The Global Impact of the US–China Trade War: Firm-Level Evidence

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Abstract

This paper documents the impact of the US-China trade war on firms worldwide. Based on data on more than five thousand listed firms in 40 countries, I establish that firms with export exposure to China have had a decline in revenue, profits and capital stocks since the trade war began. This effect is stronger in industries in which China raised tariffs on the US, suggesting that rest of the world exports to China are complements to US exports. At the same time, firms have benefited from export exposure to the US, especially in industries in which the US imposed trade war tariffs on China, implying that rest of the world exports substitute Chinese exports to the US. Supply chain linkages have also played a role: firms in Europe and the Americas in industries selling intermediate inputs to the US have had a relative decline in revenue during the trade war. These impacts have been highly heterogeneous across geographic regions as well as across firms of different sizes.

Keywords: US–China trade war, Trade policy, Firm–level data

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1 Introduction

In 2018, US trade policy took a sharp turn away from a decades–long trajectory toward free trade, raising tariffs on a broad range of imported products, particularly on imports from China. China quickly imposed retaliatory tariffs. By December 2018, the US had imposed tariffs on approximately $250 billion of imports from China, while China had imposed retaliatory tariffs on US exports covering $110 billion. By the end of 2019, approximately 72% (362 billion) of US imports from China and 97% (126 billion) in Chinese imports from the US were facing trade war tariffs.[1] As these trade policies have proven to be deeper and more persistent than initially expected, understanding their impact is a priority for policymakers worldwide. At the same time, these developments provide a unique laboratory to study the effects of trade policy, as there are no comparable events in many decades.

The goal of this paper is to examine the transmission of these policies to firms across the world – outside of the main two countries engaged in the dispute – shedding light on the mechanisms involved. Firms in most countries are significantly exposed to these policies as China and the US are large trading partners of many countries. Specifically, firms worldwide can find opportunities to substitute Chinese imports from US suppliers in industries hit by Chinese tariffs, and similarly, to substitute US imports from China in industries targeted by US tariffs. Alternatively, if a country exports goods that are complements to US or Chinese exports, US or Chinese tariffs on each other can lower demand for rest of the world goods.

In addition, supply chain linkages can also determine how the US–China trade war impacts the rest of the world. A decline in Chinese or US exports due to trade war tariffs between these countries can also imply reduced demand for imported inputs sourced from a variety of countries that are required in the production process of these exports.[2]

To study these mechanisms, I rely on data on more than five thousand listed firms in 40 countries in all continents.[3] I combine this with additional data on trade linkages to the US and China, detailed data on the tariffs imposed by the US on China, by China on the US, and by both the US and China on each country in the rest of the world. I also construct measures of supply chain linkages capturing the

[1] The amount of trade covered by US and Chinese tariffs is computed based on the value of 2017 imports in the product categories targeted by the tariffs, as is standard in the literature.

[2] There are many articles in the financial press describing these mechanisms. The following article in the Financial Times provides a useful illustration: [https://www.ft.com/content/7c007258-dac6-11e8-b173-ebef6ab1374a] It describes how a slowdown in Taiwan, "a key exporter of high-tech inputs to China's export engine", is already being observed and it mentions potential opportunities in low wage south-east Asia economies that can replace Chinese exports to the US.

[3] Limiting data to listed firms reflects a trade-off between coverage and timeliness. Data on listed firms has the benefit of being up-to-date, while firm or industry-level data representative of the entire economy published by statistical agencies in each country are available with a lag of several years. On the other hand, listed firms are just a fraction of all firms in each economy. While not representative of the entire firm distribution, given the concentration of economic activity, listed firms account for a large share of macroeconomic aggregates. Data on listed firms has been used in recent work to study the effects of various trade shocks on firms [Bloom et al., 2019, Hombert and Matray, 2018, Guadalupe and Wulf, 2010, Dorn et al., 2020].

extent to which a firm's industry and country exports intermediate inputs to the US or China. The use of cross–country firm–level data is particularly useful to identify transmission channels that are obscured in macroeconomic data.[4]

Section 2 describes the various datasets used and provides a brief timeline of the events. Section 3.1 documents the total impact of trade exposure to China or to the US during the trade war. This impact is established based on a difference-in-differences framework comparing outcomes of firms with varying degrees of exposure to China and the US between the trade war period and the preceding years. Overall, firms in industries/countries with a high export exposure to China have seen on average lower revenue, profits and capital stocks during the trade war compared to the preceding period. Comparing firms at the 90th versus 10th percentiles of export exposure to China, the more exposed firms have had 3.9% lower revenue growth. This result can be explained by rest of the world countries in the sample exporting to China goods that are complements to US exports to China. It can also be explained by a lower demand for imported inputs by China as a consequence of a decline in Chinese exports to the US, and the results in the next section disentangle these two channels. In contrast, firms more exposed to the US economy have perfomed better in terms of revenue, profits and capital stocks, such that firms at the 90th percentile of exposure have had 6.1% higher revenue growth relative to firms at the 10th percentile. This can be explained by rest of the world firms being able to substitute Chinese exports to the US.[5,6] It is important to note that the fact that not only revenue but also capital stocks respond to the trade war could imply a more persistent effect on future sales even after trade war tariffs are reversed.

The impact of the trade war is quite heterogeneous across regions. Firms in Asia suffer a stronger negative impact from export exposure to China. At the same time, firms in the Americas benefit from export exposure to the US. I also find that the negative effect of export exposure to China and the positive effect of export exposure to the US are both driven by smaller firms.

Section 3.2 examines the effect of US and Chinese tariffs as well as the role of supply chain linkages. First, I find that the negative effect of export exposure to China is magnified for firms in industries facing larger increases in Chinese tariffs on US exports. This implies that the exports to China of countries in the sample are complements to US goods exported to China, such that a decline in US exports to China due to trade war tariffs implies lower demand for other countries' exports. I also find that the positive effect of export exposure to the US is larger for firms in industries in which US tariffs toward China have

[4] In this regard the methodological approach in this paper is similar to Forbes [2004] and Claessens et al. [2012] who study how financial crises in one region transmit to firms in the rest of the world.

[5] It is possible, in addition, that as US exports decline US demand for intermediate inputs also falls. affecting firms in the rest of the world through supply chain linkages. This channel would point in the opposite direction of the overall effect found empirically, so if it is present, it is dominated by the positive effect given by the ability to substitute Chinese exports.

[6] I demonstrate that these results are not driven by pre–existing trends, as export exposure to China or the US is not correlated with lagged changes in firm outcomes.

increased more. This suggests that the exports to the US of countries in the sample are substitutes to Chinese exports to the US.

Finally, I examine the role of supply chain linkages, which could also propagate the trade war to firms in the rest of the world. I ask whether export exposure to China or the US has had a differential impact on firms in industries and countries that export a large share of intermediate goods to each of these destinations. I find a negative impact for firms in the Americas and Europe in industries exporting larger fractions of intermediate inputs to the US.

All these results are robust to including or excluding steel and aluminum industries, controlling for exchange rate fluctuations and other macroeconomic shocks using fixed effects, controlling for changes in US and Chinese tariffs toward rest of the world countries, and controlling for rest of the world retaliatory tariffs toward the US.

