



US-China Trade War: Is Winter Coming for Global Trade?

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Abstract

This paper uses the SMART Model to analyze the direct economic effects of the US-China tariff war on both China and the US. Based on the three lists of Chinese products subject to additional tariffs imposed under the US Section 301 investigation throughout 2018 and the tariff lists issued by China as a countermeasure, we simulate the trade creation/reduction effects, welfare effects, and trade diversion effects at the detailed product level. According to the simulation results, US imports from China and Chinese imports from the US will be greatly reduced by an estimated \$91.46 and \$36.71 billion, respectively. US imports will be diverted from China to other markets, specifically, Mexico, Japan and Germany, in most sectors. Chinese imports from the US will be mainly diverted to Brazil, Germany, Japan, Argentina, the United Kingdom and Canada. However, trade between the US and China cannot be completely transferred to alternative suppliers in other countries without additional costs or a loss of utility, which results in a substantial reduction in the total imports and welfare in both the US and China. The sectors with the highest welfare loss in the US are machinery and electrical products. In China, soybeans and automobiles are the most affected sectors and exhibit much higher welfare loss than other sectors. The trade war harms both sides' welfare and could have further adverse effects on global value chains and the multilateral trading system.

Keywords US-China trade · trade war · “American First” Strategy · welfare effects

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Introduction

The trade frictions between China and the US since 2018 are unprecedented since the establishment of the World Trade Organization (WTO), and they represent the largest “tariff war” in economic history to date. The tariff war raises fundamental questions about the impact of protectionist actions and the countermeasures that are triggered on both countries and the world.

Numerous studies have examined the economic impact and possible consequences of a US-China tariff war. For example, Li et al. [1] used a multi-country global general equilibrium (GE) model to numerically simulate the effects of possible US-China trade wars, and their simulation results showed that although a US-China trade war could significantly harm China, China can afford the negative impacts since they will not severely hurt China’s economy. Moreover, Guo et al. [2] used Eaton and Kortum’s 2002 multi-sector multi-country (GE) model with intersectional linkages to forecast how exports, imports, output, and real wages could change if Trump’s threat of 45-percent tariffs during his U.S. presidential campaign was implemented. They found that a trade war triggered by elevated US import tariffs could lead to the collapse of US-China bilateral trade. In all their considered scenarios, i.e., either unilateral U.S. tariffs on all of its imports from China or a US-China retaliatory tariff war, the US could experience large social welfare losses (specifically, the deadweight loss of economic welfare), whereas China may lose or slightly gain in welfare depending on the effect of the trade war on the US-China trade balance. Globally, some small open economies may experience small benefits, while other countries may suffer collateral damage. Bollen and Rojas-Romagosa [3] employed WorldScan, which is the global computational general equilibrium (CGE) model of the Netherlands Bureau for Economic Policy Analysis (CPB), to determine the global, national and sectoral economic impacts of these scenarios. They found that the economic effects of this trade conflict are limited, except for several sectors in China and the US. Chinese GDP loss could eventually reach 1.2% of its GDP. The GDP loss in the US could be limited to 0.3% due to the country’s market power, which consumes a relatively large proportion of Chinese exports. However, to date, existing research has not performed a quantitative analysis of the economic consequences of a US-China trade war based on the real actions taken, i.e., the tariff lists, which is a gap that our research seeks to address.

Following the implementation of Trump’s “America First” Strategy, a series of measures were implemented to combat the US trade deficit with China. Additional tariffs on three sets of products were announced that went into effect one after another in 2018, which triggered countermeasures from China. On April 3, 2018, the US announced a list of Chinese goods that would be subject to tariffs based on the results of a “Section 301 Investigation” concerning the import of approximately 50 billion US dollars of goods from China. On April 4, the Ministry of Commerce of the People’s Republic of China announced a retaliation list of imported goods from the US subject to additional tariffs. The lists issued by the US and China consist of two sets of products, which are valued at 34 billion and 16 billion US dollars, respectively. The US revised its tariff list on June 15, and the additional tariffs of 25 percent imposed on the first set of products went into effect on July 6, 2018¹. The second set of products

¹ The final list of the first set of products can be found at <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2018/june/ustr-issues-tariffs-chinese-products>.

issued by the US underwent further review in a public notice and comment process before the US Trade Representative (USTR) issued a final determination regarding the products on this list that are subject to additional duties of 25 percent in August 2018². China adopted countermeasures in response. On June 15, China revised the list of products that are subject to additional duties of 25 percent. The retaliation tariff on the first set of products valued at 34 billion US dollars was set to take effect on July 6, 2018³. The list of the second set of products valued at 16 billion US dollars issued by China was finalized in August 2018⁴. On July 10, 2018, the US released a third list of tariffs on Chinese goods worth 200 billion US dollars. The tariffs went into effect on September 24, 2018 at an initial rate of 10 percent and were announced to be increased to 25 percent by January 1, 2019⁵. In response, China implemented additional tariffs of 5 or 10 percent on a list of US products worth 60 billion US dollars on September 24, 2018⁶. The US and China agreed to a temporary truce to de-escalate trade tensions on December 2, 2018. The increase of additional tariffs from 10 to 25 percent on List 3 issued by the US was further postponed after the 90-day truce due to the progress in US-China trade talks. In this paper, we simulate the effect of additional tariffs on the three sets of products implemented by the US and China in 2018. Notably, China and the US had reached a “Phase One” trade deal on December 13, 2019, but the additional tariffs on the three lists of products will remain. For the rest of this paper, the final lists of the US and China containing the first set of products worth 34 billion US dollars are referred to as “List 1”, the final lists containing the second set of products worth 16 billion US dollars are referred to as “List 2”, and the third US list containing Chinese products worth 200 billion US dollars and the third Chinese list containing US products worth 60 billion US dollars are referred to as “List 3”.

Our paper applies the Single Market Partial Equilibrium Simulation Tool (SMART) model to the United Nations’ trade database, COMTRADE, and the tariff database of the United Nations Conference on Trade and Development (UNCTAD), TRAINS, to analyze the effect of the US-China tariff war in 2018. The SMART model is jointly developed by the World Bank and UNCTAD. It can be used to estimate the trade effect (including the trade creation and trade diversion effect), tariff revenue effect and welfare effect of a free trade agreement and is one of the commonly used *ex ante* simulation tools to assess the impact of specific tariff changes. Based on a partial equilibrium framework, it requires only a minimal amount of data and has the advantage of being able to analyze the effects on disaggregated product lines, while a general equilibrium (GE) analysis can only divide the economy into a limited number of sectors. Most GE analyses are based on hypothetical scenarios and their impacts on broad sectors rather than the actual lists of products issued by both countries. Our research simulates the economic effects of the US-China tariff war on both sides,

² The final list of the second set of products can be found at <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2018/august/ustr-finalizes-second-tranche>.

³ The list of the first set of products is available at <http://gss.mof.gov.cn/zhengwuxinxi/zhengcefabu/201806/P020180616034361843828.pdf>.

⁴ The list of the second set of products is available at <http://gss.mof.gov.cn/zhengwuxinxi/zhengcefabu/201806/P020180616034362364988.pdf>.

⁵ The final list can be found at <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2018/september/ustr-finalizes-tariffs-200>.

⁶ The list can be found at http://gss.mof.gov.cn/zhengwuxinxi/zhengcefabu/201808/t20180803_2980950.html.

including trade creation (trade loss) effects, trade diversion effects and welfare effects⁷. On this basis, we conduct a comprehensive evaluation of the direct impact of the Sino-US trade friction escalation on the bilateral trade between China and the US and the welfare loss⁸ incurred by implementing elevated tariffs. Notably, the indirect impact of the industrial remedies adopted by both countries following the trade friction is beyond the scope of this paper.

Our main findings are as follows. (1) According to the SMART simulation results, if the US imposed additional duties on the three sets of Chinese products and China imposed countermeasures on the three sets of US products, US imports from China and Chinese imports from the US could be reduced by an estimated \$91,459 million and \$36,706 million, respectively. Furthermore, these tariff measures could generate welfare losses of \$1,437 million in the US and \$2,193 million in China. (2) If the two countries imposed additional tariffs on each of the three sets of products, the most affected industries in the US could be machinery and electrical products. In China, the most affected industries could be soybeans, automobiles, and machinery and electrical products. These sectors could experience much higher welfare losses than other sectors. (3) According to the simulation results based on a tariff increase on the three sets of products issued by the US, a total of \$36,783 million US imports could be diverted from China to other sources, specifically, Mexico, Japan, Germany and Canada, in most sectors. Based on the three retaliation lists issued by China, a total of \$17,207 million of Chinese imports could be diverted from the US to other sources including Brazil, Germany, Japan, South Korea and the United Kingdom. (4) When comparing the simulated effect of List 3 with the simulated effects of Lists 1 and 2, the efficiency of Chinese countermeasures (which are measured as the welfare loss incurred relative to the reduction in imports from the US) is greatly improved. List 3 can incur only one-fifth of the total welfare loss of the previous lists, but it can decrease Chinese imports from the US by approximately one-half of the total reduction in Chinese imports from the US due to Lists 1 and 2. In contrast, the efficiency of List 3 in the US is lower than the efficiency of the previous lists.

The US initiated trade frictions with China not only to address its considerable trade deficit but also to further open China's markets and curb the "Made in China 2025" agenda. The future of the trade war will have a significant influence on the long-term economic relations between the two countries and on the domestic economy of both countries. Understanding the deep impact of the tariff war is important in developing the right strategy and remedies. Therefore, we provide a discussion on the deep impact and implications of the tariff war after a simulation analysis followed by a discussion on policy implications. Although we find that Chinese countermeasures will incur a higher welfare loss than the protectionist actions of the US, one of the other important effects that the Chinese countermeasures can generate is the political pressure on the US to remove tariffs and deter future protectionism [4].

The rest of this paper is structured as follows. The second section analyzes the direct economic impacts of the tariff war, including an elaboration of our simulation

⁷ In the setting of the SMART model, the welfare effect is defined as the sum of the changes in producer surplus, consumer surplus and tariff revenue when an additional tariff is imposed.

⁸ Welfare loss is the deadweight loss incurred in the entire economy when marginal benefit is not equal to marginal cost. An additional tariff on an imported good has a deadweight loss if the decrease in consumer and producer surplus is greater than the increase in tariff revenue.

approach, and presents the simulation results by sectors and by tariff lists. The third section discusses the deep impact of the tariff war, and the final section presents the conclusions and policy recommendations.

Direct Empirical Impacts of the Trade War: A Simulation Based on the SMART Model

In this section, we utilize the SMART model to simulate the impact of the US-China trade war. The analysis is based on the lists of products imported from China that are subject to the tariff increase announced by the US and the lists of US products issued by China as a countermeasure. Several similar studies that use the GE framework are based on hypothetical scenarios⁹ (e.g., [2, 5]); however, simulations based on actual measures remain scarce.

We simulate the effect of an additional duty imposed on the listed products at the 6-digit level of HS classification. Overall, these measures entail large declines in bilateral trade between China and the US, increased imports from other countries and increased tariff revenues. The total imports of China and the US could sharply decline, and welfare losses could occur in both countries. The change in welfare is given by the sum of the changes in producer surplus, consumer surplus and tariff revenue by country. Thus, the US-China trade war could result in direct net losses for both sides. In addition, we find that the direct negative impact of the trade war could be greater on China than on the US.

We first introduce the analytical framework of the SMART model and then present and discuss the simulation results. Since more than 300 6-digit products are included on each country's tariff list, we aggregate the simulation results according to the broad sectors to which these products belong. We also provide a more detailed 2-digit-sector aggregation of the results in the appendix. We not only report the effect on imports, welfare, and tariff revenue in both countries but also list the markets that could become the major substitute sources of imports for China and the US.

Analytical Framework

In the setting of the SMART model, consumers in the home country can buy a product from different countries in the world. Although each economy exports at the same price worldwide, the prices that the consumers face differ due to differences in tariffs. We assume that the suppliers in different export markets are willing to produce and sell their products to meet the demand of the consumers at any price level, i.e., the supply curve is horizontal and has infinite supply elasticity. Nevertheless, consumers will not choose to import the product from a single market that has the lowest tariff rate among all the countries, because the model relies on the Armington [6] assumption of imperfect substitutions between different import sources. As a result, a representative consumer in the importing country will make his or her consumption decision by following the two-step optimization process to maximize his or her utility.

⁹ A certain level of additional tariffs on specific sectors are assumed by the researchers, such as a 45-percent tariff on all imports from each country.

In the first step, the representative consumer first determines his or her total consumption of the product according to a composite price index. If the home country imposes additional tariffs on a specific trading partner, the composite price index will increase, and the consumer will correspondingly reduce his/her total consumption of the product. When the price changes, the change in total expenditure is determined by a key parameter, demand elasticity, which is given a default value for each product in the SMART model.

In the second step, the consumer determines his or her demand for the product from each exporting market according to the price of each exporter. The additional tariff targeted at a specific trading partner will change the relative import price of the product from this country, and the consumer will decrease his/her consumption of the product from this market relative to his/her consumption from other markets. The extent to which relative demand responds to a change in relative price depends on the elasticity of substitution. The value of the elasticity of substitution between goods from different exporting markets is set at 1.5 by default in the SMART model.

The SMART model is applied to the United Nations' COMTRADE database on international trade and the UNCTAD's TRAINS database on tariffs. Based on this theoretical framework, SMART can simulate the effect of tariff changes on given products from a certain country (or several countries), including trade effects (including the trade creation effect and trade diversion effect), welfare effects, and tariff revenue effects. The trade creation effect refers to a change in imports caused by price changes in given markets (because of tariff changes), but the total expenditure is unchanged. The trade diversion effect refers to a change in imports caused by relative price changes in different markets. The total trade effect is the sum of the trade creation and trade diversion effects. The welfare effect refers to a change in deadweight loss. Given that it is possible for the government to transfer some tariff revenue to compensate for the lost welfare of producers and consumers, the welfare effect measures the sum of the change in producers and consumers' surplus and the change in tariff revenue. Tariff revenue is calculated by multiplying the import value by the tariff rate, and the tariff revenue effect is measured as the difference between the pre- and post-tariff revenue. For a more detailed mathematical illustration of the model, please see James and Olareagga [7].

There are trade-offs between using different modeling approaches. In contrast to GE models, the SMART model does not capture the economic interactions between markets; however, the SMART model requires minimal data and has the advantage of being able to analyze the effects on disaggregated product lines, whereas a GE analysis can only divide an economy into a limited number of broad sectors, i.e., the widely used Global Trade Analysis Project (GTAP) has 57 sectors. Thus, we face a tradeoff between modeling approaches. In the context of the US-China trade war, the tariff measures were imposed at a very disaggregated product level. Not all 6-digit level products in a certain sector are subject to additional tariffs. Using GE models with broad sectors could result in aggregation bias in this regard. Therefore, we use the SMART model, which permits precision in identifying particular trade policy scenarios and provides a useful evaluation of the impact of a trade war on an *ex ante* basis [8, 9]. Since we do not model the interactions among industries, the simulation results are interpreted as direct effects of the tariff war. Incorporating the linkages among industries requires an input-output table of production at the disaggregated industry level. We expect that the actual welfare loss would be greater than the current simulation results if

we were able to capture the production linkages in future research. The increase in tariffs on products used as inputs could increase production costs for downstream industries and as a result, lower the welfare of downstream industries and final consumers.

Notably, due to the limitations of the modelling approach, many real-world complexities were neglected by the SMART model in this paper. For example, consumers' choices can be affected by the political decisions of a country's political leader (such as an emphasis on purchasing domestic products), and producers' behavior is also very likely to be affected by rising uncertainties due to ongoing trade disputes. Consumers could also face tighter budget constraints if their country faces economic downturns. These factors can exacerbate the negative impact of the China-US trade friction on the bilateral trade between the two countries and thus have indirect implications on overall welfare. The exchange rate fluctuation is also a factor worthy of study in future research. The depreciation of Chinese RMB against the US dollar can partly mitigate the adverse effect on Chinese exports, but the scale of this influence will depend on how the change in the exchange rate is passed through to the changes in the prices of different products.

Simulation Results

The total effects of each tariff list are presented in Table 1. According to the SMART simulation results, if the US imposes an additional duty of 25 percent on the first set of Chinese products and China imposes retaliatory tariffs on the first set of US products, US imports from China and Chinese imports from the US could be substantially reduced (by an estimated amount of \$35,555 and \$14,567 million, respectively). Although imports from other countries will likely increase, the total imports of the US could decrease by \$19,350 million, and the total imports of China could decrease by \$8,364 million. The US tariff revenue is estimated to be \$9,464 million, but the US could experience a welfare loss of \$463 million. Similarly, China's tariff revenue will likely increase by \$3,697 million, but its total welfare could be reduced by \$1,152 million.

If the two countries further levy an additional 25 percent in tariff duties on the second set of products, US imports from China could be further reduced by \$14,294 million, and Chinese imports from the US could be reduced by \$10,477 million. Imports from other countries are expected to increase, while the total imports of the US and China could further decrease by \$8,828 and \$5,157 million, respectively. The tariff revenue of the US could increase by \$2,134 million, and the tariff revenue of China could increase by \$2,336 million. Both countries could suffer from welfare losses (\$136 million in the US and \$746 million in China).

If the US levies an additional 10 percent in tariff duties on the third set of products, US imports from China and Chinese imports from the US could be further reduced by \$41,610 and \$11,662 million, respectively. The total imports of the US and China could further decrease by \$26,497 and \$5,978 million, respectively. Although the tariff revenue of the US could increase by \$14,789 million and the tariff revenue of China could increase by \$3,598 million, both countries would suffer from welfare losses due to the implementation of the additional tariffs (\$837 million in the US and \$296 million in China).

