Beyond Tariffs: How did China's State–Owned Enterprises Shape the US–China Trade War? *

Felipe Benguria † Felipe Saffie ‡

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Abstract

We study the role played by Chinese state–owned firms during the US–China trade war. Based on measures constructed from Chinese firm–level customs microdata, we show that the presence of state–owned enterprises (SOEs) in Chinese imports led to a large negative impact on US exports in addition to the effect of tariffs. Abstracting from general equilibrium effects, while tariffs account for a 9% decline in US exports to China, the SOE effect accounts for a 6% decline. This effect was concentrated in the last several months of 2018, point at which a vast majority of products had been already targeted by tariffs. Further, the impact of Chinese SOEs effect was concentrated among agricultural goods, industrial supplies, and among industries located in US regions with a high share of republican votes. We also find that US exports were rerouted to the rest of the world in response to Chinese tariffs, but not in response to reduced imports by Chinese SOEs.

Keywords: Trade war, Trade policy, Tariffs, US Exports, State–Owned Enterprises

JEL classification: F1

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†Department of Economics, University of Kentucky (fbe225@uky.edu).

‡Darden School of Business, University of Virginia and NBER (SaffieF@darden.virginia.edu).

1 Introduction

In a major departure from its long–standing trade policies, in 2018 the US became engaged in an unprecedented trade war with China. In this paper, we document how Chinese state–owned enterprises (SOEs) shaped the impact of the trade war on US exports. While the literature has emphasized the role of tariffs, our findings highlight the use of state–owned enterprises as an additional and so far overlooked tool of trade policy. At a time of rising protectionism and geopolitical fragmentation, understanding the role of SOEs as a trade barrier has become particularly relevant.

Chinese SOEs account for about a fifth of Chinese imports from the US.[1] These firms, under government control, could presumably have been used as a trade barrier against US exports in addition to tariffs, as anecdotal evidence has implied.[2] As a suggestive example, Figure 1 plots US exports of crude petroleum oil to China and to the rest of the world. As Bown and Lovely [2020] point out, state–owned enterprises import the bulk of energy products to China, and for this specific product the SOE import share is 100% (measured in 2015). This product did not face retaliatory Chinese tariffs up to the end of our sample, yet the figure shows how US exports to China fell substantially and suddenly (coinciding with the timing of the first broad round of tariffs in mid 2018), and were actually equal to zero in the months of August through October 2018 and in January 2019.

To analyze the role of Chinese SOEs formally and systematically, we exploit variation across products in the presence of Chinese state–owned firms as importers from the US using measures constructed from restricted–use customs data.[3] We find, indeed, that after controlling for the effect of tariffs, US exports fell relatively more during the trade war in products with a high Chinese import share by state–owned enterprises. We calculate that, abstracting from general equilibrium effects, the effect of SOEs led to a 6% decline in US exports to China. In comparison, Chinese tariffs explain a 9% decline. The decline in US exports of "high–SOE–share" products was concentrated during the months of September through December of 2018. This interval coincides with a period during which Chinese authorities were "running out" of products to apply tariffs on, and its end coincides with the negotiations that froze the tariff escalation temporarily.[4] As further evidence of this SOE effect, we see that Chinese imports from

[1] Based on data for 2015, the latest year available, Chinese state–owned firms participate in 22% of all Chinese imports from the US.

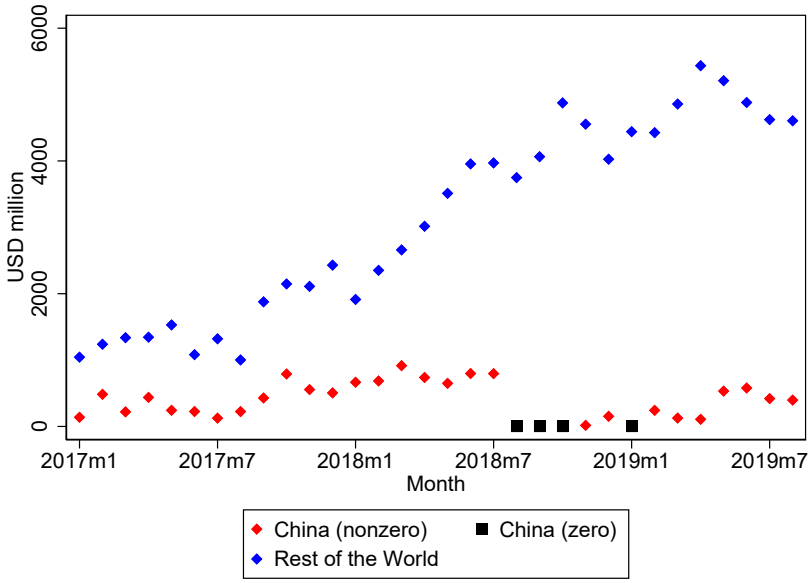
[2] For example, press reports indicate that the Chinese government instructed state–owned enterprises to halt purchases of soybeans in the midst of the trade war. See: https://www.cnbc.com/2020/06/01/china-asks-state-firms-to-halt-purchases-of-us-soybeans-pork-sources-say.html

[3] We rely on variation across products in the share of Chinese imports from the US imported by SOEs in 2015 (the latest year available). After the trade war, Chinese authorities have stopped publishing trade by SOE status at the product level, nor has firm–level customs data corresponding to the trade war period been released.

[4] By September 2018, China had imposed tariffs on 93.5% of HS10 products imported from the US, accounting for 71.2% of

sources other than the US in products with a high SOE-share increased during the trade war, especially in periods in which imports from the US fell more.

Figure 1: US exports of crude petroleum oil to China and to the rest of the world



Notes: This figure plots US exports of crude petroleum oil (HS 4-digit code 2709) to China and to the rest of the world. For exports to China, months with exports equal to zero are marked in black. This product had a 100% state-owned firm import share in 2015.

This SOE effect was heterogenous across sectors, and was concentrated among agricultural goods and industrial supplies. We also find evidence suggestive of the SOE effect being politically–guided. We construct a measure of the extent to which industries' employment in the US is located in republican–voting areas, and find that the SOE effect is associated to a decline in US exports only among "republican industries". This complements the evidence on tariffs shown by Fajgelbaum et al. [2020] and Fetzer and Schwarz [2021] who find that retaliatory tariffs targeted republican counties.

We conduct a number of robustness checks. Our results are robust to controlling for different fixed effects and to clustering standard errors along different dimensions. Further, an event–study estimation approach allows us to rule out pre-existing trends. We also show our results are not driven by the oil sector, which has quite volatile prices. In addition, we use a triple–interaction specification showing that the decline in US exports in products with high SOE shares was particular to exports to China. Finally, we take into account that about 14% of US exports to China are subject to China's processing trade customs regime, and about 24% occur under related–party trade. Our results are robust to excluding

value imported in 2017. After the G20 summit in December 2018, the US and Chinese presidents agreed to halt the escalation of tariff rates (scheduled for January 1 2019) for 90 days.

products with high–shares of exports under either of these categories.

In the last part of the paper, we examine the ability of the US to reroute exports to other destinations in response to the action of Chinese SOEs. Looking at US exports to the rest of the world (i.e. excluding China), and controlling for tariffs at the destination, we find that products facing Chinese tariffs saw an increase in exports to other destinations during the trade war. In contrast, we find that US exports in products sold to Chinese SOEs did not experience significant rerouting to other countries. An interpretation for this result is that compared to tariffs, the action by SOEs is less salient or transparent from the standpoint of a US exporting firm. In addition, the duration of SOEs actions might be more uncertain than in the case of tariffs. In fact, we documented that the reduction in US exports in high–SOE products appears to be concentrated in the last few months of 2018. All this could drive the result that, differently from tariffs, there is no "escaping" the actions of SOEs.

Summing up, we find that SOEs played an important role during the trade war, which was quantitatively similar to that of tariffs. However, SOEs have so far been absent from the analysis of trade policy, both in this and in other contexts. Our findings imply that SOEs should play a more central role in our understanding of the effects of trade policy. This is especially true in the context of developing countries, in which state–owned enterprises are ubiquitous [Kowalski et al., 2013].