Contribution to the Literature This paper contributes to a growing literature on the 2018-2019 trade war. Most of this literature has focused on estimating the impact of the trade war on the US economy. Fajgelbaum et al. [2020] estimate import demand and export supply elasticities using variation in US and trading partners' tariffs and quantify the impact of the 2018 tariff increases on the US economy, finding an aggregate welfare loss of 0.04% of GDP. Amiti et al. [2019] estimate the response of prices of US imports to US tariffs during the same period, finding a complete passthrough. In addition, they find a reduction in imported varieties and large adjustments in supply chains as a consequence of these tariffs.[7]

Firm–level studies of the trade war have focused on Chinese firms. Benguria et al. [forthcoming] conclude the trade war raised the degree of trade policy uncertainty faced by Chinese firms, which in turn had a negative impact on capital stocks. Huang et al. [2022] examine the stock market response of US firms to the announcement of the initial round of tariffs on China, finding that dependence on trade with China is associated to lower stock and bond returns around this episode.

This paper is also related to recent work by Fajgelbaum et al. [2021], who study the response of rest of the world exports to the trade war. Consistent with my findings, they observe a decline in rest of the world exports to China and an increase in exports to the US as a result of tariffs imposed by the US and China on each other.

Finally, this paper also contributes to work that investigates the transmission of other shocks or policies in one country to firms throughout the world. For example, Forbes [2004] studies the transmission

[7] Other work studies the impact of trade war tariffs on trade flows and prices. Cavallo et al. [2021] documents the response of border and retail prices. Handley et al. [2020] examine the impact of US import tariffs on US exports. Flaaen et al. [2020] document the impact of tariffs on washing machines on prices and production relocation. Benguria and Saffie [2019] study the mechanisms through which the trade war depressed US exports.

of the East Asian and Russian financial crises of the late 1990s, while Claessens et al. [2012] document the transmission of the 2008-2009 global financial crisis. While those papers study the transmission of financial crises, my paper is the first to use a similar approach to study the global impact of trade policies.

2 Data Sources and Context

This paper uses quarterly data on 5,536 listed firms in 40 countries. These data are combined with measures of trade linkages to China and the US based on each firm's country and industry. Using product–level tariff schedules, I also construct measures of exposure to changes in US and Chinese trade war tariffs on each other as well as US and Chinese tariffs on each country in the sample. Finally, to assess the role of supply chain linkages, I construct measures of the extent to which each industry in each country exports intermediate inputs to the US and China. I first provide some context on the US and Chinese trade policies and later describe the construction of the dataset in detail.

2.1 Context: The Trade War

During 2018 and 2019 US trade policy changed its course breaking with a decades–long trend toward trade liberalization.[8] In January 2018 the US imposed global safeguard tariffs on imports of solar panels and washing machines. Next, in March 2018 the US enacted tariffs on steel and aluminum on all trading partners based on a national security argument.[9] This gave rise to retaliatory tariffs on US exports imposed by China, the European Union, Canada, and Mexico, among others.[10]

In the following months, changes in trade policy were focused exclusively on China. Following an investigation on "China's laws, policies, practices, or actions... that may be harming American intellectual property rights, innovation, or technology development", the US imposed additional tariffs on broad sets of imports from China in July, August and September 2018. Each of these rounds led to immediate retaliatory tariffs by China. By the end of 2018, US trade war tariffs targeted approximately $250 billion in Chinese imports, while Chinese tariffs applied to about $110 billion in US exports.[11] After inconclusive negotiations to end the trade war, the US further raised tariff rates on the September 2018 tariff list in May 2019. China retaliated in June 2019, also raising the tariff rates on its September 2018 list. Finally, the US announced tariffs on a $300 billion list to be imposed in September and

[8] See Bown and Kolb [2019] for an excellent and detailed timeline of trade war policies.

[9] Some countries including Canada, Mexico and the European Union were temporarily exempt from these tariffs, until June 2018.

[10] Steel and aluminum tariffs imposed by the US on Canada and Mexico were lifted in May 2019, at which point the retaliation by these countries also ended.

[11] These values are calculated based on 2017 imports. These values exclude US trade war tariffs imposed on all countries.

December 2019, of which only the September list went into effect (accounting for $112 billion). China retaliated again on a $75 billion list, of which only a first part went into effect. By the end of 2019, further escalation ceased. At that point, 72% of US imports from China were covered by these trade war tariffs, while 97% of Chinese imports from the US were affected. During 2018 and 2019, aside from imposing retaliatory tariffs on the US, China reduced its MFN tariffs toward all partners.

2.2 Listed Firms Across the Globe

The firm–level dataset is obtained from COMPUSTAT Global and COMPUSTAT North America. It contains data on every listed firm in 40 countries in all continents.[12,13] I use data from 2014 to 2019. The list of countries included and the number of firms in each one are shown in Appendix Table A.1. The outcome variables used throughout the paper are revenue, profits and capital stocks. Operating profits are defined as the difference between revenue and the cost of goods sold (COGS in COMPUSTAT). Capital stocks are defined as "property, plant and equipment" capital (PPENT in COMPUSTAT).[14] Firms' industries are defined based on four-digit SIC codes, which are assigned to firms based on their main line of business, as reported by COMPUSTAT. The analysis below is restricted to firms in the manufacturing sector.[15] The resulting panel of firms is similar, in terms of the number of firms and countries represented, to Forbes [2004] and Claessens et al. [2012], who use these type of data to study the effects of financial crises.

2.3 Trade Exposure to the US and China

Trade linkages to the US and China are defined at the industry × country level and assigned to firms based on their main industry of activity and the country where they are located.[16] In any given country c, an industry i's export exposure to the US (or China) is defined as the share of output exported to the US (eq. 1) or China (eq. 2). In Appendix Section A.1 I define similar measures of import exposure to

[12] COMPUSTAT North America is used only to obtain data on Canadian firms.

[13] I exclude from the dataset countries with very few listed firms and very small economies (such as Bermudas, Luxembourg, etc.). I also exclude countries with missing trade or production data (which are used below to construct trade exposure measures), such as Argentina and Taiwan.

[14] This measure of capital stocks does not consider intangible capital. This restriction is based on data availability. It follows Gutiérrez and Philippon [2016] who have specifically used the COMPUSTAT PPENT variable as a measure of capital stocks and Pierce and Schott [2018] who also focus on tangible capital when studying the impact of trade policy on investment.

[15] Commodity producers are omitted, first, because industry by country production data necessary to construct measures of trade exposure is not systematically available in a way that makes it comparable across industries and countries and second because these firms' outcomes depend primarily on commodity price cycles.

[16] Note that COMPUSTAT does not include data on firms' exports or imports.

capture the extent to which firms face import competition from the US or China.

$$X_{ic}^{US} = \frac{\text{Exports}_{ic}^{\text{US}}}{\text{Output}_{ic}} \tag{1}$$

$$X_{ic}^{CHN} = \frac{\text{Exports}_{ic}^{\text{CHINA}}}{\text{Output}_{ic}} \tag{2}$$

These measures are time-invariant and are constructed with data for 2011, previous to the start of the firm–level panel. In constructing exposure measures with data prior to the period analyzed I follow Claessens et al. [2012]. This prevents these measures of exposure to be affected by the events studied.

