

19-17 US-China Trade War: Both Countries Lose, World Markets Adjust, Others Gain

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The continuing US-China trade war is already damaging both countries, and its expansion by the United States will only increase the damage and reverberate across the world economy. The potential impacts of the current and threatened trade war scenarios are analyzed in this paper using a computable general equilibrium (CGE) simulation model of the global economy. The first scenario is the current situation (as of June 2019), whose effects are already happening, and two additional scenarios that add new proposed US tariffs and Chinese responses. As of September 2019, the Trump administration's proposed escalations were scheduled to take effect on October 15 and December 15; at the time of writing, the administration has delayed the October tariff increase. The model projects the situation after the two countries and the rest of the world have adjusted, a time horizon of three to five years.

The trade war is already reverberating across the world economy. For the United States, increased tariffs operate exactly like a broad, large, sales tax on imported goods that is paid by US consumers—increasing prices and reducing demand—and by producers who see a rise in the cost of imported intermediate inputs, damaging competitiveness. For

the Chinese, the tariffs raise the prices of consumer goods but have less direct impact on producers, since the Chinese have exempted some intermediate inputs.¹ For the United States, both total exports and total imports decline under all three scenarios according to the CGE model. China, however, can successfully divert its exports away from the United States, expanding in other markets and increasing total exports. A chain reaction is then set in motion: China increases exports to Europe and countries in East and Southeast Asia, who in turn increase their exports to the United States. The United States is less able to divert its exports and change sources of imports, many of which are part of supply chains that are difficult to relocate.² There is a complex mix of direct and indirect effects at work, with different impacts in the two economies. Global trade declines slightly.

In terms of aggregate welfare (or aggregate final demand) both the United States and China lose from the trade war, with a larger percentage and absolute loss for China—although the numbers are small.³ All other countries gain welfare, benefitting from indirect spillover effects on international prices, once they have adjusted to the short-term disruptions associated with rebuilding supply chains and shifting labor and capital to alternative activities.

The trade war affects the structure of production in China and the United States in different ways. In the United States, in all the scenarios, relative production shifts away from agriculture, manufacturing, and traded services, and output of nontraded services increases relatively. For China, the relative shift is in favor of manufacturing and traded services. The results for the United States reflect a “fallacy of composition” in trade policy—attempts to protect many manufacturing industries simultaneously can hurt manufacturing as a whole. In the scenarios, China is more selective, excluding tariffs on some intermediate manufactured goods,

1. As noted in Bown (2019), 31 percent of US exports to China will not be affected by Chinese retaliatory tariffs even after December 15.

2. See Lovely and Liang (2018).

3. Welfare is measured by the total of all goods and services available for use in the country, which equals aggregate production (GDP) plus imports minus exports (which go to foreigners).

so manufacturing production overall increases relatively in all three scenarios and absolutely in the first two scenarios.

SCENARIO ANALYSIS

If a country imposes a tariff on imports of a final good (e.g., automobiles), the effect would be to increase the cost of imported cars, resulting in increased sales of domestically produced autos and increased prices on all autos. There would be little impact on other sectors and no indirect effects at the macroeconomic level. If the tariff is imposed on imports of intermediate inputs (e.g., steel and aluminum), the result would be the same, except that there would be indirect downstream effects on producers who use steel and aluminum inputs. Their production costs would increase, they may suffer a loss of productivity, and they would be damaged by the tariff.

In a bilateral trade war, with two countries simultaneously imposing tariffs on many sectors, the results are more complex, with a web of direct and indirect forces coming into play. These include:

- **World prices:** The tariffs will affect world prices, as global markets adjust to divert trade around the warring countries. The international terms of trade facing countries (the world prices of their exports compared to the prices of their imports) will change, favoring some and damaging others. Changes in world prices depend on the trade shares of the countries imposing the tariffs—i.e. how large the country is in the global market—as well as supply and demand elasticities.
- **Real exchange rates:** There will be induced changes in real exchange rates (the “price” of foreign exchange deflated by the domestic price index). A policy of across-the-board tariffs by a single country will reduce aggregate imports and induce an appreciation of the real exchange rate that effectively taxes exports.⁴ The effect will be to shift resources away from traded sectors (e.g., manufacturing) toward nontraded sectors (e.g., services). In a bilateral trade war, the mechanisms are more complex and depend on comparative trade shares and country size.
- **Trade diversion:** Reacting to a bilateral trade war, all countries will change the structure of their imports and exports by countries of origin and destination, diverting

trade. Such trade diversion imposes increased costs associated with shifting markets.