Contribution to the literature Our paper contributes to a growing literature studying the consequences of the US–China trade war. This literature has both quantified the consequences of these policies on US welfare and analyzed their impact on trade flows [Fajgelbaum et al., 2020, Amiti et al., 2019, Cavallo et al., 2021, Benguria and Saffie, 2024, Handley et al., forthcoming].[5] Regarding the trade war's impact on US exports, Amiti et al. [2019] and Fajgelbaum et al. [2020] analyze US exports to the world as a whole, finding a negative impact of foreign retaliatory tariffs and little impact on export unit values. Cavallo et al. [2021] study tariff pass–through on export prices using data from the Bureau of Labor Statistics' (BLS) International Price Program, and find an incomplete tariff pass–through, driven by undifferentiated products. Benguria and Saffie [2020] document the reallocation of US exports in response to Chinese tariffs, and emphasize the role of financial frictions and relationship stickiness in shaping that reallocation. Finally, Handley et al. [forthcoming] focus on the impact of US tariffs on US exports to all destinations through input–output linkages. Building on this literature, the key differentiating

[5]Other important work assessing the impact of the trade war includes Flaaen et al. [2020]'s study of import tariffs on washing machines imposed on various US trading partners between 2012 and 2018; Amiti et al. [2020a]'s analysis of the impact on US investment; Blanchard et al. [2024]'s assessment of the political effects of the trade war on the US; Flaaen and Pierce [forthcoming]'s analysis of its impact on US manufacturing; and Benguria and Saffie [2020]'s study of its impact on US local labor markets. Additionally, Benguria et al. [2022] and Chor and Li [2024] document its impact on the Chinese economy.

factor of our work is the focus on the role of Chinese state–owned enterprises, which as we show act as an additional instrument of trade policy and have not been studied as such in the existing literature (neither in this or other episodes).

More broadly, our work also connects to work on the decoupling between the US and China, and on international fragmentation along geopolitical lines. Alfaro and Chor [2023] explore the reallocation of US supply chains in response to recent geopolitical shocks. Aiyar et al. [2024] study the impact of geopolitical events on foreign direct investment. Crosignani et al. [2024] show that trade relationships between US firms and Chinese suppliers are broken by US export controls. Finally, Freund et al. [2023] document patterns of US–China decoupling in response to recent trade policy.

2 Data sources

To analyze the impact of the trade war on US exports, we use a panel of trade flows and tariffs, combined with data on the prevalence of SOEs in Chinese imports from the US. We sketch our data sources here and provide further details in Appendix A.1.

Trade flows and tariffs We use a monthly panel of US export values, quantities and unit values by HS10 product and destination which spans the period from January 2016 to August 2019. MFN and retaliatory foreign tariffs are obtained from Fajgelbaum et al. [2020]. In addition, we use data from Bown et al. [2019] on reductions in China's MFN tariffs at various points in 2018 and 2019 and the suspension of trade war tariffs on certain products in January 2019. We also consider the increase in trade war tariff rates by China imposed in June 2019.

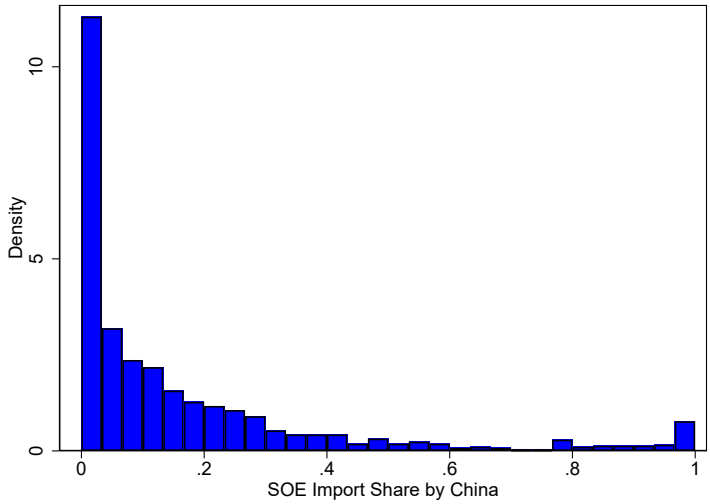
China's imports by state–owned firms We use confidential firm–level Chinese customs data to create product–level measures of import shares by state–owned firms. The raw data reports imports by firm, source country, and product and distinguishes state–owned firms from the rest. We use the most recent available year, 2015. For each HS4 product, we define the share of Chinese imports from the US imported by state–owned firms as follows:

$$\text{Share SOE}_p = \frac{\text{Imports SOE}_p}{\text{Total Imports}_p}. \tag{1}$$

We have verified the resulting shares match exactly the tabulations that Bown and Lovely [2020] and Hammer and Jones [2018] report for some specific sectors. Figure 2 provides an histogram for this

measure across HS4 products showing wide variation in this measure, and Appendix Table A.1 reports summary statistics. Further, Appendix Table A.2 lists the sectors with the highest and lowest SOE shares.

Figure 2: Histogram of the import share by state-owned enterprises across HS4 sectors for Chinese imports from the US



Notes: This figure plots an histogram of the distribution across HS4 sectors of the share of Chinese imports from the US imported by SOEs in 2015, as defined in equation (1).

Other data We use a number of supplementary datasets. Product end–use categories are obtained from the US Census Bureau. Chinese import flows by source country, HS8 product and month during the period January 2016–June 2019 are publicly available from Chinese customs.

We also construct product–level measures of the share of Chinese imports from the US imported under China's processing trade customs regime. Imports under this regime are not subject to import tariffs, and must be used in the production process of goods that will be exported. Finally, we use the US Census Bureau's related–party trade database to compute product–level shares of US exports to China traded among related parties.

3 The impact of tariffs and SOEs on US exports to China

We start by documenting the impact of Chinese retaliatory tariffs on US exports. After this first step, we move on to quantifying the additional impact of Chinese SOEs.

To analyze the effect of retaliatory tariffs, we estimate the following regression through OLS. The literature has already established that retaliatory tariffs were unanticipated and can be treated as as exogenous [Fajgelbaum et al., 2020, Amiti et al., 2019], allowing for a clean identification of their impact.

$$\Delta \log Y_{pt} = \beta_1 \cdot \Delta \log(1 + \tau_{pt}) + \gamma_p + \delta_{st} + \epsilon_{pt} \,. \tag{2}$$

In this expression, p stands for an HS10 product, s for an HS2 sector, and t for each time period (year–month). The dependent variable $\Delta \log Y_{pt}$ is the 12–month log change (between t and $t-12$) in each outcome (export values, quantities or unit values) and $\Delta \log(1+\tau_{pt})$ stands for the 12–month log change of one plus the ad–valorem Chinese statutory tariff rate. These tariffs are the sum of the MFN and the additional retaliatory *trade war* tariff. We include product (HS10) and sector (HS2) × time fixed effects, and cluster the standard errors at the level of HS6 products. This specification is similar to that in Amiti et al. [2019], but focusing only on US exports to China.

The results are shown in columns 1 through 3 in Table 1. A one percent higher tariff is associated to a 0.75 percent decline in the exported value (column 1) and a 0.97 percent decline in the exported quantity (column 2).[6] For unit values ("prices"), the coefficient in column 3 is closer to zero and not statistically significant, which implies a nearly full pass–through onto foreign domestic prices.[7,8]

We also find these estimates mask a large heterogeneity across sectors in the impact of these tariffs. In Appendix Table A.4 we split the sample according to end–use categories. For export values, we find the largest pass–through coefficients among industrial supplies and consumer goods, and a negative but smaller and not statistically significant coefficient for food and agricultural goods and for capital goods.[9]

[6] Abstracting from general equilibrium effects, the coefficient in column 1 implies that Chinese tariffs account for a 9.3% decline in US exports to China. For this calculation, we use the the mean tariffs (weighted by exported value) in January 2018 and in August 2019, which were 4.7% and 19.4% respectively, such that $e^{-0.747 \times (log(1+0.194) - log(1+0.047))} = -9.3\%$

[7] In Appendix Table A.3 we show results point in the same direction when relaxing the sector × time fixed effects, replacing them by time fixed effects, which is the specification used in Amiti et al. [2020a]. In that case, the coefficients for the effect of tariffs on export value and quantity are larger, and closer in magnitude to [Amiti et al., 2020a]'s estimates based on world exports.

[8] The result that foreign retaliatory tariffs do not reduce unit values are consistent with [Fajgelbaum et al., 2020, Amiti et al., 2019]. Cavallo et al. [2021] finds a negative impact of foreign tariffs on US export prices using data from the BLS International Prices Program, which allows them to track prices of narrowly defined products sold by a given firm over time.

[9] For industrial supplies and consumer goods, for which the effect is statistically significant, a one percent higher tariff is associated to a 1.2% and 1.4% decline in the exported value respectively.