Measuring these trade linkages requires data on output, exports and imports at the industry × country level. To construct these variables I use industry–level data on output from UNIDO's INDSTAT database and industry–level exports and imports to China, the US and the world from COMTRADE. The output data is reported in ISIC (revision 3) 4–digit codes. In some cases output data from INDSTAT is not available for 2011, so data for the most recent year available is used. The trade data is extracted directly in 4–digit ISIC codes from COMTRADE.[17,18]

Appendix Table A.2 reports summary statistics of the export and import exposure variables.[19] It indicates that export exposure to the US is on average 0.089 (i.e. exports to the US are 8.9% of output), and is highest for the Americas followed by Asia and Europe. Export exposure to China is on average 0.03 and is highest for Asia, followed distantly by Europe and the Americas.

2.4 US and Chinese Tariffs

I construct industry–level measures of exposure to US tariffs on China, Chinese tariffs on the US, US tariffs on each country in the sample, and Chinese tariffs on each country in the sample. US tariffs on China and Chinese tariffs on the US increased during 2018 and 2019 as a result of trade war tariffs which are imposed on top of MFN tariffs. In addition, the US imposed tariffs on solar panels, washing machines, steel and aluminum on all of its trading partners.[20] China's tariffs on the 40 countries in my sample also varied, because China lowered MFN tariffs during this period. Data on each of these tariffs is obtained from Fajgelbaum et al. [2020], Li [2018]'s dataset on trade war tariffs, Bown et al. [2019] and the *WTO Tariff Download Facility*. All these tariffs were essentially flat from 2014 to 2017 and start

[17] While the trade data is originally reported in US dollars, output from INDSTAT is reported in countries' national currencies (or in euros in the case of Eurozone members). These values are transformed to US dollars using year-average exchange rates.

[18] Note that while most firms have a 4–digit SIC code associated to them, some have 3 or 2–digit codes instead. If a 4–digit code is not available but a 3–digit code is, I assign to that firm the average exposure measure across all 4–digit codes in the reported 3–digit code. If only a 2–digit code is available, again I average the exposure measures at that level.

[19] Note that these are unweighted means across manufacturing firms.

[20] As discussed earlier, a few countries were temporarily exempt from these tariffs.

changing substantially during 2018 and 2019.

I first compute the average monthly tariff of the US on each trading partner for each SIC 4–digit industry as a weighted average of monthly product (HS6)–level tariffs with weights equal to imported value in the baseline year of 2017.[21] I use HS6–level tariffs as a starting point because at that level the HS classification is comparable across countries.'[22] The US import tariff imposed on country c in industry i in month t is:

$$T_{cit}^{US} = \sum_{p \in i} \eta_{cp}^{US} \cdot \tau_{cpt}^{US} \tag{3}$$

where $\eta_{cp}^{US} = \frac{v_{cp}^{US}}{\sum_{p \in i} v_{cp}^{US}}$ is the share of value imported by the US for each HS6 product p in each industry i measured for each country c in 2017 and τ_{cpt}^{US} is the product (HS6)–level tariff applied on country c in month t. Note that product–level tariffs are the sum of MFN tariffs and additional trade war tariffs. In the same way, the Chinese import tariff for each country, industry and month is:

$$T_{cit}^{CHN} = \sum_{p \in i} \eta_{cp}^{CHN} \cdot \tau_{cpt}^{CHN} \tag{4}$$

with weights $\eta_{cp}^{CHN} = \frac{v_{cp}^{CHN}}{\sum_{p \in i} v_{cp}^{CHN}}$ equal to the share of value imported by China for each HS6 product p in each industry i measured for each country c in 2017.

Appendix Table A.3 reports summary statistics on these tariff exposure measures for the full sample of manufacturing firms as well as within regions. As seen in column 1, firms in Asia were the most exposed to increases of US tariffs on China. In contrast, firms in Europe were the most exposed to increases in Chinese tariffs on the US, but with smaller variation across regions (see column 3). Regarding changes in US tariffs toward the rest of the world, firms in Asia faced the largest increase. Finally, the reduction in Chinese MFN tariffs was more significant for firms in the Americas.

2.5 Intermediate Inputs

I also measure to what extent the exports by each industry in each country to the US and China consist of intermediate inputs. To this end, I use the World Input Output Database (WIOD) [Timmer et al., 2014]. The WIOD data reports, for each industry and exporting country, the value exported to each

[21] Note that in the original tariff lists products are defined at the HS 8–digit level. In practice, however, tariffs essentially vary across, but not within, HS 6–digit level codes. Consider for example the US $200 billion round of September 2018. Out of all the HS 6–digit products imported by the US from China, in 98.5% of them either all or none of the the HS 8–digit products contained in them were subject to tariffs. (This exercise is done using more disaggregate US product–level imports data from the Census Bureau).

[22] These tariff exposure measures are assigned to firms based on their SIC 4–digit industry. Because a fraction of firms in the sample report more aggregate SIC 3–digit or 2–digit industry codes, I construct equivalent tariff exposure measures at that level of aggregation for those firms.

importing industry (or for final consumption by households) in each destination country. I use data for 2012, which is the latest year available.[23] For each 2–digit SIC industry s and country c, I define the intermediate input shares:

$$\mathrm{I}_{sc}^{US} = \frac{\text{Exports of Int. Inputs}_{sc}^{US}}{\text{Total Exports}_{sc}^{US}} \tag{5}$$

and

$$\mathrm{I}_{sc}^{CHN} = \frac{\text{Exports of Int. Inputs}_{sc}^{CHN}}{\text{Total Exports}_{sc}^{CHN}} \tag{6}$$

I then assign this values to each firm based on their country and SIC 2–digit industry. For 14 countries in my sample, WIOD data is not available.[24] For these countries, I assign the average industry–level measure of I_{sc}^{US} and I_{sc}^{US} across all other countries in the sample.

Appendix Table A.4 reports summary statistics for these measures. The mean input share I_{sc}^{US} is 0.53 in the full sample, ranging from 0.47 for firms in Europe to 0.57 for firms in Asia. The mean input share I_{sc}^{CHN} is higher (0.64), implying that firms are in industries which export more intermediate inputs to China than to the US. It ranges from 0.51 for firms in Europe to 0.72 for firms in Asia, highlighting how firms in Asia are very integrated to China through supply chain linkages.

3 The Trade War's Global Impact

As a first step, I examine the effect of trade exposure to the US and China during the trade war on the outcomes of firms worldwide. I later expand the analysis focusing on the effect of trade war tariffs and of supply chain linkages in Section 3.2.

3.1 Trade Exposure to the US and China

To capture the impact of export exposure to the US and China, I analyze changes in firm outcomes (ΔY_f) between the period 2016–2017 (before the start of the trade war) and the period 2018–2019 (during the trade war). I estimate the following regression, in which the independent variables are the measures of export exposure which vary by industry and country, and are computed before the start of the trade war.[25] I control for demand and/or productivity shocks to different sectors in each country by including country × sector (at the SIC 2-digit level) fixed effects.[26] This implies that the identification is based on

[23] Industries in the WIOD data are very similar to ISIC revision 3 2–digit industries. They can be matched to ISIC 2–digit industries after grouping ISIC codes 15 (food and beverages) and 16 (tobacco products). I then use a concordance to obtain values for SIC 2–digit industries.