- **Productivity:** A trade war that reduces both imports and exports will likely harm productivity (e.g., unwinding high-productivity supply chains). The links between participation in international trade and productivity at the sectoral level have been widely studied.⁵
- **Capital reallocation:** Shifting the structure of production to respond to changes in tariffs involves reallocating capital across sectors. Such reallocation is costly, leading to changes in capital utilization in affected sectors.
- **Intersectoral linkages:** The effect of widespread tariffs will reverberate across the economy through a web of intersectoral linkages involving traded intermediate inputs. Through this web, import tariffs will damage all sectors, and the indirect links are especially strong for manufacturing.

The three scenarios for the US-China trade war are analyzed using a global computable general equilibrium (CGE) model called GLOBE.⁶ These scenarios draw on work at the Peterson Institute by Chad P. Bown that describes the evolution of the US-China trade war in detail, based on tariff schedules proposed by both countries.⁷ The scenarios are:

- **Scenario 1, June 2019:** The current situation as of June 2019. The United States imposes a 25 percent tariff on \$250 billion in Chinese imports, and the Chinese retaliate by raising tariffs on about \$110 billion of imports from the United States, with rates differing by commodity between 5 and 25 percent.⁸ China exempts

5. See the review of this evidence by Winters (2004). For a recent example of a trade-productivity link that has been widely used in CGE models, see Melitz and Ottaviano (2008).

6. The GLOBE model is described in McDonald and Thierfelder (2016). This type of model is widely used for analyzing the impacts of changes in trade policy. The model variant used for this analysis is described in more detail in Robinson and Thierfelder (2019).

7. See Bown and Zhang (2019), Bown (2019), and Bown, Jung, and Zhang (2019). The tariff schedules are available for products at the Harmonized System (HS) level 10 for the United States and HS level 8 and level 10 for China. The tariffs are aggregated, using import weights to HS6 (which is a comparable level internationally) and then to the level of the sectors used in this CGE model. See Li et al. (2018), who also use a global CGE model to consider various US-China trade war scenarios. Their scenarios were constructed before the trade war began and include much larger tariff changes than have been proposed in 2019.

8. Two earlier studies that considered only the impact of the earlier 10 percent tariffs imposed by the United States are surveyed in the *NBER Digest*, National Bureau of Economic Research, May 2019. These studies did not use CGE models.

4. With a fixed trade balance, a reduction in imports leads to a reduction in exports through appreciation of the exchange rate. This macroeconomic mechanism is called the “Lerner effect” after the economist Abba Lerner who laid out the mechanism at work.

some imported intermediate inputs from retaliation—its policy is strategic in that Beijing seeks to minimize the impact of the trade war on Chinese producers. This status quo (as of June 1, 2019) was confirmed at the meeting between President Donald Trump and President Xi Jinping of China in Osaka, Japan on June 29.

- **Scenario 2, December 2019:** Scenario 1 plus additional threatened US tariffs and the Chinese response based on stated intentions in early September, to be implemented through the fall. After December 15, the United States will increase tariffs to 30 percent on the first \$250 billion of imports from China and add a 15 percent tariff to the remaining \$300 billion. China responds, increasing tariffs and imposing them on more commodities but excluding some imports of intermediate inputs.⁹
- **Scenario 3, December 2019 plus adjustment costs:** Scenario 2 plus assumed costs associated with shifting capital across sectors, given the increased size of the shocks.

The GLOBE model includes all the mechanisms described above through which a broad-based, bilateral trade war will affect the two countries and the global economy.¹⁰

Scenario analysis with a simulation model can be seen as a “what if” experiment—what the world economy would look like today if it had to adjust to a scenario shock. The global model solves for the situation “before” and “after” the shock. It does not consider the adjustment path that the economies would follow in moving to “after” or how long that adjustment would require. It does not consider other changes in the economy such as increases in the supplies of labor or capital. Given the nature of the policy changes under consideration, while there are immediate effects observed (e.g., rises in import prices in China and the United States), full adjustment to the policy changes, including reactions by other countries, would take three to five years to work through the global economy.

