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Abstract

From 2018 through 2019, the United States and China imposed a series of wide-ranging increases in import tariffs which have dramatically raised trade barriers between the two largest economies in the world. With a focus on the import side, this paper provides evidence on the impact of the trade war on China's trade quantities and prices, and estimates related trade elasticities. Both Chinese import quantities and values dropped sharply following the tariffs and there is evidence for incomplete pass-through of Chinese import tariffs in the very short run. More importantly, this paper shows that while China's non-processing imports declined dramatically during the trade war, the processing imports almost remain unaffected. The results suggest that the Chinese special duty-free policy on processing trade may have served as a built-in mechanism to better protect domestic firms from the damage of the trade war through the global value chain channel.

Keywords: Trade war, Tariff, China, Processing trade, Global value chain

JEL classification: F10, F13, F14

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1. Introduction

From 2018 to 2019, the import tariffs enacted by the United States and the following retaliation by China have dramatically raised trade barriers between the two largest economies in the world. Recent studies have documented the effect of this trade war on the US economy (Amiti et al. 2019; Fajgelbaum et al. 2019). However, the story from China's perspective is yet to be told. During the trade war, China levied six rounds of retaliatory tariffs on over 5,000 products from the United States, with rates ranging between 10 to 50 percent. The products that were subject to the tariffs account for over 80 percent of China's total imports from the United States, in terms of trade value.

The economic consequences of these bilateral tariffs on Chinese trade flows and prices depend on the tariff incidence and elasticities. First, are the tariffs being passed on to consumers or being absorbed by the producers? Second, are domestic firms seeking alternative destination countries to export? Moreover, it is important to understand how trade policy plays out in a global value chain era, especially under China's context: near half of China's total trade volume are processing trade, in which China import parts from foreign countries, assembling or processing them into final products to be re-exported.

Using monthly Chinese customs data from 2017-2019, this paper offers a comprehensive picture of the impact of tariffs on China's trade quantities and prices. Starting with a focus on Chinese import side, I first show the direct impact of Chinese import tariffs on trade quantities and prices. Second, I estimate Chinese import demand and US export supply elasticity using tariff changes as instruments. Third, I embed the analysis into a global value chain context by focusing on the differences between Chinese processing import and ordinary imports. Finally, I look at the impact of US import tariffs on Chinese exports, with a focus on trade diversion effect.

I find a large decline in Chinese imports when the retaliatory tariffs were implemented. Looking at the month-to-month changes, a one percent increase in Chinese retaliatory tariff immediately leads to a 0.87 percent decrease in import quantities and a 1.38 percent decrease in import values of targeted products, respectively. The prices of targeted products received by US exporters (duty-exclusive unit values) decreased by 0.51 percent and the price paid by Chinese importers (duty-inclusive unit values) increased by 0.49 percent. These results imply incomplete tariff pass-through of Chinese import tariffs in the very short-run. The impact are much larger when I look at year-to-year changes. A one percent tariff increase results in a 3.94 percent decrease in target products' import quantities and a 3.08 percent decrease in values. Following the approach taken by Fajgelbaum et al. (2019), I use the tariff changes as instruments and estimate the Chinese import demand elasticity to be 1.76 in the short run and 2.11 in the relatively long-run.

Compared to the US trade regime, the most distinct feature of Chinese imports is that nearly half are processing imports which are used in export-oriented products. Two major processing trade regimes are called "processing-with-assembly" and "processing-with-inputs" with the latter one be the dominant component of Chinese processing imports since 2000. It is important to identify the processing imports because Chinese trade policy exempts such imported inputs from tariffs. Even during the trade war, these special tariff treatments on processing imports remain largely unchanged in practice. Therefore, despite the high retaliatory import tariffs enacted by the Chinese government, we would not expect to see processing imports getting a large direct impact. In the data, I directly observe each transaction's trade regime which allows me to separately analyze the effects on ordinary trade and processing trade. When estimated by trade regimes, I find that the impact of the tariffs are almost purely driven by ordinary imports while there is no statistically significant effect on processing imports. The results are likely to be driven by the special duty-free policy. These results highlight the importance to consider the institutional details in trade policy—especially the difference to the US.

On the Chinese export side, one potential consequence of US import tariffs that has occupied the forefront of the debate among politicians as well as economists is the trade diversion effect (Gonzalez and Veron 2019). Facing the US import tariffs, were Chinese exporters reorienting or even dumping their products towards other countries? If so, as politicians have claimed, the trade war between US and China may have caused collateral damage on domestic firms in EU and other countries. However, by examining the relationship between US import tariffs and Chinese exports to the rest of the world other than the US, I do not find any overall trade diversion effect. Although I observe trade diversion on some specific products such as aluminum by plotting the trends, product characteristics such as differentiation or the elasticity of substitution cannot explain the degree of trade diversion, leaving considerable unexplained heterogeneity across products.

A key challenge in getting unbiased estimates in this paper is to address the potential endogeneity of tariff changes. The analysis in my paper requires the trade war tariffs to be exogenous and uncorrelated with potential supply and demand shocks. Most rounds of tariffs from both China and US were announced and enacted in a very short time-period. Therefore, anticipation effect may not have enough time to play an important role. I also perform several robustness checks by testing pre-trend and by visualizing the trends before and after the tariffs were being implemented using an event-study framework. The results show that there is no significant pre-trend before the tariffs were implemented.

This paper first contributes to the on-going research on the impact of the 2018-2019 trade war. Amiti et al. (2019) look at the impact of the 2018 tariffs on US prices. They find that both US export and import quantities dropped significantly following the US import tariffs and other countries' retaliatory tariffs. Also, the US import tariffs have been almost entirely passed through into domestic prices, leaving exporter prices unchanged. Fajgelbaum et al. (2019) find similar results. They use the tariff changes as instruments to estimate the trade elasticities and show that the US import demand elasticity is around 2.5 and the elasticity of foreign demand for US products to be unitary. They further embed the estimated elasticities in a general-equilibrium model to find that the US aggregate real income loss from the trade war is 0.04 percent of GDP. Other research have examined the impact of trade war from the US perspective at a more micro-level. Cavallo et al. (2019) find complete tariff pass-through to border prices during the trade war. Flaaen et al. (2020) show that the US consumer price of washing machine increased significantly following the US import tariffs. While both the US and China are important countries in global trade, the roles they play are very different. For example, one major category of products that China imports from the US is agricultural products, which tend to have a relatively high elasticity of substitution. My results show that the quantity and value of agriculture products that China imported from US declined much more than other products as China may have shifted its sources to countries such as Brazil and Argentina. Such information will be important in terms of trade policy making and the negotiation of a trade deal between US and China. Also, while related literature have found complete pass-through of US import tariffs, I find incomplete pass-through of China's retaliatory tariffs, at least in the very short-run.

To the best of my knowledge, my paper is one of the first to look at the impact of the trade war from China's perspective. The only exception is the recent work by Benguria et al. (2020) who use pre-trade war custom data to measure firm-level exposure to the trade war and then study the impact of tariffs on Chinese listed firms. My paper further contributes by providing a comprehensive picture of the impact of the trade war on the universe of Chinese importers and exporters using up-to-date data.

The paper also contributes to the literature on trade policy in the global value chain era. Since the Reform and Open in 1978, processing trade experienced a rapid increase as a result of China's comparative advantage in low-skilled labor. In fact, the share of processing imports is larger than the share of ordinary imports from 1996 to 2007 (Yu and Zhu 2019). More importantly, processing imports enjoy a special duty-free tariff treatment even during the trade war. Therefore, it is very important to recognize the special role that processing trade plays when analyzing trade-related topic under China's context (Feenstra et al. 2014; Yu 2015; Dai et al. 2014; Tian and Yu 2019). Meanwhile, during the trade war, the global supply chains could potentially magnify the impact of import tariffs by transmitting the import tariffs to exports (Boehm et al. 2019). The recent work by Handley et al. (2020) shows that a large share of US exports were facing increased tariffs on importing inputs during the trade war, which in turn leads to a even larger decline in exporting. Flaaen and Pierce (2019) show that U.S. manufacturing industries more exposed to tariff increases experience relative reductions in employment as a positive effect from import protection is offset by larger negative effects from rising input costs and retaliatory tariffs. Therefore, while trade wars have always been disruptive, they are particularly expensive and divisive in the global value chain era as the import tariffs could backfire on domestic production (Blanchard 2019). Although at the later stage of the trade war Trump's administration has allowed firms to apply for tariff exemptions, the effect might be small especially for smaller firms. On the contrary, the Chinese special duty-free policy on processing trade may have served as a built-in mechanism to better protect domestic firms from the damage of the trade war through the global value chain channel.