Table 1 Simulated Total Effect of the US-China Trade War (in Millions of Dollars)

| List | Change of Imports from the World | | Change of Import from China/US | | Tariff Revenue Effect | Welfare Effect |
|--------|----------------------------------|--------|--------------------------------|---------|-----------------------|----------------|
| US | | | | | | |
| List 1 | -19,349.95 | -3.48% | -35,554.92 | -50.63% | 9,463.79 | -463.49 |
| List 2 | -8,828.16 | -5.21% | -14,294.16 | -60.81% | 2,133.77 | -136.31 |
| List 3 | -26,497.40 | -3.09% | -41,609.53 | -21.24% | 14,789.39 | -837.39 |
| Total | -54,675.50 | -3.45% | -91,458.61 | -31.58% | 26,386.96 | -1,437.19 |
| China | | | | | | |
| List 1 | -8,363.82 | -6.80% | -14,566.90 | -43.74% | 3,697.48 | -1,151.98 |
| List 2 | -5,156.53 | -3.07% | -10,477.00 | -46.25% | 2,335.97 | -745.89 |
| List 3 | -5,977.86 | -0.68% | -11,662.30 | -18.72% | 3,597.56 | -295.98 |
| Total | -19,498.21 | -1.67% | -36,706.20 | -31.04% | 9,631.01 | -2,193.84 |

The tariff lists imposed by both countries could result in a large decrease in their imports from each other. Although the decrease in US imports from China can be much lower than the decrease in Chinese imports from the US on an absolute level, the decreases in their imports from each other in percentage terms are similar. The third tariff lists of both countries cover a wider range of sectors than the previous two lists. The decrease of US imports from China due to List 3 of the US is approaching the total effect of the previous two lists, while the welfare loss that List 3 can incur is approximately 1.4 times the total welfare loss of Lists 1 and 2. As for List 3 of China, it could decrease Chinese imports from the US by \$11,662 million, which is close to half of the total decrease due to Lists 1 and 2 (\$25,044 million). However, the welfare loss of List 3 would be less than one-fifth of the total welfare loss of the previous two lists. From this perspective, the efficiency of Chinese countermeasures was greatly improved.

Effect by Sectors

In this subsection, we discuss the sectors that could suffer the largest welfare loss from the trade war based on the three lists of products announced by the two countries. As shown in Tables 2 and 3, if the US imposes additional tariffs on the three sets of products, its machinery and electrical industry will suffer the largest welfare loss. As shown in the last column of Table 3, every 100-dollar decrease in the US imports of machinery and electrical products from China will cost the US economy approximately 1 dollar. This industry consists of two HS 2-digit sectors, namely, HS 84 and HS 85 (The description of the HS 2-digit sectors are provided in Table 8). They are also the most affected HS 2-digit industries in the US. In List 1, the three most likely affected HS 2-digit industries in the US are as follows (see Table 9). Other sectors could face much lower losses than these two sectors.

- HS 84: Nuclear Reactors, Boilers, Machinery and Mechanical Appliances, Parts Thereof. The total imports of the US in this sector are expected to decrease by \$8,673 million, with tariff revenue increasing by \$4,795 million. Total welfare loss

is \$239 million, which is 1.41% of the decrease in the US imports of this sector from China.

- HS 85: Electrical Machinery and Equipment and Parts Thereof; Sound Recorders and Reproducers. The US total imports in this sector are expected to decrease by \$9,323 million, with tariff revenue increasing by \$3,247 million. Total welfare loss is \$204 million, which is 1.33% of the decrease in the US imports of this sector from China.
- HS 90: Optical, Photographic, Cinematographic, Measuring, Checking, Precision, Medical or Surgical Instruments and Apparatus. The US total imports in this sector are expected to decrease by \$1,074 million, with tariff revenue increasing by \$703 million and a total welfare loss of \$15 million, which is 0.57% of the decrease in the US imports of this sector from China.

Regarding the tariff measures on the second set of products, the three most likely affected HS 2-digit industries in the US are as follows (Table 9).

- HS 85: Electrical Machinery and Equipment and Parts Thereof; Sound Recorders and Reproducers. The US total imports in this sector are expected to decrease by \$5,860 million, with tariff revenue increasing by \$1,166 million and a total welfare loss of \$78 million (0.87% of the decrease in the US imports of this sector are from China).
- HS 84: Nuclear Reactors, Boilers, Machinery and Mechanical Appliances, Parts Thereof. The total imports of the US in this sector are expected to decrease by \$1,422 million, with tariff revenue increasing by \$622 million and a total welfare loss of \$29 million (1.13% of the decrease in the US imports of this sector are from China).
- HS 39: Plastics and Articles Thereof. The US total imports in this sector are expected to decrease by \$297 million, with tariff revenue increasing by \$186 million and a total welfare loss of \$13 million (1.21% of the decrease in the US imports of this sector are from China).

Regarding the tariff measures on the third set of products, the three most likely affected HS 2-digit industries in the US are as follows (Table 9).

- HS 85: Electrical Machinery and Equipment and Parts Thereof; Sound Recorders and Reproducers. The US total imports in this sector are expected to decrease by \$6,253 million, with tariff revenue increasing by \$3,066 million and a total welfare loss of \$132 million (1.38% of the decrease in the US imports of this sector are from China).
- HS 84: Nuclear Reactors, Boilers, Machinery and Mechanical Appliances, Parts Thereof. The total imports of the US in this sector are expected to decrease by \$5,346 million, with tariff revenue increasing by \$3,656 million and a total welfare loss of \$105 million (1.17% of the decrease in the US imports of this sector are from China).
- HS 94: Furniture; Bedding, Mattresses, Mattress Supports, Cushions and Similar Stuffed Furnishings; Lamps and Lighting Fittings, Not Elsewhere Specified or

Table 2 Import Value and Weighted Import Tariff of the US by Sector (Before the Changes in Tariffs)

| Sector | Description | Weighted Tariff on Imports from the World (%) | Total Import (in millions of USD) | Weighted Tariff on Imports from China (%) | Import from China (in millions of USD) |
|----------------|---|---|-----------------------------------|---|--|
| Product List 1 | | | | | |
| 6 | Chemicals & Allied Industries | 0.00 | 72.01 | 0.00 | 2.67 |
| 7 | Plastics / Rubbers | 0.00 | 126.59 | 0.00 | 0.13 |
| 16 | Machinery / Electrical | 0.36 | 276,857.50 | 0.50 | 63,444.79 |
| 17 | Transportation | 0.80 | 232,484.75 | 0.91 | 1,479.75 |
| 18 | Precision Instruments | 0.21 | 45,915.61 | 0.78 | 5,293.06 |
| Product List 2 | | | | | |
| 5 | Mineral Products | 3.26 | 23,034.26 | 6.40 | 408.66 |
| 6 | Chemicals & Allied Industries | 3.89 | 666.57 | 6.10 | 7.70 |
| 7 | Plastics / Rubbers | 1.54 | 22,179.19 | 3.66 | 1,927.51 |
| 13 | Stone / Glass | 2.97 | 96.26 | 3.00 | 16.52 |
| 15 | Base Metals | 0.02 | 3,754.01 | 0.05 | 1,038.71 |
| 16 | Machinery / Electrical | 0.47 | 109,027.96 | 1.05 | 19,271.76 |
| 17 | Transportation | 0.08 | 6,695.04 | 0.69 | 459.96 |
| 18 | Precision Instruments | 1.02 | 3,997.95 | 1.65 | 373.85 |
| Product List 3 | | | | | |
| 1 | Animal & Animal Products | 0.18 | 18,126.35 | 0.23 | 1,681.33 |
| 2 | Vegetable Products | 0.71 | 22,695.89 | 4.23 | 738.24 |
| 3 | Animal or Vegetable Fats and Oils | 0.64 | 190.68 | 0.91 | 13.17 |
| 4 | Prepared Foodstuffs | 4.01 | 31,562.23 | 5.32 | 2,721.88 |
| 5 | Mineral Products | 0.00 | 100,014.49 | 0.06 | 280.08 |
| 6 | Chemicals & Allied Industries | 1.63 | 66,196.22 | 2.85 | 9,521.43 |
| 7 | Plastics / Rubbers | 2.16 | 46,782.04 | 3.52 | 12,319.86 |
| 8 | Raw Hides, Skins, Leather, & Furs | 8.41 | 14,426.35 | 10.05 | 7,824.71 |
| 9 | Wood & Wood Products | 1.09 | 9,658.89 | 2.33 | 1,897.84 |
| 10 | Pulp of Wood or of Other Fibrous Material | 0.00 | 19,252.00 | 0.00 | 3,274.95 |
| 11 | Textiles | 3.55 | 14,424.49 | 5.51 | 3,663.64 |
| 12 | Footwear / Headgear | 4.90 | 2,040.82 | 5.35 | 1,326.76 |
| 13 | Stone / Glass | 1.79 | 16,808.91 | 2.64 | 4,979.32 |
| 14 | Natural or Cultured Pearls | 0.18 | 22,056.19 | 0.65 | 129.39 |
| 15 | Base Metals | 1.55 | 64,640.24 | 2.42 | 16,655.71 |
| 16 | Machinery / Electrical | 0.62 | 265,813.42 | 0.82 | 87,150.48 |
| 17 | Transportation | 0.60 | 74,884.14 | 1.50 | 12,492.09 |
| 18 | Precision Instruments | 1.00 | 12,194.42 | 2.22 | 2,315.92 |
| 20 | Miscellaneous Manufactured Articles | 0.73 | 55,923.51 | 1.33 | 26,898.39 |

Included; Illuminated Signs, Illuminated Nameplates and The Like; Prefabricated Buildings. The total imports of the US in this sector are expected to decrease by \$2,748 million, with tariff revenue increasing by \$2,203 million and a total welfare loss of \$101 million (2.33% of the decrease in the US imports of this sector are from China).

If the tariff revenue is zero before the increase of tariff rate, the value of the percentage change of tariff revenue cannot be calculated and its corresponding cell is thus left blank.

In the case of China, as shown in Tables 4 and 5, the industries that will suffer the largest welfare losses due to the additional tariffs imposed on the three sets of products are not the same. The two industries most likely affected (which could suffer considerably greater welfare losses than other sectors) by an additional tariff of 25 percent on the first set of products are transportation and vegetables, specifically, automobiles (HS 87) and soybeans (HS 12) (as shown in Table 10). The welfare loss is approximately 3 to 14 dollars for every 100-dollar decrease in Chinese imports from the US in these sectors.

- HS 87: Vehicles Other than Railway or Tramway Rolling Stock, and Parts and Accessories. The total Chinese imports in this sector are expected to decrease by \$2,672 million, with total welfare losses of \$678 million (12.92% of the decrease in the Chinese imports of this sector are from the US) and an increase in tariff revenue of \$1,246 million.
- HS 12: Oil Seeds and Oleaginous Fruits: Miscellaneous Grains, Seeds and Fruit. The total Chinese imports in this sector are expected to be reduced by \$3,522 million, with an economic welfare loss of \$223 million (3.51% of the decrease in the Chinese imports of this sector are from the US) and a \$1,827 million increase in tariff revenue.

The third and fourth most affected 2-digit HS sectors are as follows. The welfare losses of these two sectors are similar, but they are significantly higher than the welfare losses of the other sectors in List 1 (Table 10).

- HS 02: Meat and Edible Meat offal. China's total imports in this sector are expected to be reduced by \$413 million, with a total welfare loss of \$53 million (8.19% of the decrease in the Chinese imports of this sector are from the US) and an increase in tariff revenue of \$124 million.
- HS 10: Cereals. China's total imports in this sector are expected to decrease by \$257 million, with a total welfare loss of \$52 million (14.58% of the decrease in the Chinese imports of this sector are from the US) and an increase in tariff revenue of \$257 million.

Among the second set of products, transportation (mainly including HS 87) is still the sector that suffers the largest welfare loss. The three most likely affected HS 2-digit industries in China are as follows (Table 10). The welfare loss is approximately 2 to 13 dollars for every 100-dollar decrease in the Chinese imports from the US in these sectors.

Table 3 Effect of US-China Trade War on the US by Sector (in Millions of USD and Percentage Change)

| Sector | Change of Total Import | | Change of Import from China | | Tariff Revenue Effect | | Welfare Effect | Welfare Effect/Import Effect* |
|--------|------------------------|---------|-----------------------------|----------|-----------------------|-----------|----------------|-------------------------------|
| List 1 | | | | | | | | |
| 6 | -2.32 | -3.23% | -2.67 | -100.00% | 0.00 | | 0.00 | 0.00% |
| 7 | -0.03 | -0.02% | -0.07 | -57.39% | 0.01 | | 0.00 | 0.00% |
| 16 | -17,995.43 | -6.50% | -32,170.99 | -50.71% | 8,042.19 | 796.31% | -442.56 | 1.38% |
| 17 | -277.94 | -0.12% | -692.68 | -46.81% | 718.58 | 38.59% | -5.51 | 0.79% |
| 18 | -1074.23 | -2.34% | -2,688.51 | -50.79% | 703.01 | 714.63% | -15.42 | 0.57% |
| Total | -19349.95 | | -35,554.92 | | 9,463.79 | | -463.49 | 1.30% |
| List 2 | | | | | | | | |
| 5 | -150.07 | -0.65% | -293.80 | -71.89% | 14.53 | 1.94% | -4.95 | 1.69% |
| 6 | -3.11 | -0.47% | -5.48 | -71.20% | 0.33 | 1.27% | -0.12 | 2.15% |
| 7 | -496.67 | -2.24% | -1,070.35 | -55.53% | 186.16 | 54.37% | -12.93 | 1.21% |
| 13 | -13.00 | -13.50% | -16.52 | -100.00% | -0.39 | -13.70% | -0.39 | 2.33% |
| 15 | -457.34 | -12.18% | -717.45 | -69.07% | 79.97 | 10136.23% | -6.60 | 0.92% |
| 16 | -7281.66 | -6.68% | -11,632.18 | -60.36% | 1,789.09 | 347.62% | -107.48 | 0.92% |
| 17 | -335.38 | -5.01% | -368.99 | -80.22% | 20.98 | 404.36% | -1.30 | 0.35% |
| 18 | -90.93 | -2.27% | -189.38 | -50.66% | 43.10 | 106.09% | -2.54 | 1.34% |
| Total | -8828.16 | | -14,294.16 | | 2,133.77 | | -136.31 | 0.95% |
| List 3 | | | | | | | | |
| 1 | -204.90 | -1.13% | -332.82 | -19.79% | 134.04 | 408.64% | -4.41 | 1.33% |
| 2 | -138.94 | -0.61% | -202.15 | -27.38% | 45.04 | 27.77% | -4.78 | 2.36% |
| 3 | -1.30 | -0.68% | -2.99 | -22.73% | 1.01 | 82.80% | -0.02 | 0.55% |
| 4 | -304.26 | -0.96% | -557.70 | -20.49% | 194.43 | 15.38% | -15.20 | 2.73% |
| 5 | -44.03 | -0.04% | -77.30 | -27.60% | 20.20 | 2969.07% | -0.20 | 0.26% |
| 6 | -1,180.87 | -1.78% | -2,029.77 | -21.32% | 711.63 | 65.91% | -41.84 | 2.06% |
| 7 | -1,665.45 | -3.56% | -2,663.41 | -21.62% | 891.52 | 88.33% | -82.82 | 3.11% |
| 8 | -767.15 | -5.32% | -1,172.94 | -14.99% | 588.63 | 48.54% | -87.53 | 7.46% |
| 9 | -616.70 | -6.38% | -763.78 | -40.24% | 97.46 | 92.62% | -15.78 | 2.07% |
| 10 | -788.36 | -4.09% | -1,012.05 | -30.90% | 226.29 | | -5.91 | 0.58% |
| 11 | -991.15 | -6.87% | -1,282.32 | -35.00% | 178.39 | 34.83% | -51.10 | 3.98% |
| 12 | -167.51 | -8.21% | -233.15 | -17.57% | 100.05 | 100.13% | -12.60 | 5.40% |
| 13 | -822.52 | -4.89% | -1,185.62 | -23.81% | 349.30 | 115.96% | -32.80 | 2.77% |
| 14 | -22.62 | -0.10% | -38.39 | -29.67% | 8.82 | 22.18% | -0.24 | 0.63% |
| 15 | -2,874.89 | -4.45% | -4,105.61 | -24.65% | 1,184.43 | 118.37% | -85.57 | 2.08% |
| 16 | -11,598.94 | -4.36% | -18,576.99 | -21.32% | 6,722.29 | 411.06% | -237.56 | 1.28% |
| 17 | -1,354.29 | -1.81% | -2,572.24 | -20.59% | 951.25 | 211.72% | -51.11 | 1.99% |
| 18 | -194.23 | -1.59% | -433.43 | -18.72% | 181.54 | 148.75% | -5.62 | 1.30% |
| 20 | -2,759.28 | -4.93% | -4,366.88 | -16.23% | 2,203.09 | 540.46% | -102.29 | 2.34% |
| Total | -26,497.40 | | -41,609.53 | | 14,789.39 | | -837.39 | 2.01% |

Note: * Import effect in this table refers to the change of import from China

- HS 87: Vehicles Other than Railway or Tramway Rolling Stock, and Parts and Accessories. The total Chinese imports in this sector are expected to decrease by \$2,264 million, with total welfare losses of \$605 million (13.10% of the decrease in the Chinese imports of this sector are from the US) and an increase in tariff revenue of \$1,045 million.
- HS 27: Mineral Fuels, Mineral Oils and Products of their Distillation; Bituminous Substances; Mineral Waxes. The total Chinese imports in this sector are expected to be reduced by \$500 million, with an economic welfare loss of \$27 million (2.71% of the decrease in the Chinese imports of this sector are from the US) and a \$256 million increase in tariff revenue.
- HS 47: Pulp of Wood or Other Fibrous Cellulosic Material; Recovered (Waste and Scrap) Paper of a Paperboard. China's total imports in this sector are expected to be reduced by \$483 million, with a total welfare loss of \$19 million (2.06% of the decrease in the Chinese imports of this sector are from the US) and an increase in tariff revenue of \$331 million.