3.1 How did Chinese SOEs impact US exports?

We now move on to studying the effect of Chinese SOEs on US exports. In 2015, imports by state–owned firms from the US account for 22% of total imports from the US. These state–owned firms' imports can presumably be directed more easily by the Chinese government. There have been many anecdotal accounts of the role played by Chinese state–owned firms during the trade war, including for example the case of US soybean exports, in which state–owned firms account for about 25% of total imports (based on 2015 data). We show below that during the trade war, US exports declined more in "high–SOE" products relative to the previous period.

To show this formally, we augment equation (2) including an interaction term between the product-level share of imports by state–owned firms (SOE share$_p$, defined in equation (1)) and a dummy variable equal to one after the trade war with China starts in April 2018.[10,11]

$$\Delta \log Y_{pt} = \beta_1 \cdot \Delta \log(1 + \tau_{pt}) + \beta_2 \cdot TW_t \times \cdot \text{SOE share}_p + \gamma_p + \delta_{st} + \epsilon_{pt} \,. \tag{3}$$

The results are shown in columns 4 through 6 in Table 1. In column 4, for export values, the negative coefficient on the interaction term indicates that, after controlling for the effect of Chinese tariffs, US exports fell during the trade war relative to the previous period in products with higher SOE shares. To interpret the magnitude of the coefficient, consider that the average SOE share (weighted by value) in our sample is 0.21. Evaluating the effect of the trade war at this mean SOE share, exports to China fell by 6% (=-0.28×0.21) during the trade war due to SOEs. The effect on quantities is similar in magnitude while the effect on prices is not statistically different from zero.

We explore several robustness checks. First, Appendix Table A.5 shows the results are similar if the trade war is assumed to start in March 2018 or January 2018. Second, Appendix Table A.6 shows that the results are robust to clustering by HS4 product. In addition, Appendix Table A.7 shows that the results are not driven by the oil sector. Finally, we extend the sample considering exports to all

[10] In April 2, 2018, China imposed a first set of tariffs on the US in retaliation against US tariffs on steel and aluminum, which the US had imposed on all trading partners (with a few exceptions) on March 23, 2018. In addition, in April 3rd the US threatened to impose tariffs specifically on China following the release, in March 22nd, of the results of the investigation on China's trade practices related to intellectual property.

[11] The identification of the SOE effect during the trade war is based on comparing US exports across products from April 2018 onward relative to the previous months. Since the dependent variable is expressed in 12–month changes, effectively we are comparing the 12–month export growth for all months between January 2017 and March 2018 (for which $TW_t = 0$) to that for months between April 2018 and August 2019.

Table 1: China's Tariffs, State-Owned Firms and US Exports

	(1) Value	(2) Quantity	(3) Unit Value	(4) Value	(5) Quantity	(6) Unit Value
$\Delta\log(1+\tau_{pt})$	-0.747***	-0.966***	0.140	-0.763***	-0.974***	0.132
	(0.246)	(0.357)	(0.167)	(0.248)	(0.361)	(0.169)
Trade War$_t$ × SOE share$_p$				-0.284***	-0.274*	-0.069
				(0.102)	(0.156)	(0.089)
Product (HS10) FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector (HS2) × Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	111070	90337	90337	110610	89912	89912

Notes: Columns 1 through 3 report the estimation of equation (2). Columns 4 through 6 report the estimation of equation (3). The dependent variable is the 12-month log change (between t and $t-12$) in the exported value, quantity, or unit value. Each observation corresponds to a product (HS10) and time (year–month) combination. The sample consists of US exports to China. All columns include product (HS10) and sector (HS2) × time fixed effects. Standard errors are clustered by HS6 product. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

countries. We augment equation (3) and estimate the following triple–difference specification:

$$\Delta\log Y_{cpt} = \beta_1 \cdot \Delta\log(1+\tau_{cpt}) + \beta_2 \cdot \text{TW}_t \times \text{SOE share}_p \times \text{China}_c + \gamma_{cp} + \delta_{pt} + \eta_{cst} + \epsilon_{cpt}\,, \tag{4}$$

where c stands for a destination country and China$_c$ is equal to one for exports to China and zero otherwise. Table 2 shows that during the trade war US exports to China declined in products with a high presence of Chinese SOEs, relative to US exports to other countries.

Timing of the SOE effect State–owned firms could have had a different impact at different points of the trade war, and we explore this issue as follows. First, in Table 3 we interact the SOE share variable with four dummy variables capturing different stages of the trade war; a first one is equal to one during April–August 2018, a second one equal to one during September–December 2018, and the last two equal to one during January–April and May–August 2019. We find a negative coefficient for the four periods, which implies lower US exports to China in high–SOE products relative to the period before the trade war. The SOE effect, however, is more than two times larger and estimated much more precisely during the September–December 2018 period. The effect is also statistically significant during April–August 2018 and during January–April 2019, but only at the 10% confidence level, and is not statistically significant for May–August 2019. An alternative and more flexible approach consists in interacting the product-level SOE share with time (year-month) dummy variables, and is discussed in

Table 2: China's state–owned firms and US exports: Entire world sample

	(1) Value	(2) Quantity	(3) Unit Value
$\Delta\log(1+\tau_{cpt})$	-0.737***	-0.600***	-0.243***
	(0.145)	(0.198)	(0.092)
Trade War$_t$ × China$_c$ × SOE share$_p$	-0.259**	-0.216	-0.077
	(0.117)	(0.167)	(0.094)
Country × Product (HS10) FE	Yes	Yes	Yes
Product (HS10) × Time	Yes	Yes	Yes
Country × Sector (HS2) × Time FE	Yes	Yes	Yes
Observations	1831261	1397825	1397825

Notes: This table reports the estimation of equation (4). The dependent variable is the 12-month log change (between t and $t-12$) in the exported value, quantity, or unit value. Each observation corresponds to a country-product (HS10) and time (year–month) combination. The sample consists of US exports to all destinations. All columns include country × product (HS10), product (HS10) × time and country × sector (HS2) × time fixed effects. Standard errors are clustered by HS6 product. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

Appendix A.4.1. This exercise shows, first, that there were no pre-existing trends in the SOE effect. It also confirms that the stronger negative impact of SOEs on US exports occurs during the last months of 2018. The timing during which exports in products with high–SOE shares decline is interesting, as it coincides with the point in time in which China was "running out" of products on which to impose retaliatory tariffs. While on July and August 2018, China imposed tariffs on an equal volume of trade than the US (approximately $50 billion), in September 2018 the US imposed tariffs on $200 billion, and China retaliated with tariffs on goods representing $60 billion in imports from the US. At that point, 93.5% of Chinese products were targeted by tariffs, accounting for 71.2% of the value imported from the US. This suggests that SOEs were used as a tool for retaliation with more force when imposing tariffs had become more difficult.

Heterogeneity across sectors We now move on to documenting how this SOE effect was heterogeneous across sectors. In columns 1 through 4 in Table 4 we split the sample based on end–use categories. We find that the negative impact of SOEs on US exports is driven by the food and agricultural goods sector followed by the industrial supplies sector. Among the former, the –0.822 coefficient implies that exports fell by 17.4% (= –0.822 × 0.21) during the trade war due to SOEs. The coefficients are smaller and not statistically different from zero for capital and consumer goods.