Finally, this paper also contributes to the trade diversion literature. A large literature have examined the trade diversion effect created by different free trade agreements and regional trade agreements (e.g., Magee 2008; Dai et al. 2014). In the context of bilateral trade conflicts, Nicita (2019) shows that one consequence of the tariffs between United States and China has been to increase United States imports from elsewhere. Bekkers and Schroete (2020) show that the reduction in trade between the US and China in 2019 and is accompanied by considerable trade diversion to imports from other regions. Feenstra and Hong (2020) suggest that the Phase One trade agreement, which mandates China to purchase additional imports from the US worth $200 billion in 2020 and 2021, would result in trade diversion away from the rest of the world. However, with all the discussion about trade diversion, I show that there is no systematic diversion going on except in some selected products.

The reminder of this paper is structured as follows. Section 2 describes the data and lists the key events during the trade war. Section 3 provides an event-study framework to visualize the impact of the trade war. Section 4 shows the main empirical specifications and the estimation results. Section 5 performs the robustness checks and Section 6 concludes.

2. Data Description and Key Events

This section describes the data, lists the key events during the trade war and shows stylized facts about the response of Chinese imports to the series of tariffs.

2.1. Data

The primary data I use is the administrative Chinese monthly import and export data from the General Administration of Customs. The data period covers from January 2017 to December 2019. It records the universe of Chinese import and export transactions and has a variety of information for each transaction, including product (HS-8 level), quantity, value, and firm's location (at the province-level). More importantly, I can also observe each transaction's trade regime which allows me to perform analysis separately on processing and ordinary trade.

However, I do not directly observe the custom duties or tariff lines in the data. Therefore, I combine data from multiple additional sources and construct a monthly panel data set of tariffs. The US-China specific tariffs data during the trade war are obtained from the Ministry of Finance of China, the U.S. International Trade Commission (USITC) and Li (2018) trade war tariff dataset. These ad valorem tariffs are mostly set at the HS-8 level. Since many rounds of tariffs were enacted in the middle of the month, I scale the tariffs by the number of days of the month they were in effect.[1]

To construct the baseline Chinese import tariffs, I first collect the Most Favored Nation (MFN) tariff rates at the HS-8 level published by the central government of China. Then I compile the list of country-products that are subject to regional trade agreements. These include, for example, the tariffs applied to products from the Association of Southeast Asian Nations (ASEAN), from

[1] For example, if a 25% tariff was enacted on June 15, then the effective tariff will be $25 \times 15/30 = 12.5\%$ in June and 25% in the following month.

35 Least-developed countries (LDC), and from other countries (regions) which have signed specific trade agreements with China.[2] Then I compute the effective Chinese import tariff rate for each country-product pair (variety) as the sum of the baseline tariff rate and the announced trade war tariff rate changes. In the baseline analysis, I ignore the changes in Chinese MFN tariffs and regional trade agreements during the trade war. Therefore, I only use the trade war tariff changes as identifying variation.[3] However, each year China also adjusted the MFN rates due to the commitment to the WTO and sign/modify the regional trade agreements.[4] It is difficult to judge whether some of the changes were driven by the trade war. Thus, I also examine all the official documents published by the Ministry of Finance of China and present the results that include all the tariff adjustments in the appendix.

On the Chinese export side, most US import tariffs are set at the HS-8 or HS-10 level which is not directly comparable when using the Chinese export data. Thus, I first use the publicly available 2017 US import data from the US Census Bureau and the trade war specific tariffs from the USITC to calculate the trade weighted tariffs at the HS-6 level. Then I combine it with the WTO database of MFN rates and merge with the Chinese export data.

2.2. Key Events

Table 1 reports the scope of the six waves of Chinese import tariffs. Following the US tariffs on steel and aluminum, the first wave of China's retaliatory tariffs began in April 2018 targeted 128 HS-8 level products. The second wave implemented in July 2018 only targeted for 545 distinct products (mostly agricultural products), but the total value of these products exceeds 3 billion USD. Starting from September 2018, additional tariffs have been added to most products that China imported from the US and the scale of these tariffs were being elevated again in 2019.

Figure 1 shows the average applied tariff on products that were being targeted in each wave. For products that were being targeted in the first three waves, the average ad valerom tariff has been increased to over 30%. And in the later stage of the trade war, the majority of products that

[2]These include South Korea, Laos, Macao, New Zealand, Pakistan, Peru, Singapore, Sri Lanka, Switzerland, Taiwan, Chile, Australia, Iceland, Costa Rica Georgia, and Hongkong.

[3]Fajgelbaum et al. (2019) also ignore the changes in US import tariffs due to preexisting treaty commitments when analyzing the impact of trade war on US imports.

[4]These include, for example, the MFN changes in 2018:1, 2018:7, 2019:1 and 2019:7; the changes in regional trade agreements with countries such as Korea in 2018 and 2019.

China imported from the US were subjected to tariffs over 20%.

Table 1: Summary Statistics: Tariffs on Chinese Imports

Tariffs	Date	# of Products	Value (mil USD)	Average Tariff (%)
Wave 1	Apr 2, 2018	128	297	16
Wave 2	July 6, 2018	545	3383	25
Wave 3	Aug 23, 2018	333	1411	25
Wave 4	Sep 24, 2018	5207	5816	8.4
Wave 5	June 1, 2019	4544	4022	11.7
Wave 6	Sep 1, 2019	1717	2866	7.7

Notes: Number of products is at the HS-8 level. Value is calculated as the 2017 annual import value of targeted products in each wave. Average tariff is calculated as the unweighted ad valerom average tariff across targeted products.

Figure 1: Summary Statistics: Average Chinese Import Tariffs

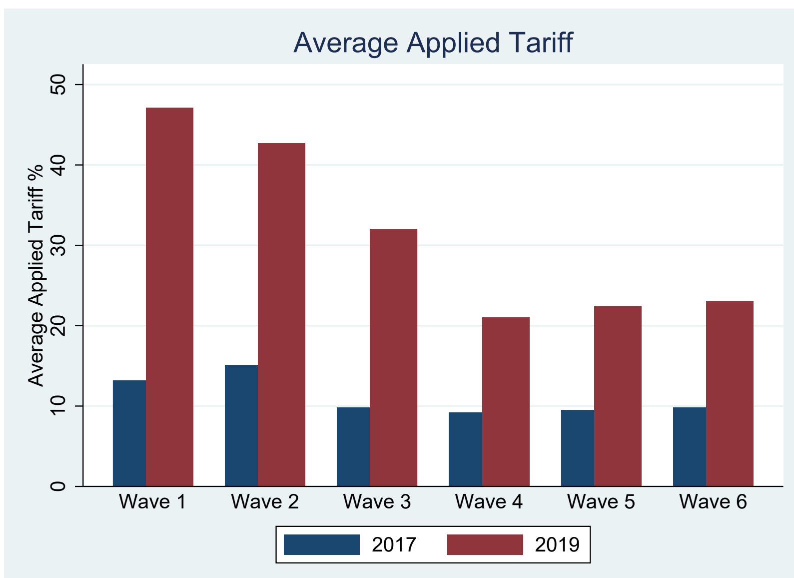

Figure shows the unweighted average applied Chinese import tariff rates of targeted products for each wave in 2017 and 2019.

