.S. jobs	-2,159.5

**Table 9**  
**Announced Tariffs and Quotas Plus Tariffs on All Goods Trade with China:**  
**Net National Employment impacts by Sector, 1-3 Years After Tariffs Imposed**  
(Thousands)

<b>Total</b>	<b>-2,159.5</b>
Agriculture	-70.3
Forestry	-6.9
Fishing	-1.2
Oil and gas	-3.7
Other mining	-5.0
<b>Manufacturing</b>	<b>+235.5</b>
Processed foods	-14.6
Beverages and tobacco	-8.0
Textiles	+17.1
Apparel	+13.6
Leather products	+6.0
Wood products	-9.8
Paper products and publishing	-1.5
Petroleum, coal products	-0.5
Chemicals, rubber, plastic products	+4.4
Other mineral products	+3.9
Iron and steel	+23.3
Nonferrous metals (including aluminum)	+0.4
Fabricated metal products	+24.1
Motor vehicles and parts	-31.4
Other transportation equipment	-33.6
Electronic equipment	+145.4
Machinery	+24.7
Other manufactures	+72.0
<b>Services</b>	<b>-2,307.9</b>
Construction	-412.8
Wholesale and retail trade	-482.1
Transportation	-28.7
Finance	-75.9
Insurance	-42.2
Communications	-64.0
Business and professional services	-324.5
Personal and recreational services	-126.8
Other services (e.g. utilities, educ., health, gov't, etc.)	-703.5

See Appendix Table A.1 for sector descriptions

D. Trade War

Now suppose U.S. policy makers impose all tariffs and quotas contemplated, and U.S. trading partners retaliate as promised or as likely to retaliate. This scenario adds motor vehicle and parts tariffs to the previous scenario, and the results show increases the net negative impacts, as expected, but not by a lot, also as expected.

The annual reduction in U.S. GDP declines by just over -1 percent (Table 10). The average America family of four will pay nearly \$2,400 more for higher costs for goods and services resulting from the tariffs, for every year they are in effect, wiping out gains from tax reform.

U.S. exports of goods and services overall decline by 8.7 percent, or \$204.5 billion annually based on 2017 levels, as a result of the tariffs. The impacts of U.S. duties on exports to the world outweigh the negative impacts of retaliatory tariffs. Sectors experiencing the largest declines in exports to the world include those primarily feeling the brunt of retaliation (forestry product, -20.4 percent; oilseeds, -17.0 percent; non-bovine animal products, -20.4 percent; iron and steel, -43.6 percent, wood products, -19.6 percent), but also many other sectors that are now less competitive internationally due to U.S. tariffs (electronic equipment, -23.4 percent; metals, -13.3 percent; textiles, -12.7 percent; clothing, -20.6 percent; and, again, footwear and leather products, -36.0 percent).

*Net* U.S. jobs decline by more than double the losses in the base scenario, by 2,235,400. Table 11 shows that more manufacturing workers benefit from the additional tariffs as they force more production back to the United States. Overall, 332,000 workers gain jobs as a result of the tariffs. But higher costs, especially for consumers, multiplies the jobs lost in other sectors, primarily services. A total of 2,567,500 workers lose jobs, nearly eight for every job gained. The tariffs cost the U.S. economy \$583,693 for every job gained. Table 12 shows that every state experiences net job losses.

**Table 10**  
**Trade War: National impacts 1-3 Years After Tariffs Imposed**

Annual change in real U.S. GDP	-1.04%
Annual change in real U.S. national income (billions)	-\$193.8
Annual change in U.S. exports to the world	-8.7
Annual change in U.S. imports from the world (percent)	-11.5
Annual cost per U.S. family of four	\$2,389
One-time net impact on U.S. jobs	-2,235.4