The literature has documented that Chinese retaliatory tariffs might have been politically motivated

Table 3: China's state-owned firms and US exports: Splitting the trade war dummy by subperiods

	(1) Value	(2) Quantity	(3) Unit Value
$\Delta\log(1+\tau_{pt})$	-0.764***	-0.982***	0.140
	(0.248)	(0.362)	(0.170)
Trade War (April 2018 - Aug. 2018)$_t$ × SOE share$_p$	-0.181*	-0.130	-0.092
	(0.109)	(0.169)	(0.108)
Trade War (Sep. 2018 - Dec. 2018)$_t$ × SOE share$_p$	-0.520***	-0.582***	-0.021
	(0.143)	(0.211)	(0.119)
Trade War (Jan. 2019 - April 2019)$_t$ × SOE share$_p$	-0.248*	-0.149	-0.197
	(0.142)	(0.221)	(0.128)
Trade War (May 2019 - Aug. 2019)$_t$ × SOE share$_p$	-0.212	-0.277	0.044
	(0.150)	(0.235)	(0.129)
Product (HS10) FE	Yes	Yes	Yes
Sector (HS2) × Time FE	Yes	Yes	Yes
Observations	110610	89912	89912

Notes: This table reports the estimation of equation (3). The dependent variable is the 12-month log change (between t and $t-12$) in the exported value, quantity, or unit value. The sample consists of US exports to China. Each observation corresponds to a product (HS10) and time (year–month) combination. The sample consists of US exports to China. All columns include product and time fixed effects. Standard errors are clustered by HS6 product. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

as they were imposed on industries located in geographic regions with a high share of votes for the republican party, in power during 2018–2019 [Fajgelbaum et al., 2020, Fetzer and Schwarz, 2021]. In the same spirit, we examine whether the decline in US exports in products with a high SOE import share differentially impacted republican–associated industries. To this end, we construct a measure of the share of republican votes in the 2016 presidential election associated to each NAICS 6–digit industry based on the geographic location of industry employment. The construction of this measure is explained in detail in Appendix A.5. Based on this, in columns 5 and 6 in Table 4 we estimate equation (3) splitting the sample between industries with above– or below–median republican votes. We find evidence that the decline in Chinese imports from the US in high–SOE products appears to be politically–driven. The coefficient is nearly six times larger among the sample of industries with a high share of republican votes, and is statistically significant only within that sample. The magnitude of the coefficient implies a 6.2% (= –0.291 × 0.21) decline in exports among "republican industries" during the trade war due to SOEs.

Is tariff pass–through different for SOEs? We have established that SOE presence reduces US exports during the trade war. In addition, we ask whether SOEs influence tariff pass–through. For this purpose, we augment equation (3) allowing for an interaction between the SOE share and the tariff change as

Table 4: China's State-Owned Firms and US Exports: Impact by Sector

	(1) Food and Agric. Goods	(2) Industrial Supplies	(3) Capital Goods	(4) Consumer Goods	(5) High Republican Vote Share	(6) Low Republican Vote Share
$\Delta\log(1+\tau_{pt})$	-0.338	-1.159**	-0.389	-1.460**	-0.529	-0.670**
	(0.473)	(0.495)	(0.330)	(0.588)	(0.340)	(0.266)
Trade War$_t$ × SOE share$_p$	-0.822*	-0.407**	0.069	-0.277	-0.291**	-0.164
	(0.456)	(0.174)	(0.147)	(0.228)	(0.141)	(0.165)
Product (HS10) FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector (HS2) × Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7199	46787	38223	17668	53123	53002

Notes: This table reports the estimation of equation (3). The dependent variable is the 12-month log change (between t and $t-12$) in the exported value. Each observation corresponds to a product (HS10) and time (year–month) combination. The sample consists of US exports to China. All columns include product and sector (HS2) × time fixed effects. Standard errors are clustered by HS6 product. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

follows:

$$\Delta\log Y_{pt} = \beta_1 \cdot \Delta\log(1+\tau_{pt}) + \beta_2 \cdot \text{TW}_t \cdot \text{SOE share}_p + \beta_3 \cdot \Delta\log(1+\tau_{pt}) \cdot \text{SOE share}_p + \gamma_p + \delta_{st} + \epsilon_{pt}\,. \quad (5)$$

Table 5 indicates that this interaction term is not statistically significant – so high–SOE products do not have a different tariff pass–through– and the interaction of the SOE share with the trade war dummy remains statistically significant.

Accounting for processing trade and related–party trade Two particular features of the US-China trading relationship are the presence of the processing trade customs regime and of related–party trade. In 2017, about 14% of China's imports from the US take place under the processing trade customs regime in which imports are duty–free if the goods produced using them are later exported.[12] In addition, about 24% of US exports occur within related–parties. [13]

Here, we show that the SOE effect is robust to excluding products with high shares of trade under the processing trade regime, or high shares of related party trade. To this end, we estimate our baseline equation (3) excluding either the top third of products with highest shares of exports under the processing trade customs regime or related party trade, as measured prior to the start of the trade war in 2017.

[12] Brandt and Morrow [2017] describe China's processing trade regime in detail. As they point out, in practice there are two slightly different processing trade regimes, which we group together.

[13] Historically, foreign owned enterprises and joint ventures played a significant role in the opening of the Chinese economy [Tseng and Rodlauer, 2003, Hammer, 2006].

Table 5: China's state–owned firms and US exports: Including interaction between SOE share and change in tariffs

	Value	Quantity	Unit Value
	(1)	(2)	(3)
$\Delta\log(1+\tau_{pt})$	-1.489***	-1.359**	-0.360
	(0.461)	(0.550)	(0.261)
$\Delta\log(1+\tau_{pt}) \times$ SOE share$_p$	-0.160	-1.413	0.445
	(1.312)	(1.795)	(0.875)
Trade War$_t \times$ SOE share$_p$	-0.252**	-0.173	-0.109
	(0.111)	(0.160)	(0.099)
Product (HS10) FE	Yes	Yes	Yes
Sector (HS2) × Time FE	Yes	Yes	Yes
Observations	57511	46958	46958

Notes: This table reports the estimation of equation (3). The dependent variable is the 12-month log change (between t and $t-12$) in the exported value, quantity, or unit value. Each observation corresponds to a product (HS10) and time (year–month) combination. The sample consists of US exports to China. All columns include product (HS10) and sector (HS2) × time fixed effects, with sectors defined at the HS2 level. Standard errors are clustered by HS6 product. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

The results are shown in Table 6 and indicate that the baseline results are robust and are not driven by these other features. In fact, the coefficient for export values is 16% higher than in the baseline results in Table 1 when excluding processing trade (column 1), and 28% higher when excluding related–party trade (column 4).

SOEs and Chinese imports from the rest of the world If Chinese SOEs stopped importing products exported by the US, one might expect increased Chinese imports from the rest of the world. Indeed, using data on Chinese imports by source country, product (HS8), and month obtained from the Chinese customs agency, we show that China increased its imports from the rest of the world (i.e. all countries excluding the US) during the trade war in sectors with a high SOE share (defined in eq. (1)) of Chinese imports from the US.[14]

We estimate the following triple–difference regression in a sample consisting of imports from all countries except the US. In this equation, TW_t is a dummy equal to one after the onset of the trade war (from April 2018 onwards) and zero otherwise. US import share$_p$ is the share of imports from the US out of total Chinese imports in each HS8 product, measured in 2017. This term is included because the need to replace imports by SOEs from other sources is proportional to the share imported from the US.

[14]These data cover the period January 2016 to June 2019.

Table 6: China's Tariffs, State-Owned Firms and US Exports

	(1)	(2)	(3)	(4)	(5)	(6)
	Excluding processing trade			Excluding related–party trade		
	Value	Quantity	Unit Value	Value	Quantity	Unit Value
$\Delta\log(1+\tau_{pt})$	-0.642**	-0.970**	0.172	-0.858**	-0.823	-0.175
	(0.299)	(0.453)	(0.223)	(0.367)	(0.510)	(0.216)
Trade War$_t$ × SOE share$_p$	-0.330***	-0.463**	0.065	-0.364**	-0.456**	-0.021
	(0.126)	(0.192)	(0.104)	(0.153)	(0.230)	(0.120)
Product (HS10) FE	Yes	Yes	Yes	Yes	Yes	Yes
Sector (HS2) × Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	56347	45648	45648	56007	44773	44773

Notes: This table reports the estimation of equation (2). Columns 1 through 3 exclude the top third of products with the highest processing trade share. Columns 4 through 6 exclude the top third of products with the highest related–party trade share. The dependent variable is the 12-month log change (between t and $t-12$) in the exported value, quantity, or unit value. Each observation corresponds to a product (HS10) and time (year–month) combination. The sample consists of US exports to China. All columns include product (HS10) and sector (HS2) × time fixed effects. Standard errors are clustered by HS6 product. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

We include fixed effects by country × product and country × time (year–month), and cluster standard errors by HS6 product.

$$\Delta\log Y_{cpt} = \beta_1 \cdot TW_t \cdot \text{SOE share}_p + \beta_2 \cdot TW_t \cdot \text{US import share}_p + \beta_3 \cdot TW_t \cdot \text{SOE share}_p \cdot \text{US import share}_p + \gamma_{cp} + \nu_{ct} + \epsilon_{cpt}\,. \quad (6)$$

The results are shown in Table 7. For conciseness, only the coefficients on the triple interaction term are shown. In column 1, we find a positive coefficient on the triple interaction which is almost but not statistically significant at conventional levels. It indicates that there is a differential effect of the SOE share on sectors with high vs. low US import shares during the trade war.[15]

In column 2 we divide the trade war dummy into three different dummies, equal to one during April to August 2018, September to December 2018, and January to June 2019 respectively. We see a positive coefficient in the second and third periods. The coefficient is larger and statistically significant only for September to December 2018. This implies that during the same period in which we see a *decline* in US exports to China in sectors with a higher SOE share (as we showed in Table 3), here we find an *increase* in Chinese imports from the rest of the world. Thus, this is further evidence in favor of the SOE effect

[15] To evaluate the magnitude of this effect, consider the elasticity $\frac{d\Delta\log Y_{cpt}}{dTW_t}$ elasticity evaluated at the mean US import share and at the 25th and 75th percentiles of the SOE share (which takes values 0.014 and 0.039 respectively).

found using data on US exports to China earlier.