175 ## 2.3. Variation across Sectors

Table 2 reports the summary statistics for Chinese import tariffs across broad SITC one-digit sectors. It shows that China placed most protections on machinery and transport equipment sector as well as crude materials sector which include products such as soybean. Meanwhile, the unweighted-average tariff increases on targeted import products are similar across sectors. This suggests that China was not choosing specific sectors to target because otherwise we should observe tariff variation across sectors.

Table 3 shows the change of the share of US products by SITC one-digit sectors. By 2019, the quantity share of US products dropped sharply in almost all the sectors which suggests China was switching its import sources. However, the US share in machinery and transport equipment sector, where China placed most protections, did not vary significantly. On the contrary, the US share in agricultural-related sectors experienced a dramatic decline.

Table 2: Tariff Variation by SITC Sector

SITC Category	# of Products	Value (mil USD)	Average Tariff (%)
Machinery and transport equipment	1403	3232	18
Crude materials, inedible, except fuels	276	2830	19
Chemicals and related products	964	1169	18
Miscellaneous manufactured articles	881	1027	19
Manufactured goods	1623	703	19
Commodities and transactions	6	477	21
Mineral fuels, lubricants and related materials	53	407	25
Food and live animals	215	340	21
Beverages and tobacco	32	30	26
Animal and vegetable oils, fats and waxes	32	11	22

Notes: Number of products is at the HS-8 level. Value is calculated as the 2017 annual import value of targeted products in each SITC category. Average tariff is calculated as the unweighted ad valerom average tariff across targeted products in each category.

3. Event Study Framework

To better visualize the effects of tariff increases on Chinese import, I implement an event study specification. Specifically, I compare the trends of targeted products from the US to the same HS-8 products from other countries which were not subject to the tariff increases. The equation I estimate is as follows:

$$log[y_{ict}] = \sum_{j=-6}^{j=6} \beta_{0j} \mathbb{1}[t=j] + \sum_{j=-6}^{j=6} \beta_{1j} \mathbb{1}[t=j] \times Target_{ic} + f_{ic} + f_{ct} + f_{it} + \epsilon_{ict} \tag{1}$$

Table 3: Quantity Share of China's Import from the United States by SITC Category

SITC Category	2017 US Share	2019 US Share
Food and live animals	25.28	8.69
Commodities and transactions	9.25	0.04
Miscellaneous manufactured articles	6.49	5.39
Chemicals and related products	5.08	3.14
Manufactured goods	4.08	1.81
Crude materials, inedible, except fuels	3.84	1.91
Machinery and transport equipment	3.27	3.24
Mineral fuels, lubricants and related materials	2.41	1.06
Beverages and tobacco	2.23	1.34
Animal and vegetable oils, fats and waxes	1.05	0.03

Notes: the denominators are the annual total quantity of Chinese imports in each sector.

where y_{ict} represents quantity, value, duty-exclusive unit value or duty-inclusive unit value for product i (HS-8) from country c at month t. j represents the introduction time of each round of tariffs. $Target_{ic}$ equals to one if product i was subject to the Chinese retaliatory tariffs and equals to zero otherwise. f_{ic} is the product-country fixed effects, f_{it} is the product-month fixed effects, f_{ct} is month-country fixed effects. The standard errors are clustered at HS8-country level. β_{1j} is the coefficient of interest. It is identified by comparing targeted variety to the non-targeted variety within the same HS product code at the same time. Following Fajgelbaum et al. (2019), the event date of targeted product is the nearest full month when the tariffs were enacted while the event date of non-targeted product is the earliest event date within the same HS code as the targeted product.[5] Event times less than -6 (i.e., 6 months before the roll out) are dropped and event times greater than 6 are binned together. Therefore, this event study framework only shows the trend in the very short-run.

One caveat of this event-study framework described above is that during the trade war, many products were being targeted multiple times. However, under this specification, for the non-targeted products within the same HS code, I can only assign one event date to them. Therefore, for products being targeted multiple times, the trend before the event may be affected by the previous rounds of tariffs. In order to show a less noisy trend, figure 2 reports the event-study coefficients by focusing

[5]For example, if a product was targeted in both the Sep 24, 2018 wave and June 1, 2019 wave, the event date for this product will be October 2018.

on products that were only being targeted once by Chinese import tariffs. The error bar shows 95% confidence intervals. Overall, I observe downward trends on both import quantities and values immediately following the tariffs. The before-duty unit value was fluctuated but mostly are not significantly different from zero. In contrast, the duty-inclusive unit value increased by around 10 percent following the tariffs. The event-study also suggests that there is no significant anticipation effect that would complicate the elasticity estimates. While there is an upward trend in total import value before the tariffs were being implemented, they are not statistically different from zero. Therefore, the concern that importers might anticipate the upcoming tariffs and purchase earlier seems to be minimal.

Figure 2: Event Study: Chinese Imports

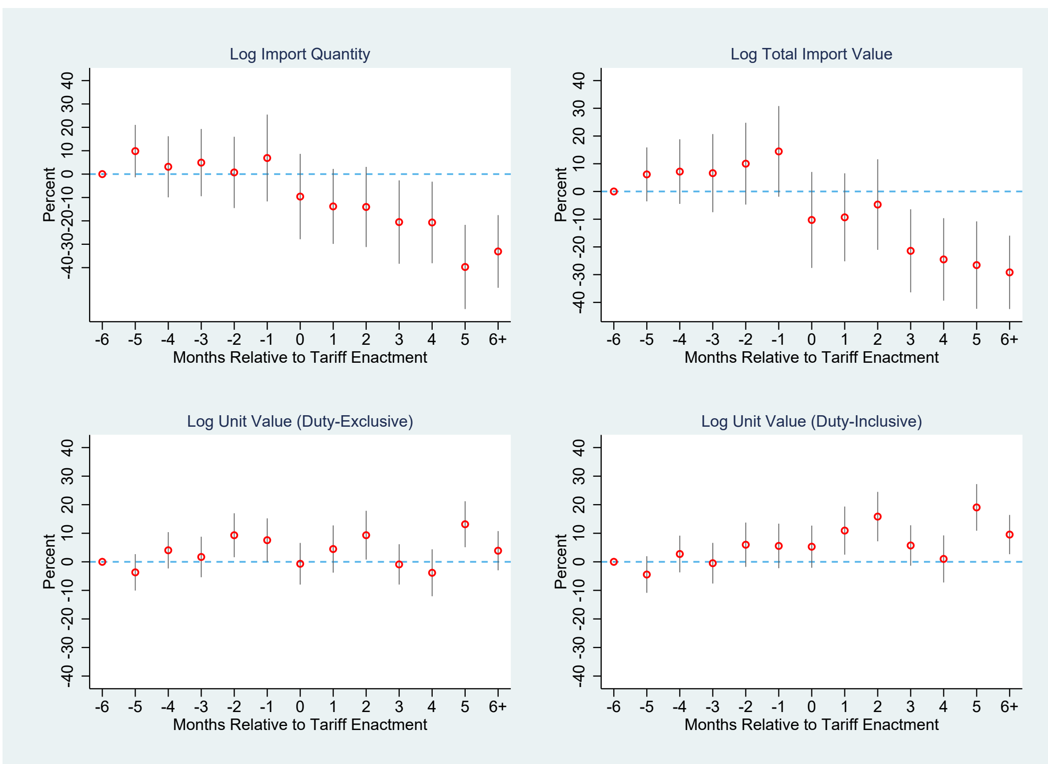

Figure plots the event-study dummies estimated from equation (1). Error bar shows 95% confidence interval. Products being targeted multiple times during the trade war were dropped to avoid noisy trends caused by previous rounds of tariffs.