**Table 11**  
**Trade War:**  
**Net National Employment impacts by Sector**  
(Thousands)

<b>Total</b>	<b>-2,235.4</b>
Agriculture	-70.8
Forestry	-6.9
Fishing	-1.2
Oil and gas	-4.0
Other mining	-5.2
<b>Manufacturing</b>	<b>+236.4</b>
Processed foods	-14.1
Beverages and tobacco	-8.2
Textiles	+17.2
Apparel	+13.7
Leather products	+6.0
Wood products	-10.3
Paper products and publishing	-2.0
Petroleum, coal products	-0.6
Chemicals, rubber, plastic products	+3.5
Other mineral products	+3.7
Iron and steel	+23.4
Nonferrous metals (including aluminum)	+0.4
Fabricated metal products	+24.5
Motor vehicles and parts	-25.3
Other transportation equipment	-34.1
Electronic equipment	+144.8
Machinery	+23.4
Other manufactures	+71.4
<b>Services</b>	<b>-2,383.7</b>
Construction	-426.8
Wholesale and retail trade	-501.4
Transportation	-28.7
Finance	-78.2
Insurance	-43.0
Communications	-65.8
Business and professional services	-330.4
Personal and recreational services	-131.4
Other services (e.g. utilities, educ., health, gov't, etc.)	-729.8

See Appendix Table A.1 for sector descriptions

**Table 12**  
**Announced Tariffs and Quotas: Net Employment impacts by State**

Alabama	-30,348	Montana	-9,050
Alaska	-5,972	Nebraska	-16,201
Arizona	-42,673	Nevada	-21,566
Arkansas	-19,493	New Hampshire	-8,133
California	-248,399	New Jersey	-61,694
Colorado	-44,590	New Mexico	-13,623
Connecticut	-27,219	New York	-143,888
Delaware	-6,919	North Carolina	-63,479
District of Columbia	-11,187	North Dakota	-7,501
Florida	-145,251	Ohio	-76,491
Georgia	-71,170	Oklahoma	-27,308
Hawaii	12,030	Oregon	-25,713
Idaho	-11,484	Pennsylvania	-84,789
Illinois	-85,120	Rhode Island	-6,894
Indiana	-39,233	South Carolina	-31,491
Iowa	-23,514	South Dakota	-7,200
Kansas	-23,566	Tennessee	-46,960
Kentucky	-30,677	Texas	-199,388
Louisiana	-34,943	Utah	-21,853
Maine	-10,635	Vermont	-4,993
Maryland	-45,237	Virginia	-64,467
Massachusetts	-50,502	Washington	-57,237
Michigan	-61,727	West Virginia	-11,162
Minnesota	-36,832	Wisconsin	-37,344
Mississippi	-18,710	Wyoming	-5,302
Missouri	-45,075	TOTAL*	2,235,400

\* The sum of the states does not add precisely to the total because of rounding.



## **V. Conclusion**

By any measure, the imposition of tariffs by the United States and U.S. imports of steel, aluminum, motor vehicles and parts, some subset of products imported from China – or all of them is a net loss for the U.S. economy and U.S. workers. An examination of all the ways in which such tariffs, accompanied by retaliation by U.S. trading partners, affects purchasing and hiring decisions demonstrates that on balance U.S. farmers, manufacturers, services providers and their workers experience greater losses than gains. In some instances, the tariff actions erase all of the anticipated gains from tax reform.

## Appendix A: Methodology In Detail

### A. The Model

To estimate the economic effects of various tariff scenarios, we start with the Global Trade Analysis Project (GTAP) database, which is integrated into a computable general equilibrium (CGE) model. The mathematical structure of our model, starting with the GTAP database, follows Egger et al, augmenting the basic Eaton-Kortum-Armington structure of the GTAP model with monopolistic competition, depending on the sector.<sup>6</sup>

The GTAP database covers international trade and economy-wide interindustry relationships and national income accounts, as well as tariffs, some nontariff barriers and other taxes. While our GTAP model database is based on version 10 (for 2014 data), we have updated the data to better reflect the U.S. economy in 2017. We have also estimated the trade elasticities and used in the model an extended version of the gravity model database employed by Egger et al (2015).