Table 7: China's state-owned firms and Chinese imports from the rest of the world

	(1)	(2)
Trade War$_t$ × US import share$_p$ × SOE share$_p$	0.298	
	(0.182)	
Trade War (April 2018 - Aug. 2018)$_t$ × US import share$_p$ × SOE share$_p$		-0.038
		(0.247)
Trade War (Sep. 2018 - Dec. 2018)$_t$ × US import share$_p$ × SOE share$_p$		0.458*
		(0.257)
Trade War (Jan. 2019 - June. 2019)$_t$ × US import share$_p$ × SOE share$_p$		0.340
		(0.223)
Country × Product (HS8) FE	Yes	Yes
Country × Time FE	Yes	Yes
Observations	1577439	1559198

Notes: This table reports the estimation of equation (6). Only the coefficients on the triple interaction term are shown, and the other coefficients are not statistically significant. The dependent variable is the 12-month log change (between t and $t-12$) in the imported value. Each observation corresponds to a country, product (HS8) and time (year–month) combination. The sample consists of China's imports from all countries except the US. All columns include country × product and country × time fixed effects. Standard errors are clustered by HS6 product. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

4 Were US exports rerouted away from Chinese tariffs and SOEs?

Having established the negative impact of Chinese tariffs and SOEs on US exports, an important question that emerges is to what extent US exporters were able to "escape the trade war" by rerouting those exports to other markets. Quantifying the ability of US exporters to reroute exports facing Chinese tariffs and SOEs is important for our understanding of the reasons behind the welfare cost of the trade war for the US.

To address this question, we use a dynamic specification given that the adjustment can take place gradually over time. Extending Amiti et al. [2020b] and Benguria and Saffie [2024] we estimate the following regression:[16]

$$\log Y_{cpt} = \sum_{k=--\underline{T}}^{\overline{T}} \beta_k \left(I_{cpk} \times \ln\left(\frac{1+\tau_{cpk}}{1+\tau_{cp0}}\right)\right) + \sum_{k=--\underline{T}}^{\overline{T}} \gamma_k \left(I^{CHN}_{pk} \times \ln\left(\frac{1+\tau^{CHN}_{pk}}{1+\tau^{CHN}_{p0}}\right) \times S^{CHN}_{p0}\right)$$
$$+ \sum_{k=--\underline{T}}^{\overline{T}} \varphi_k \left(TW_k \times \text{SOE share}_{p0} \times S^{CHN}_{p0}\right) + \eta_{cp} + \delta_{cst} + \epsilon_{cpt}\,. \quad (7)$$

[16] Amiti et al. [2020b] and Benguria and Saffie [2024] estimate regressions including the first term on the right–hand side of equation (7) to analyze the effect of tariffs on trade flows.

In this equation, Y_{cpt} stands for US exports of HS10 product p to destination c at time t. The sample consists of exports to non–China destinations and each observation corresponds to a country–product (HS10)–time (year–month) combination.[17] The first term on the right–hand side captures the effect of tariffs in each destination. I_{cpk} is a treatment month indicator variable equal to one in the first month a tariff is raised and zero otherwise. This indicator is multiplied by the term $\ln\left(\frac{1+\tau_{cpk}}{1+\tau_{cp0}}\right)$ which captures the magnitude of the tariff increase, such that τ_{cpk} is the increased value of the tariff and τ_{cp0} is its previous value. The second term on the right–hand side captures the effect of Chinese tariffs. I_{pk}^{CHN} is a treatment month indicator variable equal to one in the first month a Chinese tariff on a given product is raised and zero otherwise. This is multiplied by $\ln\left(\frac{1+\tau_{pk}^{CHN}}{1+\tau_{p0}^{CHN}}\right)$ which measures the size of the Chinese tariff increase, such that τ_{pk} is the increased value of the tariff and τ_{p0} is its previous value. In addition, we multiply this term by the share of US exports in each HS10 product sold to China (as a fraction of total exports per product), S_{p0}^{CHN}. This share is measured prior to the trade war, in 2017. The reason for including this share S_{p0}^{CHN} is that the impact of Chinese tariffs on US exports to the rest of the world should be larger for products in which China represents a larger fraction of US exports.[18] The third term on the right–hand side captures the effect of Chinese SOEs, interacting the trade war dummy (equal to one for April 2018 onwards) with the SOE share in Chinese imports from the US in each product (computed in 2015), and with the share of US exports in each HS10 product sold to China (as a fraction of total exports per product), S_{p0}^{CHN}. We include country × product and country × sector (HS2) × time fixed effects. Standard errors are clustered by HS6 product. We include 8 leads and 12 lags in each of the right–hand side terms ($\underline{T} = 8$ and $\overline{T} = 12$).

First, Figure 3*a* plots the set of coefficients β_k capturing the dynamic impact of the rest of the world tariffs on US exports. There are no signs of pre-existing trends, and the negative impact of these retaliatory tariffs starts on impact and increases over time. After 4 months, the magnitude of the coefficients is such that a ten percent increase in rest of the world retaliatory tariffs is associated to a 5 percent decline in US exports to the rest of the world.

Figure 3*b* plots the coefficients γ_k which measure the dynamic impact of Chinese tariffs on exports to the rest of the world. We find a gradual rerouting of exports facing Chinese tariffs to other destinations: US exports to the rest of the world have increased relatively more in products targeted by Chinese retaliatory tariffs. For example, at month 4, the coefficient is such that a ten percent increase in Chinese

[17] We exclude from the sample US exports to Hong–Kong given its role as *entrepôt* of exports to China [Feenstra and Hanson, 2004], although this makes no difference for our results.

[18] In the limit, if the US does not export a product to China, Chinese tariffs should not have an impact on exports to the rest of the world.

tariffs is associated to a 1.2 percent increase in exports to the rest of the world.[19] This finding, new to the literature, implies that impact of the trade war on US exports is less than it would appear only from the effect of tariffs on exports to retaliating countries.

Figure 3*c* plots the coefficients φ_k. These measure the relative impact of the trade war on exports to the rest of the world in products with a high participation of Chinese SOEs. Unlike the case of tariffs, we do not find signs of rerouting. Recall we documented in Section 3.1 a particularly large decline in US exports to China in high–SOE products not at the start of the trade war, but toward the last third of 2018. A relative increase in exports to the rest of the world in high–SOE products is not seen even during this period. What could explain then the difference between the response to Chinese tariffs and Chinese SOEs? We conjecture that this could be due to the short and uncertain duration of SOEs' actions, and their lack of salience.

Finally, we ask whether there were geographic markets more likely to absorb US exports targeted by Chinese tariffs and SOEs. In Appendix Figure A.2 we report estimates for the coefficients γ_k estimating (7) separately for the largest markets for US exports, and find a rerouting toward East Asia and Europe, but not toward North America or Latin America.[20] In Appendix Figure A.3, in contrast, we show that the lack of rerouting in sectors with a large presence of Chinese SOEs was common across most geographic markets. The exception is North America, toward which we see an increase in exports concentrated in the first months of 2019.[21]

5 Conclusions

We have analyzed the role of state–owned enterprises in the US–China trade war. We have established that once the trade war began US exports declined substantially more in products with a high participation of Chinese SOEs. Our results imply that – ignoring general equilibrium effects – US exports to China declined by 6% during the trade war due to Chinese SOEs. In comparison, Chinese retaliatory tariffs account for a 9% decline in US exports. This SOE effect was concentrated primarily toward the end of 2018, and among agricultural goods and industrial supplies. We have also found evidence that the SOE effect was stronger among industries located in republican–voting US counties, suggesting

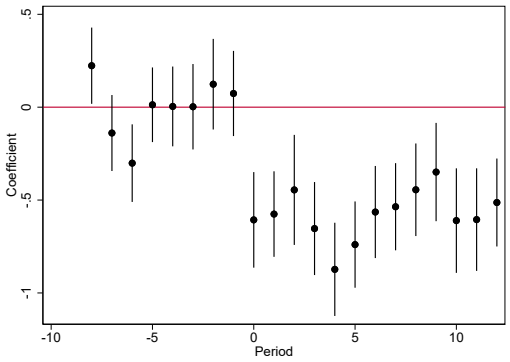
[19] The increase in exports to the rest of the world in response to a ten percent increase in Chinese tariffs is equal to 10% × 0.06 ×1.95, where 1.95 is the estimated γ coefficient corresponding to the third lag, and 0.06 is the mean US share in Chinese imports, S_{p0}^{CHN}.