4. Empirical Strategy and Estimations

4.1. Impact of Chinese Tariffs on Chinese Imports

4.1.1. Reduced-form Analysis

A key first step in analyzing the impact of the trade war is to understand how prices and quantities move in response to a tariff change. Therefore, I estimate the following regression:

$$\Delta log[z_{ict}] = \eta \Delta log(1 + \tau_{ict}) + f_{ct} + f_{it} + f_{ic} + \epsilon_{ict} \tag{2}$$

where $z \in \{q,\ p{\times}q,\ p^*,\ p\} \equiv$ {import quantity, import value, duty-exclusive unit value, duty-inclusive unit value}. τ_{ict} represents the statutory import tariff rates.[6] The regression includes country-time fixed effects, product-time fixed effects and product-country fixed effects to control for seasonality, time-varying country-specific factors, and product-country time-invariant trends. Under the assumption that the import tariffs enacted by Chinese government are exogenous, the coefficient of interest η is identified using variation in product-country-level over time. The robust standard errors are clustered at the country-HS8-level. Each regression is run separately in month-to-month differences and year-to-year differences to capture the very short-run trends and relatively long-run trends.

Table 4 panel A reports the responses of Chinese imports to the tariff changes in first differences. Column (1) shows that import quantities dropped sharply following the tariff increases. Column (2) shows that the decline in import values is even larger, because the before-duty unit values (received by US exporters) also decreased as shown in column (3). Column (4) shows that a one percent increases in tariff resulted in a 0.49 percent increases in duty-inclusive unit values (paid by Chinese importers).[7] The results from column (3) and (4) are interesting because it provides evidence that, at least in the very short-run, the incidence of Chinese import tariffs was borne by both Chinese importers and US exporters. Amiti et al. (2019) and Fajgelbaum et al. (2019) examine

[6] I ignore the changes in baseline MFN rates and changes in regional trade agreements during 2018 and 2019. Thus, I only use the import tariffs changes as the result of the trade war as identifying variation in the main analysis. Results including all tariff changes can be found in table A7-A8 in the appendix.

[7] Because I do not directly observe the duty-inclusive unit value in the data, I impute the duty-inclusive unit value as $p = p^* \times (1 + \tau)$. Therefore mechanically the coefficient in column (4) is 1 plus the coefficient in column (3). However, the coefficient in column (3) alone is sufficient to show the tariff incidence.

Table 4: Impact of Chinese Tariffs on Chinese Imports

Panel A: month-to-month differences				
	Δlnq_{ict} (1)	$\Delta lnp^*_{ict}q_{ict}$ (2)	Δlnp^*_{ict} (3)	Δlnp_{ict} (4)
$\Delta ln(1+\tau_{ict})$	-0.87***	-1.38***	-0.51***	0.49***
	(0.30)	(0.26)	(0.14)	(0.14)
Product × time FE	Y	Y	Y	Y
Country × time FE	Y	Y	Y	Y
Product × country FE	Y	Y	Y	Y
R^2	0.13	0.14	0.11	0.11
N	2,328,703	2,328,703	2,328,703	2,328,703
Panel B: year-to-year differences				
	Δlnq_{ict} (1)	$\Delta lnp^*_{ict}q_{ict}$ (2)	Δlnp^*_{ict} (3)	Δlnp_{ict} (4)
$\Delta ln(1+\tau_{ict})$	-3.94***	-3.08***	0.86***	1.86***
	(0.18)	(0.16)	(0.10)	(0.10)
Product × time FE	Y	Y	Y	Y
Country × time FE	Y	Y	Y	Y
Product × country FE	Y	Y	Y	Y
R^2	0.23	0.23	0.19	0.19
N	1,513,561	1,513,561	1,513,561	1,513,561

Notes: Column (1)-(4) report log changes in import quantities, values, before-duty unit values, and duty-inclusive unit values regressed on log changes in statutory tariff rates. Robust standard errors in the parentheses are clustered by country and HS-8. Significance: * 0.10, ** 0.05, *** 0.01.

the impact of US tariffs on US imports and find complete pass-through of tariffs to duty-inclusive import prices. However, the reduced-form estimates in my paper suggest incomplete pass-through of Chinese import tariffs in the very short-run.

Table 4 panel B reports the responses of Chinese imports to the tariff changes in twelve-month differences. Over a year, import quantities and values declined significantly more than in the very short-run. A one percent increase in tariff resulted in a 3.94 percent decrease in quantities and a 3.08 percent decrease in import values, respectively. However, both before-duty and duty-inclusive unit values increased in the relatively long-run in response to the import tariffs. The result in Column (3) suggests that in the relatively long-run Chinese importers were paying higher prices to the US exporters. One possible explanation is that during the trade war, the US import tariffs increased the production cost for the US manufactures through the global supply chain. Therefore, the US exporters were adjusting to this cost shock and eventually raised their prices. Under this hypothesis, the before-duty unit values should have increased more for ordinary trade than for processing trade because the former are primarily final products and the latter are mostly intermediate inputs. In section 4.2 I show that this is the case.

4.1.2. IV Estimation of Trade Elasticities

Beyond the reduced-form analysis above, the tariff changes could be viewed as a natural experiment to further estimate the Chinese import demand elasticity and US export supply elasticity. The estimations of these elasticities can be important for future welfare analysis.

I follow the previous literature to use the variation in Chinese import tariffs to estimate the Chinese import demand elasticity and US export supply elasticity simultaneously (Romalis 2007; Zoutman et al. 2018; Fajgelbaum et al. 2019). To be more specific, I estimate the following two equations:

$$\Delta log[q_{ict}] = -\sigma \Delta log[p_{ict}] + f_{ct} + f_{it} + f_{ic} + \epsilon_{ict} \tag{3}$$

$$\Delta log[p^*_{ict}] = \omega \Delta log[q_{ict}] + f_{ct} + f_{it} + f_{ic} + \epsilon_{ict} \tag{4}$$

Equation (3) identifies the Chinese import demand elasticity σ by regressing observed import quantities on import duty-inclusive unit values, using change in log tariffs $\Delta ln(1 + \tau_{ict})$ as instruments for import duty-inclusive unit values. Equation (4) identifies the US supply elasticity ω by regressing before-duty unit values on observed import quantities, using $\Delta ln(1+\tau_{ict})$ as instruments for observed quantities.

Intuitively, as long as the incidence of the tariff is shared between both sides, for a given price received by US exporter (before-duty price), an exogenous increase in Chinese import tariffs will affect the Chinese import demand through and only through the change in duty-inclusive prices paid by the Chinese importers. Conversely, for a given price paid by the Chinese importers, an exogenous tariff increase will shift up the US supply curve through and only through reducing the quantities ordered by the Chinese importers. The identification assumption here is that the Chinese retaliatory tariffs are uncorrelated with unobserved import demand or foreign export supply shock. The multiple fixed effects included in the estimation control for potential unobserved trends. Meanwhile,

Table 5: IV Estimation of Chinese Import Demand Elasticity and US Export Supply Elasticity

Panel A: month-to-month differences		
	Δlnq_{ict} (1)	Δlnp^*_{ict} (2)
Δlnp_{ict}	-1.76***	
	(0.55)	
Δlnq_{ict}		0.59**
		(0.32)
Product × time FE	Y	Y
Country × time FE	Y	Y
Product × country FE	Y	Y
N	2,328,703	2,328,703
Panel B: year-to-year differences		
	Δlnq_{ict} (1)	Δlnp^*_{ict} (2)
Δlnp_{ict}	-2.11***	
	(0.11)	
Δlnq_{ict}		-0.22***
		(0.02)
Product × time FE	Y	Y
Country × time FE	Y	Y
Product × country FE	Y	Y
N	1,513,561	1,513,561

Notes: Robust standard errors in the parentheses are clustered by country and HS-8. Significance: * 0.10, ** 0.05, *** 0.01.

the event-study framework shows no significant preexisting trend prior to the implementation of the tariffs. In section 5, I formally perform robustness checks to test the preexisting trends which provide support to this identification assumption.

Under this specification, Column (4) and column (1) in table 4 panel A serve as the first-stage estimation for equation (3) and (4), respectively. Column (1) and (2) in table 5 panel A report the IV estimation of σ and ω, respectively. It shows that the estimated Chinese import demand elasticity is 1.76. The estimated positive US supply elasticity supports the finding of incomplete tariff pass-through in the reduced-form analysis above. Compared to the estimation from the US side, Fajgelbaum et al. (2019) estimate the US import demand elasticity to be 2.53 and the foreign supply elasticity to be a statistical zero. One potential explanation for China to have a lower import demand elasticity is the special processing trade regime as I will discuss in detail below.