Among the third set of products, machinery/electrical products (namely, HS 84 and HS 85) become the sector that suffers the largest welfare loss (Table 2). The three most likely affected HS 2-digit industries in China are as follows (Table 10). The welfare loss is approximately 1.5 to 3 dollars for every 100-dollar decrease in the Chinese imports from the US in these sectors, which is smaller than the welfare loss in the most affected sectors of Lists 1 and 2.

- HS 84: Nuclear Reactors, Boilers, Machinery and Mechanical Appliances; Parts Thereof. The total Chinese imports in this sector are expected to decrease by \$969 million, with total welfare losses of \$54 million (2.67% of the decrease in the Chinese imports of this sector are from the US) and an increase in tariff revenue of \$608 million.
- HS 85: Electrical Machinery and Equipment and Parts Thereof; Sound Recorders and Reproducers, Television Image and Sound Recorders and Reproducers, and Parts and Accessories of Such Articles. The total Chinese imports in this sector are expected to be reduced by \$822 million, with an economic welfare loss of \$26 million (1.54% of the decrease in the Chinese imports of this sector are from the US) and a \$483 million increase in tariff revenue.
- HS 90: Optical, Photographic, Cinematographic, Measuring, Checking, Precision, Medical or Surgical Instruments and Apparatus; Parts and Accessories Thereof. China's total imports in this sector are expected to be reduced by \$520 million, with a total welfare loss of \$20 million (1.71% of the decrease in the Chinese imports of this sector are from the US) and an increase in tariff revenue of \$499 million.

Given the limitations of the SMART model, we cannot simulate the effect of the US-China trade war on the welfare of exporters. We can only identify the impact on the welfare of the importing country that imposes the tariff measures. Nevertheless, the above results imply that the trade war reduces exports from other countries, which can harm their welfare, and the importing country suffers a large welfare loss in the targeted sectors that originally had high imports from another country. Imposing additional tariffs can harm both the US and China's own industries. Of course, it is reasonable for

Table 4 Import Value and Import Tariff of China by Sector (Before the Changes in Tariffs)

| HS1 | Sector | Weighted Tariff on Imports from the World (%) | Total Import (in Millions of USD) | Weighted Tariff on Imports from the US (%) | Import from the US (in Millions of USD) |
|----------------|---|---|-----------------------------------|--|---|
| Product List 1 | | | | | |
| 1 | Animal & Animal Products | 9.24 | 17,398.11 | 11.23 | 2,463.60 |
| 2 | Vegetable Products | 4.52 | 46,609.47 | 3.87 | 16,312.09 |
| 4 | Prepared Foodstuffs | 14.06 | 3,231.67 | 13.49 | 1,304.34 |
| 11 | Textiles | 13.67 | 1,565.34 | 13.67 | 508.75 |
| 17 | Transportation | 21.56 | 54,146.12 | 24.17 | 12,715.17 |
| Product List 2 | | | | | |
| 4 | Prepared Foodstuffs | 1.18 | 1,617.41 | 3.50 | 183.85 |
| 5 | Mineral Products | 2.97 | 50,758.52 | 5.41 | 2,171.18 |
| 6 | Chemicals & Allied Industries | 4.06 | 18,448.65 | 6.11 | 1,492.60 |
| 7 | Plastics / Rubbers | 4.86 | 21,131.23 | 6.63 | 1,186.86 |
| 9 | Wood & Wood Products | 0.00 | 7.44 | 0.00 | 0.04 |
| 10 | Pulp of Wood or of Other Fibrous Material | 0.00 | 4,988.90 | 0.00 | 2,263.32 |
| 11 | Textiles | 3.59 | 213.44 | 11.45 | 4.45 |
| 13 | Stone / Glass | 8.90 | 309.23 | 9.00 | 49.77 |
| 14 | Natural or Cultured Pearls | 4.00 | 0.06 | 4.00 | 0.06 |
| 15 | Base Metals | 2.19 | 11,313.71 | 2.39 | 1,961.23 |
| 16 | Machinery / Electrical | 0.00 | 8,885.84 | 0.00 | 507.31 |
| 17 | Transportation | 24.41 | 44,565.47 | 24.96 | 11,072.89 |
| 18 | Precision Instruments | 4.11 | 5,790.56 | 4.27 | 1,759.26 |
| Product List 3 | | | | | |
| 1 | Animal & Animal Products | 9.03 | 830.46 | 15.97 | 103.01 |
| 2 | Vegetable Products | 7.40 | 2,795.07 | 14.45 | 182.52 |
| 3 | Animal or Vegetable Fats and Oils | 7.77 | 3,852.81 | 13.09 | 138.92 |
| 4 | Prepared Foodstuffs | 10.08 | 18,632.92 | 12.34 | 1,432.03 |
| 5 | Mineral Products | 0.25 | 64,535.90 | 0.37 | 2,470.97 |
| 6 | Chemicals & Allied Industries | 4.52 | 74,239.65 | 6.39 | 7,835.94 |
| 7 | Plastics / Rubbers | 5.47 | 46,860.25 | 7.56 | 5,342.10 |
| 8 | Raw Hides, Skins, Leather, & Furs | 6.94 | 9,343.48 | 6.67 | 1,257.87 |
| 9 | Wood & Wood Products | 0.41 | 9,351.16 | 0.05 | 2,119.97 |
| 10 | Pulp of Wood or of Other Fibrous Material | 1.53 | 21,736.70 | 2.03 | 2,962.74 |
| 11 | Textiles | 7.88 | 25,031.04 | 8.47 | 769.64 |
| 12 | Footwear / Headgear | 6.21 | 3,951.74 | 15.26 | 116.45 |

Table 4 (continued)

| HS1 | Sector | Weighted Tariff on Imports from the World (%) | Total Import (in Millions of USD) | Weighted Tariff on Imports from the US (%) | Import from the US (in Millions of USD) |
|-----|--|---|-----------------------------------|--|---|
| 13 | Stone / Glass | 10.16 | 9,776.80 | 12.68 | 1,253.05 |
| 14 | Natural or Cultured Pearls | 1.02 | 65,288.18 | 1.03 | 5,306.29 |
| 15 | Base Metals | 3.61 | 76,905.24 | 8.01 | 3,158.87 |
| 16 | Machinery / Electrical | 2.91 | 334,338.40 | 4.83 | 16,903.99 |
| 17 | Transportation | 6.29 | 4,474.03 | 6.00 | 500.32 |
| 18 | Precision Instruments | 5.04 | 93,539.84 | 3.67 | 9,898.67 |
| 19 | Arms and Ammunition | 12.90 | 4.33 | 13.00 | 1.36 |
| 20 | Miscellaneous Manufactured Articles | 6.70 | 8,260.26 | 9.70 | 532.95 |
| 21 | Works of Art | 6.46 | 76.64 | 4.69 | 10.66 |

the US government (or Chinese government) to transfer some of the tariff revenue to compensate for the lost welfare. Indeed, the US government has announced that a large number of subsidies will be provided to farmers harmed by the trade war. However, this transfer is not sufficient. Moreover, in a practical and political sense, producers who face additional Chinese import tariffs are more likely to obtain support than consumers who suffer from the higher prices of Chinese products. As a result, the transfer of the tariff revenue does not eliminate the problem of welfare loss. The trade war is inevitably a lose-lose game.

Trade Diversion

Due to the change in relative prices, the goods that would otherwise be imported from a country could instead be sourced from other exporting markets. According to the simulation results, based on the tariff increase imposed by the US on the three lists of products, a total of \$16,205, \$5,466 and \$15,112 million, respectively, of US imports formerly sourced from mainland China could be obtained from other markets.

Table 6 shows the markets that account for the largest share of the total import diversion of the US. For the first set of products, the top five alternative importing markets are Mexico, Japan, Germany, Canada and Taiwan¹⁰. For the second set of products, the top five markets are Mexico, Japan, Malaysia, Canada and South Korea, and the top five markets for the third set of products are Mexico, Canada, Japan, Taiwan and Germany. Table 11 in the appendix presents more detailed results by sector and shows that in most sectors of the first set of products, trade is diverted to Mexico, Japan and Germany. In most sectors of the second set of products, trade is diverted to Canada, Japan and Germany.

Based on the three lists of products by China, a total of \$6,203, \$5,320 and \$5,684 million, respectively, of Chinese imports are diverted from the US to other exporting

¹⁰ In this paper, Taiwan refers to the separate customs territories of Taiwan, Penghu, Kinmen and Matsu.

Table 5 Effect of the Trade War on China by Sector (in Millions of USD and Percentage Change)

| Sector | Change of Total Import | | Change of Import from the US | | Tariff Revenue Effect | | Welfare Effect | Welfare Effect/Import Effect* |
|--------|------------------------|---------|------------------------------|---------|-----------------------|---------|----------------|-------------------------------|
| List 1 | | | | | | | | |
| 1 | -653.73 | -3.76% | -1,127.60 | -45.77% | 251.96 | 15.68% | -79.62 | 7.06% |
| 2 | -3,999.84 | -8.58% | -7,034.11 | -43.12% | 2,119.62 | 100.61% | -303.41 | 4.31% |
| 4 | -923.50 | -28.58% | -928.70 | -71.20% | 26.13 | 5.75% | -72.60 | 7.82% |
| 11 | -115.17 | -7.36% | -228.77 | -44.97% | 54.26 | 25.36% | -18.52 | 8.09% |
| 17 | -2,671.58 | -4.93% | -5,247.73 | -41.27% | 1,245.51 | 10.67% | -677.84 | 12.92% |
| Total | -8,363.82 | | -14,566.90 | | 3,697.48 | | -1,151.98 | 7.91% |
| List 2 | | | | | | | | |
| 4 | -48.55 | -3.00% | -107.68 | -58.57% | 15.81 | 82.70% | -0.83 | 0.77% |
| 5 | -499.79 | -0.98% | -1,010.66 | -46.55% | 255.66 | 16.96% | -27.38 | 2.71% |
| 6 | -568.97 | -3.08% | -923.45 | -61.87% | 99.11 | 13.22% | -40.64 | 4.40% |
| 7 | -258.89 | -1.23% | -638.46 | -53.79% | 111.95 | 10.90% | -13.53 | 2.12% |
| 9 | -0.01 | -0.17% | -0.03 | -63.98% | 0.00 | | 0.00 | 0.10% |
| 10 | -483.29 | -9.69% | -937.36 | -41.42% | 331.49 | | -19.34 | 2.06% |
| 11 | -2.68 | -1.25% | -3.36 | -75.43% | -0.10 | -1.27% | -0.07 | 2.02% |
| 13 | -14.61 | -4.72% | -28.47 | -57.21% | 3.99 | 14.50% | -1.43 | 5.03% |
| 14 | -0.01 | -11.74% | -0.01 | -12.41% | 0.01 | 528.34% | 0.00 | 15.58% |
| 15 | -593.70 | -5.25% | -1,164.51 | -59.38% | 181.91 | 73.63% | -15.06 | 1.29% |
| 16 | -69.18 | -0.78% | -248.40 | -48.96% | 64.73 | | -0.25 | 0.10% |
| 17 | -2,265.52 | -5.08% | -4,624.23 | -41.76% | 1,045.20 | 9.61% | -605.35 | 13.09% |
| 18 | -351.35 | -6.07% | -790.39 | -44.93% | 226.20 | 95.16% | -22.01 | 2.78% |
| Total | -5,156.53 | | -10,477.00 | | 2,335.97 | | -745.89 | 7.12% |
| List 3 | | | | | | | | |
| 1 | -8.17 | -0.98% | -18.48 | -17.94% | 6.11 | 8.15% | -1.16 | 6.26% |
| 2 | -38.78 | -1.39% | -46.25 | -25.34% | 2.80 | 1.35% | -5.34 | 11.53% |
| 3 | -15.84 | -0.41% | -31.87 | -22.94% | 7.47 | 2.49% | -1.36 | 4.26% |
| 4 | -254.06 | -1.36% | -374.55 | -26.16% | 58.60 | 3.12% | -21.51 | 5.74% |
| 5 | -203.67 | -0.32% | -497.88 | -20.15% | 174.73 | 107.67% | -2.40 | 0.48% |
| 6 | -806.37 | -1.09% | -1,396.46 | -17.82% | 413.66 | 12.33% | -51.06 | 3.66% |
| 7 | -377.37 | -0.81% | -842.37 | -15.77% | 300.36 | 11.71% | -24.61 | 2.92% |
| 8 | -100.44 | -1.08% | -153.29 | -12.19% | 50.39 | 7.77% | -6.63 | 4.33% |
| 9 | -324.58 | -3.47% | -439.93 | -20.75% | 166.25 | 435.15% | -10.24 | 2.33% |
| 10 | -212.91 | -0.98% | -405.69 | -13.69% | 145.37 | 43.73% | -7.30 | 1.80% |
| 11 | -101.12 | -0.40% | -172.72 | -22.44% | 36.93 | 1.87% | -7.50 | 4.34% |
| 12 | -14.21 | -0.36% | -23.43 | -20.12% | 5.91 | 2.41% | -1.69 | 7.22% |
| 13 | -116.57 | -1.19% | -199.11 | -15.89% | 45.33 | 4.56% | -13.36 | 6.71% |
| 14 | -698.26 | -1.07% | -1,397.15 | -26.33% | 378.77 | 56.79% | -11.44 | 0.82% |
| 15 | -301.08 | -0.39% | -569.70 | -18.03% | 169.45 | 6.11% | -22.96 | 4.03% |
| 16 | -1,790.46 | -0.54% | -3,749.66 | -22.18% | 1,090.78 | 11.21% | -80.79 | 2.15% |
| 17 | -41.13 | -0.92% | -66.15 | -13.22% | 19.94 | 7.09% | -2.55 | 3.86% |
| 18 | -523.77 | -0.56% | -1,185.64 | -11.98% | 499.29 | 10.60% | -20.58 | 1.74% |

Table 5 (continued)

| Sector | Change of Total Import | | Change of Import from the US | | Tariff Revenue Effect | | Welfare Effect | Welfare Effect/Import Effect* |
|--------|------------------------|--------|------------------------------|---------|-----------------------|--------|----------------|-------------------------------|
| 19 | -0.16 | -3.65% | -0.22 | -15.97% | 0.04 | 6.62% | -0.01 | 6.58% |
| 20 | -48.20 | -0.58% | -90.18 | -16.92% | 24.81 | 4.49% | -3.44 | 3.81% |
| 21 | -0.72 | -0.94% | -1.59 | -14.89% | 0.59 | 11.85% | -0.05 | 2.85% |
| Total | -5,977.86 | | -11,662.30 | | 3,597.56 | | -295.98 | 2.54% |

Note: * Import effect in this table refers to the change of import from the US

If the tariff revenue is zero before the increase of tariff rate, the value of the percentage change of tariff revenue cannot be calculated and its corresponding cell is thus left blank

markets. As shown below, the markets that represent the largest share of the total trade diversion are listed in Table 7. The top five markets for the first set of products are Brazil, Germany, Japan, Argentina, and the United Kingdom, and the top five markets for the second set of products are Germany, Japan, the United Kingdom, South Korea and the United Arab Emirates. For the third set of products, the top five markets are Japan, Germany, South Korea, Switzerland and Taiwan. The results by sector are presented in Table 12 in the appendix. Since the automobile sector (HS code 87) features the largest Chinese imports from the US, the largest alternative automobile exporters to China (which are Germany, Japan and the U.K.) are among the top five markets in terms of the trade diversion effect. The other sectors of the first set of products are agricultural sectors. In these sectors, the trade diversion results show more heterogeneity. For oil seeds and oleaginous fruits (HS code 12), which are the products on the list that exhibit the largest imports from the US, Chinese imports are mostly diverted from the US to Latin American countries (Brazil, Argentina and Uruguay), while for cereals (HS code 10), Chinese imports are mostly diverted from the US to Australia, Canada and Ukraine. The United Arab Emirates is among the top five markets for the second set of products since it is a major alternative source of imports of mineral fuels (HS 27).

Analysis of the Deep Impact of the US-China Trade War

The Impact on the Domestic Economy

After imposing additional tariffs, US imports from China and China's imports from the US could shift to other exporting markets. However, although these alternative countries acquire relative price advantages due to the increased tariffs on trade between the US and China, their products can be far from the best choice for the US when compared to the Chinese goods imported before the trade war. Furthermore, trade diversion still requires a series of adjustment costs. Therefore, the part of the China-US trade affected by the trade war could not be completely compensated for by trade diversion and can instead incur costs from exporting companies and domestic producers. Furthermore, the additional increased trade costs could eventually be passed to consumers and cause a deterioration in consumer welfare.