[24] These are Chile, Colombia, Israel, Jordan, Malaysia, Mauritius, Morocco, New Zealand, Peru, Singapore, South Africa, Sri Lanka, Tunisia, and Vietnam.

[25] These measures of export exposure were described by equations (1) and (2) in Section 2.

[26] These fixed effects control for country–level shocks including exchange rate fluctuations.

variation across 4-digit industries but *within* sectors in each country. I cluster standard errors by country and sector using multiway clustering.

$$\Delta Y_f = \beta_1 X_{ic}^{CHN} + \beta_2 X_{ic}^{US} + \nu_{cs} + \epsilon_f \tag{7}$$

Baseline Results The baseline estimates of equation (7) are shown in Table 1. Column 1 shows that firms in industries/countries with a high export exposure to China have had on average lower revenue in the trade war period, while firms with higher export exposure to the US economy have perfomed relatively better. The estimated coefficients imply that firms at the 90th percentile of export exposure to China have 3.9% lower revenue than those at the 10th percentile during the trade war relative to the preceding period. At the same time firms at the 90th percentile of export exposure to the US have 6.1% higher revenue relative to those at the 10th percentile. The identification of the coefficients in equation (7) relies on the absence of pre–existing trends. To show that this is the case, I replace the dependent variable for revenue growth between the periods 2014–2015 and 2016–2017 (i.e. before the trade war). The results, in Appendix Table A.5, rule out pre–existing trends.[27]

There are two alternative mechanisms that can explain the negative effect of export exposure to China. First, that on average countries in the sample export goods that are complements to US exports to China. This implies that Chinese trade barriers imposed on the US that reduce US exports to China also reduce Chinese demand for other countries' goods. Second, that the decline in Chinese exports to the US due to US tariffs on China lead to a lower demand for imported inputs by China. The empirical approach in Section 3.2, which examines tariffs and supply chain linkages, will be able to distinguish between these two alternatives. The positive effect of export exposure to the US implies that on average countries in the sample export goods that substitute Chinese exports to the US. This effect would dominate any potential decline in US demand for imported inputs caused by Chinese tariffs on US exports.

Next, I examine the impact of the trade war on firm profits and capital stocks. First, the impact on profits might differ from that on revenue if firms have adjusted their costs during the trade war. Second, the response of firms' capital stocks gives additional insights. The current trade policy environment has heightened uncertainty, and a large literature establishes that in the face of uncertainty firms can postpone investments.[28] Further, if there is a negative impact on capital stocks, this implies that even if trade war tariffs are reversed, their negative impact on economic activity can be longlasting.

The results of the estimation of equation (7) with profits as the dependent variable are shown in

[27] Fajgelbaum et al. [2021], who examine exports of the rest of the world to the US and China, use a similar approach to test for pre–existing trends.

[28] For the impact of the trade war on uncertainty see Chapter 1 in IMF [2018] as well as the analysis in Benguria et al. [forthcoming] for Chinese firms.

Table 1: Trade Exposure to the US and China and Firm Outcomes

	(1) Revenue	(2) Profits	(3) Capital
X_{ic}^{CHN}	-0.495***	-0.611***	-0.316**
	(0.157)	(0.187)	(0.129)
X_{ic}^{US}	0.220*	0.207*	0.203***
	(0.105)	(0.101)	(0.064)
Observations	5410	5086	6089

Notes: This table reports the results of the estimation of equation (7). Standard errors are clustered by country and two-digit industry using multiway clustering. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

column 2 in Table 1. The impact of the trade war on profits resembles closely the impact on revenue presented earlier. This indicates the trade war has impacted profits through revenue, not through costs. Firms at the 90th percentile of export exposure to China have 4.7% lower profits than those at the 10th percentile. In contrast, firms at the 90th percentile of export exposure to the US have 5.7% larger profits than those at the 10th percentile.

Column 3 in Table 1 shows the results for firms' capital stocks. Firms at the 90th percentile of export exposure to China have had capital stocks fall 2.4% relative to those at the 10th percentile. In contrast, capital at firms at the 90th percentile of export exposure to the US has increased by 5.6% relative to those at the 10th percentile. Lower capital stocks associated to export exposure to China as a consequence of the trade war could imply a persistent effect on future sales.

Regional Heterogeneity The impact of the trade war is highly heterogeneous across different regions of the world. In Table 2, the baseline regression is estimated separately for firms in Asia, Europe, and the Americas.[29] For firms in Asia (column 1), the negative impact of export exposure to China is statistically significant, and such that firms at the 90th percentile of exposure have 3.5% lower revenue relative to those at the 10th percentile. In contrast, this effect is not present for firms in Europe (column 2), or the Americas (column 3). One possible explanation for this results is that exports of Asian countries to China are complements to US exports to China to a larger extent than exports to China from other regions. Another explanation is that China has reduced its demand for inputs, and supply chain linkages to China are stronger in Asian countries.

The effect of export exposure to the US, in contrast, is positive, statistically significant, and very large for firms in the Americas (see column 3), such that firms at the 90th percentile of exposure have

[29]The Americas include North America (Canada and Mexico) and Central and South America. Asia includes Oceania (Australia). I do not report separate reports for Africa given the very small number of observations. The list of countries in each of these regions is found in Appendix Table A.1.

Table 2: Trade Exposure to the US and China and Firm Outcomes by Region

	(1) Asia	(2) Europe	(3) Americas
X_{ic}^{CHN}	-0.535*	-0.538	0.093
	(0.272)	(0.926)	(0.591)
X_{ic}^{US}	0.231	0.170	0.391***
	(0.164)	(0.188)	(0.091)
Observations	3008	1995	381

Notes: This table reports the results of the estimation of equation (7) splitting the sample by region. Standard errors are clustered by country and two-digit industry using multiway clustering. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

13.1% higher revenue compared to those at the 10th percentile. This effect is positive but not statistically significant for firms in Europe or Asia, which could be driven by differences in the type of good exported across regions.

Firm Heterogeneity Exposure to the trade war has also led to different impacts for firms of different sizes. In Table 3, I split the sample between firms with above or below median revenue (measured in 2016–2017) in each country.[30] For small firms, in column 1, the results show a large negative and statistically significant impact of export exposure to China on revenue, and a large positive effect of export exposure to the US.[31] For large firms, in contrast, the coefficients are not statistically significant.[32]

In the case, of profits (see columns 3 and 4), again the coefficients are larger and statistically significant for small firms, with the same signs as for the overall sample (in this case the coefficient on US export exposure is almost statistically significant at conventional levels). For large firms, only the negative effect of export exposure to China is statistically significant. For capital (in columns 5 and 6) export exposure to China is associated to a decline in capital stocks for both small and large firms, with a somewhat larger effect for small firms. One possible interpretation is that while the immediate effect on revenue is larger on small firms, both small and large firms respond to the uncertainty triggered by the trade war by freezing investment decisions.

[30] I compute whether firms have above or below median revenue *within* each country because the firm size distribution varies across countries. Large firms concentrate primarily in certain regions and differences in outcomes between large and small firms could be driven by regional differences.

[31] In the small firm sample, firms at the 90th percentile of export exposure to China have had revenue fall 9% relative to those at the 10th percentile. Firms at the 90th percentile of export exposure to the US have had revenue increase 11.9% relative to those at the 10th percentile.