Table 5 panel B shows the estimation at twelve-month differences with Column (4) and column (1) in table 4 panel B as the first-stage. The Chinese import demand elasticity is larger in relatively long-run. The sign of estimated US export supply elasticity, however, turns negative which implies a downward sloping inverse supply curve in the relatively long run.

4.2. The Impact on Ordinary and Processing Imports

When analyzing the tariff incidence in the Chinese context, it is important to distinguish ordinary imports and processing imports because processing imports enjoy a special duty-free tariff treatment. Table 6 reports a simple summary statistics for Chinese import transaction data by trade regimes and year from 2017-2019. Overall, at the HS-8 product level, approximately 60 percent of total import value comprises ordinary imports, whereas processing imports account for around 40 percent.

Table 6: Chinese Transaction-level Trade Data by Trade Regimes and Year

Imports by Trade Regimes	2017	2018	2019
Percentage of import value			
Ordinary imports	58.7	59.7	60.5
Processing imports	39.3	39.1	38.0

Processing trade in China started after the reform and opening-up in 1978. In order to promote development and take advantage of low labor costs, the Chinese government encouraged firms to import raw materials or intermediate inputs, and re-export the final goods after processing. Today, the Chinese Custom reports very detailed and specific types of processing trade. Among all types of processing trade, two are the most important: "processing-with-assembly" and "processing-with-inputs". Both types of processing trade require certain certifications and licenses. For processing-with-assembly, the Chinese firms import raw material or parts from their foreign partners without paying for the materials and custom duty. However, they must re-export the final products to the same foreign partners after processing. This trade regime was very popular before year 2000 because it imposed a smaller credit constraint on Chinese firms (Feenstra et al. 2014). However, it now only account for a very small portion of total Chinese imports. For processing-with-inputs, Chinese firms pay the custom duties for imported inputs first. They get a full rebate on import duties only after exporting the goods that used these imported inputs.[8]

The special duty-free policy on processing imports remained largely unchanged during the trade war.[9] Therefore, we should expect ordinary imports were subject to larger impact of tariffs while processing imports should not be heavily affected at least in the short-run. In the data, I directly observe the trade regime of each transaction, so I split my data into processing and non-processing imports and estimate equation (2)-(4) again to test this hypothesis.

Table 7 shows the results using the month-to-month difference and is analog to table 4 panel A. It shows that almost all the impact we observed in table 4 are coming from the impact on ordinary imports. Column (1)-(3) in table 7, panel B show that import quantities, values and before-duty unit prices were not changed significantly for processing import.

Table 8 is analog to table 5 panel A. Column (1) shows that while the Chinese import demand elasticity is high for ordinary imports, it is inelastic for processing import. Column (2) shows that while the US export supply elasticity is positive for ordinary imports in the short-run, I cannot reject a horizontal supply curve for the processing imports. Table A1 and A2 in the appendix show the estimation results in twelve-month differences and deliver similar results.

The results in this section highlight the importance of considering the trade structure and distributional consequences of the US-China trade war. On one side, due to China's free-duty policy on processing imports, Chinese firms that completely or partially engaged in processing trade may not be largely affected (although they have to face the US import tariffs when exporting). On the other side, previous literature that estimated the impact of trade-war from the US perspective may have over-estimated the welfare loss because they cannot distinguish processing and ordinary trade when analyzing the effect of China's retaliatory tariffs on US exports.

Meanwhile, the global value chain are transforming the nature of production during the past

[8] Note here, if a Chinese firm imports foreign inputs but sell the final products to the domestic market after processing, the custom duties will not be refunded.

[9] All the official documents on retaliatory tariffs published by the Ministry of Finance of China state that "For products from the United States included in the tariffs list, the tariffs will be added in addition to the current baseline tariffs. Current duty-free and duty-reduction policy will remain unchanged. Tariff deduction is not applied to the products on the list." This statement is ambiguous and it is difficult to tell whether processing imports still enjoy the duty-free policy. However, I find solid evidence support that processing imports remain largely unaffected during the trade war. First, I find explanatory documents from professional lawyers implying that according to the Chinese Customs Law the current duty-free policy on processing import remain valid even for products involved in the trade war. Second, many Chinese firms that engaged in processing imports stated that they were not affected by the import tariff increases. For example, a large listed company in China made a public announcement in 2019 saying they confirmed with the Chinese Custom and their imported cotton products from the US would still be duty-free as processing imports.

Table 7: Impact of Chinese Tariffs on Imports

Panel A: ordinary imports only				
	Δlnq_{ict} (1)	$\Delta lnp^*_{ict}q_{ict}$ (2)	Δlnp^*_{ict} (3)	Δlnp_{ict} (4)
$\Delta ln(1+\tau_{ict})$	-1.29***	-1.99***	-0.70***	0.30
	(0.31)	(0.26)	(0.18)	(0.18)
Product × time FE	Y	Y	Y	Y
Country × time FE	Y	Y	Y	Y
Product × country FE	Y	Y	Y	Y
R^2	0.14	0.15	0.12	0.12
N	1,967,462	1,967,462	1,967,462	1,967,462
Panel B: processing imports only				
	Δlnq_{ict} (1)	$\Delta lnp^*_{ict}q_{ict}$ (2)	Δlnp^*_{ict} (3)	Δlnp_{ict} (4)
$\Delta ln(1+\tau_{ict})$	-0.28	-0.32	-0.04	0.96***
	(0.33)	(0.31)	(0.18)	(0.18)
Product × time FE	Y	Y	Y	Y
Country × time FE	Y	Y	Y	Y
Product × country FE	Y	Y	Y	Y
R^2	0.16	0.17	0.13	0.13
N	1,092,999	1,092,999	1,092,999	1,092,999

Notes: Column (1)-(4) report log changes in import quantities, values, before-duty unit values, and duty-inclusive unit values regressed on log changes in statutory tariff rates. Robust standard errors in the parentheses are clustered by country and HS-8. Significance: * 0.10, ** 0.05, *** 0.01.

several decades. Instead of "made in China" or "made in USA", more products are actually "made in the world". Therefore, while trade wars have always been disruptive, they are particularly expensive and divisive in the global value chain era (Blanchard 2019). The global value chains could be an important channel of transmitting the impact of import tariffs to exports because they can amplify shocks (Handley et al. 2020).

To bring production and jobs back to the US was one important incentive of the US import tariffs. However, Trump's administration has imposed tariffs disproportionately on imported intermediate inputs (Bown and Zhang 2019). Therefore, the import tariffs could potentially backfire and shift the production away from the US. The recent work by Handley et al. (2020) shows that a large share of US exports were facing increased tariffs on importing inputs during the trade war, which in turn leads to a even larger decline in exporting. Flaaen and Pierce (2019) also show

Table 8: IV Estimation of Chinese Import Demand Elasticity and Foreign Export Supply Elasticity

Panel A: ordinary imports only		
	Δlnq_{ict} (1)	Δlnp^*_{ict} (2)
Δlnp_{ict}	-4.33*	
	(2.25)	
Δlnq_{ict}		0.54**
		(0.24)
Product × time FE	Y	Y
Country × time FE	Y	Y
Product × country FE	Y	Y
N	1,967,462	1,967,462
Panel B: processing imports only		
	Δlnq_{ict} (1)	Δlnp^*_{ict} (2)
Δlnp_{ict}	-0.29	
	(0.33)	
Δlnq_{ict}		0.15
		(0.72)
Product × time FE	Y	Y
Country × time FE	Y	Y
Product × country FE	Y	Y
N	1,092,999	1,092,999

Notes: Robust standard errors in the parentheses are clustered by country and HS-8. Significance: * 0.10, ** 0.05, *** 0.01.

that U.S. manufacturing industries more exposed to tariff increases experience relative reductions in employment as a positive effect from import protection is offset by larger negative effects from rising input costs and retaliatory tariffs. In the later stage of the trade war, Trump's administration initiated a tariff exclusion process for Chinese products and over 2,500 US firms filed for tariff exclusions for Chinese imports. However, failure of considering the global value chain linkages when the administration first imposed the import protection may have already added large unintentional burdens on US producers.