Table 6 US Imports Diverted from China to Other Sources (in Millions of USD)

| Product List 1 | | Product List 2 | | Product List 3 | |
|----------------------|-------------------|----------------------|-------------------|----------------------|-------------------|
| Market | Change of import | Market | Change of import | Market | Change of import |
| 1 Mexico | 2,897.30 (17.88%) | Mexico | 915.83 (16.76%) | Mexico | 3,879.10 (25.67%) |
| 2 Japan | 2,158.05 (13.32%) | Japan | 850.79 (15.57%) | Canada | 1551.30 (10.27%) |
| 3 Germany | 1,442.12 (8.90%) | Malaysia | 710.94 (13.01%) | Japan | 1136.30 (7.52%) |
| 4 Canada | 1,195.10 (7.37%) | Canada | 411.34 (7.53%) | Taiwan, China | 993.25 (6.57%) |
| 5 Taiwan, China | 1,030.77 (6.36%) | Korea, Rep. | 340.93 (6.24%) | Germany | 926.91 (6.13%) |
| 6 Korea, Rep. | 1,025.49 (6.33%) | Taiwan, China | 300.39 (5.50%) | Korea, Rep. | 842.19 (5.57%) |
| 7 Thailand | 827.48 (5.11%) | Germany | 289.83 (5.30%) | Vietnam | 620.59 (4.11%) |
| 8 Malaysia | 814.10 (5.02%) | Vietnam | 151.03 (2.76%) | Thailand | 558.34 (3.69%) |
| 9 United Kingdom | 497.04 (3.07%) | Thailand | 148.41 (2.72%) | Italy | 493.43 (3.27%) |
| 10 Italy | 479.19 (2.96%) | Singapore | 130.12 (2.38%) | India | 449.88 (2.98%) |
| Rest of the World | 3,838.32 (23.69%) | Rest of the World | 1,216.38 (22.25%) | Rest of the World | 3,660.85 (24.22%) |

Note: The US imports from China in the analysis only include the US imports from mainland China. Number in the parenthesis is the share of total trade diversion effect

Moreover, US-China trade friction could also affect the investment decision-making of companies. In the short term, investment in the industries targeted by the additional tariffs in both countries may face a significant reduction. Concerns about a slowdown in the Chinese domestic economy and uncertainty about the future of the US-China trade war would further restrain domestic and foreign investment in China.

Despite these adverse impacts on the domestic economy, the US-China trade war can stimulate policy reforms and economic adjustments in China to build long-term economic growth momentum. A report published by the Peterson Institute for International Economics argues that once China corrects the intellectual property protection problem criticized by the US, the resulting improvements in the Chinese business environment would further encourage US companies to invest in China (Gown et al, 2018). Importing from the US can result from trade stickiness and path dependence but is not necessarily the best choice of Chinese firms. If this is the case, the trade war can stimulate constructive adjustments of the firms in China.

Spillover Effect on American Politics

Although we find that Chinese countermeasures will incur a higher welfare loss than the protectionist actions of the US, our simulation of the effects on various industries suggests that China's countermeasures are designed with the political implication of American economic geography in mind and aim to combat Trump's supporters in key states by increasing the financial burden of Republican supporters. For instance, raising

tariffs on US soybeans can disproportionately affect Iowa, the home state of influential Republican Senator Charles E. Grassley, a Senate Agriculture Committee member. By using a county-level measure of tariff exposure, Fetzer and Schwarz [4] found that the political targeting of tariffs is systematically against the Republican voter base and areas that swung to support Donald Trump in the 2016 Presidential Elections. According to the results of the mid-term elections, China's strategic identification of retaliation targets was successful. Although the Republican Party retains the majority in the Senate, it lost control over the House of Representatives. Thus, Trump's political roots were shaken, and his political resources for implementing radical trade policies are less sufficient than before.

Spillover Effect Along the Global Supply Chain

In addition to the end consumers, a tariff shock on intermediate goods would affect all the manufacturing firms along the supply chains. If the market was efficient, the intermediate goods of other countries were not as ideal as the intermediate goods of China and the US before the trade war in terms of quality and/or price. The trade war forces China and the US to shift their imports to inferior substitute sources. Currently, it is widely recognized that the organizational forms of production are based on the global supply chain. The manufacturing industry, especially the high-end manufacturing industry, is highly reliant on the global procurement of raw materials and components. Therefore, on the one hand, the practice of levying tariffs on key components could

Table 7 Chinese Imports Diverted from the US to Other Sources (in Millions of USD)

| Product List 1 | | Product List 2 | | Product List 3 | |
|-------------------|-------------------|----------------------|-------------------|-------------------|------------------|
| Market | Change of import | Market | Change of import | Market | Change of import |
| 1 Brazil | 2,108.44 (33.99%) | Germany | 1,173.54 (22.06%) | Japan | 942.34 (16.58%) |
| 2 Germany | 1,073.66 (17.31%) | Japan | 895.69 (16.83%) | Germany | 657.31 (11.56%) |
| 3 Japan | 626.37 (10.10%) | United Kingdom | 577.18 (10.85%) | Korea, Rep. | 488.01 (8.58%) |
| 4 Argentina | 510.15 (8.22%) | Korea, Rep. | 223.22 (4.20%) | Switzerland | 405.81 (7.14%) |
| 5 United Kingdom | 408.71 (6.59%) | United Arab Emirates | 195.06 (3.67%) | Taiwan, China | 346.96 (6.10%) |
| 6 Canada | 211.11 (3.40%) | Hong Kong, China | 168.38 (3.16%) | Australia | 231.25 (4.07%) |
| 7 Slovak Republic | 136.99 (2.21%) | Slovak Republic | 135.40 (2.54%) | Singapore | 206.44 (3.63%) |
| 8 Australia | 127.89 (2.06%) | Netherlands | 134.25 (2.52%) | France | 152.64 (2.69%) |
| 9 Uruguay | 111.14 (1.79%) | Australia | 130.26 (2.45%) | Italy | 122.30 (2.15%) |
| 10 Russia | 94.96 (1.53%) | Italy | 126.55 (2.38%) | Thailand | 105.67 (1.86%) |
| Rest of the World | 793.65 (12.79%) | Rest of the World | 1560.94 (29.34%) | Rest of the World | 1742.88 (30.66%) |

Note: The Chinese imports in the analysis only include imports of mainland China. Number in the parenthesis is the share of total trade diversion effect

increase the import costs of intermediate goods for both China and the US. On the other hand, Sino-US trade friction could disrupt the entire supply chain and make it impossible for both sides to carry out so-called precision strikes, which could ultimately harm the domestic industries that are highly dependent on the global division of labor. Furthermore, the US-China trade war can hurt US allies, which may receive collateral damage because of the spillover effect from the input-output linkage in the context of global value chains [2, 10]. The US-China trade war will harm companies from the US and its allies, thus weakening the dominant position of the US in the global value chain and the support that it can receive from its allies for its protectionist measures against China.

Turbulence in the World Trading System

In the multilateral trading system under the WTO framework, the US-China trade war could produce extremely unfavorable negative spillover effects and even create the risk of turbulence in the existing international economy and trade governance structure. Since the Cold War, the WTO, as the representative organization that regulates the global trade order, has played an important role in governing the global economy and trade, including organizing trade negotiations, formulating, implementing and supervising multilateral trade rules, and resolving trade disputes. Nevertheless, disregarding the multilateral framework, the US first unveiled its plans to impose tariffs on China and arbitrarily undermined the tariff reduction schedule under Article II of the GATT and thus clearly violated the basic principle of the most-favored-nation (MFN) obligations of the WTO. Second, the US adopted retaliatory measures without WTO authorization and unilaterally imposed tariffs while bypassing the WTO dispute settlement mechanism. This unilateral protectionism overtly places its domestic trade laws above the WTO's multilateral rules. As a result, the trade war launched by the US directly violates the rules of the WTO and places the WTO in a more marginalized position. This trade conflict between the two largest economies worldwide is essentially a multilateral issue. Thus, if the US-China trade war continues to escalate, the rest of the world could easily become involved in an even more extensive trade war, which could, in turn, have a significant negative impact on the international economy and trade governance.

Policy Implications for the US and China

From the perspective of the US, its unilateral provocation of trade friction has disrupted the normal order of bilateral economic and trade relations between the two countries. More seriously, due to the trade and economic volume of China and the US, the trade friction between the world's two major economies has even cast a shadow of the Cold War on international relations. The tariff war will have spillover effects to other areas beyond trade on both countries and also the world, including declining domestic and foreign investment, collateral damage along the global value chain and turbulence in the world trading system. At the domestic level, in the US, if the Sino-US trade friction continues to escalate, not only consumers will suffer from higher prices, which will result in a further reduction in the overall economic welfare, but also more companies

and more industries will suffer from collateral damage through input-output linkages and uncertainties in the economic situation. Therefore, it is in the interest of the US to abandon the extreme means of a trade war and steadily resolve the long-term accumulation of problems between China and the US through constructive bilateral economic and trade negotiations, such as signing a Sino-US investment and trade agreement.

As for China's current countermeasures, although China has adopted retaliating tariff lists with the same value, scale, and tariff increases as the US tariff lists, the simulation results in this paper show that the impact of the trade war on the two countries is asymmetric. Thus, China's capabilities of responding to trade frictions is still rather limited. Therefore, to avoid the serious consequences of the current and future trade frictions, China must establish more comprehensive and sophisticated trade friction response instruments. Specifically, these instruments should include countermeasures, proactive measures, and safeguards, and proactive measures are the most important mechanism.

First, the countermeasures must be designed and implemented with accuracy and efficiency based on a comprehensive consideration of domestic consumer welfare and industrial competitiveness. According to the model estimation, although China can strike the target industries of the US through the tariff lists, the so-called "peer-to-peer" measures adopted by China have caused welfare losses in China that are several times the losses experienced in the US. From the perspective of global value chains, these measures may also jeopardize related domestic industries. In addition, improving the breadth and depth of its participation in global value chains, especially upgrading its position in the value chain, is fundamental for China to enhance its ability to resolve trade frictions.

Second, in the long run, the proactive measures should force further domestic reform and opening up with trade friction as visionary as it is essential for progress. China should identify the core claims of the US in this round of trade friction because many of the US's criticisms of China in the trade war are on issues that China needs to address, such as securing property rights and openness and fairness to foreign investment. These are the types of policies that could attract investment to China and broaden foreign markets for China's businesses over the long run. China should be ready to play by the international trade and investment rules because these rules could counteract the negative impact of the trade war and accelerate China's growth as an economic powerhouse.

Third, the safeguard measures mainly include two aspects. On the one hand, China can establish a trade friction compensation mechanism. On the other hand, China should actively participate in and improve global economic and trade governance. Locally, temporary schemes that transfer tariff revenues from trade frictions to the affected industrial sectors should be established. More importantly, companies in relevant industrial sectors in China should be encouraged to introduce new diversified markets and import channels to reduce their loss. From the perspective of global economic and trade governance, China should support and maintain a multilateral trading system centered on the WTO. As mentioned above, the unilateral levying of tariffs by the US violates the WTO rules and deconstructs the influence of the WTO. Under such circumstances, as a legitimate holder of interests and a responsible member of the WTO, China should assume the role of supporters and defenders. In addition, as an important external factor in the Sino-US friction, the ruling from the WTO on the disputes between China and the US can make a difference in the Sino-US trade friction. China should make efforts in litigation and use this opportunity to seek negotiations to achieve the effective maintenance of WTO authority.

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Appendix

Table 8 Description of 2-digit HS Sectors

| HS1 | HS2 | Description |
|-----|-----|--|
| 1 | 1 | Live Animals |
| 1 | 2 | Meat and Edible Meat Offal |
| 1 | 3 | Fish and Crustaceans, Molluscs and Other Aquatic Invertebrates |
| 1 | 4 | Dairy Produce; Birds' Eggs; Natural Honey; Edible Products of Animal Origin, Not Elsewhere Specified or Included |
| 1 | 5 | Products of Animal Origin, Not Elsewhere Specified or Included |
| 2 | 6 | Live Trees and Other Plants; Bulbs, Roots and The Like; Cut Flowers and Ornamental Foliage |
| 2 | 7 | Edible Vegetables and Certain Roots and Tubers |
| 2 | 8 | Edible Fruit and Nuts; Peel of Citrus Fruit or Melons |
| 2 | 9 | Coffee, Tea, Maté and Spices |
| 2 | 10 | Cereals |
| 2 | 11 | Products of The Milling Industry; Malt; Starches; Inulin; Wheat Gluten |
| 2 | 12 | Oil Seeds and Oleaginous Fruits; Miscellaneous Grains, Seeds and Fruit; Industrial or Medicinal Plants; Straw and Fodder |
| 2 | 13 | Lac; Gums, Resins and Other Vegetable Saps and Extracts |
| 2 | 14 | Vegetable Plaiting Materials; Vegetable Products Not Elsewhere Specified or Included |
| 3 | 15 | Animal or Vegetable Fats and Oils and Their Cleavage Products; Prepared Edible Fats; Animal or Vegetable Waxes |
| 4 | 16 | Preparations of Meat, of Fish or of Crustaceans, Molluscs or Other Aquatic Invertebrates |
| 4 | 17 | Sugars and Sugar Confectionery |
| 4 | 18 | Cocoa and Cocoa Preparations |
| 4 | 19 | Preparations of Cereals, Flour, Starch or Milk; Pastrycooks' Products |
| 4 | 20 | Preparations of Vegetables, Fruit, Nuts or Other Parts of Plants |
| 4 | 21 | Miscellaneous Edible Preparations |
| 4 | 22 | Beverages, Spirits and Vinegar |
| 4 | 23 | Residues and Waste from The Food Industries; Prepared Animal Fodder |
| 4 | 24 | Tobacco and Manufactured Tobacco Substitutes |
| 5 | 25 | Salt; Sulphur; Earths and Stone; Plastering Materials, Lime and Cement |
| 5 | 26 | Ores, Slag and Ash |
| 5 | 27 | Mineral Fuels, Mineral Oils and Products of Their Distillation; Bituminous Substances; Mineral Waxes |
| 6 | 28 | Inorganic Chemicals; Organic or Inorganic Compounds of Precious Metals, of Rare-Earth Metals, of Radioactive Elements or of Isotopes |

Table 8 (continued)

| HS1 | HS2 | Description |
|-----|-----|--|
| 6 | 29 | Organic Chemicals |
| 6 | 30 | Pharmaceutical Products |
| 6 | 31 | Fertilisers |
| 6 | 32 | Tanning or Dyeing Extracts; Tannins and Their Derivatives; Dyes, Pigments and Other Colouring Matter; Paints and Varnishes; Putty and Other Mastics; Inks |
| 6 | 33 | Essential Oils and Resinoids; Perfumery, Cosmetic or Toilet Preparations |
| 6 | 34 | Soap, Organic Surface-Active Agents, Washing Preparations, Lubricating Preparations, Artificial Waxes, Prepared Waxes, Polishing or Scouring Preparations, Candles and Similar Articles, Modelling Pastes, 'Dental Waxes' and Dental Preparation |
| 6 | 35 | Albuminoidal Substances; Modified Starches; Glues; Enzymes |
| 6 | 36 | Explosives; Pyrotechnic Products; Matches; Pyrophoric Alloys; Certain Combustible Preparations |
| 6 | 37 | Photographic or Cinematographic Goods |
| 6 | 38 | Miscellaneous Chemical Products |
| 7 | 39 | Plastics and Articles Thereof |
| 7 | 40 | Rubber and Articles Thereof |
| 8 | 41 | Raw Hides and Skins (Other Than Furskins) and Leather |
| 8 | 42 | Articles of Leather; Saddlery and Harness; Travel Goods, Handbags and Similar Containers; Articles of Animal Gut (Other Than Silkworm Gut) |
| 8 | 43 | Furskins and Artificial Fur; Manufactures Thereof |
| 9 | 44 | Wood and Articles of Wood; Wood Charcoal |
| 9 | 45 | Cork and Articles of Cork |
| 9 | 46 | Manufactures of Straw, of Esparto or of Other Plaiting Materials; Basketware and Wickerwork |
| 10 | 47 | Pulp of Wood or of Other Fibrous Cellulosic Material; Recovered (Waste and Scrap) Paper or Paperboard |
| 10 | 48 | Paper and Paperboard; Articles of Paper Pulp, of Paper or of Paperboard |
| 10 | 49 | Printed Books, Newspapers, Pictures and Other Products of The Printing Industry; Manuscripts, Typescripts and Plans |
| 11 | 50 | Silk |
| 11 | 51 | Wool, Fine or Coarse Animal Hair; Horsehair Yarn and Woven Fabric |
| 11 | 52 | Cotton |
| 11 | 53 | Other Vegetable Textile Fibres; Paper Yarn and Woven Fabrics of Paper Yarn |
| 11 | 54 | Man-Made Filaments; Strip and The Like of Man-Made Textile Materials |
| 11 | 55 | Man-Made Staple Fibres |
| 11 | 56 | Wadding, Felt and Nonwovens; Special Yarns; Twine, Cordage, Ropes and Cables and Articles Thereof |
| 11 | 57 | Carpets and Other Textile Floor Coverings |
| 11 | 58 | Special Woven Fabrics; Tufted Textile Fabrics; Lace; Tapestries; Trimmings; Embroidery |
| 11 | 59 | Impregnated, Coated, Covered or Laminated Textile Fabrics; Textile Articles of A Kind Suitable For Industrial Use |
| 11 | 60 | Knitted or Crocheted Fabrics |
| 11 | 61 | Articles of Apparel and Clothing Accessories, Knitted or Crocheted |
| 11 | 62 | Articles of Apparel and Clothing Accessories, Not Knitted or Crocheted |
| 11 | 63 | Other Made-Up Textile Articles; Sets; Worn Clothing and Worn Textile Articles; Rags |