[32] The fact that smaller firms' performance seems to respond more strongly to the trade war can be linked to work that finds that smaller firms are more ciclycal [Crouzet and Mehrotra, 2020].

Table 3: Trade Exposure to the US and China and Firm Outcomes by Firm Size

	(1)	(2)	(3)	(4)	(5)	(6)
	Revenue		Profits		Capital	
	Small	Large	Small	Large	Small	Large
X_{ic}^{CHN}	-1.137***	-0.120	-0.873***	-0.449**	-0.676***	-0.513**
	(0.355)	(0.202)	(0.144)	(0.213)	(0.044)	(0.181)
X_{ic}^{US}	0.435*	-0.048	0.317	0.030	0.109	0.105
	(0.225)	(0.056)	(0.184)	(0.135)	(0.176)	(0.108)
Observations	2596	2654	2311	2611	2548	2665

Notes: This table reports the results of the estimation of equation (7) splitting the sample between firms with above–median and below–median revenue in the initial period. Standard errors are clustered by country and two-digit industry using multiway clustering. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

3.2 The Effect of Tariffs and Supply Chain Linkages

Next, I explore in more depth the mechanisms through which the trade war has impacted firms worldwide. Specifically, I examine whether US tariffs on China and Chinese tariffs on the US have impacted firms in the rest of the world.

As in the previous section, I examine the change in firm outcomes between 2016–2017 and 2018–2019. I augment equation (7) by adding the interaction between export exposure to China and the change in Chinese tariffs toward the US between these two periods, $\Delta T_i^{CHN/US}$. This allows me to determine whether Chinese tariffs on the US allowed firms in other countries to substitute US exports in the Chinese market (or alternatively, if these firms produce complements to US exports). I also add the interaction between export exposure to the US and the change in US tariffs on China, $\Delta T_i^{US/CHN}$, to assess whether firms in my sample substitute or complement Chinese exports to the US. Finally, recall that US tariffs toward some of the countries in the sample also changed, as the US imposed tariffs on solar panels, washing machines, steel and aluminum products. To capture this effect, I include the interaction between US export exposure and US tariffs imposed on the country in which each firm is located, ΔT_{ic}^{US}. Finally, Chinese MFN tariffs were reduced during 2018–2019, so I include the interaction between export exposure to China and Chinese tariffs toward each country in the sample, ΔT_{ic}^{CHN}.[33] As before, I include country × sector (at the SIC 2-digit level) fixed effects and cluster standard errors by

[33] In practice, these tariffs vary across industries but not across countries.

country and sector using multiway clustering. This is shown in the following regression:

$$\begin{aligned}\Delta Y_f = &\beta_1 X_{ic}^{CHN} + \beta_2 \Delta T_i^{CHN/US} + \beta_3 X_{ic}^{CHN} \Delta T_i^{CHN/US} + \beta_4 \Delta T_{ic}^{CHN} + \beta_5 X_{ic}^{CHN} \Delta T_{ic}^{CHN} \\ &+ \beta_6 X_{ic}^{US} + \beta_7 \Delta T_i^{US/CHN} + \beta_8 X_{ic}^{US} \Delta T_i^{US/CHN} + \beta_9 \Delta T_{ic}^{US} + \beta_{10} X_{ic}^{US} \Delta T_{ic}^{US} \\ &+ \nu_{cs} + \epsilon_f \end{aligned} \tag{8}$$

Baseline Results The results for growth in firm revenue as the dependent variable are shown in column 1 in Table 4. The negative coefficient on the interaction term $X_{ic}^{CHN} \Delta T_i^{CHN/US}$ implies that the negative effect of export exposure to China was magnified for firms in industries in which Chinese tariffs on the US increased more. This suggests that rest of the world exports to China are on average complements to US exports. To convey the magnitude, consider that in industries at the 90th percentile in terms of the increase in Chinese tariffs toward the US, firms at the 90th percentile of export exposure to China have revenue growth 2.1% lower than firms at the 10th percentile of export exposure to China. In industries, at the 10th percentile in terms of the increase in Chinese tariffs, firms more exposed to China have higher growth (+4.8% p90/p10 difference).

Next, the positive coefficient on the interaction term $X_{ic}^{US} \Delta T_i^{US/CHN}$ means that the positive effect of export exposure to the US was larger for firms in industries in which US tariffs on China increased more. This indicates that rest of the world exports to the US are substitutes to US exports. The magnitude, once again, is substantial. In industries at the 90th percentile in terms of the increase in US tariffs toward China, firms at the 90th percentile of export exposure to the US have revenue growth 7.9% higher than firms at the 10th percentile of export exposure to the US. In industries, at the 10th percentile in terms of the increase in US tariffs, firms more exposed to the US have lower growth (-4.6% p90/p10 difference).

Note also that the coefficient on the interaction $X_{ic}^{CHN} \Delta T_{ic}^{CHN}$ is negative, implying that a firm exposed to China benefits from reductions in Chinese MFN tariffs. In the case of US tariffs on rest of the world countries, the effect is not statistically different from zero.[34]

Next, column 2 displays the results for growth in profits as the dependent variable, which are very similar to the case of revenue. The results for capital stocks in column 3 are different. There appears to be no effect from either Chinese tariffs on the US or US tariffs on China. This result suggests that the negative effect of export exposure to China and the positive effect of export exposure to the US on capital discussed in Section 3 is not driven by tariffs. Instead, the trade war might have raised uncertainty across all industries. This could lead to a pause in investment decisions in industries exposed to China or the US, beyond the effect of tariffs.

[34]This could be due to the fact that US tariffs to rest of the world countries were concentrated on very few industries.

Table 4: Trade Exposure, Tariffs, and Firm Outcomes

	(1) Revenue	(2) Profits	(3) Capital
X_{ic}^{CHN}	0.471	0.112	0.514
	(0.469)	(0.333)	(0.783)
$\Delta T_i^{CHN/US}$	0.004**	0.003	0.003
	(0.002)	(0.002)	(0.005)
$X_{ic}^{CHN} \times \Delta T_i^{CHN/US}$	-0.059*	-0.053	-0.022
	(0.034)	(0.034)	(0.060)
X_{ic}^{US}	-0.166	-0.190*	0.009
	(0.130)	(0.102)	(0.134)
$\Delta T_i^{US/CHN}$	-0.004	-0.004*	0.003
	(0.003)	(0.002)	(0.004)
$X_{ic}^{US} \times \Delta T_i^{US/CHN}$	0.020*	0.022**	-0.002
	(0.010)	(0.010)	(0.017)
$X_{ic}^{US} \times \Delta T_{ic}^{US}$	0.021	0.063	0.065
	(0.106)	(0.077)	(0.052)
ΔT_{ic}^{US}	0.002	-0.006*	-0.003
	(0.004)	(0.004)	(0.004)
ΔT_{ic}^{CHN}	-0.005	-0.000	-0.022**
	(0.007)	(0.006)	(0.009)
$X_{ic}^{CHN} \times \Delta T_{ic}^{CHN}$	-0.127*	-0.220***	-0.031
	(0.075)	(0.070)	(0.157)
Observations	5410	5086	6089

Notes: This table reports the results of the estimation of equation (8). Standard errors are clustered by country and two-digit industry using multiway clustering. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