[20] Note that Mexico is included in North America, not Latin America.

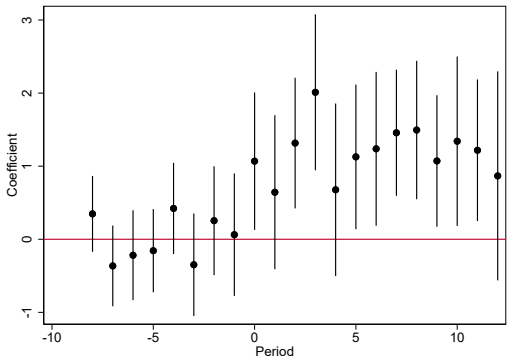
[21] The fact that Chinese tariffs are associated to increased US exports to East Asia and Europe, while Chinese SOEs could be associated to increased exports to North America, could be due to differences in the product composition of exports targeted by Chinese tariffs and SOEs.

Figure 3: Chinese tariffs, SOEs, and exports rerouting

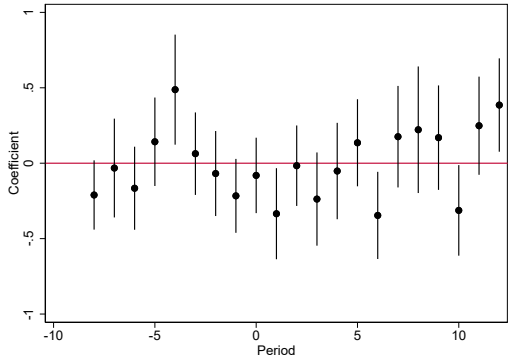
a) ROW Tariffs and US Exports to ROW



b) Chinese Tariffs and US Exports to ROW



c) Chinese SOEs and US Exports to ROW



Notes: This figure plots the coefficients obtained from the estimation of equation (7). Vertical bars represent 90% confidence intervals.

a political motivation just like the literature has found for tariffs [Fajgelbaum et al., 2020, Fetzer and Schwarz, 2021]. Our work is the first to provide evidence on the use of state–owned enterprises as tools of trade policy, in *any* context. Further, it complements the emerging literature on the US–China trade war, which has been centered exclusively on the role of tariffs.

Given the large impact of the SOE effect, we ask whether US exports to China were able to escape from it by rerouting exports to other destinations. We have shown that while US exports facing Chinese tariffs were gradually rerouted toward other markets, this was not the case for exports facing the reduced demand by Chinese SOEs.

To conclude, we conjecture that state–owned enterprises, which as we have shown shaped the impact of the US–China trade war, could also be determinant in other contexts. They could be especially relevant in developing countries or economies with a large participation of the public sector in international trade.

6 References

S. Aiyar, D. Malacrino, and A. F. Presbitero. Investing in friends: The role of geopolitical alignment in fdi flows. *European Journal of Political Economy*, 83:102508, 2024.

L. Alfaro and D. Chor. Global supply chains: The looming "great reallocation". *NBER Working Paper No. 31661*, 2023.

M. Amiti, S. J. Redding, and D. Weinstein. The impact of the 2018 trade war on US prices and welfare. *Journal of Economic Perspectives*, 33(4):187–210, 2019.

M. Amiti, S. H. Kong, and D. Weinstein. The effect of the US-China trade war on US investment. *NBER Working Paper No. 27114*, 2020a.

M. Amiti, S. J. Redding, and D. E. Weinstein. Who's paying for the US tariffs? A longer-term perspective. *AEA Papers and Proceedings*, 110, 2020b.

F. Benguria and F. Saffie. The impact of the 2018-2019 trade war on US local labor markets. *Working Paper*, 2020.

F. Benguria and F. Saffie. Escaping the trade war: Finance and relational supply chains in the adjustment to trade policy shocks. *Journal of International Economics*, 152:103987, 2024.

F. Benguria, J. Choi, D. L. Swenson, and M. J. Xu. Anxiety or pain? The impact of tariffs and uncertainty on Chinese firms in the trade war. *Journal of International Economics*, 137:103608, 2022.

E. J. Blanchard, C. P. Bown, and D. Chor. Did trump's trade war impact the 2018 election? *Journal of International Economics*, 148:103891, 2024.

C. Bown and M. Kolb. Trump's Trade War Timeline: An Up-To-Date Guide. *Peterson Institute for International Economics*, May, 2019.

C. Bown and M. Lovely. Trump's phase one deal relies on China's state-owned enterprises. *Peterson Institute for International Economics*, March, 2020.

C. P. Bown, E. Jung, and E. Zhang. Trump has gotten China to lower its tariffs. Just toward everyone else. *Peterson Institute for International Economics*, 2019.

L. Brandt and P. M. Morrow. Tariffs and the organization of trade in China. *Journal of International Economics*, 104:85–103, 2017.

A. Cavallo, G. Gopinath, B. Neiman, and J. Tang. Tariff pass-through at the border and at the store: Evidence from US trade policy. *American Economic Review: Insights*, 3(1):19–34, 2021.

D. Chor and B. Li. Illuminating the effects of the US-China tariff war on China's economy. *Journal of International Economics*, 150:103926, 2024.

M. Crosignani, L. Han, M. Macchiavelli, and A. F. Silva. Geopolitical risk and decoupling: Evidence from us export controls. *Working Paper*, 2024.

P. D. Fajgelbaum, P. K. Goldberg, P. J. Kennedy, and A. K. Khandelwal. The return to protectionism. *The Quarterly Journal of Economics*, 135(1):1–55, 2020.

R. C. Feenstra and G. H. Hanson. Intermediaries in entrepot trade: Hong Kong re-exports of Chinese goods. *Journal of Economics & Management Strategy*, 13(1):3–35, 2004.

T. Fetzer and C. Schwarz. Tariffs and politics: Evidence from Trump's trade wars. *The Economic Journal*, 131(636):1717–1741, 2021.

A. Flaaen and J. R. Pierce. Disentangling the effects of the 2018-2019 tariffs on a globally connected us manufacturing sector. *Review of Economics and Statistics*, forthcoming.

A. Flaaen, A. Hortaçsu, and F. Tintelnot. The production relocation and price effects of US trade policy: The case of washing machines. *American Economic Review*, 110(7):2103–27, 2020.

C. Freund, A. Mattoo, A. Mulabdic, and M. Ruta. Is us trade policy reshaping global supply chains? *Working Paper*, 2023.

A. B. Hammer. The dynamic structure of US-China trade. *Working Paper*, 2006.

A. B. Hammer and L. Jones. State-owned enterprises play a smaller, but still strategic, role in China's external sector. *Executive Briefings on Trade (USITC)*, 2018.

K. Handley, F. Kamal, and R. Monarch. Rising import tariffs, falling exports: When modern supply chains meet old-style protectionism. *American Economic Journal: Applied Economics*, forthcoming.

P. Kowalski, M. Büge, M. Sztajerowska, and M. Egeland. State-owned enterprises: Trade effects and policy implications. *OECD*, 2013.

M. W. Tseng and M. M. Rodlauer. *China: Competing in the global economy*. International Monetary Fund, 2003.

A Appendix

A.1 Data description

In this section we provide further details about the data used.

Trade flows and tariffs Trade data are obtained from the US Census Bureau "US Exports of Merchandise" publication. Retaliatory trade war tariffs are added to prevailing *most favored nation* (MFN) tariffs. Following Fajgelbaum et al. [2020], tariffs are assigned to the nearest month based on the date they are applied. While in most cases tariffs are reported at the HS 8–digit level, we follow the literature in measuring tariffs at the HS 6–digit level, which is the most disaggregate level that is comparable internationally. Retaliatory tariffs by China include the waves of April 2nd 2018, July 6th 2018, August 23rd 2018, September 24th 2018 and June 1st 2019. Other retaliating countries or regions include Canada (July 1st 2018), Mexico (June 5th 2018), the European Union (June 22nd 2018), Russia (August 6th 2018), Turkey (June 21st 2018) and India (June 16th 2019). Bown and Kolb [2019] provide a useful timeline of these policies.