Table 8 (continued)

| HS1 | HS2 | Description |
|-----|-----|--|
| 12 | 64 | Footwear, Gaiters and The Like; Parts of Such Articles |
| 12 | 65 | Headgear and Parts Thereof |
| 12 | 66 | Umbrellas, Sun Umbrellas, Walking Sticks, Seat-Sticks, Whips, Riding-Crops and Parts Thereof |
| 12 | 67 | Prepared Feathers and Down and Articles Made of Feathers or of Down; Artificial Flowers; Articles of Human Hair |
| 13 | 68 | Articles of Stone, Plaster, Cement, Asbestos, Mica or Similar Materials |
| 13 | 69 | Ceramic Products |
| 13 | 70 | Glass and Glassware |
| 14 | 71 | Natural or Cultured Pearls, Precious or Semi-Precious Stones, Precious Metals, Metals Clad with Precious Metal, and Articles Thereof; Imitation Jewellery; Coin |
| 15 | 72 | Iron and Steel |
| 15 | 73 | Articles of Iron or Steel |
| 15 | 74 | Copper and Articles Thereof |
| 15 | 75 | Nickel and Articles Thereof |
| 15 | 76 | Aluminium and Articles Thereof |
| 15 | 78 | Lead and Articles Thereof |
| 15 | 79 | Zinc and Articles Thereof |
| 15 | 80 | Tin and Articles Thereof |
| 15 | 81 | Other Base Metals; Cermets; Articles Thereof |
| 15 | 82 | Tools, Implements, Cutlery, Spoons and Forks, of Base Metal; Parts Thereof of Base Metal |
| 15 | 83 | Miscellaneous Articles of Base Metal |
| 16 | 84 | Nuclear Reactors, Boilers, Machinery and Mechanical Appliances; Parts Thereof |
| 16 | 85 | Electrical Machinery and Equipment and Parts Thereof; Sound Recorders and Reproducers, Television Image and Sound Recorders and Reproducers, and Parts and Accessories of Such Articles |
| 17 | 86 | Railway or Tramway Locomotives, Rolling Stock and Parts Thereof; Railway or Tramway Track Fixtures and Fittings and Parts Thereof; Mechanical (Including Electromechanical) Traffic Signalling Equipment of All Kinds |
| 17 | 87 | Vehicles Other Than Railway or Tramway Rolling Stock, and Parts and Accessories Thereof |
| 17 | 88 | Aircraft, Spacecraft, and Parts Thereof |
| 17 | 89 | Ships, Boats and Floating Structures |
| 18 | 90 | Optical, Photographic, Cinematographic, Measuring, Checking, Precision, Medical or Surgical Instruments and Apparatus; Parts and Accessories Thereof |
| 18 | 91 | Clocks and Watches and Parts Thereof |
| 18 | 92 | Musical Instruments; Parts and Accessories of Such Articles |
| 19 | 93 | Arms and Ammunition; Parts and Accessories Thereof |
| 20 | 94 | Furniture; Bedding, Mattresses, Mattress Supports, Cushions and Similar Stuffed Furnishings; Lamps and Lighting Fittings, Not Elsewhere Specified or Included; Illuminated Signs, Illuminated Nameplates and The Like; Prefabricated Buildings |
| 20 | 95 | Toys, Games and Sports Requisites; Parts and Accessories Thereof |
| 20 | 96 | Miscellaneous Manufactured Articles |
| 21 | 97 | Works of Art, Collectors' Pieces and Antiques |

Table 9 Effect of the trade war on the US by 2-digit HS sector (in millions of dollars)

| HS2 | Change of Total Import | | Change of Import from China | | Tariff Revenue Effect | | Welfare Effect | Welfare Effect/Import Effect* |
|--------|------------------------|---------|-----------------------------|----------|-----------------------|----------|----------------|-------------------------------|
| List 1 | | | | | | | | |
| 28 | -2.32 | -3.23% | -2.67 | -100.00% | 0.00 | | 0.00 | 0.00% |
| 40 | -0.03 | -0.02% | -0.07 | -57.39% | 0.01 | | 0.00 | 0.00% |
| 84 | -8,672.53 | -5.10% | -16,873.43 | -47.40% | 4,795.45 | 858.97% | -238.51 | 1.41% |
| 85 | -9,322.90 | -8.74% | -15,297.55 | -54.93% | 3,246.74 | 718.87% | -204.06 | 1.33% |
| 86 | -105.80 | -7.02% | -232.79 | -35.84% | 112.75 | 1675.38% | -4.47 | 1.92% |
| 87 | -59.65 | -0.03% | -169.14 | -50.43% | 554.81 | 29.90% | -0.86 | 0.51% |
| 88 | -108.69 | -0.31% | -286.91 | -58.44% | 51.01 | | -0.18 | 0.06% |
| 89 | -3.79 | -0.52% | -3.84 | -98.23% | 0.02 | | 0.00 | 0.00% |
| 90 | -1,074.23 | -2.34% | -2,688.50 | -50.79% | 703.01 | 714.63% | -15.42 | 0.57% |
| Total | -19,349.95 | | -35,554.92 | | 9,463.79 | | -463.49 | 1.30% |
| List 2 | | | | | | | | |
| 27 | -150.07 | -0.65% | -293.80 | -71.89% | 14.53 | 1.94% | -4.95 | 1.69% |
| 34 | -1.67 | -0.77% | -2.62 | -72.81% | 0.15 | 1.73% | -0.06 | 2.43% |
| 38 | -1.44 | -0.32% | -2.87 | -69.79% | 0.18 | 1.04% | -0.05 | 1.89% |
| 39 | -496.67 | -2.24% | -1,070.35 | -55.53% | 186.16 | 54.37% | -12.93 | 1.21% |
| 70 | -13.00 | -13.50% | -16.52 | -100.00% | -0.39 | -13.70% | -0.39 | 2.33% |
| 73 | -452.45 | -12.27% | -710.60 | -69.13% | 79.32 | | -6.54 | 0.92% |
| 76 | -4.89 | -7.23% | -6.85 | -63.22% | 0.65 | 82.67% | -0.07 | 0.96% |
| 84 | -1,422.14 | -4.63% | -2,605.73 | -50.91% | 622.47 | 706.10% | -29.35 | 1.13% |
| 85 | -5,859.52 | -7.48% | -9,026.46 | -63.77% | 1,166.62 | 273.53% | -78.13 | 0.87% |
| 86 | -57.41 | -11.93% | -89.98 | -50.18% | 20.66 | 427.79% | -1.29 | 1.43% |
| 87 | -277.97 | -4.47% | -279.02 | -99.42% | 0.32 | 89.00% | -0.01 | 0.00% |
| 90 | -90.93 | -2.27% | -189.38 | -50.66% | 43.10 | 106.09% | -2.54 | 1.34% |
| Total | -8,828.16 | | -14,294.16 | | 2,133.77 | | -136.31 | 0.95% |
| List 3 | | | | | | | | |
| 02 | -5.16 | -0.68% | -6.55 | -39.50% | 0.74 | 59.49% | -0.26 | 3.98% |
| 03 | -183.71 | -1.12% | -291.11 | -19.64% | 118.75 | 441.19% | -3.91 | 1.34% |
| 04 | -4.27 | -2.46% | -4.27 | -100.00% | -0.04 | -2.98% | -0.04 | 1.00% |
| 05 | -11.76 | -1.59% | -30.89 | -17.32% | 14.59 | 454.58% | -0.19 | 0.63% |
| 07 | -43.98 | -0.72% | -66.14 | -21.18% | 18.95 | 38.31% | -2.38 | 3.60% |
| 08 | -8.99 | -0.08% | -18.20 | -23.10% | 5.55 | 34.54% | -0.16 | 0.87% |
| 10 | -1.54 | -0.09% | -2.66 | -28.03% | 0.63 | 0.89% | -0.04 | 1.55% |
| 11 | -38.68 | -2.75% | -39.70 | -87.79% | -0.99 | -7.62% | -1.30 | 3.28% |
| 12 | -44.80 | -1.99% | -72.15 | -27.38% | 18.34 | 149.26% | -0.89 | 1.23% |
| 14 | -0.95 | -0.78% | -3.30 | -11.36% | 2.56 | 898.90% | -0.01 | 0.34% |
| 15 | -1.30 | -0.68% | -2.99 | -22.73% | 1.01 | 82.80% | -0.02 | 0.55% |
| 16 | -131.04 | -2.73% | -203.75 | -26.83% | 50.56 | 27.72% | -5.20 | 2.55% |
| 17 | -5.16 | -0.23% | -23.80 | -16.54% | 10.91 | 12.42% | -0.26 | 1.09% |
| 19 | -12.24 | -0.27% | -37.75 | -19.08% | 14.84 | 23.81% | -0.36 | 0.97% |
| 20 | -97.83 | -1.48% | -190.17 | -15.67% | 89.97 | 34.53% | -7.97 | 4.19% |

Table 9 (continued)

| HS2 | Change of Total Import | | Change of Import from China | | Tariff Revenue Effect | | Welfare Effect | Welfare Effect/Import Effect* |
|-----|------------------------|---------|-----------------------------|---------|-----------------------|-----------|----------------|-------------------------------|
| 21 | -27.23 | -2.33% | -42.13 | -28.63% | 8.86 | 29.90% | -0.85 | 2.03% |
| 22 | -0.34 | 0.00% | -1.60 | -19.07% | 0.68 | 5.41% | 0.00 | 0.00% |
| 23 | -30.11 | -1.06% | -58.12 | -23.23% | 18.78 | 107.68% | -0.36 | 0.62% |
| 24 | -0.29 | -0.01% | -0.40 | -32.60% | -0.16 | -0.03% | -0.19 | 48.51% |
| 25 | -38.84 | -1.29% | -64.12 | -29.23% | 15.44 | 2279.13% | -0.18 | 0.28% |
| 26 | -1.99 | -0.11% | -4.79 | -20.67% | 1.84 | 66090.20% | -0.01 | 0.28% |
| 27 | -3.20 | 0.00% | -8.39 | -22.33% | 2.92 | | -0.01 | 0.09% |
| 28 | -242.80 | -3.16% | -325.80 | -30.52% | 69.90 | 105.73% | -4.68 | 1.44% |
| 29 | -572.16 | -2.12% | -970.40 | -19.19% | 385.08 | 54.14% | -29.15 | 3.00% |
| 31 | -25.51 | -0.43% | -50.41 | -26.79% | 13.77 | | -0.05 | 0.09% |
| 32 | -53.17 | -1.29% | -109.45 | -19.69% | 41.59 | 42.01% | -2.26 | 2.06% |
| 33 | -120.49 | -1.25% | -269.61 | -19.34% | 110.46 | 452.76% | -2.16 | 0.80% |
| 34 | -29.41 | -1.28% | -60.78 | -24.36% | 18.11 | 76.18% | -0.38 | 0.63% |
| 35 | -24.74 | -1.81% | -49.48 | -18.14% | 21.75 | 210.25% | -0.74 | 1.50% |
| 36 | -2.20 | -11.58% | -2.70 | -62.31% | 0.16 | | -0.01 | 0.40% |
| 37 | -5.84 | -0.41% | -10.64 | -27.34% | 2.78 | 10.47% | -0.10 | 0.91% |
| 38 | -104.56 | -1.58% | -180.51 | -26.08% | 48.04 | 40.65% | -2.30 | 1.28% |
| 39 | -1494.76 | -6.94% | -2,152.69 | -22.79% | 663.33 | 123.07% | -78.01 | 3.62% |
| 40 | -170.70 | -0.68% | -510.71 | -17.78% | 228.19 | 48.52% | -4.81 | 0.94% |
| 41 | -26.50 | -3.68% | -26.85 | -95.77% | -0.52 | -3.71% | -0.57 | 2.12% |
| 42 | -731.99 | -5.43% | -1,130.48 | -14.65% | 583.00 | 48.86% | -86.52 | 7.65% |
| 43 | -8.66 | -3.88% | -15.61 | -19.43% | 6.15 | 113.81% | -0.43 | 2.78% |
| 44 | -478.41 | -5.43% | -604.37 | -39.45% | 81.45 | 96.08% | -10.35 | 1.71% |
| 45 | -2.41 | -0.88% | -4.16 | -14.89% | 2.35 | 2172.66% | -0.07 | 1.67% |
| 46 | -135.89 | -23.35% | -155.25 | -45.94% | 13.66 | 67.14% | -5.36 | 3.45% |
| 47 | -7.48 | -0.23% | -7.58 | -93.02% | 0.06 | | 0.00 | 0.03% |
| 48 | -780.88 | -4.90% | -1,004.48 | -30.75% | 226.23 | | -5.91 | 0.59% |
| 50 | -2.86 | -3.38% | -5.28 | -23.04% | 1.74 | 747.77% | -0.04 | 0.80% |
| 51 | -8.09 | -3.11% | -10.22 | -54.22% | -0.21 | -1.02% | -0.82 | 8.02% |
| 52 | -94.72 | -10.07% | -112.82 | -47.50% | 4.04 | 7.26% | -7.36 | 6.52% |
| 53 | -11.93 | -5.03% | -15.51 | -40.34% | 2.10 | 100.69% | -0.22 | 1.41% |
| 54 | -169.33 | -7.93% | -209.15 | -38.32% | 17.41 | 15.75% | -12.75 | 6.10% |
| 55 | -107.92 | -7.10% | -134.54 | -35.85% | 12.60 | 16.16% | -9.59 | 7.13% |
| 56 | -190.33 | -8.59% | -244.63 | -37.38% | 36.57 | 136.61% | -5.03 | 2.06% |
| 57 | -257.97 | -8.88% | -306.57 | -47.36% | 27.22 | 44.42% | -6.89 | 2.25% |
| 58 | -34.63 | -5.41% | -52.63 | -23.38% | 14.84 | 45.53% | -2.21 | 4.19% |
| 59 | -69.44 | -2.59% | -128.60 | -23.10% | 39.61 | 65.51% | -2.34 | 1.82% |
| 60 | -43.95 | -5.44% | -62.38 | -18.27% | 22.47 | 35.33% | -3.85 | 6.17% |
| 65 | -165.71 | -8.22% | -230.89 | -17.67% | 98.32 | 99.27% | -12.46 | 5.40% |
| 67 | -1.79 | -7.44% | -2.26 | -11.06% | 1.73 | 196.93% | -0.14 | 6.10% |
| 68 | -408.72 | -4.86% | -566.17 | -26.64% | 145.41 | 130.14% | -11.79 | 2.08% |

Table 9 (continued)

| HS2 | Change of Total Import | | Change of Import from China | | Tariff Revenue Effect | | Welfare Effect | Welfare Effect/Import Effect* |
|-------|------------------------|---------|-----------------------------|----------|-----------------------|---------|----------------|-------------------------------|
| 69 | -28.32 | -1.86% | -52.42 | -24.24% | 15.94 | 90.58% | -0.47 | 0.90% |
| 70 | -385.47 | -5.61% | -567.03 | -21.50% | 187.95 | 109.35% | -20.55 | 3.62% |
| 71 | -22.62 | -0.10% | -38.39 | -29.67% | 8.82 | 22.18% | -0.24 | 0.63% |
| 72 | -14.93 | -0.22% | -24.39 | -29.58% | 5.68 | 21.16% | -0.12 | 0.48% |
| 73 | -1,389.86 | -6.26% | -2,016.67 | -23.62% | 630.32 | 165.80% | -32.19 | 1.60% |
| 74 | -104.48 | -1.04% | -152.38 | -28.28% | 35.47 | 62.52% | -2.97 | 1.95% |
| 75 | -3.88 | -0.16% | -10.62 | -19.58% | 4.29 | 26.78% | -0.07 | 0.61% |
| 76 | -152.17 | -3.87% | -219.26 | -25.56% | 57.77 | 154.22% | -3.06 | 1.40% |
| 78 | -0.27 | -0.09% | -0.85 | -18.35% | 0.36 | 93.10% | 0.00 | 0.48% |
| 79 | -17.01 | -4.95% | -26.17 | -18.46% | 10.98 | 126.35% | -0.86 | 3.30% |
| 80 | -13.95 | -34.24% | -15.46 | -73.00% | 0.27 | 31.40% | -0.44 | 2.82% |
| 81 | -26.76 | -1.43% | -45.75 | -25.74% | 12.06 | 12.88% | -0.97 | 2.13% |
| 82 | -306.33 | -3.83% | -512.18 | -18.63% | 211.92 | 86.95% | -15.32 | 2.99% |
| 83 | -845.24 | -9.75% | -1,081.89 | -31.01% | 215.32 | 158.12% | -29.56 | 2.73% |
| 84 | -5,345.62 | -3.47% | -8,993.63 | -19.58% | 3,656.03 | 472.84% | -105.11 | 1.17% |
| 85 | -6,253.32 | -5.59% | -9,583.35 | -23.26% | 3,066.27 | 355.65% | -132.45 | 1.38% |
| 87 | -1329.08 | -1.82% | -2,533.16 | -20.49% | 942.75 | 216.67% | -50.83 | 2.01% |
| 88 | -0.28 | -1.15% | -0.30 | -100.00% | -0.01 | -2.30% | 0.00 | 1.44% |
| 89 | -24.92 | -1.27% | -38.79 | -30.68% | 8.51 | 61.67% | -0.28 | 0.72% |
| 90 | -190.16 | -1.57% | -428.01 | -18.67% | 179.89 | 148.56% | -5.41 | 1.26% |
| 91 | -4.07 | -4.43% | -5.42 | -23.27% | 1.65 | 172.56% | -0.21 | 3.78% |
| 94 | -2748.36 | -4.92% | -4,354.52 | -16.20% | 2,202.87 | 546.79% | -101.44 | 2.33% |
| 96 | -10.92 | -13.83% | -12.36 | -49.32% | 0.22 | 4.60% | -0.85 | 6.88% |
| Total | -26,497.40 | | -41,609.53 | | 14,789.39 | | -837.39 | |