As in Section 3, I verify that these results are not due to pre–existing trends by estimating equation (8) with lagged dependent variables, computed as changes between 2014–2015 and 2016–2017. The results for revenue, profits, and capital stocks in Table A.6 do not show signs of pre–existing trends.[35]

Supply Chains An alternative transmission mechanism of the effect of the US–China trade war on other economies is related to supply chain linkages. A decline in Chinese or US exports can also imply reduced demand for imported inputs sourced from a variety of countries. To examine this mechanism, I augment equation (8) adding the interaction between export exposure to China and the share of exports that are intermediate inputs corresponding to each firm's industry and location. In the same way, I include an interaction term between export exposure to the US and the share of exports that are inter-

[35]These results do show a pre-existing trend in US or Chinese tariffs toward rest of the world countries, but not in the coefficients of interest: the effect of US tariffs on China and Chinese tariffs on the US.

mediate inputs corresponding to each firm's industry and location.[36,37]

$$\begin{aligned}\Delta Y_f = &\beta_1 X_{ic}^{CHN} + \beta_2 \Delta T_i^{CHN/US} + \beta_3 X_{ic}^{CHN} \Delta T_i^{CHN/US} + \beta_4 \Delta T_{ic}^{CHN} + \beta_5 X_{ic}^{CHN} \Delta T_{ic}^{CHN} \\ &+ \beta_6 X_{ic}^{US} + \beta_7 \Delta T_i^{US/CHN} + \beta_8 X_{ic}^{US} \Delta T_i^{US/CHN} + \beta_9 \Delta T_{ic}^{US} + \beta_{10} X_{ic}^{US} \Delta T_{ic}^{US} \\ &+ \beta_{11} X_{ic}^{CHN} I_{sc}^{CHN} + \beta_{12} I_{sc}^{CHN} + \beta_{13} X_{ic}^{US} I_{sc}^{US} + \beta_{14} I_{sc}^{US} + \nu_{cs} + \epsilon_f \end{aligned} \tag{9}$$

The results for the estimation of regression (9) are shown in Table 5. The results indicate that the interaction between export exposure to the US and the intermediate input share of exports to the US, as well as the interaction between export exposure to China and the intermediate input share of exports to China are not statistically significant. However, Appendix Table A.7 splits the sample by regions and shows that the interaction between export exposure to the US and the intermediate input share of exports to the US is negative and statistically significant for firms in both Europe and the Americas. For firms in the Americas, for example, the magnitude is such at the 90th percentile of the input share measure, firms at the 90th percentile of export exposure to the US have 39% lower revenue than those at the 10th percentile of export exposure during the trade war relative to the preceding period. In contrast, for firms at the 10th percentile of the input share measure, firms more exposed to the US have higher growth (+8.7% p90/p10 difference). This implies that supply chain linkages are a relevant transmission channel of the US–China trade war to these regions. More disaggregate data, not currently available in a systematic and internationally comparable way, could help examine this issue further.

Extensions and Robustness The Appendix presents a set of extensions and robustness checks. First, US tariffs on China could cause an increase in Chinese exports to rest of the world countries, affecting especially firms in industries with high import exposure to China. Similarly, Chinese tariffs on the US could affect sectors with high import exposure to the US. I augment equation (8) including measures of import exposure to the US and China, as well as the interaction between Chinese import exposure and US tariffs on China as well as between US import exposure and Chinese tariffs on the US. The results show that the coefficients capturing this channel are not statistically significant.

Second, I show that the results are robust to excluding the steel and aluminum industries, which were the main sector on which the US imposed tariffs on all countries.

Third, several countries including Canada, Mexico and the European Union imposed retaliatory tariffs on the US. I augment equation (8) controlling for the change in rest of the world retaliatory tariffs

[36] It is not necessary to include the intermediate input shares by themselves (beyond the interaction term). The country × sector fixed effects absorb them, given that the input shares vary by sector.

[37] Ideally, one could track how US tariffs in a certain industry impact firms in upstream industries in the rest of the world. However, these is not feasible with existing data, given the WIOD input-output tables are far too aggregate for this purpose.

Table 5: Trade Exposure, Tariffs, Supply Chain Linkages, and Firm Outcomes

	(1) Revenue	(2) Profits	(3) Capital
X_{ic}^{CHN}	0.168	-0.391	1.115
	(0.739)	(0.524)	(1.091)
$\Delta T_i^{CHN/US}$	0.004*	0.002	0.003
	(0.002)	(0.002)	(0.005)
$X_{ic}^{CHN} \times \Delta T_i^{CHN/US}$	-0.062	-0.060	-0.024
	(0.038)	(0.038)	(0.061)
X_{ic}^{US}	-0.055	0.092	0.145
	(0.195)	(0.365)	(0.296)
$\Delta T_i^{US/CHN}$	-0.004	-0.004*	0.003
	(0.003)	(0.002)	(0.004)
$X_{ic}^{US} \times \Delta T_i^{US/CHN}$	0.020*	0.020*	-0.005
	(0.011)	(0.011)	(0.020)
$X_{ic}^{US} \times \Delta T_{ic}^{US}$	0.023	0.070	0.072
	(0.104)	(0.076)	(0.051)
ΔT_{ic}^{US}	0.002	-0.006*	-0.004
	(0.004)	(0.003)	(0.004)
ΔT_{ic}^{CHN}	-0.005	-0.000	-0.022**
	(0.007)	(0.006)	(0.009)
$X_{ic}^{CHN} \times \Delta T_{ic}^{CHN}$	-0.126	-0.208**	0.011
	(0.080)	(0.084)	(0.183)
$X_{ic}^{CHN} \times I_{sc}^{CHN}$	0.576	0.992	-0.986
	(1.106)	(0.811)	(0.717)
$X_{ic}^{US} \times I_{sc}^{US}$	-0.214	-0.548	-0.269
	(0.309)	(0.629)	(0.388)
Observations	5410	5086	6089

Notes: This table reports the results of the estimation of equation (9). Standard errors are clustered by country and two-digit industry using multiway clustering. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

toward the US, and find that the baseline results are robust.

4 Conclusions

In this paper I document the impact of the US–China trade war on the performance of firms throughout the rest of the world and examine the transmission channels involved. Based on data on listed firms in 40 countries I first establish that firms with a higher extent of export exposure to China have lower revenue, profits and capital stocks in the trade war period relative to the preceding years. This effect is stronger in industries in which China's tariffs on the US increased by more, suggesting that rest of the world firms export to China goods that complement US exports. I also find that export exposure to the US is associated to better performance. Again, this effect is larger in industries in which US tariffs on China increased by more, indicating that rest of the world firms export to the US goods that substitute Chinese exports.

I also emphasize the heterogeneity in the effects of the trade war. Firms in Asia are hurt the most from export exposure to China, while firms in the Americas benefit from US export exposure. In addition, smaller firms are more responsive to the trade war.

Finally, I examine the role of supply chain linkages, finding that firms in Europe and the Americas in industries selling intermediate inputs to the US had a relative decline in revenue during the trade war. Use of more disaggregate data, perhaps for a single country, would be valuable to explore this channel further.

A final consideration is that these results do not capture the total welfare impact of the trade war on other countries, focusing exclusively on the impact on firm revenue, profits and capital stocks. Measuring the consequences for foreign consumers, or measuring the total welfare impact of the trade war remains a task for future research.