CAVEATS

The effects of the trade war could end up being worse than found in this scenario analysis. The scenarios assume that other countries not involved in the US-China trade war divert trade to the United States. In fact, they may hesitate to invest in expanding into the US market because of the

9. The October 15 tariff increase to 30 percent on the first \$250 billion of imports was delayed after the October 11, 2019 meeting between the United States and China, and is therefore not included in the model calculations.

10. The model is described in more detail in Robinson and Thierfelder (2019).

Trump administration’s hostile attitude toward imports. Were that hesitation to occur, the result would be supply bottlenecks and higher prices in the United States.

The model does not incorporate the possibility that the trade war will create macro shocks in asset markets in either or both countries, and/or in other countries, that would lead to recessions. There is some evidence of growing unease among investors, and there is work indicating that trade policy uncertainty affects global economic activity.¹¹ The scenarios assume the continuation of full employment across all economies and no change in the overall balance of trade of any country. The model should be viewed as projecting scenario results with a “medium-run” perspective—where the economies are able to adjust to the changes in trade, production, and demand without incurring macroeconomic costs.¹²

The three scenarios further assume that the rest of the world continues to operate within World Trade Organization (WTO) rules for trade among themselves and that the trade war does not spread beyond the United States and China. Any shift to protectionism by other countries, following a US decision to operate outside the WTO rules, would be damaging. The evidence so far is that the rest of the world is proceeding with new free trade agreements excluding the United States and working within the WTO structure. China, for example, has unilaterally cut its tariffs on imports from all non-US countries, even as it retaliates against US tariffs.¹³

The model used in this analysis captures the costs incurred by producers when shifting exports to, and imports from, different markets and also (in the third scenario) the costs associated with shifting capital across sectors. These adjustment costs will erode over time as investment opens new markets and the capital stock adjusts. The model does not consider the potential costs of shifting markets back if the tariff war is ended. Such costs might be considerable and, if the trade war continues for some time, the process is probably irreversible—once lost, the markets will not be regained.

Finally, this global simulation model specifies links between trade performance and productivity at the sectoral

11. See Caldara et al. (2019).

12. The aggregate balance of trade in national economies is largely determined by macroeconomic forces in global and national asset markets, which are not included in most CGE models. Some models consider the impact of increased or decreased uncertainty resulting from changes in trade policy—see, for example, the USITC CGE model of the impacts of the new USMCA agreement, USITC (2019).

13. See “Trump Has Gotten China to Lower Its Tariffs. Just Toward Everyone Else” (Bown, Jung, and Zhang 2019) for an analysis of Chinese tariff cuts to non-US countries. The cuts are small in absolute terms (1 to 2 percent) but do signal Chinese commitment to further liberalization.

level. The results for the impact of a trade war on GDP in various countries are sensitive to the strengths of these links, and it may well be that the model understates the power of these links. For example, a trade war initiated by the United States might generate uncertainty about US policies in the future that would inhibit investment in the United States and lead to the destruction of US-based supply chains, with loss of productivity—a mechanism that is not part of the model used in this analysis.

SIMULATION RESULTS

The qualitative results from all three scenarios on trade flows are the same, but the magnitudes increase as tariffs increase and adjustment costs are introduced (table 1). The declines in Chinese exports to the United States are large (6 to 11 percent). The Chinese successfully divert exports away from the United States, increasing their exports to all other regions, and total Chinese exports rise slightly (0.4 to 0.9 percent). There is a chain reaction: China increases exports to Europe and countries in East and Southeast Asia, who in turn increase exports to the United States. The United States, on the other hand, sees a small decline in total exports (0.3 to 1.1 percent), with the decline spread across all destination regions.

The impact of the tariff increase in all scenarios on other countries is mixed. Canada and Mexico, whose economies are tightly linked to the United States, see export declines along with the United States. In scenarios 2 and 3, all other countries increase exports to the United States, taking advantage of the Chinese withdrawal from the US market. Because of the costs associated with shifting trade, all non-warring countries see a small decline in their total exports.