Note: *In this table, import effect refers to change of import from China

Table 10 Effect of the trade war on China by 2-digit HS sector (in millions of dollars)

| HS2 | Change of Total Import | | Change of Import from the US | | Tariff Revenue Effect | | Welfare Effect | Welfare Effect/Import Effect* |
|--------|------------------------|---------|------------------------------|----------|-----------------------|----------|----------------|-------------------------------|
| List 1 | | | | | | | | |
| 02 | -412.84 | -4.87% | -651.64 | -48.18% | 124.16 | 13.15% | -53.34 | 8.19% |
| 03 | -147.45 | -2.83% | -304.20 | -39.95% | 95.80 | 22.90% | -17.28 | 5.68% |
| 04 | -74.59 | -2.21% | -132.99 | -49.77% | 25.60 | 13.38% | -5.75 | 4.32% |
| 05 | -18.85 | -5.63% | -38.76 | -47.07% | 6.40 | 12.17% | -3.24 | 8.36% |
| 07 | -10.42 | -0.57% | -18.43 | -64.55% | 2.21 | 19.76% | -0.35 | 1.89% |
| 08 | -209.53 | -3.69% | -310.51 | -54.19% | 32.86 | 15.05% | -28.52 | 9.18% |
| 10 | -256.73 | -5.77% | -353.63 | -23.19% | 256.75 | 31.93% | -51.56 | 14.58% |
| 11 | -0.14 | -0.49% | -0.15 | -94.53% | -0.03 | -0.58% | -0.03 | 17.88% |
| 12 | -3,522.49 | -10.21% | -6,349.31 | -44.77% | 1,827.25 | 171.69% | -222.93 | 3.51% |
| 14 | -0.53 | -0.50% | -2.07 | -46.53% | 0.57 | 13.64% | -0.02 | 1.07% |
| 16 | -2.84 | -1.66% | -3.50 | -63.82% | 0.26 | 4.25% | -0.17 | 4.75% |
| 20 | -3.30 | -2.38% | -4.79 | -12.57% | 7.56 | 52.52% | -0.79 | 16.45% |
| 22 | -51.66 | -10.12% | -54.71 | -13.85% | 71.14 | 54.57% | -19.13 | 34.96% |
| 23 | -683.37 | -99.91% | -683.37 | -100.00% | -34.17 | -99.91% | -33.86 | 4.95% |
| 24 | -182.33 | -10.55% | -182.33 | -100.00% | -18.66 | -6.93% | -18.66 | 10.23% |
| 52 | -115.17 | -7.36% | -228.77 | -44.97% | 54.26 | 25.36% | -18.52 | 8.09% |
| 87 | -2,671.58 | -4.93% | -5,247.73 | -41.27% | 1,245.51 | 10.67% | -677.84 | 12.92% |
| Total | -8,363.82 | | -14566.90 | | 3697.48 | | -1151.98 | 7.91% |
| List 2 | | | | | | | | |
| 23 | -48.55 | -3.00% | -107.68 | -58.57% | 15.81 | 82.70% | -0.83 | 0.77% |
| 27 | -499.79 | -0.99% | -1,010.66 | -46.55% | 255.66 | 17.00% | -27.38 | 2.71% |
| 29 | -222.38 | -1.46% | -461.86 | -54.15% | 89.77 | 18.41% | -10.11 | 2.19% |
| 34 | -164.28 | -9.81% | -279.29 | -61.06% | 27.57 | 20.23% | -15.86 | 5.68% |
| 35 | -182.30 | -11.86% | -182.30 | -100.00% | -18.23 | -14.52% | -14.67 | 8.05% |
| 39 | -226.96 | -1.10% | -569.42 | -54.95% | 94.67 | 9.50% | -10.93 | 1.92% |
| 40 | -31.92 | -6.37% | -69.04 | -45.83% | 17.29 | 56.56% | -2.60 | 3.77% |
| 44 | 0.00 | -0.01% | 0.00 | -60.56% | 0.00 | | 0.00 | 0.00% |
| 45 | -0.01 | -1.50% | -0.03 | -64.17% | 0.00 | | 0.00 | 0.11% |
| 47 | -483.29 | -9.69% | -937.36 | -41.42% | 331.49 | | -19.34 | 2.06% |
| 51 | -0.08 | -0.84% | -0.25 | -46.55% | 0.06 | 4.63% | -0.01 | 4.25% |
| 52 | -0.06 | -0.06% | -0.23 | -47.49% | 0.05 | 1.25% | 0.00 | 1.70% |
| 55 | -0.15 | -0.99% | -0.50 | -47.47% | 0.13 | 20.16% | -0.01 | 1.41% |
| 63 | -2.38 | -2.71% | -2.38 | -100.00% | -0.33 | -18.39% | -0.05 | 1.95% |
| 70 | -14.61 | -4.72% | -28.47 | -57.21% | 3.99 | 14.50% | -1.43 | 5.03% |
| 71 | -0.01 | -11.74% | -0.01 | -12.41% | 0.01 | 528.34% | 0.00 | 15.58% |
| 72 | -2.65 | -0.29% | -7.25 | -51.55% | 1.70 | 7878.22% | 0.00 | 0.06% |
| 73 | -39.91 | -2.17% | -102.82 | -49.88% | 21.53 | 12.95% | -3.89 | 3.79% |
| 74 | -256.93 | -4.16% | -578.42 | -55.79% | 108.34 | 200.03% | -4.65 | 0.80% |
| 75 | -0.02 | -9.17% | -0.05 | -28.29% | 0.03 | 720.91% | 0.00 | 3.99% |
| 76 | -286.84 | -13.03% | -462.32 | -67.72% | 48.91 | 293.95% | -6.00 | 1.30% |

Table 10 (continued)

| HS2 | Change of Total Import | | Change of Import from the US | | Tariff Revenue Effect | | Welfare Effect | Welfare Effect/Import Effect* |
|--------|------------------------|--------|------------------------------|---------|-----------------------|------------|----------------|-------------------------------|
| 79 | -0.69 | -4.81% | -1.83 | -39.82% | 0.68 | 321.46% | -0.03 | 1.51% |
| 81 | -6.66 | -4.25% | -11.83 | -70.28% | 0.71 | 7.28% | -0.49 | 4.11% |
| 85 | -69.18 | -0.78% | -248.40 | -48.96% | 64.73 | | -0.25 | 0.10% |
| 87 | -2,264.19 | -5.10% | -4,621.51 | -41.75% | 1,044.93 | 9.61% | -605.31 | 13.10% |
| 89 | -1.33 | -0.92% | -2.72 | -68.67% | 0.27 | 6.50% | -0.04 | 1.46% |
| 90 | -351.35 | -6.07% | -790.39 | -44.93% | 226.20 | 95.16% | -22.01 | 2.78% |
| Total | -5,156.53 | | -10477.00 | | 2335.97 | | -745.89 | 7.12% |
| List 3 | | | | | | | | |
| 01 | -0.17 | -0.30% | -0.50 | -9.22% | 0.24 | 6.98% | -0.01 | 1.65% |
| 02 | 0.00 | -0.27% | 0.00 | -22.97% | 0.00 | 1.34% | 0.00 | 5.61% |
| 03 | 0.00 | -0.01% | 0.00 | -19.93% | 0.00 | 0.07% | 0.00 | 3.77% |
| 04 | -0.14 | -0.06% | -0.38 | -21.20% | 0.09 | 2.27% | 0.00 | 0.91% |
| 05 | -7.86 | -1.50% | -17.59 | -18.37% | 5.78 | 8.56% | -1.14 | 6.50% |
| 06 | -0.57 | -0.45% | -1.07 | -28.20% | 0.22 | 2.34% | -0.04 | 4.10% |
| 07 | -1.62 | -4.73% | -1.67 | -8.92% | 0.67 | 31.35% | -0.15 | 9.03% |
| 08 | -0.30 | -0.19% | -0.94 | -16.86% | 0.28 | 1.32% | -0.05 | 4.85% |
| 09 | -15.94 | -3.59% | -16.18 | -91.09% | -2.24 | -5.03% | -2.34 | 14.46% |
| 11 | -3.38 | -0.35% | -4.04 | -16.99% | 0.54 | 1.43% | -0.47 | 11.65% |
| 12 | -14.26 | -1.97% | -17.40 | -19.10% | 2.23 | 3.87% | -1.98 | 11.35% |
| 13 | -2.68 | -1.05% | -4.84 | -22.81% | 1.06 | 3.49% | -0.31 | 6.36% |
| 14 | -0.04 | -0.04% | -0.11 | -21.19% | 0.03 | 0.95% | 0.00 | 1.27% |
| 15 | -15.84 | -0.41% | -31.87 | -22.94% | 7.47 | 2.49% | -1.36 | 4.26% |
| 16 | -0.05 | -0.52% | -0.05 | -58.62% | 0.00 | -0.35% | -0.01 | 12.33% |
| 17 | -18.85 | -1.34% | -22.18 | -28.03% | 1.11 | 0.29% | -2.40 | 10.82% |
| 18 | -4.78 | -0.73% | -8.19 | -28.31% | 1.47 | 4.01% | -0.35 | 4.30% |
| 19 | -33.58 | -0.59% | -46.73 | -38.88% | -0.31 | -0.05% | -4.53 | 9.69% |
| 20 | -46.18 | -5.17% | -58.48 | -25.65% | 2.98 | 3.02% | -7.08 | 12.10% |
| 21 | -11.90 | -0.50% | -56.70 | -12.84% | 32.56 | 11.12% | -1.71 | 3.01% |
| 22 | -7.48 | -0.16% | -21.04 | -19.66% | 6.99 | 1.65% | -0.73 | 3.48% |
| 23 | -131.26 | -4.70% | -161.17 | -37.74% | 13.80 | 33.19% | -4.70 | 2.92% |
| 25 | -52.79 | -0.83% | -73.39 | -22.88% | 18.22 | 11.23% | -1.97 | 2.68% |
| 26 | -129.39 | -0.30% | -311.69 | -20.60% | 104.09 | 149532.32% | -0.39 | 0.12% |
| 27 | -21.49 | -0.15% | -112.80 | -17.71% | 52.42 | | -0.04 | 0.03% |
| 28 | -72.45 | -0.71% | -139.00 | -15.70% | 48.79 | 12.48% | -3.68 | 2.65% |
| 29 | -298.35 | -0.86% | -502.50 | -17.43% | 154.82 | 13.62% | -16.71 | 3.32% |
| 30 | -9.98 | -1.15% | -20.46 | -9.68% | 10.45 | 29.46% | -0.54 | 2.65% |
| 31 | -7.30 | -0.32% | -9.21 | -16.33% | 2.34 | 1.30% | -0.51 | 5.55% |
| 32 | -41.14 | -0.89% | -95.37 | -19.02% | 31.61 | 10.99% | -2.81 | 2.95% |
| 33 | -80.85 | -1.06% | -181.01 | -20.21% | 60.90 | 10.96% | -7.14 | 3.95% |
| 34 | -27.69 | -1.06% | -57.96 | -13.40% | 19.98 | 9.44% | -2.27 | 3.92% |
| 35 | -118.74 | -3.54% | -147.52 | -30.19% | 5.30 | 2.13% | -9.30 | 6.30% |

Table 10 (continued)

| HS2 | Change of Total Import | | Change of Import from the US | | Tariff Revenue Effect | | Welfare Effect | Welfare Effect/Import Effect* |
|-----|------------------------|---------|------------------------------|---------|-----------------------|---------|----------------|-------------------------------|
| 36 | -12.41 | -7.56% | -14.40 | -24.72% | 1.03 | 9.95% | -0.79 | 5.49% |
| 37 | -39.40 | -2.99% | -63.59 | -14.24% | 35.21 | 40.38% | -1.91 | 3.01% |
| 38 | -98.07 | -1.51% | -165.44 | -16.95% | 43.24 | 20.42% | -5.39 | 3.26% |
| 39 | -308.51 | -0.95% | -678.08 | -16.18% | 236.62 | 12.86% | -19.41 | 2.86% |
| 40 | -68.86 | -0.48% | -164.29 | -14.26% | 63.75 | 8.79% | -5.20 | 3.17% |
| 41 | -87.35 | -1.57% | -133.60 | -11.14% | 48.40 | 16.74% | -5.00 | 3.74% |
| 42 | -5.49 | -0.21% | -7.34 | -40.07% | 0.47 | 0.19% | -0.49 | 6.70% |
| 43 | -7.60 | -0.67% | -12.35 | -30.43% | 1.52 | 1.42% | -1.14 | 9.24% |
| 44 | -324.45 | -3.49% | -439.71 | -20.75% | 166.21 | 480.50% | -10.24 | 2.33% |
| 45 | -0.04 | -0.09% | -0.08 | -25.92% | 0.02 | 0.61% | 0.00 | 3.51% |
| 46 | -0.09 | -0.93% | -0.14 | -34.55% | 0.02 | 3.60% | -0.01 | 4.46% |
| 47 | -84.02 | -0.55% | -185.99 | -11.24% | 73.50 | | -0.33 | 0.18% |
| 48 | -87.74 | -1.87% | -143.27 | -17.80% | 40.46 | 14.73% | -5.64 | 3.94% |
| 49 | -41.15 | -2.40% | -76.43 | -15.21% | 31.40 | 54.37% | -1.33 | 1.74% |
| 50 | -0.02 | -0.05% | -0.05 | -21.71% | 0.02 | 0.51% | 0.00 | 3.24% |
| 51 | -1.46 | -0.05% | -3.55 | -21.38% | 1.04 | 0.19% | -0.26 | 7.27% |
| 52 | -14.09 | -0.30% | -26.29 | -29.31% | 5.05 | 3.84% | -0.25 | 0.97% |
| 53 | -0.02 | -0.05% | -0.05 | -22.73% | 0.02 | 0.38% | 0.00 | 3.82% |
| 54 | -11.05 | -0.37% | -23.48 | -17.82% | 8.09 | 5.71% | -0.62 | 2.64% |
| 55 | -17.12 | -0.84% | -27.72 | -22.38% | 6.37 | 6.27% | -1.12 | 4.04% |
| 56 | -16.31 | -1.26% | -28.77 | -15.94% | 7.24 | 7.48% | -1.20 | 4.19% |
| 57 | -17.25 | -13.25% | -17.74 | -85.31% | -1.49 | -11.15% | -1.64 | 9.26% |
| 58 | -1.88 | -0.36% | -4.42 | -20.81% | 1.42 | 3.78% | -0.16 | 3.70% |
| 59 | -9.79 | -0.56% | -21.68 | -18.17% | 7.21 | 5.77% | -0.84 | 3.88% |
| 60 | -0.53 | -0.04% | -1.44 | -21.74% | 0.42 | 0.49% | -0.03 | 2.37% |
| 61 | -1.47 | -0.05% | -2.60 | -27.95% | 0.35 | 0.16% | -0.14 | 5.46% |
| 62 | -4.42 | -0.12% | -6.58 | -36.98% | 0.30 | 0.07% | -0.53 | 8.00% |
| 63 | -5.70 | -1.36% | -8.35 | -26.33% | 0.87 | 1.93% | -0.69 | 8.31% |
| 64 | -12.62 | -0.35% | -20.88 | -20.48% | 5.46 | 2.80% | -1.44 | 6.88% |
| 65 | -0.33 | -0.42% | -0.76 | -16.70% | 0.22 | 2.35% | -0.04 | 5.59% |
| 66 | -0.05 | -0.44% | -0.07 | -33.95% | 0.00 | 0.22% | -0.01 | 8.24% |
| 67 | -1.20 | -0.55% | -1.72 | -17.71% | 0.23 | 0.57% | -0.21 | 12.01% |
| 68 | -17.12 | -1.03% | -37.87 | -14.82% | 14.13 | 7.26% | -2.16 | 5.69% |
| 69 | -13.19 | -1.48% | -21.44 | -17.14% | 4.59 | 6.43% | -1.00 | 4.68% |
| 70 | -86.26 | -1.19% | -139.80 | -16.02% | 26.61 | 3.66% | -10.20 | 7.30% |
| 71 | -698.26 | -1.07% | -1,397.15 | -26.33% | 378.77 | 56.79% | -11.44 | 0.82% |
| 72 | -27.36 | -0.18% | -57.40 | -18.77% | 16.91 | 2.69% | -1.63 | 2.85% |
| 73 | -103.69 | -1.04% | -204.24 | -17.41% | 59.32 | 7.39% | -8.29 | 4.06% |
| 74 | -25.81 | -0.08% | -58.65 | -22.18% | 16.88 | 4.30% | -1.27 | 2.16% |
| 75 | -19.10 | -0.43% | -32.12 | -10.64% | 16.95 | 13.16% | -1.39 | 4.32% |
| 76 | -34.68 | -0.92% | -67.25 | -18.32% | 19.35 | 7.93% | -2.58 | 3.84% |

Table 10 (continued)

| HS2 | Change of Total Import | | Change of Import from the US | | Tariff Revenue Effect | | Welfare Effect | Welfare Effect/Import Effect* |
|-------|------------------------|--------|------------------------------|---------|-----------------------|--------|----------------|-------------------------------|
| 78 | -0.09 | -0.12% | -0.24 | -8.90% | 0.13 | 6.66% | 0.00 | 2.08% |
| 79 | -0.89 | -0.04% | -1.91 | -9.46% | 1.05 | 2.25% | -0.06 | 3.01% |
| 80 | -0.92 | -0.44% | -1.39 | -40.53% | 0.13 | 1.40% | -0.05 | 3.82% |
| 81 | -44.97 | -1.51% | -63.33 | -22.74% | 16.44 | 27.11% | -3.70 | 5.85% |
| 82 | -25.52 | -0.70% | -52.19 | -19.18% | 15.17 | 5.58% | -2.08 | 3.98% |
| 83 | -18.04 | -1.00% | -30.96 | -18.22% | 7.12 | 3.84% | -1.90 | 6.15% |
| 84 | -968.89 | -0.70% | -2,032.01 | -20.87% | 608.19 | 11.76% | -54.32 | 2.67% |
| 85 | -821.57 | -0.42% | -1,717.65 | -23.96% | 482.58 | 10.59% | -26.46 | 1.54% |
| 86 | -9.87 | -1.34% | -13.30 | -35.14% | 1.43 | 6.12% | -0.36 | 2.74% |
| 87 | -13.09 | -0.61% | -24.71 | -11.90% | 7.90 | 4.21% | -1.20 | 4.86% |
| 88 | -11.01 | -1.44% | -19.43 | -8.50% | 10.06 | 57.29% | -0.46 | 2.37% |
| 89 | -7.15 | -0.85% | -8.71 | -33.11% | 0.55 | 1.03% | -0.52 | 6.03% |
| 90 | -519.68 | -0.57% | -1,179.58 | -11.95% | 498.63 | 11.20% | -20.14 | 1.71% |
| 91 | -0.41 | -0.02% | -0.69 | -25.23% | 0.10 | 0.05% | -0.05 | 7.04% |
| 92 | -3.69 | -0.91% | -5.37 | -22.34% | 0.57 | 1.13% | -0.39 | 7.29% |
| 93 | -0.16 | -3.65% | -0.22 | -15.97% | 0.04 | 6.62% | -0.01 | 6.58% |
| 94 | -28.04 | -0.77% | -53.88 | -20.13% | 14.59 | 10.79% | -0.92 | 1.70% |
| 95 | -10.48 | -0.52% | -20.20 | -11.86% | 6.63 | 6.96% | -1.02 | 5.04% |
| 96 | -9.68 | -0.37% | -16.10 | -16.97% | 3.58 | 1.11% | -1.50 | 9.31% |
| 97 | -0.72 | -0.94% | -1.59 | -14.89% | 0.59 | 11.85% | -0.05 | 2.85% |
| Total | -5,977.86 | | -11,662.30 | | 3,597.56 | | -295.98 | 2.54% |