The model simulates the percentage changes in aggregate economic measures, including U.S. real GDP and aggregate employment, when moving from the baseline or reference level (in this case, 2017 U.S. and global economies) to the various counterfactuals (tariffs and quotas are imposed). The model results are then converted into percentage changes when moving from counterfactual levels to the actual levels that prevailed in the baseline. The results reflect short-term impacts, i.e., that the tariffs have been in effect for at least one to three years. For this analysis, we recognize that U.S. employment has continued the growth trend that began in mid 2010 (see <https://fred.stlouisfed.org/series/PAYEMS>), with the economy now appearing to approach full employment. At the same time, wage growth remains relatively flat compared to employment growth. We incorporated data reflecting recent employment and earnings trends and the tightening of the labor market.<sup>7</sup>

**It is important to emphasize that our employment impact estimates are net. They take into account potential increases as well as decreases in employment as demand increases in some cases for U.S. products, and declines in others.** These changes arise not only from the direct impacts of the re-imposition of tariffs, quotas and retaliation, but also the indirect impacts of changes in supply and demand for goods and services generally across the economy. For example, you will see that some sectors that you might not think would benefit from tariffs – chemicals, for example – show employment increases. This is because declines in production in other sectors releases labor and capital that can now be used

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<sup>6</sup> See Francois, J., Manchin, M., & Martin, W. (2013). "Market structure in multisector general equilibrium models of open economies." In D. Jorgenson and P. Dixon eds., *Handbook of computable general equilibrium modeling*, vol. 1, Elsevier, and Egger, Peter, Joseph Francois, Miriam Manchin, and Douglas Nelson. "Non-tariff barriers, integration and the transatlantic economy." *Economic Policy* 30, no. 83 (2015): 539-584.

1. According to the U.S. Department of Labor, unemployment increased 1.4 percent from May 2017 to May 2018. (See <https://www.bls.gov/opub/ted/2018/real-average-hourly-earnings-up-0-point-2-percent-for-all-private-employees-april-2015-to-april-2018.htm>). We use this recent relationship between relative changes in employment and real wages (technically in the form of an aggregate labor supply elasticity) to better reflect current labor market conditions.

more productively in other sectors, like chemicals. So output and related employment rise there.

## B. Data

To determine tariff level changes in the different scenarios, we first mapped U.S. import and export data for 2017 from the U.S. Census Bureau to both GTAP sectors and remedy/retaliation lists. For U.S. Section 232 steel/aluminum remedies, we applied a 25 percent tariff to U.S. imports of the steel products detailed in the Commerce Department's steel national security report, and a 10 percent tariff to U.S. imports of the aluminum products detailed in the Commerce Department's aluminum national security report, excluding imports from Argentina, Australia, Brazil and Korea. We reduced imports of steel from Korea by 30 percent, the estimate in media reports that the Administration sought to achieve from Korea. We similarly reduced imports from Brazil by the shares shown in Table 1, and froze imports from Argentina at the average of 2015-2017 levels.

Finally, for state level analysis, we first map state-level data on employment and GDP for NAICS sectors from BEA to corresponding model sectors. We then map national changes in production and employment at industry level to the corresponding state data at the model sector level. The impact on states therefore reflects the variation in the output and employment structure across state economies.

## C. Modeling Issues

Technically, the increase in trade costs for services takes the form of increased operating costs for U.S. firms operating in the Chinese market (also known as iceberg trade costs). We hypothesize that China imposes the equivalent of a 25 percent tariff on U.S. services imports into China, and slow-downs in Customs processing and other administrative procedures amounts to an additional 2 percent tariff-equivalent on goods imported from the United States.