The different results for China and the United States are largely due to the indirect effects of the tariffs on world prices and exchange rates—see table 2. In all three scenarios, the United States suffers a small terms-of-trade loss. China has significant terms-of-trade losses (1 to 2 percent)—China is more dependent on US markets than the United States is on China. The US real exchange rate changes little—a tiny depreciation in the first scenario and a small appreciation in the latter two.¹⁴ The real exchange rate in China, on the other hand, depreciates in all scenarios (2.1 to 4.5 percent)—an expected reaction when a major trading partner imposes large tariffs that effectively tax Chinese exports. On net, the combined effects are negative but small for US exports in all scenarios and positive but small for China.

14. The exchange rate in the model is in units of domestic currency per unit of foreign currency, so a depreciation is an increase in value and an appreciation is a decrease.

US GDP is essentially unchanged in the first two scenarios (tiny losses; tables 2a, 2b), while it falls by 0.23 percent under scenario 3 when there are capital stock adjustment costs (table 2c), which represent a GDP loss of \$47 billion.¹⁵ For China, GDP is also essentially unchanged in the first two scenarios (tiny increases), while it falls by 0.34 percent in the third scenario—a loss of \$42 billion.¹⁶

In terms of welfare (aggregate final demand = GDP + imports – exports), both the United States and China lose in all scenarios. China's losses are larger than US losses, both in percentage and absolute terms. The United States loses 0.04, 0.08, and 0.21 percent in the three scenarios, which translates to \$8 billion, \$17 billion, and \$44 billion annually. China loses 0.35, 0.68, and 0.95 percent in the three scenarios, which translates to welfare losses of \$43 billion, \$82 billion, and \$115 billion annually. These larger welfare losses for China are due largely to changes in world prices that worsen China's terms of trade (lower export prices relative to import prices) by 1.26, 2.28, and 1.98 percent in the three scenarios, and by the GDP loss in the third scenario. China pays a cost to divert trade away from the United States to other markets. If the trade war persists and China completes the process of trade diversion, it would also be costly to return to the old trade patterns when the trade war ends—the changes in the global structure of trade are likely to be irreversible.

Welfare in all other countries improves slightly in all scenarios, largely because of the improvements in their terms of trade. The policy-induced disruptions to international markets change world prices and real exchange rates for nonparticipating countries, allowing them to adjust to the shocks and gain from the market shifts, once they have adjusted to the short-term disruptions associated with rebuilding supply chains and shifting resources across sectors.

Table 3 shows the impact of tariffs on the structure of production in the United States and China. The impacts are very similar in the first two scenarios. For the United States, exports fall in almost all sectors, with some sectoral variation across the scenarios, and production falls in all but the low-trade services sectors. Agriculture is hit the hardest, while the effects are broadly similar for other sectors. There is a “fallacy of composition” at work: Broad-based tariffs do

15. The US Bureau of Economic Analysis estimates US 2018 GDP equals \$20.5 trillion, so the GDP losses are in 2018 dollars. The US trade deficit in 2018 was \$621 billion, so aggregate final demand (GDP + imports – exports) was \$21.121 trillion.

16. From World Bank data for 2017, the most recent year available for China, Chinese GDP was \$12,237.7 billion, and the trade deficit was -\$176.3 billion, so aggregate final demand was \$12,061.4 billion.

not protect domestic markets because indirect effects operating through the exchange rate, changes in world prices, and intermediate-input linkages lead to a shift away from traded sectors toward nontraded sectors. In the United States, the shift is away from manufacturing toward nontraded service sectors. For China, the effects in the first two scenarios are different. Partly because China chooses to exempt imports of intermediate inputs from their tariff retaliation, the trade war has a positive impact on the manufacturing sectors. At the sectoral level, the result for China is that the shifts in the structure of production favor traded sectors and the share of low-trade services shrink in all three scenarios.

In the third scenario, with the loss of GDP in both China and the United States due to capital stock adjustment costs, the negative shock is spread across the economy—in both countries sectoral production, exports, and imports are all lower than in the first two scenarios.

CONCLUSION

Starting a bilateral trade war is a bad idea. While there are potential gains from imposing tariffs and exploiting market power in world markets, the inevitable retaliation largely erodes or reverses the potential gains. Global markets are disrupted, and countries adjust trade patterns to deal with the high levels of protection in the warring countries. These adjustments are costly and inefficient. The warring countries

both lose, while all non-warring countries gain, as they can more easily adjust to the shocks.