Imports under China's processing trade customs regime These data are publicly available from China's Customs Agency and we use data for 2017, the latest year before the start of the trade war. We compute the share of imports under the processing trade customs regime by HS6 product.

Related–party trade We use data on related–party trade from 2017, reported for NAICS 6-digit industries. We use a concordance between US HS 10–digit codes and NAICS 6–digit codes provided directly by the US Census Bureau to add this measure to our exports panel. Ideally, one would use data on exports split into trade among related parties and arms–length trade during the trade war period. These data, however, are published at an annual frequency, whereas the analysis in this paper is monthly given the frequency of tariff changes.

End–use classification The End–Use classification divides products into food and agricultural goods, industrial supplies, capital goods, and consumer goods. Originally, automobiles are a separate category. We assign passenger cars (end–use code 300) to consumer goods; trucks, buses and special purpose vehicles (301) to capital goods; and parts, engines, bodies, and chassis (302) to industrial supplies. The largest categories in exports to China are capital goods (accounting for 37.1% of total exports in

2017) followed by industrial supplies (34.9%), food and agricultural goods (14.1%), and consumer goods (13.5%).

Chinese product–level customs data These data are public and are obtained from the Chinese Customs Authority.

A.2 China's state-owned firms and US exports: Descriptive statistics

Table A.1: Summary statistics for the SOE share

	Mean	St. Dev	p10	p25	p50	p75	p90
SOE share	0.166	0.235	0	0.008	0.075	0.219	0.466

Notes: This table reports summary statistics of the distribution across HS4 sectors of the share of Chinese imports from the US imported by SOEs in 2015, as defined in equation (1).

Table A.2: List of HS2 sectors with the highest and lowest SOE shares in Chinese imports from the US

Rank	HS2	HS2 Name	SOE share
Panel A: Highest SOE share			
1	24	Tobacco and manufactured tobacco substitutes	0.98
2	31	Fertilisers	0.90
3	49	Printed books, newspapers, pictures and other products	0.70
4	55	Man-made staple fibres	0.69
5	86	Railway/tramway locomotives, etc.	0.67
6	22	Beverages, spirits and vinegar	0.56
7	10	Cereals	0.52
8	88	Aircraft, spacecraft, and parts thereof	0.52
9	75	Nickel and articles thereof	0.51
10	23	Residues and waste from the food industry; etc.	0.51
Panel B: Lowest SOE share			
1	45	Cork and articles of cork	0.00
2	98	UN Special Code	0.00
3	46	Manufactures of straw, esparto and other plaiting	0.00
4	79	Zinc and articles thereof	0.00
5	64	Footwear, gaiters and the like; parts of such articles	0.00
6	14	Vegetable plaiting materials; vegetable products nes	0.00
7	66	Umbrellas, walking-sticks, seat-sticks, whips, etc.	0.01
8	16	Preparations of meat, fish, etc.	0.01
9	80	Tin and articles thereof	0.01
10	2	Meat and edible meat offal	0.02

Notes: This table reports the share of Chinese imports from the US in 2015 imported by SOEs, computed at the HS2 sector level.

A.3 Chinese tariffs and US exports: Additional results

This section reports additional results regarding the effect of Chinese tariffs on US exports. These results are described in the main text, but we also provide a brief outline here.

- Appndix Table A.3 estimates equation (2) with an alternative set of fixed effects. In this case the sample is restricted to t = Jan. 2018 onward to be able to compare our results to the literature.
- Appndix Table A.4 estimates equation (2) splitting the sample into four mutually-exclusive groups based on end-use categories.

Table A.3: The impact of Chinese tariffs on US exports: Alternative fixed effects

	Value	Quantity	Unit Value
	(1)	(2)	(3)
$\Delta\log(1+\tau_{pt})$	-1.249***	-1.632***	0.162
	(0.222)	(0.269)	(0.128)
Product (HS10) FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Observations	69202	56315	56315

Notes: This table reports the estimation of equation (2). The dependent variable is the 12-month log change (between t and $t-12$) in the exported value, quantity, or unit value. Each observation corresponds to a product (HS10) and time (year–month) combination. The sample consists of US exports to China and is restricted to t = Jan. 2018 onward. All columns include product (HS10) and sector (HS2) × time fixed effects. Standard errors are clustered by HS6 product. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

Table A.4: The impact of Chinese tariffs on US exports by end-use sectors

	(1) Food and Agricultural Goods	(2) Industrial Supplies	(3) Capital Goods	(4) Consumer Goods
$\Delta\log(1+\tau_{pt})$	-0.446	-1.164**	-0.384	-1.381**
	(0.479)	(0.491)	(0.330)	(0.585)
Product (HS10) FE	Yes	Yes	Yes	Yes
Sector (HS2) × Time FE	Yes	Yes	Yes	Yes
Observations	7303	47112	38232	17676

Notes: This table reports the estimation of equation (2). The dependent variable is the 12-month log change (between t and $t-12$) in the exported value. Each observation corresponds to a product (HS10) and time (year–month) combination. The sample consists of US exports to China. All columns include product (HS10) and sector (HS2) × time fixed effects. Standard errors are clustered by HS6 product. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

A.4 China's state-owned firms and US exports: Additional results and robustness checks

This appendix presents additional results and robustness checks regarding the effect of Chinese SOEs on US exports. These results are described in the main text, but we also provide a brief outline here.

- In Appendix Table A.5 we revisit our baseline regression for the effect of SOEs on US exports (equation (3)) showing the results are robust to assuming the trade war with China starts in March 2018 or January 2018 instead of April 2018.
- In Appendix Table A.6 we revisit our baseline regression for the effect of SOEs on US exports (equation (3)) clustering standard errors by HS4 product.
- In Appendix Table A.7 we revisit our baseline regression for the effect of SOEs on US exports (equation (3)) but exclude oil and related products (HS2 = 27) from the sample.

Table A.5: China's state–owned firms and US exports: Alternative timing

	(1)	(2)	(3)
Trade War From:	Jan. 2018	March 2018	April 2018
$\Delta\log(1+\tau_{pt})$	-0.759***	-0.760***	-0.763***
	(0.248)	(0.248)	(0.248)
Trade War$_t$ × SOE share$_p$	-0.179*	-0.236**	-0.284***
	(0.108)	(0.103)	(0.102)
Product (HS10) FE	Yes	Yes	Yes
Sector (HS2) × Time FE	Yes	Yes	Yes
Observations	110610	110610	110610

Notes: This table reports the estimation of equation (3). The dependent variable is the 12-month log change (between t and $t-12$) in the exported value. Each observation corresponds to a product (HS10) and time (year–month) combination. In columns 1 and 2, TW_t is equal to one starting in January and March 2018 respectively. In column 3, TW_t is equal to one starting in April 2018 (as in the main text). All columns include product and sector (HS2) × time fixed effects. Standard errors are clustered by HS6 product. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

Table A.6: China's state–owned firms and US exports: Alternative clustering

	(1) Value	(2) Quantity	(3) Unit Value
$\Delta\log(1+\tau_{pt})$	-0.763***	-0.974***	0.132
	(0.252)	(0.361)	(0.173)
Trade War$_t$ × SOE share$_p$	-0.284***	-0.274	-0.069
	(0.104)	(0.170)	(0.099)
Product (HS10) FE	Yes	Yes	Yes
Sector (HS2) × Time FE	Yes	Yes	Yes
Observations	110610	89912	89912

Notes: This table reports the estimation of equation (3). The dependent variable is the 12-month log change (between t and $t-12$) in the exported value, quantity, or unit value. Each observation corresponds to a product (HS10) and time (year–month) combination. The sample consists of US exports to China. All columns include product (HS10) and sector (HS2) × time fixed effects. Standard errors are clustered by HS4 product. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

Table A.7: China's state-owned firms and US exports: Excluding oil

	(1) Value	(2) Quantity	(3) Unit Value
$\Delta\log(1+\tau_{pt})$	-0.804***	-1.015***	0.118
	(0.247)	(0.361)	(0.170)
Trade War$_t$ × SOE share$_p$	-0.278***	-0.287*	-0.051
	(0.102)	(0.158)	(0.091)
Product (HS10) FE	Yes	Yes	Yes
Sector (HS2) × Time FE	Yes	Yes	Yes
Observations	109567	88869	88869