**Table A.1**

**Sector Concordances**

<b>GTAP no.</b>	<b>GTAP Sector</b>	<b>Our Model Sector No.</b>	<b>Our Model Sectors</b>	<b>NAICS No.</b>	<b>NAICS Category</b>
1	PDR - Paddy rice	1	Primary agriculture	111,112	Agriculture
2	WHT – Wheat	1	Primary agriculture	111,112	Agriculture
3	GRO - Cereal grains n.e.c.	1	Primary agriculture	111,112	Agriculture
4	V_F - Vegetables, fruit, nuts	1	Primary agriculture	111,112	Agriculture
5	OSD - Oil seeds	1	Primary agriculture	111,112	Agriculture
6	C_B - Sugar cane, sugar beets	1	Primary agriculture	111,112	Agriculture
7	PFB - Plant-based fibers	1	Primary agriculture	111,112	Agriculture
8	OCR - Crops n.e.c.	1	Primary agriculture	111,112	Agriculture
9	CTL - Bovine cattle, sheep and goats, horses	1	Primary agriculture	111,112	Agriculture
10	OAP - Animal products n.e.c.	1	Primary agriculture	111,112	Agriculture
11	RMK - Raw milk	1	Primary agriculture	111,112	Agriculture
12	WOL - Wool, silk-worm cocoons	1	Primary agriculture	111,112	Agriculture
13	FRS - Forestry	2	Forestry	113	Forestry
14	FSH - Fishing	3	Fishing	114	Fishing and Hunting
15	COA – Coal	4	Other mining	2121	Coal Mining
16	OIL – Oil	5	Oil & gas	21112	Crude Petroleum Extraction
17	GAS – Gas	5	Oil & gas	21113	Natural Gas Extraction
18	OMN - Other mining	4	Other mining	2122, 2123, 213	Metal Ore Mining + Nonmetallic Mineral Mining + Support for Mining Activities
19	CMT - Bovine meat prods	6	Processed foods	311	Food Manufacturing
20	OMT - Meat and fish products n.e.c.	6	Processed foods	311	Food Manufacturing
21	VOL - Vegetable oils and fats	6	Processed foods	311	Food Manufacturing
22	MIL - Dairy products	6	Processed foods	311	Food Manufacturing
23	PCR - Processed rice	6	Processed foods	311	Food Manufacturing
24	SGR – Sugar	6	Processed foods	311	Food Manufacturing
25	OFD - Food products n.e.c.	6	Processed foods	311	Food Manufacturing
26	B_T - Beverages and tobacco products	7	Beverages & tobacco	312	Beverage and Tobacco Product Manufacturing
27	TEX – Textiles	8	Textiles	313, 314	Textile Mills + Textile Product Mills
28	WAP - Wearing apparel	9	Wearing apparel	315	Apparel Manufacturing
29	LEA - Leather products	10	Leather products	316	Leather and Allied Product Manufacturing

<b>GTAP no.</b>	<b>GTAP Sector</b>	<b>Our Model Sector No.</b>	<b>Our Model Sectors</b>	<b>NAICS No.</b>	<b>NAICS Category</b>
30	LUM - Wood products	11	Wood products	321, 322, 323	Wood Product Manufacturing + Paper Manufacturing + Printing and Related Support Activities
31	PPP - Paper products, publishing	12	Paper products, publishing	321, 322, 323	Wood Product Manufacturing + Paper Manufacturing + Printing and Related Support Activities
32	P_C - Petroleum, coal products	13	Petroleum, coal products	324	Petroleum and Coal Products Manufacturing
33	CRP - Chemical, rubber, plastic products	14	Chemical, rubber, plastic products	325, 326	Chemical Manufacturing + Plastics and Rubber Products Manufacturing
34	NMM - Mineral products n.e.c.	15	Mineral products nec	327	Non-metallic Mineral Product Manufacturing
35	I_S - Ferrous metals	16	Iron & steel	3311, 3312, 3315	Primary Metal Manufacturing (Ferrous)
36	NFM - Metals n.e.c.	17	Nonferrous metals	3313, 3314, 3315	Primary Metal Manufacturing (Other)
37	FMP - Metal products	18	Metal products	332	Fabricated Metal Product Manufacturing
38	MVH - Motor vehicles and parts	19	Motor vehicles and parts	3361, 3362, 3363	Motor Vehicle Manufacturing + Motor Vehicle Body and Trailer Manufacturing + Motor Vehicle Parts Manufacturing
39	OTN - Transport equipment n.e.c.	20	Transport equipment nec	3364, 3365, 3366, 3369	Aerospace Product and Parts Manufacturing + Railroad Rolling Stock Manufacturing + Ship and Boat Building + Other Transportation Equipment Manufacturing
40	ELE - Electronic equipment	21	Electronic equipment	334	Computer and Electronic Product Manufacturing
41	OME - Machinery and equipment n.e.c.	22	Machinery and equipment nec	333, 335	Machinery Manufacturing + Electrical Equipment, Appliance, and Component Manufacturing
42	OMF - Manufactures n.e.c.	23	Manufactures nec	337, 339	Furniture and Related Product Manufacturing + Miscellaneous Manufacturing
43	ELY - Electric power	34	Other services	22, 61, 62, 81, 99	Utilities + Educational Services + Health Care and Social Assistance + Other Services (except Public Administration) + Federal, State, and Local Government (excluding state and local schools and hospitals)
44	GDT - Gas manufactured and distributed	34	Other services	22, 61, 62, 81, 99	Utilities + Educational Services + Health Care and Social Assistance + Other Services (except Public Administration) + Federal, State, and Local Government (excluding state and local schools and hospitals)
46	CNS – Construction	24	Construction	23	Construction
47	TRD - Trade and distribution	25	Trade and distribution	42, 44-45, 72	Wholesale and Retail Trade, Accommodation and Food Services