By contrast, although the Chinese government imposed protection at a similar magnitude, the duty-free policy on processing imports served as a build-in mechanic to protect the Chinese exporters in the global value chain era. In other words, such policy prevented the Chinese import tariffs to backfire on Chinese exporting, which is one major driver of China's economy growth.

4.3. Trade Diversion Effect

Although the primary focus of this paper is on the Chinese import side, one question that is of great public interest is whether there was trade diversion effect on Chinese exports following the US import tariffs. Were Chinese exporters reorienting or even dumping their products towards other countries? During the trade war, firms as well as politicians from multiple countries have expressed concerns that China may lower the prices of the products in order to sell them in new markets other than the US. If so, the US-China trade war may have caused collateral damage on domestic firms in EU and other countries (Gonzalez and Veron 2019). To formally assess the extend of trade diversion, I propose a simple regression to check the relationship between US import tariffs and Chinese exports to the rest of the world other than the US:

$$\Delta log(RoW_i) = \beta \Delta log(1 + Tariff_i^{US}) + f_i + \epsilon_i \tag{5}$$

where on the left hand side, I take the difference of the total Chinese export quantity (and value) of product i at the HS-6 level to all countries other than the US between 2019 Q4 and 2017 Q4. Because many products experienced multiple rounds of tariff increases, comparing the change before (2017 Q4) and after (2019 Q4) the trade war yields a less noisy trend. On the right hand side, $Tariff_i^{US}$ represents the effective US import tariffs on product i. Because most US imports tariffs were being set at the HS-8 level but the HS code across countries are only comparable at the HS-6 level, I first use the publicly available administrative US import data (HS-10 level) from the US Census Bureau to calculate the average US import tariff at the HS-6 level using 2017 total trade value as weights. I then merge the trade weighted tariff to the Chinese monthly export data. f_i represents the product fixed effects at the HS-2 level and the robust standard error ϵ_i is clustered at the HS-6 level.

However, despite all the discussion about trade diversion, it looks like that there is no systematic diversion going on. Table 9 shows that the US import tariffs have no impacts on the over all Chinese export quantity and value to the rest of the world.

To further assess the trade diversion effect at the product-level, I choose several key products that were subjected to the US import tariffs during the trade war and visualize the trends. Figure

Table 9: Trade Diversion Effect

	$\Delta log(RoW\ Quantity)$	$\Delta log(RoW\ Value)$
	(1)	(2)
$\Delta log(1 + Tariff_i^{US})$	-0.12	0.40
	(0.30)	(0.26)
Product FE (HS-2)	Y	Y
R^2	0.04	0.05
N	4,779	4,779

Notes: Robust standard errors in the parentheses are clustered at the HS-6 level. Significance: * 0.10, ** 0.05, *** 0.01.

Figure 3: Chinese Export Trends

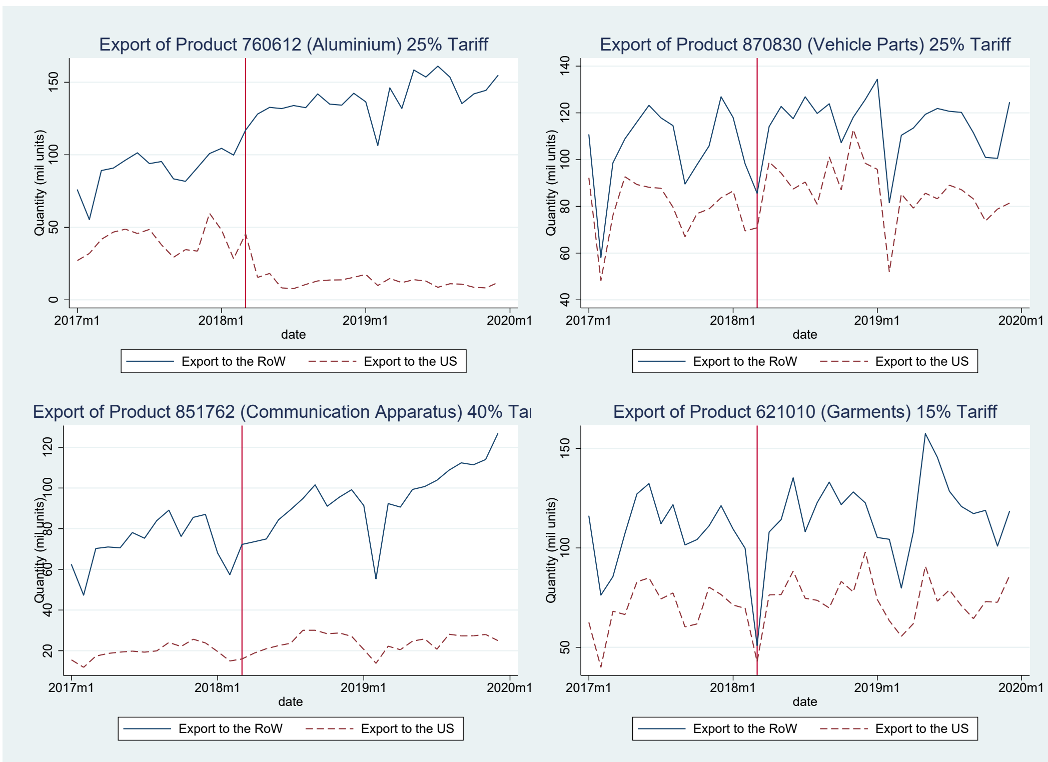

Figure plots the Chinese export trends for aluminium, vehicle parts, communication apparatus and garments.The vertical line marks the beginning of the trade war.

3 plots the trends of Chinese export to the US and to the rest of the world for aluminium, vehicle parts, communication apparatus and garments. China was a major exporter to the US in all these

four products which were subjected to different levels of tariffs. However, while the graphs indicate that there was potentially some trade diversion in aluminium, I do not observe the same effect in other products. This result suggests that there might be considerable heterogeneity across products or sectors that may mask the overall variations. In table A3 in the appendix, I explore one potential source of heterogeneity by interacting the US import tariff with Rauch classification (Rauch 1999) and import demand elasticities estimated by Soderbery (2018). However, neither interaction term yields significant results which implies that product differentiation or elasticity are not driving the observed heterogeneity. Further research is needed to explore the heterogeneity of the trade diversion effect.

5. Robustness Checks

5.1. Preexisting Trends

The previous estimations treat the tariff changes during the trade war as exogenous and assume that the changes are uncorrelated with potential demand and supply shocks. To support this identification assumption, I test the pre-trends by regressing the import outcomes before the trade war (i.e., year 2017) on the subsequent tariff changes. The equation I estimate is as following:

$$\Delta_{\overline{2017}} log[z_{ic}] = \eta \Delta_{2018-2019} log(1 + \tau_{ic}) + f_i + f_c + \epsilon_{ic} \tag{6}$$

where $z \in \{q,\ p{\times}q,\ p,\ p\} \equiv$ {import quantity, total import value, duty-exclusive unit value, duty-inclusive unit value}. The left hand side is the average monthly change of each of four outcomes from 2017:1-2017:12. $\Delta_{2018-2019} log(1+\tau_{ic})$ represents the net log changes in import tariff rates for product i from country c between 2018:1 and 2019:12. The regression control for HS-8 product and country fixed effects. Robust standard errors are two-way clustered by country and HS-8.

Table 10 reports the estimation results. There is no statistical significant relationship between pre-trend outcomes and the subsequent Chinese import tariffs. This result, combined with the event-study above, suggest that targeted products from the US were not on different trends before the trade war which supports the main identification assumption in this paper.