Expanding a bilateral trade war into a simultaneous trade war against many trade partners increases the dangers.¹⁷ The negative productivity, terms-of-trade, and exchange-rate impacts are potentially much larger, which would lead to much more damage to the US economy and greater adjustment in global trade patterns. It is also a dangerous mistake to view a trade war as a temporary tactical strategy to get a “better” deal from trade partners. Countries that change their trade and production patterns, at serious cost, to adjust to the new policy environment where the United States operates outside of WTO rules and weaponizes tariffs will be hesitant to believe that the United States can be trusted as a trade partner in the future. Having diverted trade around the United States, they are not likely to rush to return to US markets. Markets that are lost because of even a temporary trade war may be irretrievable.

17. We may be moving to a world where the United States, through its protectionist policies, withdraws significantly from world trade. Robinson and Thierfelder (2019) consider various scenarios of a US withdrawal using the same global CGE model.

Table 1

Impact of tariffs on real exports**a. Scenario 1: June 2019**

Exporting country/region	Destination country/region (percent change in real exports)						
	NAFTA	Europe	East and Southeast Asia	All Other	Total	United States	China and Hong Kong
United States	0.41	0.19	-1.94	0.20	-0.33	0.00	-7.32
Canada	0.19	-1.11	-0.89	-1.28	-0.24	0.23	-0.29
Mexico	-0.16	-2.41	-2.44	-2.10	-0.65	-0.06	-2.63
Europe	1.31	-0.10	-0.54	-0.16	-0.02	1.51	-0.98
China and Hong Kong	-4.59	2.26	2.05	2.42	0.51	-5.61	1.49
Japan	2.30	-0.50	-0.86	-0.51	-0.16	2.57	-1.03
South Korea	1.70	-0.35	-0.54	-0.37	-0.14	2.02	-0.55
Other high-income Asia	1.54	-0.32	-0.36	-0.32	-0.12	1.82	-0.24
Low-income Asia	0.55	-0.16	-0.27	-0.19	-0.12	0.61	-0.04
Central America	0.25	-0.22	-0.44	-0.33	-0.08	0.28	-0.70
Latin America	-0.07	-0.85	0.54	-0.48	-0.21	0.04	1.58
India	-0.04	-0.17	0.04	-0.22	-0.12	-0.05	0.69
Africa	0.18	-0.18	-0.15	-0.20	-0.09	0.21	-0.03
Russia	0.26	-0.08	-0.13	-0.11	-0.07	0.28	-0.11
Middle East and North Africa	0.21	-0.06	-0.12	-0.08	-0.06	0.21	-0.31
Other countries	-2.50	0.49	0.37	0.13	-0.18	-3.07	0.70
All countries	-0.15	0.02	-0.22	0.13	-0.05	-0.33	-0.85

b. Scenario 2: December 2019

Exporting country/region	Destination country/region (percent change in real exports)						
	NAFTA	Europe	East and Southeast Asia	All Other	Total	United States	China and Hong Kong
United States	0.69	0.08	-4.12	0.31	-0.86	0.00	-14.38
Canada	0.24	-1.51	-1.37	-1.64	-0.35	0.31	-0.84
Mexico	-0.21	-3.36	-3.19	-2.96	-0.89	-0.02	-3.18
Europe	1.89	-0.19	-0.61	-0.24	-0.04	2.21	-0.89
China and Hong Kong	-8.77	4.62	3.63	4.20	0.86	-10.69	2.71
Japan	2.68	-0.68	-1.03	-0.70	-0.23	3.14	-1.15
South Korea	2.57	-0.49	-0.83	-0.52	-0.21	3.17	-0.91
Other high-income Asia	2.92	-0.44	-0.63	-0.30	-0.13	3.44	-0.68
Low-income Asia	3.07	-0.72	-0.82	-0.51	-0.19	3.56	-0.76
Central America	1.22	-0.89	-1.31	-0.91	-0.08	1.40	-2.03
Latin America	0.07	-1.04	0.44	-0.60	-0.28	0.24	1.55
India	2.00	-0.78	-0.53	-0.72	-0.17	2.20	0.02
Africa	0.50	-0.33	-0.43	-0.29	-0.15	0.56	-0.36
Russia	0.52	-0.10	-0.33	-0.12	-0.10	0.56	-0.42
Middle East and North Africa	1.10	-0.23	-0.30	-0.16	-0.07	1.19	-0.75
Other countries	2.16	-0.94	-0.53	-0.56	-0.20	2.67	-0.19
All countries	-0.30	0.06	-0.44	0.26	-0.09	-0.59	-1.64