<b>GTAP no.</b>	<b>GTAP Sector</b>	<b>Our Model Sector No.</b>	<b>Our Model Sectors</b>	<b>NAICS No.</b>	<b>NAICS Category</b>
48	OTP - Other transport	26	Other transport	482, 484, 485, 486, 487, 488, 493	Rail, Truck, Transit and Ground, Passenger, Pipeline, Scenic and Sightseeing Transportation, + Support Activities for Transportation + Warehousing and Storage
49	WTP - Water transport	27	Water transport	483	Water Transportation
50	ATP - Air transport	28	Air transport	481	Air Transportation
51	CMN - Communications	29	Communications	491, 492, 51	Information + Postal Service + Couriers and Messengers
52	OFI - Financial services	30	Financial services	521, 522, 523, 525	Monetary Authorities-Central Bank + Credit Intermediation and Related Activities + Securities, Commodity Contracts, and Other Financial Investments and Related Activities + Funds, Trusts, and Other Financial Vehicles
53	ISR – Insurance	31	Insurance	524	Insurance Carriers and Related Activities
54	OBS - Other business services, IT services	32	Business and professional services	53, 54, 55, 56	Real Estate and Rental and Leasing + Professional, Scientific, and Technical Services + Management of Companies and Enterprises + Administrative and Support and Waste Management Services
55	ROS - Recreational and other services	33	Personal and recreational services	71	Arts, Entertainment, and Recreation
45	WTR - Water and sewer services	34	Other services	22, 61, 62, 81, 99	Utilities + Educational Services + Health Care and Social Assistance + Other Services (except Public Administration) + Federal, State, and Local Government (excluding state and local schools and hospitals)
56	OSG - Other public services	34	Other services	22, 61, 62, 81, 99	Utilities + Educational Services + Health Care and Social Assistance + Other Services (except Public Administration) + Federal, State, and Local Government (excluding state and local schools and hospitals)
57	- Residential services, Dwellings	34	Other services		

**Table A.2**

**Country/Regions**

Australia	Ecuador	Lithuania	Kuwait
New Zealand	Paraguay	Luxembourg	Oman
China	Peru	Malta	Qatar
Hong Kong	Uruguay	Netherlands	Saudi Arabia
Japan	Venezuela	Poland	Turkey
Korea	Costa Rica	Portugal	United Arab Emirates
Taiwan	Guatemala	Slovakia	Egypt
Cambodia	Honduras	Slovenia	Morocco
Indonesia	Nicaragua	Spain	Tunisia
Laos	Panama	Sweden	Benin
Malaysia	El Salvador	United Kingdom	Burkina Faso
Philippines	Dominican Republic	Switzerland	Cameroon
Singapore	Trinidad and Tobago	Norway	Cote d'Ivoire
Thailand	Austria	Iceland & Lichtenstein	Ghana
Viet Nam	Belgium	Albania	Guinea
Bangladesh	Cyprus	Bulgaria	Nigeria
India	Czech Republic	Belarus	Senegal
Pakistan	Denmark	Croatia	Ethiopia
Sri Lanka	Estonia	Romania	Kenya
Canada	Finland	Russia	Madagascar
United States	France	Ukraine	Malawi
Mexico	Germany	Tajikistan	Mauritius
Argentina	Greece	Armenia	Rwanda
Bolivia	Hungary	Georgia	Tanzania
Brazil	Ireland	Iran	Uganda
Chile	Italy	Israel	Zambia
Colombia	Latvia	Jordan	Zimbabwe
			South Africa
			Rest of the World