Table 10: Testing for Preexisting Trends

	$\Delta_{\overline{2017}} lnq_{ic}$	$\Delta_{\overline{2017}} lnp^*_{ic}q_{ic}$	$\Delta_{\overline{2017}} lnp^*_{ic}$	$\Delta_{\overline{2017}} lnp_{ic}$
$\Delta_{2018-2019} log(1+\tau_{ic})$	0.12	0.15	0.03	0.03
	(0.11)	(0.11)	(0.07)	(0.07)
Product FE	Y	Y	Y	Y
Country FE	Y	Y	Y	Y
R^2	0.08	0.08	0.08	0.08
N	98,264	98,264	98,264	98,264

Notes: Robust standard errors in the parentheses are clustered by country and HS-8. Significance: * 0.10, ** 0.05, *** 0.01.

5.2. Agricultural Products

The estimation results in this paper assign one common elasticity across all products and sectors which may mask variations. One important sector that may react differently to tariffs is the agricultural sector. Agricultural products have long been a very important product category in the US-China trade negotiations. They account for a significant share of Chinese imports from US. They were also the key element in the recently signed Phase 1 US-China deal. Meanwhile, agricultural products that US exports, such as soy beans, have a relatively high elasticity of substitution. Therefore, we might expect that during the trade war, agricultural products from US experienced larger impact from Chinese import tariffs.

In table 11, I split the data into agricultural and non-agricultural products and re-estimate equation (2) at the month-to-month differences.[10] The short-run impact of Chinese tariffs are much larger on the agricultural products in terms of quantities and values. Also, column (3) of table 11 panel A indicates no impact of tariff increases on before-duty unit values on agricultural products. This suggests complete tariff pass-through and providing evidence that the incidence of Chinese import tariffs on agricultural products is borne by Chinese importers. On the contrast, column (3) in panel B implies that the finding of incomplete tariff pass-through in table 5 is likely to be driven by non-agricultural products only. Table A4 in the appendix examine the same specification in twelve-month differences. In the relatively long-run, the impact of tariffs on agriculture products were even larger in terms of import quantities and values while the impact on before-duty prices

[10] Products with HS-2 code as 01-24, 33, 40, 41, 51, 52 are considered as agricultural products here.

were still relatively small.

Table 11: Impact of Chinese Tariffs on Imports

Panel A: agricultural only				
	$\Delta ln q_{ict}$ (1)	$\Delta ln p^*_{ict} q_{ict}$ (2)	$\Delta ln p^*_{ict}$ (3)	$\Delta ln p_{ict}$ (4)
$\Delta ln(1+\tau_{ict})$	-2.41***	-2.44***	-0.03	0.97***
	(0.55)	(0.50)	(0.21)	(0.21)
Product × time FE	Y	Y	Y	Y
Country × time FE	Y	Y	Y	Y
Product × country FE	Y	Y	Y	Y
R^2	0.17	0.18	0.14	0.14
N	261,439	261,439	261,439	261,439
Panel B: non-agricultural only				
	$\Delta ln q_{ict}$ (1)	$\Delta ln p^*_{ict} q_{ict}$ (2)	$\Delta ln p^*_{ict}$ (3)	$\Delta ln p_{ict}$ (4)
$\Delta ln(1+\tau_{ict})$	-0.30	-0.96***	-0.65***	0.35*
	(0.35)	(0.28)	(0.18)	(0.18)
Product × time FE	Y	Y	Y	Y
Country × time FE	Y	Y	Y	Y
Product × country FE	Y	Y	Y	Y
R^2	0.13	0.13	0.11	0.11
N	2,066,240	2,066,240	2,066,240	2,066,240

Notes: Column (1)-(4) report log changes in import quantities, values, before-duty unit values, and duty-inclusive unit values regressed on log changes in statutory tariff rates. Each specification is run on monthly differences. Robust standard errors in the parentheses are clustered by country and HS-8. Significance: * 0.10, ** 0.05, *** 0.01.

6. Conclusion

This paper analyzes the impact of the 2018-2019 trade war from China's perspective. I first show the direct impact of Chinese import tariffs on trade quantities and prices. Both Chinese import quantities and values dropped sharply following the tariffs. The before-duty unit values decreased in the short-run, suggesting incomplete tariff pass-through and a tariff incidence borne by both Chinese importers and US exporters. Using Chinese import tariff variation, I also provide estimates of Chinese import demand and US export supply elasticities.

Furthermore, I consider the role of global value chains in the trade war and highlight the role of Chinese processing trade regime. Chinese processing imports enjoy a special duty-free tariff treatment which remained largely unchanged even during the trade war. As a consequence, I find that the impact of the tariffs are almost purely driven by ordinary imports while there is no statistically significant effect on processing imports. These results highlight the importance to consider the institutional details in trade policy–especially the difference between China and US in this contex. Recent study have suggested that the impact of such tit-for-tat tariff increases would be more disruptive because the existence of global value chain could potentially magnify the impact and even backfire on one country's export or labor market. However, I show that the Chinese special duty-free policy on processing trade may have served as a built-in mechanism to protect domestic firms from the damage of the trade war through the global value chain channel.

While the the paper mainly focuses on the Chinese import side, I also examine the potential diversion effect of Chinese exports as a result of the US tariffs. However, despite all the discussion about trade diversion, I show that there is no systematic diversion going on except in some selected products.

Let me finish by noting two important limitations. First, this paper only provides short-run analysis on the impact of the trade war from the Chinese perspective. However, the long-run consequence of the trade war such as future trade agreements as well as the re-shaping of global value chains are yet to be examined. Second, this paper does not provide detailed analysis on the sectoral or regional level, which I believe are important areas to focus on for future research.

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Appendix

Table A.1: Impact of Chinese Tariffs on Imports (Twelve-month Differences)

Panel A: ordinary imports only				
	Δlnq_{ict}	$\Delta lnp^{*}_{ict}q_{ict}$	Δlnp^{*}_{ict}	Δlnp_{ict}
	(1)	(2)	(3)	(4)
$\Delta ln(1+\tau_{ict})$	-5.16***	-3.71***	1.44***	2.44***
	(0.22)	(0.17)	(0.13)	(0.13)
it, ct, ic FE	Y	Y	Y	Y
R^2	0.24	0.24	0.20	0.20
N	1,273,697	1,273,697	1,273,697	1,273,697
Panel B: processing imports only				
	Δlnq_{ict}	$\Delta lnp^{*}_{ict}q_{ict}$	Δlnp_{ict}	Δlnp_{ict}
	(1)	(2)	(3)	(4)
$\Delta ln(1+\tau_{ict})$	-0.57**	-0.36	0.20	1.20***
	(0.27)	(0.23)	(0.15)	(0.15)
it, ct, ic FE	Y	Y	Y	Y
R^2	0.26	0.26	0.22	0.22
N	707,186	707,186	707,186	707,186

Notes: Column (1)-(4) report log changes in import quantities, values, before-duty unit values, and duty-inclusive unit values regressed on log changes in statutory tariff rates. Product-time, country-time and product-country fixed effects are included. Robust standard errors in the parentheses are clustered by country and HS-8. Significance: * 0.10, ** 0.05, *** 0.01.

Table A.2: IV Estimation of Chinese Import Demand Elasticity and Foreign Export Supply Elasticity (Twelve-month Differences)

Panel A: ordinary imports only		
	Δlnq_{ict} (1)	Δlnp^{*}_{ict} (2)
Δlnp_{ict}	-2.11***	
	(0.08)	
Δlnq_{ict}		-0.28***
		(0.02)
it, ct, ic FE	Y	Y
N	1,273,697	1,273,697
Panel A: processing imports only		
	Δlnq_{ict} (1)	Δlnp^{*}_{ict} (2)
Δlnp_{ict}	-0.47**	
	(0.20)	
Δlnq_{ict}		-0.36
		(0.23)
it, ct, ic FE	Y	Y
N	707,186	707,186

Notes: Robust standard errors in the parentheses are clustered by country and HS-8. Significance: * 0.10, ** 0.05, *** 0.01.