Note: *In this table, import effect refers to change of import from the US

Table 11 Import diversion of U.S. imports from China (top 3 markets by sector, in millions of dollars)

| HS2 | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import |
|----------------|-------------|--------------|------------------|-------------|--------------|------------------|---------------|--------------|------------------|
| Product List 1 | | | | | | | | | |
| 28 | Russia | 0.00 | 0.11 | Georgia | 0.00 | 0.07 | Netherlands | 0.00 | 0.04 |
| 40 | UK | 0.00 | 0.01 | Thailand | 0.00 | 0.01 | France | 0.00 | 0.01 |
| 84 | Japan | 0.73 | 1,089.65 | Mexico | 0.00 | 988.74 | Germany | 0.64 | 743.75 |
| 85 | Mexico | 0.00 | 1,525.01 | Japan | 0.82 | 755.52 | Taiwan, China | 0.52 | 474.76 |
| 86 | Japan | 1.68 | 25.48 | Canada | 0.00 | 22.79 | Mexico | 0.00 | 22.36 |
| 87 | Mexico | 0.00 | 35.81 | Germany | 2.09 | 22.98 | Japan | 2.17 | 14.66 |
| 88 | Japan | 0.00 | 55.84 | Canada | 0.00 | 23.08 | UK | 0.00 | 13.25 |
| 89 | Mexico | 0.00 | 0.02 | Canada | 0.00 | 0.02 | Vietnam | 0.00 | 0.0042 |
| 90 | Mexico | 0.00 | 312.49 | Germany | 0.40 | 244.45 | Japan | 0.49 | 216.88 |
| Product List 2 | | | | | | | | | |
| 27 | Russia | 6.40 | 37.34 | Canada | 0.00 | 22.48 | Algeria | 2.33 | 14.09 |
| 34 | Germany | 4.94 | 0.27 | Japan | 5.96 | 0.21 | Canada | 0.00 | 0.12 |
| 38 | Mexico | 0.00 | 0.38 | France | 6.50 | 0.31 | Canada | 0.00 | 0.20 |
| 39 | Canada | 0.00 | 136.09 | Germany | 2.74 | 68.72 | Japan | 3.09 | 55.39 |
| 70 | France | 3.00 | 1.86 | Germany | 3.00 | 0.76 | Japan | 3.00 | 0.71 |
| 73 | Canada | 0.00 | 80.28 | Mexico | 0.00 | 50.94 | Japan | 0.00 | 18.46 |
| 76 | Mexico | 0.00 | 1.05 | Canada | 0.00 | 0.44 | Bahrain | 0.00 | 0.17 |
| 84 | Japan | 0.18 | 476.61 | Malaysia | 0.00 | 197.34 | Mexico | 0.00 | 92.86 |
| 85 | Mexico | 0.00 | 672.02 | Malaysia | 0.08 | 509.43 | Japan | 1.17 | 281.01 |
| 86 | Japan | 1.03 | 6.07 | Canada | 0.00 | 5.39 | Mexico | 0.00 | 2.93 |
| 87 | Germany | 0.00 | 0.66 | Mexico | 0.00 | 0.21 | Japan | 0.03 | 0.11 |
| 90 | Mexico | 0.00 | 39.81 | Japan | 3.22 | 9.64 | Germany | 2.13 | 7.24 |
| Product List 3 | | | | | | | | | |
| 02 | New Zealand | 1.95 | 1.08 | Canada | 0.00 | 0.14 | Australia | 0.00 | 0.09 |
| 03 | Chile | 0.00 | 18.11 | Indonesia | 0.04 | 11.06 | Canada | 0.00 | 10.34 |
| 05 | Mexico | 0.00 | 3.56 | New Zealand | 0.81 | 2.58 | Brazil | 0.76 | 2.55 |
| 07 | Mexico | 0.00 | 5.33 | Canada | 0.00 | 1.83 | Germany | 8.38 | 1.55 |
| 08 | Chile | 0.00 | 1.48 | Argentina | 0.80 | 1.20 | Mexico | 0.00 | 1.18 |
| 10 | Thailand | 11.00 | 0.70 | India | 10.86 | 0.27 | Pakistan | 0.00 | 0.03 |
| 11 | Belgium | 1.94 | 0.19 | Thailand | 1.05 | 0.17 | Germany | 3.09 | 0.15 |
| 12 | India | 0.86 | 3.65 | Netherlands | 0.02 | 2.25 | Canada | 0.00 | 2.25 |
| 14 | Mexico | 0.00 | 0.82 | France | 0.01 | 0.38 | Argentina | 0.00 | 0.30 |
| 15 | Norway | 0.31 | 0.50 | Peru | 0.00 | 0.29 | Japan | 1.92 | 0.17 |
| 16 | Thailand | 6.45 | 18.54 | Indonesia | 3.79 | 12.17 | Vietnam | 4.31 | 12.00 |
| 17 | Mexico | 2.19 | 5.92 | Canada | 1.48 | 4.84 | Germany | 8.35 | 1.43 |
| 19 | Canada | 0.06 | 7.35 | Italy | 3.21 | 5.87 | Mexico | 0.21 | 2.25 |
| 20 | Mexico | 1.26 | 19.89 | Peru | 0.03 | 8.28 | Canada | 1.68 | 7.33 |

Table 11 (continued)

| HS2 | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import |
|-----|------------------|--------------|------------------|-------------|--------------|------------------|------------------|--------------|------------------|
| 21 | Canada | 0.00 | 3.61 | Mexico | 1.00 | 1.85 | Italy | 4.83 | 1.54 |
| 22 | Mexico | 0.00 | 0.80 | Netherlands | 0.00 | 0.20 | Belgium | 0.00 | 0.08 |
| 23 | Canada | 0.00 | 9.52 | Thailand | 0.08 | 7.33 | France | 3.25 | 1.13 |
| 24 | Brazil | 78.65 | 0.06 | Malawi | 46.58 | 0.01 | Guatemala | 9.19 | 0.01 |
| 25 | Canada | 0.00 | 9.37 | Greece | 0.00 | 3.41 | Turkey | 0.00 | 2.42 |
| 26 | Japan | 0.00 | 0.64 | Canada | 0.00 | 0.56 | Turkey | 0.00 | 0.25 |
| 27 | Canada | 0.00 | 1.58 | Argentina | 0.00 | 0.61 | Brazil | 0.00 | 0.48 |
| 28 | Germany | 1.93 | 17.99 | Mexico | 0.00 | 8.14 | Japan | 1.74 | 7.32 |
| 29 | Germany | 3.82 | 59.35 | India | 3.82 | 59.23 | Japan | 3.08 | 47.97 |
| 31 | Morocco | 0.00 | 4.33 | Canada | 0.00 | 4.22 | Russia | 0.00 | 3.19 |
| 32 | Canada | 0.00 | 10.33 | Germany | 3.66 | 10.07 | India | 3.87 | 7.35 |
| 33 | Canada | 0.00 | 31.07 | France | 0.09 | 28.18 | Italy | 0.12 | 21.78 |
| 34 | Canada | 0.00 | 9.75 | Mexico | 0.00 | 6.67 | Germany | 2.43 | 2.09 |
| 35 | Denmark | 0.03 | 4.49 | Germany | 1.31 | 2.60 | Japan | 0.38 | 2.28 |
| 36 | UK | 0.00 | 0.18 | Korea, Rep. | 0.00 | 0.17 | Turkey | 0.00 | 0.06 |
| 37 | Japan | 1.98 | 3.48 | Belgium | 2.87 | 0.38 | Korea, Rep. | 0.00 | 0.38 |
| 38 | Japan | 0.54 | 14.32 | Germany | 2.71 | 9.72 | India | 3.43 | 8.64 |
| 39 | Canada | 0.00 | 171.71 | Mexico | 0.00 | 118.91 | Korea, Rep. | 1.19 | 48.74 |
| 40 | Canada | 0.00 | 47.77 | Thailand | 3.07 | 38.87 | Mexico | 0.00 | 37.44 |
| 41 | Italy | 2.48 | 0.13 | Mexico | 0.00 | 0.06 | Turkey | 2.60 | 0.04 |
| 42 | Vietnam | 9.40 | 90.30 | Italy | 7.07 | 59.96 | France | 8.05 | 45.41 |
| 43 | Italy | 3.28 | 2.18 | Turkey | 3.89 | 0.76 | Argentina | 1.09 | 0.56 |
| 44 | Canada | 0.00 | 32.66 | Brazil | 1.83 | 23.85 | Chile | 0.00 | 20.15 |
| 45 | Portugal | 0.02 | 1.17 | Spain | 0.04 | 0.32 | Italy | 0.16 | 0.05 |
| 46 | Vietnam | 3.96 | 5.94 | India | 3.10 | 3.77 | Philippines | 2.04 | 2.89 |
| 47 | Canada | 0.00 | 0.07 | Germany | 0.00 | 0.01 | Thailand | 0.00 | 0.01 |
| 48 | Canada | 0.00 | 83.50 | Mexico | 0.00 | 36.21 | Germany | 0.00 | 13.94 |
| 50 | Italy | 0.59 | 0.76 | Korea, Rep. | 0.00 | 0.74 | India | 0.30 | 0.48 |
| 51 | Italy | 15.07 | 0.74 | Peru | 0.00 | 0.27 | Canada | 0.00 | 0.27 |
| 52 | Korea, Rep. | 0.00 | 3.89 | Pakistan | 7.40 | 3.59 | Japan | 7.89 | 1.88 |
| 53 | India | 0.42 | 0.84 | Belgium | 0.87 | 0.72 | Italy | 1.88 | 0.58 |
| 54 | Korea, Rep. | 1.71 | 8.70 | India | 3.65 | 4.78 | Mexico | 0.00 | 4.26 |
| 55 | Korea, Rep. | 0.00 | 7.60 | India | 6.58 | 3.51 | Taiwan, China | 5.88 | 2.25 |
| 56 | Mexico | 0.00 | 5.94 | Germany | 0.68 | 5.50 | Japan | 0.48 | 5.30 |
| 57 | India | 2.63 | 23.30 | Turkey | 0.38 | 6.35 | Canada | 0.00 | 4.68 |
| 58 | Taiwan, China | 5.70 | 5.95 | Mexico | 0.00 | 1.72 | Korea, Rep. | 0.01 | 1.36 |
| 59 | Canada | 0.00 | 10.43 | Mexico | 0.00 | 7.57 | Korea, Rep. | 0.73 | 5.21 |
| 60 | Korea, Rep. | 3.02 | 6.69 | Canada | 0.00 | 2.50 | Taiwan, China | 11.17 | 2.21 |
| 65 | Vietnam | 5.55 | 19.11 | Bangladesh | 5.57 | 17.37 | Mexico | 0.00 | 10.06 |

Table 11 (continued)

| HS2 | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import |
|-----|---------------|--------------|------------------|---------------|--------------|------------------|---------------|--------------|------------------|
| 67 | South Africa | 0.00 | 0.17 | France | 4.00 | 0.07 | Canada | 0.00 | 0.04 |
| 68 | Canada | 0.00 | 22.17 | Italy | 2.91 | 16.76 | Spain | 0.95 | 15.78 |
| 69 | Japan | 2.24 | 5.33 | Mexico | 0.00 | 3.94 | Germany | 1.05 | 3.44 |
| 70 | Mexico | 0.00 | 50.18 | Canada | 0.00 | 20.09 | Germany | 2.48 | 17.75 |
| 71 | Mexico | 0.00 | 3.34 | Canada | 0.00 | 2.33 | Germany | 0.11 | 2.19 |
| 72 | Canada | 0.00 | 1.89 | Russia | 0.43 | 1.53 | Norway | 1.96 | 1.08 |
| 73 | Mexico | 0.07 | 132.05 | Taiwan, China | 3.89 | 76.84 | Canada | 0.00 | 74.90 |
| 74 | Taiwan, China | 2.51 | 7.32 | Germany | 2.29 | 6.66 | Mexico | 0.00 | 6.08 |
| 75 | Canada | 0.00 | 1.19 | UK | 1.37 | 1.08 | France | 2.36 | 0.79 |
| 76 | Mexico | 0.39 | 18.60 | Canada | 0.00 | 11.64 | Taiwan, China | 1.53 | 5.98 |
| 78 | Canada | 0.00 | 0.33 | Germany | 2.25 | 0.05 | Venezuela | 2.00 | 0.04 |
| 79 | Taiwan, China | 3.00 | 2.65 | Canada | 0.00 | 1.41 | India | 3.00 | 1.39 |
| 80 | Japan | 2.17 | 0.34 | Germany | 2.17 | 0.24 | Italy | 2.17 | 0.14 |
| 81 | Russia | 9.20 | 2.87 | Japan | 10.06 | 1.74 | France | 4.58 | 1.58 |
| 82 | Taiwan, China | 4.99 | 43.42 | Germany | 3.62 | 28.43 | Japan | 3.38 | 24.09 |
| 83 | Mexico | 0.00 | 56.85 | Canada | 0.00 | 37.81 | Taiwan, China | 2.37 | 36.45 |
| 84 | Mexico | 0.00 | 983.11 | Korea, Rep. | 0.10 | 376.70 | Japan | 1.23 | 347.52 |
| 85 | Mexico | 0.01 | 1,257.97 | Japan | 1.26 | 330.03 | Taiwan, China | 0.86 | 225.75 |
| 87 | Mexico | 0.00 | 479.89 | Canada | 0.00 | 192.86 | Japan | 0.91 | 118.08 |
| 88 | UK | 3.00 | 0.0046 | Canada | 0.00 | 0.0038 | Mexico | 0.00 | 0.0032 |
| 89 | Italy | 1.00 | 2.49 | Mexico | 0.00 | 2.28 | UK | 0.99 | 1.71 |
| 90 | Mexico | 0.00 | 51.62 | Japan | 1.21 | 43.35 | Germany | 1.05 | 28.35 |
| 91 | Mexico | 0.00 | 0.34 | Indonesia | 3.00 | 0.27 | Canada | 0.00 | 0.23 |
| 94 | Mexico | 0.00 | 461.94 | Vietnam | 0.02 | 275.07 | Canada | 0.00 | 272.71 |
| 96 | Japan | 5.50 | 0.28 | Italy | 3.33 | 0.26 | Mexico | 0.00 | 0.18 |

Note: Sectors that have zero trade diversion are not included in the table

Table 12 Import diversion of Chinese imports from the U.S. (top 3 markets by sector, in million dollars)

| HS2 | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import |
|-----------------------|----------------------|--------------|------------------|---------------|--------------|------------------|---------------|--------------|------------------|
| Product List 1 | | | | | | | | | |
| 02 | Germany | 12.31 | 55.85 | Denmark | 12.16 | 48.70 | Canada | 12.23 | 33.86 |
| 03 | Russia | 10.06 | 71.73 | Norway | 10.55 | 11.65 | Canada | 8.73 | 11.63 |
| 04 | New Zealand | 1.96 | 13.66 | France | 11.36 | 12.64 | Netherlands | 8.94 | 5.68 |
| 05 | New Zealand | 0.00 | 3.83 | Denmark | 19.14 | 3.24 | Netherlands | 19.14 | 3.13 |
| 07 | Canada | 2.51 | 7.53 | UK | 2.50 | 0.18 | France | 2.56 | 0.10 |
| 08 | Chile | 0.00 | 43.71 | Australia | 8.22 | 11.88 | South Africa | 11.69 | 11.55 |
| 10 | Australia | 21.76 | 70.34 | Canada | 33.00 | 20.94 | Ukraine | 33.00 | 3.28 |
| 11 | Thailand | 15.60 | 0.01 | Russia | 20.60 | 0.00 | Austria | 20.60 | 0.00 |
| 12 | Brazil | 3.00 | 2,093.07 | Argentina | 3.00 | 505.05 | Uruguay | 3.00 | 110.20 |
| 14 | India | 4.00 | 0.49 | Uzbekistan | 4.00 | 0.38 | Turkmenistan | 4.00 | 0.29 |
| 16 | Canada | 5.01 | 0.24 | Korea, Rep. | 8.71 | 0.10 | Russia | 5.32 | 0.08 |
| 20 | Chile | 0.00 | 1.11 | Canada | 16.43 | 0.12 | Taiwan, China | 14.31 | 0.10 |
| 22 | Korea, Rep. | 23.98 | 1.41 | Brazil | 30.00 | 0.77 | South Africa | 29.32 | 0.46 |
| 24 | United Arab Emirates | 28.18 | 0.00 | India | 31.16 | 0.00 | Denmark | 39.88 | 0.00 |
| 52 | Australia | 13.67 | 40.15 | India | 13.67 | 20.50 | Uzbekistan | 13.67 | 16.73 |
| 87 | Germany | 21.80 | 1,009.46 | Japan | 19.38 | 619.63 | UK | 24.99 | 401.84 |
| Product List 2 | | | | | | | | | |
| 23 | Peru | 0.30 | 29.17 | Vietnam | 0.00 | 6.94 | Russia | 3.50 | 4.35 |
| 27 | United Arab Emirates | 6.39 | 167.07 | Qatar | 6.00 | 59.41 | Saudi Arabia | 6.52 | 41.57 |
| 29 | Korea, Rep. | 2.16 | 82.98 | Taiwan, China | 3.25 | 36.26 | Saudi Arabia | 4.79 | 34.56 |
| 34 | Japan | 9.37 | 29.54 | Germany | 9.16 | 21.15 | France | 9.71 | 19.42 |
| 39 | Saudi Arabia | 6.50 | 37.76 | Korea, Rep. | 6.13 | 36.36 | Thailand | 1.40 | 32.36 |