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A Appendix (For Online Publication)

A.1 Import exposure

US tariffs on China could have caused an increase in Chinese exports to rest of the world countries, affecting primarily sectors with high import exposure to China. Similarly, Chinese tariffs on the US could have caused an increase in US exports to the rest of the world, with a larger impact on industries with high import exposure to the US.

To measure this impact, I construct the following measures of import exposure to the US and China defined as imports from the US over domestic absorption or imports from China over domestic absorption. The data used to construct these measures was described in Section 2.3.

$$\mathrm{M}_{ic}^{US} = \frac{\mathrm{Imports}_{ic}^{\mathrm{US}}}{\mathrm{Output}_{ic} + \mathrm{Imports}_{ic} - \mathrm{Exports}_{ic}} \tag{10}$$

$$\mathrm{M}_{ic}^{CHN} = \frac{\mathrm{Imports}_{ic}^{\mathrm{CHINA}}}{\mathrm{Output}_{ic} + \mathrm{Imports}_{ic} - \mathrm{Exports}_{ic}} \tag{11}$$

I then extend equation (8) by adding these measures of import exposure to the US and China, as well as the interaction i) between Chinese import exposure and US tariffs on China and ii) between US import exposure and Chinese tariffs on the US.

$$\begin{aligned}\Delta Y_f = {} & \beta_1 \mathrm{X}_{ic}^{CHN} + \beta_2 \Delta T_i^{CHN/US} + \beta_3 \mathrm{X}_{ic}^{CHN} \Delta T_i^{CHN/US} + \beta_4 \Delta T_{ic}^{CHN} + \beta_5 \mathrm{X}_{ic}^{CHN} \Delta T_{ic}^{CHN} \\ & + \beta_6 \mathrm{X}_{ic}^{US} + \beta_7 \Delta T_i^{US/CHN} + \beta_8 \mathrm{X}_{ic}^{US} \Delta T_i^{US/CHN} + \beta_9 \Delta T_{ic}^{US} + \beta_{10} \mathrm{X}_{ic}^{US} \Delta T_{ic}^{US} \\ & + \beta_{11} \mathrm{X}_{ic}^{CHN} \Delta T_i^{US/CHN} + \beta_{12} \mathrm{X}_{ic}^{US} \Delta T_i^{CHN/US} + \nu_{cs} + \epsilon_f \end{aligned} \tag{12}$$

The results are shown in column 3 in Table A.8. They indicate that this was not a relevant channel, which is consistent with the slow and incomplete reallocation of US and Chinese exports found in the literature [Benguria and Saffie, 2019].

A.2 Excluding steel and aluminum industries

The US has set various tariffs on steel and aluminum industries for various partners at different points in time. The baseline results in column 1 in Table 4 are robust to excluding firms in these industries from the sample as seen in column 1 in Table A.8.

A.3 Controlling for changes in rest of the world tariffs

In response to US tariffs on steel and aluminum, the European Union, Canada, and Mexico among other countries imposed retaliatory tariffs on several products exported by the US. I verify the robustness of the results to controlling for changes in these countries' tariff toward the US.

To this end I construct the following measure of the tariff toward the US of rest of the world country c in industry i at time t:

$$T_{cit}^{ROW/US} = \sum_{p \in i} \eta_{cp}^{ROW} \cdot \tau_{cpt}^{ROW/US} \tag{13}$$

with weights $\eta_{cp}^{ROW} = \frac{v_{cp}^{ROW}}{\sum_{p \in i} v_{cp}^{ROW}}$ equal to the share of value imported from the US for each HS6 product p in each industry i measured for each country c in 2017.

I then estimate equation (8) adding the change in each country's retaliatory tariff toward the US, $\Delta T_{cit}^{ROW/US}$. The results are shown in column 3 in Table A.8 and are very close to the baseline results in column 1 in Table 4 .

A.4 Appendix Tables and Figures

Table A.1: Number of Firms per Country

Country	Number of Firms	Region	Country	Number of Firms	Region
Australia	296	Asia	Malaysia	412	Asia
Austria	33	Europe	Mauritius	2	Africa
Belgium	55	Europe	Mexico	37	Americas
Brazil	76	Americas	Morocco	12	Africa
Bulgaria	22	Europe	Netherlands	42	Europe
Canada	215	Americas	New Zealand	6	Asia
Chile	28	Americas	Norway	51	Europe
Colombia	10	Americas	Peru	36	Americas
Denmark	53	Europe	Poland	250	Europe
Finland	64	Europe	Portugal	10	Europe
France	266	Europe	Russia	62	Asia
Germany	230	Europe	Singapore	167	Asia
Great Britain	302	Europe	South Africa	22	Africa
Greece	62	Europe	Spain	59	Europe
India	1570	Asia	Sri Lanka	28	Asia
Indonesia	185	Asia	Sweden	365	Europe
Ireland	11	Europe	Switzerland	35	Europe
Israel	73	Asia	Tunisia	3	Africa
Italy	144	Europe	Turkey	168	Asia
Jordan	36	Asia	Vietnam	38	Asia

Notes: This table reports the number of manufacturing firms in each of the 40 countries in the sample.

Table A.2: Summary Statistics of Export Exposure

	Mean	St. Dev	p10	p25	p50	p75	p90
Panel A: Export exposure to the US							
All	0.089	0.131	0.003	0.014	0.040	0.106	0.279
Asia	0.089	0.130	0.002	0.012	0.039	0.107	0.281
Europe	0.077	0.123	0.004	0.015	0.036	0.084	0.192
Americas	0.162	0.158	0.002	0.021	0.162	0.212	0.336
Panel B: Export exposure to China							
All	0.030	0.060	0.001	0.003	0.012	0.029	0.080
Asia	0.032	0.069	0.001	0.004	0.014	0.027	0.065
Europe	0.031	0.045	0.001	0.005	0.015	0.035	0.085
Americas	0.015	0.051	0.000	0.001	0.001	0.007	0.032

Notes: This table reports summary statistics across firms of the measures of export exposure to the US and China defined in equations (1) and (2). In each panel, the first row corresponds to the full sample of firms, while rows two through four break down the sample by region.

Table A.3: Summary Statistics of Tariff Exposure

	$\Delta T_i^{US/CHN}$		$\Delta T_i^{CHN/US}$		ΔT_{ic}^{US}		ΔT_{ic}^{CHN}	
	Mean	St. Dev	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
All	5.94	5.06	10.86	7.43	0.89	3.80	-1.80	2.37
Asia	6.12	4.79	10.80	6.70	1.28	4.61	-1.88	2.45
Europe	5.64	5.36	10.97	8.35	0.41	2.35	-1.66	2.27
Americas	5.95	5.35	10.81	7.76	0.33	2.13	-1.91	2.32

Notes: This table reports the mean and standard deviation across firms of the measures of exposure to tariff changes defined in equations (3) and (4). The first two columns correspond to US tariffs on China. The third and fourth columns refer to Chinese tariffs on the US. The fifth and sixth columns refer to US tariffs on the country in which each firm is located. Finally, the last two columns correspond to Chinese tariffs on the country in which each firm is located. The first row corresponds to the full sample of firms, while rows two through four break down the sample by region.