Table A.3: Trade Diversion Effect Heterogeneity

	$\Delta log(RoW\ Quantity)$ (1)	$\Delta log(RoW\ Quantity)$ (2)
$\Delta log(1 + Tariff_i^{US})$	-0.16	-0.14
	(0.43)	(0.40)
$\Delta log(1 + Tariff_i^{US})\times$ Rauch Differentiated (0/1)	0.62	
	(0.39)	
$\Delta log(1 + Tariff_i^{US})\times$ Soderbery Elasticity (2018)		0.00
		(0.01)
Product FE (HS-2)	Y	Y
R^2	0.05	0.05
N	3,864	3,303

Notes: Column (1) shows the result by interacting trade value weighted US import tariff variable with the Rauch classification (Rauch 1999); Column (2) shows the interaction with import demand elasticities estimated by Soderbery (2018). Standard errors are clustered by HS-2. Significance: * 0.10, ** 0.05, *** 0.01.

Table A.4: Impact of Chinese Tariffs on Imports (Twelve-month Differences)

Panel A: agricultural only				
	Δlnq_{ict} (1)	$\Delta lnp^*_{ict}q_{ict}$ (2)	Δlnp^*_{ict} (3)	Δlnp_{ict} (4)
$\Delta ln(1+\tau_{ict})$	-4.89***	-4.62***	0.27*	1.27***
	(0.39)	(0.35)	(0.14)	(0.14)
it, ct, ic FE	Y	Y	Y	Y
R^2	0.27	0.28	0.24	0.25
N	167,972	167,972	167,972	167,972
Panel B: non-agricultural only				
	Δlnq_{ict} (1)	$\Delta lnp^*_{ict}q_{ict}$ (2)	Δlnp^*_{ict} (3)	Δlnp_{ict} (4)
$\Delta ln(1+\tau_{ict})$	-3.53***	-2.49***	1.04***	2.04***
	(0.21)	(0.16)	(0.16)	(0.16)
it, ct, ic FE	Y	Y	Y	Y
R^2	0.22	0.23	0.19	0.19
N	1,344,959	1,344,959	1,344,959	1,344,959

Notes: Column (1)-(4) report log changes in import quantities, values, before-duty unit values, and duty-inclusive unit values regressed on log changes in statutory tariff rates. Each specification is run on twelve-month Differences. Product-time, country-time and product-country fixed effects are included. Robust standard errors in the parentheses are clustered by country and HS-8. Significance: * 0.10, ** 0.05, *** 0.01.

Table A.5: Impact of Chinese Tariffs on Imports (Semi-elasticity)

	Δlnq_{ict} (1)	$\Delta lnp^*_{ict}q_{ict}$ (2)	Δlnp^*_{ict} (3)	Δlnp_{ict} (4)
$\Delta \tau_{ict}$	-0.68***	-1.04***	-0.36***	0.43***
	(0.24)	(0.21)	(0.11)	(0.11)
it, ct, ic FE	Y	Y	Y	Y
R^2	0.13	0.14	0.11	0.11
N	2,328,703	2,328,703	2,328,703	2,328,703

Notes: Column (1)-(4) report log changes in import quantities, values, before-duty unit values, and duty-inclusive unit values regressed on log changes in statutory tariff rates. Each regression is run on monthly differences. Product-time, country-time and product-country fixed effects are included. Robust standard errors in the parentheses are clustered by country and HS-8. Significance: * 0.10, ** 0.05, *** 0.01.

Table A.6: Impact of Chinese Tariffs on Imports (Semi-elasticity)

Panel A: ordinary imports only				
	Δlnq_{ict} (1)	$\Delta lnp^*_{ict}q_{ict}$ (2)	Δlnp^*_{ict} (3)	Δlnp_{ict} (4)
$\Delta\tau_{ict}$	-0.97***	-1.49***	-0.53***	0.26*
	(0.25)	(0.22)	(0.15)	(0.15)
it, ct, ic FE	Y	Y	Y	Y
R^2	0.14	0.15	0.12	0.12
N	1,967,462	1,967,462	1,967,462	1,967,462
Panel B: processing imports only				
	Δlnq_{ict} (1)	$\Delta lnp^*_{ict}q_{ict}$ (2)	Δlnp^*_{ict} (3)	Δlnp_{ict} (4)
$\Delta\tau_{ict}$	-0.31	-0.35	-0.03	0.83***
	(0.29)	(0.27)	(0.16)	(0.16)
it, ct, ic FE	Y	Y	Y	Y
R^2	0.16	0.17	0.13	0.13
N	1,092,999	1,092,999	1,092,999	1,092,999

Notes: Column (1)-(4) report log changes in import quantities, values, before-duty unit values, and duty-inclusive unit values regressed on log changes in statutory tariff rates. Each regression is run on monthly differences. Product-time, country-time and product-country fixed effects are included. Robust standard errors in the parentheses are clustered by country and HS-8. Significance: * 0.10, ** 0.05, *** 0.01.

Table A.7: Impact of Chinese Tariffs on Imports (Including MFN and RTA Changes)

Panel A: month-to-month differences				
	Δlnq_{ict}	$\Delta lnp^{*}_{ict}q_{ict}$	Δlnp^{*}_{ict}	Δlnp_{ict}
	(1)	(2)	(3)	(4)
$\Delta ln(1+\tau_{ict})$	-0.33	-0.69**	-0.36**	0.64***
	(0.34)	(0.33)	(0.15)	(0.15)
Product × time FE	Y	Y	Y	Y
Country × time FE	Y	Y	Y	Y
Product × country FE	Y	Y	Y	Y
R^2	0.13	0.14	0.11	0.11
N	2,307,350	2,307,350	2,307,350	2,307,350
Panel B: year-to-year differences				
	Δlnq_{ict}	$\Delta lnp^{*}_{ict}q_{ict}$	Δlnp^{*}_{ict}	Δlnp_{ict}
	(1)	(2)	(3)	(4)
$\Delta ln(1+\tau_{ict})$	-2.06***	-1.56***	0.51**	1.51***
	(0.78)	(0.60)	(0.21)	(0.21)
Product × time FE	Y	Y	Y	Y
Country × time FE	Y	Y	Y	Y
Product × country FE	Y	Y	Y	Y
R^2	0.23	0.23	0.19	0.19
N	1,511,344	1,511,344	1,511,344	1,511,344

Notes: Column (1)-(4) report log changes in import quantities, values, before-duty unit values, and duty-inclusive unit values regressed on log changes in statutory tariff rates (including MFN and RTA changes during the trade war). Robust standard errors in the parentheses are clustered by country and HS-8. Significance: * 0.10, ** 0.05, *** 0.01.

Table A.8: Impact of Chinese Tariffs on Imports (Including MFN and RTA Changes)

Panel A: ordinary imports only				
	Δlnq_{ict} (1)	$\Delta lnp^*_{ict}q_{ict}$ (2)	Δlnp^*_{ict} (3)	Δlnp_{ict} (4)
$\Delta ln(1+\tau_{ict})$	-0.82**	-1.17***	-0.35*	0.65***
	(0.36)	(0.39)	(0.20)	(0.20)
Product × time FE	Y	Y	Y	Y
Country × time FE	Y	Y	Y	Y
Product × country FE	Y	Y	Y	Y
R^2	0.14	0.15	0.12	0.12
N	1,954,678	1,954,678	1,954,678	1,954,678
Panel B: processing imports only				
	Δlnq_{ict} (1)	$\Delta lnp^*_{ict}q_{ict}$ (2)	Δlnp^*_{ict} (3)	Δlnp_{ict} (4)
$\Delta ln(1+\tau_{ict})$	-0.28	-0.32	-0.04	0.96***
	(0.33)	(0.31)	(0.18)	(0.18)
Product × time FE	Y	Y	Y	Y
Country × time FE	Y	Y	Y	Y
Product × country FE	Y	Y	Y	Y
R^2	0.16	0.17	0.13	0.13
N	1,092,999	1,092,999	1,092,999	1,092,999

Notes: Column (1)-(4) report log changes in import quantities, values, before-duty unit values, and duty-inclusive unit values regressed on log changes in statutory tariff rates (including MFN and RTA changes during the trade war). Robust standard errors in the parentheses are clustered by country and HS-8. Significance: * 0.10, ** 0.05, *** 0.01.