Table 12 (continued)

| HS2 | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import |
|----------------|------------------|--------------|------------------|--------------|--------------|------------------|-------------|--------------|------------------|
| 40 | Singapore | 0.00 | 9.67 | Belgium | 7.50 | 7.09 | Japan | 7.50 | 6.21 |
| 44 | Malaysia | 0.00 | 0.0006 | Vietnam | 0.00 | 0.0001 | Indonesia | 0.00 | 0.00004 |
| 45 | Portugal | 0.00 | 0.01 | Algeria | 0.00 | 0.0048 | Italy | 0.00 | 0.0035 |
| 47 | UK | 0.00 | 102.42 | Japan | 0.00 | 81.47 | Canada | 0.00 | 44.83 |
| 51 | Argentina | 14.25 | 0.03 | India | 14.25 | 0.03 | Uruguay | 14.25 | 0.03 |
| 52 | Turkey | 10.00 | 0.04 | Vietnam | 0.00 | 0.04 | India | 10.00 | 0.03 |
| 55 | Taiwan, China | 5.00 | 0.13 | Japan | 5.00 | 0.13 | Thailand | 0.00 | 0.02 |
| 70 | Japan | 9.00 | 9.41 | Germany | 9.00 | 1.92 | India | 9.00 | 1.05 |
| 71 | Germany | 4.00 | 0.0003 | | | | | | |
| 72 | Japan | 0.00 | 3.25 | Korea, Rep. | 0.01 | 0.43 | Malaysia | 0.00 | 0.17 |
| 73 | Japan | 9.67 | 13.04 | Germany | 9.67 | 12.89 | Korea, Rep. | 7.20 | 7.50 |
| 74 | Hong Kong, China | 0.00 | 64.14 | Australia | 0.00 | 50.38 | Japan | 1.50 | 27.60 |
| 75 | Germany | 1.50 | 0.02 | | | | | | |
| 76 | Hong Kong, China | 0.00 | 44.65 | Australia | 0.00 | 38.78 | Malaysia | 0.00 | 38.32 |
| 79 | Netherlands | 1.50 | 0.48 | Spain | 1.50 | 0.29 | Italy | 1.50 | 0.19 |
| 81 | Japan | 8.23 | 1.03 | Germany | 7.96 | 0.93 | Brazil | 3.00 | 0.80 |
| 85 | Japan | 0.00 | 53.22 | Unspecified | 0.00 | 51.98 | Korea, Rep. | 0.00 | 19.92 |
| 87 | Germany | 24.85 | 940.40 | Japan | 24.83 | 540.14 | UK | 24.99 | 401.97 |
| 89 | Japan | 3.00 | 0.88 | Korea, Rep. | 2.60 | 0.25 | Unspecified | 3.00 | 0.10 |
| 90 | Germany | 4.20 | 140.40 | Japan | 4.42 | 77.58 | Netherlands | 4.11 | 34.69 |
| Product List 3 | | | | | | | | | |
| 01 | Denmark | 5.21 | 0.09 | South Africa | 5.00 | 0.05 | Zimbabwe | 5.00 | 0.03 |
| 02 | New Zealand | 0.00 | 0.0006 | Australia | 10.00 | 0.0005 | Mongolia | 25.00 | 0.0004 |
| 03 | Netherlands | 14.00 | 0.0001 | UK | 14.00 | 0.0004 | Norway | 14.00 | 0.00004 |

Table 12 (continued)

| HS2 | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import |
|-----|-------------|--------------|------------------|-------------|--------------|------------------|---------------|--------------|------------------|
| 04 | New Zealand | 0.00 | 0.15 | Australia | 6.48 | 0.02 | Indonesia | 0.00 | 0.02 |
| 05 | New Zealand | 0.00 | 1.56 | Germany | 18.54 | 1.40 | Netherlands | 19.14 | 1.16 |
| 06 | Japan | 6.70 | 0.27 | Netherlands | 7.59 | 0.10 | Taiwan, China | 6.64 | 0.02 |
| 07 | Thailand | 0.00 | 0.02 | UK | 13.00 | 0.01 | Vietnam | 0.00 | 0.00 |
| 08 | Thailand | 0.00 | 0.17 | Chile | 0.00 | 0.08 | Morocco | 30.00 | 0.08 |
| 09 | Italy | 15.07 | 0.05 | Japan | 15.19 | 0.03 | Taiwan, China | 5.57 | 0.02 |
| 11 | Netherlands | 15.02 | 0.32 | Germany | 16.02 | 0.10 | Canada | 22.93 | 0.06 |
| 12 | Senegal | 0.00 | 1.16 | Canada | 15.28 | 0.41 | Kazakhstan | 7.27 | 0.40 |
| 13 | France | 16.75 | 0.28 | Indonesia | 0.00 | 0.26 | India | 11.04 | 0.26 |
| 14 | Malaysia | 0.00 | 0.04 | India | 11.43 | 0.02 | Peru | 0.57 | 0.01 |
| 15 | Brazil | 11.20 | 5.35 | Indonesia | 0.00 | 2.03 | Russia | 9.03 | 1.76 |
| 16 | Spain | 15.00 | 0.0028 | Italy | 14.94 | 0.0007 | Poland | 15.00 | 0.0007 |
| 17 | Germany | 10.31 | 0.53 | Malaysia | 1.06 | 0.28 | Thailand | 27.28 | 0.27 |
| 18 | Italy | 8.32 | 0.91 | Belgium | 9.44 | 0.40 | Russia | 8.07 | 0.28 |
| 19 | Netherlands | 14.82 | 2.90 | New Zealand | 0.00 | 1.74 | Ireland | 14.75 | 1.61 |
| 20 | Turkey | 12.93 | 1.84 | Korea, Rep. | 13.23 | 1.63 | Thailand | 1.36 | 1.54 |
| 21 | Australia | 6.72 | 10.79 | Germany | 17.53 | 4.61 | Thailand | 0.71 | 3.85 |
| 22 | France | 12.26 | 4.73 | Australia | 5.74 | 2.71 | Chile | 0.00 | 1.06 |
| 23 | Peru | 0.00 | 13.37 | Vietnam | 0.00 | 2.69 | Uruguay | 3.50 | 1.14 |
| 25 | India | 2.03 | 4.70 | Japan | 3.13 | 2.79 | Australia | 0.00 | 2.34 |
| 26 | Peru | 0.00 | 41.15 | Chile | 0.00 | 31.25 | Australia | 0.00 | 15.54 |
| 27 | Australia | 0.00 | 40.01 | Qatar | 0.00 | 21.71 | Malaysia | 0.00 | 9.49 |
| 28 | Korea, Rep. | 2.80 | 15.05 | Germany | 4.54 | 11.44 | Japan | 5.46 | 7.36 |
| 29 | Japan | 3.83 | 35.29 | Korea, Rep. | 2.44 | 32.70 | Taiwan, China | 1.54 | 16.50 |

Table 12 (continued)

| HS2 | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import |
|-----|-------------|--------------|------------------|----------------|--------------|------------------|---------------|--------------|------------------|
| 30 | Germany | 3.66 | 1.87 | Japan | 5.11 | 1.63 | Switzerland | 1.11 | 1.01 |
| 31 | UK | 8.94 | 0.39 | Russia | 8.48 | 0.34 | Norway | 26.87 | 0.27 |
| 32 | Japan | 8.13 | 14.50 | Germany | 8.36 | 8.07 | Korea, Rep. | 4.47 | 6.52 |
| 33 | Korea, Rep. | 5.98 | 23.52 | France | 7.82 | 23.50 | Japan | 7.38 | 21.94 |
| 34 | Japan | 9.70 | 8.67 | Germany | 9.55 | 6.66 | Korea, Rep. | 6.07 | 3.05 |
| 35 | Japan | 9.53 | 8.33 | Germany | 9.82 | 3.80 | Korea, Rep. | 6.62 | 3.01 |
| 36 | Thailand | 0.00 | 0.61 | Czech Republic | 9.00 | 0.47 | Germany | 8.98 | 0.42 |
| 37 | Japan | 8.28 | 16.21 | Belgium | 4.83 | 5.07 | Taiwan, China | 7.51 | 0.98 |
| 38 | Japan | 3.63 | 12.36 | Singapore | 0.00 | 11.00 | Germany | 5.86 | 7.82 |
| 39 | Japan | 7.26 | 96.94 | Korea, Rep. | 5.19 | 61.98 | Taiwan, China | 4.03 | 60.76 |
| 40 | Japan | 8.56 | 20.81 | Korea, Rep. | 6.04 | 13.08 | Germany | 9.62 | 11.07 |
| 41 | Australia | 3.10 | 11.68 | Brazil | 6.08 | 6.24 | Canada | 6.14 | 5.61 |
| 42 | Italy | 10.45 | 0.43 | France | 10.71 | 0.26 | Korea, Rep. | 9.10 | 0.16 |
| 43 | Denmark | 14.84 | 2.82 | Canada | 15.27 | 0.79 | Finland | 14.86 | 0.71 |
| 44 | Russia | 0.52 | 30.01 | Lao PDR | 0.00 | 10.29 | France | 0.92 | 9.34 |
| 45 | Portugal | 8.19 | 0.02 | Algeria | 3.02 | 0.01 | Italy | 7.89 | 0.00 |
| 46 | Korea, Rep. | 4.94 | 0.02 | Taiwan, China | 9.00 | 0.01 | France | 9.00 | 0.01 |
| 47 | Canada | 0.00 | 27.57 | Chile | 0.00 | 15.08 | Brazil | 0.00 | 12.21 |
| 48 | Japan | 6.65 | 10.05 | Germany | 6.64 | 5.86 | Taiwan, China | 6.12 | 4.93 |
| 49 | Singapore | 4.99 | 8.56 | Ireland | 4.60 | 5.91 | UK | 0.61 | 4.49 |
| 50 | Italy | 10.00 | 0.01 | Korea, Rep. | 4.52 | 0.01 | Japan | 10.00 | 0.00 |
| 51 | Australia | 19.50 | 1.44 | South Africa | 19.50 | 0.15 | Italy | 9.24 | 0.15 |
| 52 | Vietnam | 0.05 | 4.92 | Pakistan | 3.07 | 3.00 | India | 3.61 | 1.52 |
| 53 | Italy | 10.00 | 0.01 | Japan | 10.00 | 0.0045 | Belgium | 10.00 | 0.0042 |

Table 12 (continued)

| HS2 | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import |
|-----|---------------|--------------|------------------|------------------|--------------|------------------|---------------|--------------|------------------|
| 54 | Taiwan, China | 2.01 | 2.25 | Korea, Rep. | 6.19 | 1.99 | Japan | 8.26 | 1.78 |
| 55 | Austria | 5.01 | 3.33 | Korea, Rep. | 4.68 | 1.34 | UK | 5.25 | 1.01 |
| 56 | Japan | 9.57 | 4.15 | Taiwan, China | 3.00 | 1.76 | Korea, Rep. | 5.13 | 1.22 |
| 57 | India | 12.97 | 0.12 | Taiwan, China | 12.26 | 0.04 | Japan | 10.45 | 0.03 |
| 58 | Japan | 10.07 | 0.76 | Taiwan, China | 2.58 | 0.37 | Korea, Rep. | 4.77 | 0.32 |
| 59 | Korea, Rep. | 6.46 | 2.35 | Japan | 9.05 | 2.14 | Germany | 9.20 | 1.67 |
| 60 | Taiwan, China | 2.77 | 0.26 | Korea, Rep. | 7.19 | 0.18 | Japan | 10.16 | 0.17 |
| 61 | Vietnam | 0.00 | 0.20 | Italy | 14.98 | 0.12 | Bangladesh | 0.03 | 0.09 |
| 62 | Italy | 15.96 | 0.34 | Bangladesh | 0.86 | 0.22 | Vietnam | 0.00 | 0.21 |
| 63 | Japan | 14.27 | 0.35 | Korea, Rep. | 10.54 | 0.31 | Vietnam | 0.00 | 0.20 |
| 64 | Vietnam | 0.00 | 3.02 | Korea, Rep. | 11.46 | 0.80 | Taiwan, China | 7.58 | 0.56 |
| 65 | Vietnam | 0.00 | 0.05 | Italy | 15.55 | 0.05 | Japan | 12.84 | 0.04 |
| 66 | Taiwan, China | 10.37 | 0.0033 | Germany | 12.08 | 0.0016 | Italy | 10.79 | 0.0014 |
| 67 | India | 17.96 | 0.13 | Korea, Dem. Rep. | 24.02 | 0.06 | Japan | 20.01 | 0.04 |
| 68 | Japan | 12.68 | 9.13 | Korea, Rep. | 10.54 | 3.04 | Germany | 11.00 | 1.81 |
| 69 | Japan | 10.56 | 2.41 | Germany | 9.54 | 1.00 | Korea, Rep. | 4.10 | 0.91 |
| 70 | Korea, Rep. | 11.42 | 15.76 | Japan | 13.84 | 12.98 | Taiwan, China | 4.03 | 7.02 |
| 71 | Switzerland | 0.06 | 336.60 | Australia | 0.01 | 122.22 | South Africa | 2.55 | 83.02 |
| 72 | Japan | 5.72 | 9.26 | Germany | 4.86 | 4.58 | Korea, Rep. | 4.55 | 4.09 |
| 73 | Japan | 8.47 | 26.42 | Germany | 8.36 | 24.68 | Korea, Rep. | 5.71 | 10.94 |
| 74 | Japan | 4.10 | 8.69 | Taiwan, China | 0.38 | 7.92 | Korea, Rep. | 1.30 | 4.10 |
| 75 | Germany | 5.93 | 2.60 | Austria | 5.38 | 1.88 | Japan | 3.88 | 1.63 |
| 76 | Japan | 6.59 | 9.77 | Korea, Rep. | 4.75 | 5.26 | Taiwan, China | 5.69 | 4.67 |
| 78 | Germany | 5.33 | 0.06 | Japan | 5.84 | 0.04 | Korea, Rep. | 1.29 | 0.01 |

Table 12 (continued)

| HS2 | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import | Market | Ave. Tariff% | Change of import |
|-----|---------------|--------------|------------------|-------------|--------------|------------------|----------------|--------------|------------------|
| 79 | Korea, Rep. | 0.25 | 0.18 | Switzerland | 3.48 | 0.15 | Germany | 5.47 | 0.14 |
| 80 | Japan | 7.50 | 0.14 | Korea, Rep. | 4.21 | 0.08 | Taiwan, China | 6.74 | 0.05 |
| 81 | Japan | 6.83 | 6.29 | France | 7.58 | 1.92 | Russia | 5.73 | 1.87 |
| 82 | Japan | 8.35 | 7.98 | Germany | 8.72 | 5.64 | Korea, Rep. | 6.21 | 2.99 |
| 83 | Japan | 10.44 | 2.19 | Germany | 11.04 | 2.09 | Korea, Rep. | 8.43 | 1.70 |
| 84 | Japan | 5.47 | 250.76 | Germany | 6.47 | 216.41 | Korea, Rep. | 2.32 | 105.57 |
| 85 | Japan | 3.35 | 146.83 | Germany | 5.61 | 98.01 | Korea, Rep. | 2.53 | 89.60 |
| 86 | Germany | 3.14 | 1.61 | Japan | 3.03 | 0.56 | Hungary | 3.01 | 0.42 |
| 87 | Germany | 9.22 | 4.32 | Japan | 9.16 | 1.92 | Korea, Rep. | 7.56 | 0.98 |
| 88 | France | 2.01 | 2.77 | Canada | 2.11 | 1.39 | Italy | 2.06 | 1.12 |
| 89 | Italy | 9.93 | 0.40 | Mexico | 10.19 | 0.20 | France | 9.54 | 0.16 |
| 90 | Germany | 3.74 | 137.08 | Japan | 5.73 | 136.60 | Korea, Rep. | 5.75 | 51.63 |
| 91 | Germany | 12.22 | 0.06 | Switzerland | 7.69 | 0.04 | Japan | 13.95 | 0.02 |
| 92 | Japan | 17.89 | 0.42 | Germany | 17.57 | 0.35 | Indonesia | 0.00 | 0.34 |
| 93 | Germany | 13.00 | 0.03 | Austria | 13.00 | 0.01 | Czech Republic | 13.00 | 0.00 |
| 94 | Italy | 1.51 | 4.38 | Germany | 3.85 | 3.80 | Japan | 6.97 | 2.09 |
| 95 | Taiwan, China | 2.06 | 2.44 | Italy | 13.09 | 0.79 | Japan | 5.86 | 0.77 |
| 96 | Japan | 11.83 | 2.29 | Germany | 18.94 | 0.78 | Korea, Rep. | 10.07 | 0.58 |
| 97 | Italy | 11.00 | 0.12 | UK | 8.53 | 0.11 | Germany | 2.77 | 0.08 |

Note: Sectors that have zero trade diversion are not included in the table

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