Table continues

Table 1
Impact of tariffs on real exports (continued)

c. Scenario 3: December 2019 plus adjustment cost

Exporting country/region	Destination country/region (percent change in real exports)									
	NAFTA	Europe	East and Southeast Asia	All Other	Total	United States	China and Hong Kong			
United States	0.56	-0.11	-4.33	0.09	-1.05	0.00	-14.73			
Canada	0.29	-1.36	-1.30	-1.51	-0.28	0.35	-0.92			
Mexico	-0.14	-3.23	-3.19	-2.86	-0.81	0.05	-3.35			
Europe	1.84	-0.16	-0.63	-0.26	-0.04	2.15	-1.05			
China and Hong Kong	-9.23	4.12	3.19	3.71	0.39	-11.16	2.06			
Japan	2.67	-0.60	-1.04	-0.67	-0.22	3.11	-1.30			
South Korea	2.60	-0.39	-0.85	-0.47	-0.19	3.17	-1.07			
Other high-income Asia	3.02	-0.30	-0.61	-0.21	-0.08	3.52	-0.81			
Low-income Asia	3.15	-0.62	-0.81	-0.48	-0.15	3.63	-0.95			
Central America	1.23	-0.82	-1.28	-0.86	-0.05	1.39	-2.17			
Latin America	0.11	-0.91	0.39	-0.52	-0.23	0.25	1.39			
India	2.00	-0.72	-0.56	-0.71	-0.17	2.19	-0.16			
Africa	0.51	-0.19	-0.48	-0.18	-0.10	0.55	-0.54			
Russia	0.52	-0.02	-0.38	-0.05	-0.05	0.55	-0.62			
Middle East and North Africa	1.10	-0.12	-0.31	-0.08	-0.03	1.18	-0.95			
Other countries	2.19	-0.87	-0.61	-0.55	-0.17	2.70	-0.41			
All countries	-0.37	0.05	-0.52	0.20	-0.14	-0.67	-1.84			

NAFTA = North American Free Trade Agreement

Note: The observed increased trade from China and Hong Kong to China arises because of increased trade between China and Hong Kong.

Source: Authors' calculations.

Table 2

Indirect effects of the tariffs: Impact on macroeconomic indicators**a. Scenario 1: June 2019**

Percent change

	GDP	Final demand	Terms of trade	Exchange rate
United States	-0.02	-0.04	-0.16	0.15
Canada	-0.02	0.16	0.63	-1.05
Mexico	-0.08	0.29	1.18	-1.84
Europe	-0.01	0.02	0.06	0.00
China and Hong Kong	0.02	-0.35	-1.26	2.09
Japan	-0.01	0.05	0.35	-0.28
South Korea	0.00	0.13	0.26	-0.18
Other high-income Asia	-0.01	0.09	0.23	-0.19
Low-income Asia	-0.01	0.08	0.19	-0.02
Central America	-0.01	0.07	0.19	-0.26
Latin America	0.00	0.08	0.49	-0.71
India	0.00	0.03	0.13	0.02
Africa	0.01	0.09	0.28	-0.25
Russia	-0.01	0.06	0.22	-0.17
Middle East and North Africa	-0.01	0.05	0.15	-0.09
Other countries	0.02	0.02	-0.19	0.52

b. Scenario 2: December 2019

Percent change

	GDP	Final demand	Terms of trade	Exchange rate
United States	-0.07	-0.08	-0.10	-0.15
Canada	-0.02	0.25	0.96	-1.29
Mexico	-0.09	0.43	1.71	-2.45
Europe	-0.01	0.04	0.11	0.08
China and Hong Kong	0.01	-0.68	-2.28	4.49
Japan	-0.02	0.07	0.53	-0.26
South Korea	0.00	0.20	0.40	-0.16
Other high-income Asia	-0.01	0.12	0.30	-0.07
Low-income Asia	-0.03	0.18	0.43	-0.24
Central America	-0.04	0.17	0.53	-0.79
Latin America	-0.01	0.11	0.68	-0.81
India	-0.01	0.08	0.35	-0.26
Africa	0.01	0.15	0.45	-0.29
Russia	-0.01	0.09	0.37	-0.14
Middle East and North Africa	-0.01	0.08	0.27	-0.09
Other countries	0.00	0.11	0.27	-0.08