Table A.4: Summary Statistics of Intermediate Input Shares

	US		China	
	Mean	St. Dev	Mean	St. Dev.
All	0.53	0.25	0.64	0.23
Asia	0.57	0.26	0.72	0.21
Europe	0.47	0.23	0.51	0.21
Americas	0.54	0.25	0.63	0.26

Notes: This table reports the mean and standard deviation across firms of the measures of the share of intermediate inputs in the exports of each country and industry to the US or China, defined in equations (5) and (6). The first row corresponds to the full sample of firms, while rows two through four break down the sample by region.

Table A.5: Trade Exposure to the US and China and Lagged Firm Outcomes

	(1) Revenue	(2) Capital	(3) Profits
X_{ic}^{CHN}	-0.588	-0.396	0.012
	(0.345)	(0.293)	(0.317)
X_{ic}^{US}	0.275	0.109	0.037
	(0.189)	(0.193)	(0.187)
Observations	5022	4750	5856

Notes: This table reports the results of the estimation of equation (7) with the dependent variable equal to changes in firm outcomes between 2014–2015 and 2016–2017. Standard errors are clustered by country and two-digit industry using multiway clustering. ** and * indicate statistical significance at the 1% and 5% level.

Table A.6: Trade Exposure, Tariffs, and Lagged Firm Outcomes

	(1) Revenue	(2) Capital	(3) Profits
X_{ic}^{CHN}	1.264	-0.356	0.191
	(1.041)	(0.781)	(0.641)
$\Delta T_i^{CHN/US}$	0.004	0.001	0.005
	(0.003)	(0.004)	(0.003)
$X_{ic}^{CHN} \times \Delta T_i^{CHN/US}$	0.012	0.002	-0.038
	(0.049)	(0.042)	(0.029)
X_{ic}^{US}	0.621	0.084	0.128
	(0.437)	(0.202)	(0.136)
$\Delta T_i^{US/CHN}$	0.001	-0.002	0.003
	(0.004)	(0.004)	(0.003)
$X_{ic}^{US} \times \Delta T_i^{US/CHN}$	-0.019	-0.001	-0.014
	(0.016)	(0.018)	(0.014)
$X_{ic}^{US} \times \Delta T_{ic}^{US}$	0.055	0.043	0.091*
	(0.063)	(0.044)	(0.051)
ΔT_{ic}^{US}	0.000	0.012**	0.002
	(0.005)	(0.005)	(0.004)
ΔT_{ic}^{CHN}	-0.012**	-0.005	-0.001
	(0.006)	(0.008)	(0.008)
$X_{ic}^{CHN} \times \Delta T_{ic}^{CHN}$	0.236	-0.241	0.055
	(0.202)	(0.201)	(0.131)
Observations	5022	4750	5856

Notes: This table reports the results of the estimation of equation (8) with the dependent variable equal to changes in firm outcomes between 2014–2015 and 2016–2017. Standard errors are clustered by country and two-digit industry using multiway clustering. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

Table A.7: Trade Exposure, Tariffs, Supply Chain Linkages, and Firm Outcomes by Region

	(1) Asia	(2) Europe	(3) Americas
X_{ic}^{CHN}	0.524	-2.006	-0.134
	(0.441)	(2.194)	(3.232)
$\Delta T_i^{CHN/US}$	0.003	0.007*	-0.009
	(0.004)	(0.004)	(0.005)
$X_{ic}^{CHN} \times \Delta T_i^{CHN/US}$	-0.022	-0.088*	0.082
	(0.057)	(0.048)	(0.129)
X_{ic}^{US}	-0.206	1.079	0.789
	(0.313)	(0.720)	(0.462)
$\Delta T_i^{US/CHN}$	-0.001	-0.005	-0.006
	(0.004)	(0.004)	(0.010)
$X_{ic}^{US} \times \Delta T_i^{US/CHN}$	0.007	0.011	0.089*
	(0.009)	(0.019)	(0.043)
$X_{ic}^{US} \times \Delta T_{ic}^{US}$	0.201	-0.366	-0.151***
	(0.155)	(0.223)	(0.031)
ΔT_{ic}^{US}	-0.004	0.017	0.014
	(0.003)	(0.010)	(0.010)
ΔT_{ic}^{CHN}	-0.006	0.005	-0.023
	(0.007)	(0.016)	(0.028)
$X_{ic}^{CHN} \times \Delta T_{ic}^{CHN}$	-0.092	-0.324	0.115
	(0.068)	(0.296)	(0.465)
$X_{ic}^{CHN} \times I_{sc}^{CHN}$	-0.658	4.841	-0.379
	(1.091)	(2.989)	(2.695)
$X_{ic}^{US} \times I_{sc}^{US}$	0.384	-2.298**	-2.033**
	(0.491)	(1.033)	(0.565)
Observations	3008	1995	381

Notes: This table reports the results of the estimation of equation (9) splitting the sample by region. Standard errors are clustered by country and two-digit industry using multiway clustering. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

Table A.8: Trade Exposure, Tariffs, and Firm Outcomes: Extensions and Robustness

	(1) Excl. Steel and Alum.	(2) Control for ROW Retaliation	(3) Incl. Imp. Exposure
X_{ic}^{CHN}	0.504	0.470	0.316
	(0.445)	(0.473)	(0.600)
$\Delta T_i^{CHN/US}$	0.004*	0.004*	0.004
	(0.002)	(0.002)	(0.003)
$X_{ic}^{CHN} \times \Delta T_i^{CHN/US}$	-0.059*	-0.059*	-0.050
	(0.033)	(0.035)	(0.044)
X_{ic}^{US}	-0.184	-0.166	-0.240
	(0.125)	(0.130)	(0.159)
$\Delta T_i^{US/CHN}$	-0.004	-0.004	-0.003
	(0.003)	(0.003)	(0.002)
$X_{ic}^{US} \times \Delta T_i^{US/CHN}$	0.020**	0.020*	0.027*
	(0.010)	(0.010)	(0.015)
$X_{ic}^{US} \times \Delta T_{ic}^{US}$	0.025	0.021	0.026
	(0.108)	(0.106)	(0.113)
ΔT_{ic}^{US}	0.002	0.002	0.003
	(0.004)	(0.004)	(0.004)
ΔT_{ic}^{CHN}	-0.005	-0.005	-0.004
	(0.007)	(0.007)	(0.007)
$X_{ic}^{CHN} \times \Delta T_{ic}^{CHN}$	-0.114	-0.127	-0.151**
	(0.070)	(0.075)	(0.073)
$\Delta T_{ic}^{ROW/US}$		0.000	
		(0.002)	
M_{ic}^{CHN}			-0.071
			(0.324)
$M_{ic}^{CHN} \times \Delta T_i^{US/CHN}$			-0.015
			(0.015)
M_{ic}^{US}			0.239
			(0.185)
$M_{ic}^{US} \times \Delta T_i^{CHN/US}$			-0.001
			(0.025)
Observations	5221	5410	5410

Notes: Columns 1 and 2 report the estimation of equation (8) excluding steel and aluminum industries (column 1) and controlling for rest of the world retaliatory tariffs on the US (column 2). Column 3 reports the estimation of equation (12). Standard errors are clustered by country and two-digit industry using multiway clustering. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.