Table continues

Table 2
Indirect effects of the tariffs: Impact on macroeconomic indicators
 (continued)

c. Scenario 3: December 2019 plus adjustment costs
 Percent change

	GDP	Final demand	Terms of trade	Exchange rate
United States	-0.23	-0.21	-0.02	-0.33
Canada	-0.01	0.21	0.81	-1.15
Mexico	-0.09	0.39	1.57	-2.37
Europe	-0.01	0.04	0.11	0.06
China and Hong Kong	-0.34	-0.95	-1.98	4.09
Japan	-0.01	0.07	0.50	-0.27
South Korea	0.00	0.18	0.36	-0.15
Other high-income Asia	-0.01	0.08	0.22	0.02
Low-income Asia	-0.03	0.15	0.37	-0.19
Central America	-0.04	0.15	0.47	-0.75
Latin America	0.00	0.09	0.56	-0.65
India	-0.01	0.09	0.36	-0.29
Africa	0.01	0.12	0.31	-0.11
Russia	0.00	0.06	0.26	0.03
Middle East and North Africa	0.00	0.05	0.16	0.07
Other countries	0.00	0.10	0.25	-0.11

Notes: The exchange rate is in units of domestic currency per unit of foreign currency, so a depreciation is an increase in value and an appreciation is a decrease. Final demand is real aggregate final demand; terms of trade is ratio of world prices of exports to world prices of imports; exchange rate is real effective exchange rate, deflating by producer price index.

Source: Authors' calculations.

Table 3

Impact of tariffs on the structure of production: Percent change in real production, exports, and imports by aggregate sector**a. Scenario 1: June 2019**

	United States			China and Hong Kong		
	Production	Exports	Imports	Production	Exports	Imports
Agriculture	-0.47	-2.23	-0.47	-0.02	-0.08	-1.96
Mining	-0.02	-0.31	-0.19	0.24	0.90	-0.58
Intermediate manufactured goods	-0.06	-0.32	-0.58	0.12	0.26	-0.82
Final manufactured goods	-0.01	-0.19	-0.34	0.09	0.56	-0.83
Traded services	-0.03	0.02	-0.09	0.14	1.11	-1.10
Low-trade services	0.01	0.15	-0.06	-0.12	1.03	-1.03

b. Scenario 2: December 2019

	United States			China and Hong Kong		
	Production	Exports	Imports	Production	Exports	Imports
Agriculture	-0.58	-2.94	-0.40	0.01	0.73	-3.08
Mining	-0.05	-0.57	-0.20	0.62	2.07	-0.95
Intermediate manufactured goods	-0.24	-0.65	-0.77	0.34	0.98	-1.50
Final manufactured goods	-0.50	-1.13	-0.96	0.23	0.53	-1.83
Traded services	-0.10	-0.20	0.02	0.36	2.35	-2.16
Low-trade services	0.03	0.04	0.13	-0.20	2.14	-2.07

c. Scenario 3: December 2019 plus adjustment costs

	United States			China and Hong Kong		
	Production	Exports	Imports	Production	Exports	Imports
Agriculture	-0.77	-3.23	-0.45	-0.27	0.39	-3.24
Mining	-0.22	-0.80	-0.26	0.23	1.63	-1.23
Intermediate manufactured goods	-0.39	-0.81	-0.85	-0.05	0.56	-1.69
Final manufactured goods	-0.65	-1.31	-1.05	-0.18	0.05	-2.02
Traded services	-0.25	-0.39	-0.05	-0.03	1.77	-2.27
Low-trade services	-0.12	-0.18	0.05	-0.53	1.57	-2.20

Note: Manufactured goods are aggregated to either intermediate or final manufactured goods. Intermediate input demand accounts for more than 75 percent of final demand in the base data for the aggregate category intermediate manufactured goods. Low-trade services have less than 5 percent of imports as a share of final demand and exports as a share of production.

Source: Authors' calculations.

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