Notes: This table reports the estimation of equation (3). The dependent variable is the 12-month log change (between t and $t-12$) in the exported value, quantity, or unit value. Each observation corresponds to a product (HS10) and time (year–month) combination. The sample consists of US exports to China, and excludes oil and related products (HS2 code 27). All columns include product (HS10) and sector (HS2) × time fixed effects. Standard errors are clustered by HS6 product. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

A.4.1 China's state-owned firms and US exports: Dynamic framework

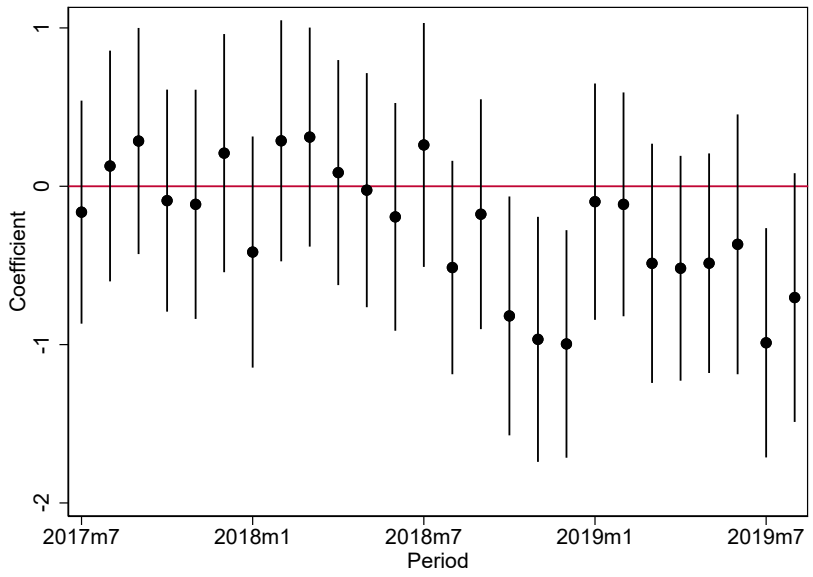
We complement the analysis in the main text of the effect of China's SOEs on US exports augmenting equation (3) to include the interaction between the SOE share in each product and time (year–month) dummy variables as shown in equation (A.1). This allows us to rule out pre-existing trends and to describe the dynamics of this SOE effect.

$$\Delta \log Y_{pt} = \beta_1 \cdot \Delta \log(1+\tau_{pt}) + \beta_2 \cdot \Delta \log(1+\tau_{pt}) \times \text{SOE share}_p + \sum_{k=\underline{T}}^{\overline{T}} \gamma_k \times \mathbb{1}[k=t] \times \text{SOE share}_p + \gamma_p + \delta_{st} + \epsilon_{pt} \,. \tag{A.1}$$

As in Table 1 in the main text, the sample consists of exports to China between $\underline{T}$ =January 2017 and $\overline{T}$ =August 2019, each observation corresponds to a HS10 product p and time (year–month) t combination, and standard errors are clustered by HS6 product. The dependent variable is the 12-month log change (between t and $t-12$) in the exported value. We also include the interaction between the tariff change and the SOE share as a regressor, although results are similar excluding this term.

The results are shown in Appendix Figure A.1 and discussed in Section 3.1 in the main text.

Figure A.1: US exports and Chinese SOEs



Notes: This figure plots the coefficients obtained from the estimation of equation (A.1). Vertical bars represent 90% confidence intervals.

A.5 Definition of industry-level share of Republican votes

We construct a measure of the share of republican votes associated to each NAICS 6-digit industry based on the geographic location of employment of each industry. We focus on the 2016 presidential election and use county-level electoral results and country by industry employment data to infer an approximate share of employment in each industry that is associated with Republican votes.

Let L_{jc} be employment in industry j in county c, and Share Votes Rep.$_c$ (Share Votes Dem.$_c$) be the share of Republican (Democrat) voters in the county.[22] The share of votes for Republicans in industry j is:[23]

$$\text{Share Votes Rep.}_j = \frac{\sum_c L_{jc} \cdot \text{Share Votes Rep.}_c}{\sum_c L_{jc} \cdot \text{Share Votes Rep.}_c + \sum_c L_{jc} \cdot \text{Share Votes Dem.}_c}. \tag{A.2}$$

The employment data to construct these measure is obtained from the year 2017 County Business Patterns dataset, and reported by NAICS 6-digit industry. This is complemented with BEA data for agricultural industries missing from CBP. The election data is obtained from the MIT Election Data + Science Lab.[24]

The industries with the largest share of votes for republicans are "325194 Cyclic Crude, Intermediate, and Gum and Wood Chemical Manufacturing" (83.7%), "212111 Bituminous Coal and Lignite Surface Mining" (81.3%) and "212391 Potash, Soda, and Borate Mineral Mining" (79.0%).

The industries with the lowest share of votes for republicans are "315240 Women's, Girls', and Infants' Cut and Sew Apparel Manufacturing" (24.8%), "336415 Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing" (24.7%) and "316992 Women's Handbag and Purse Manufacturing" (23.2%).

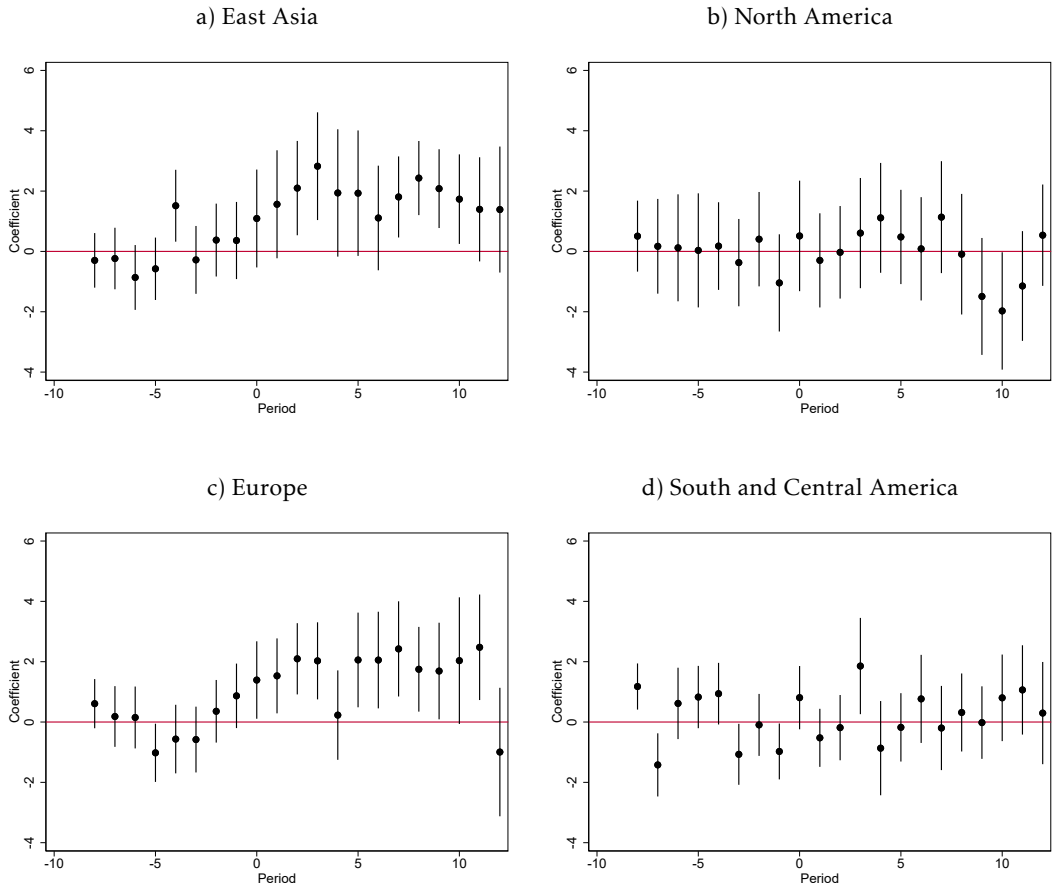
[22] We exclude the small amount of third-party votes.

[23] For example, if employment in automobile manufacturing is concentrated 100% in Detroit, and Detroit votes 30% Republican and 70% Democrat, then the share of votes for Republicans would be 30% for the auto industry.

[24] These data are available at https://electionlab.mit.edu/.

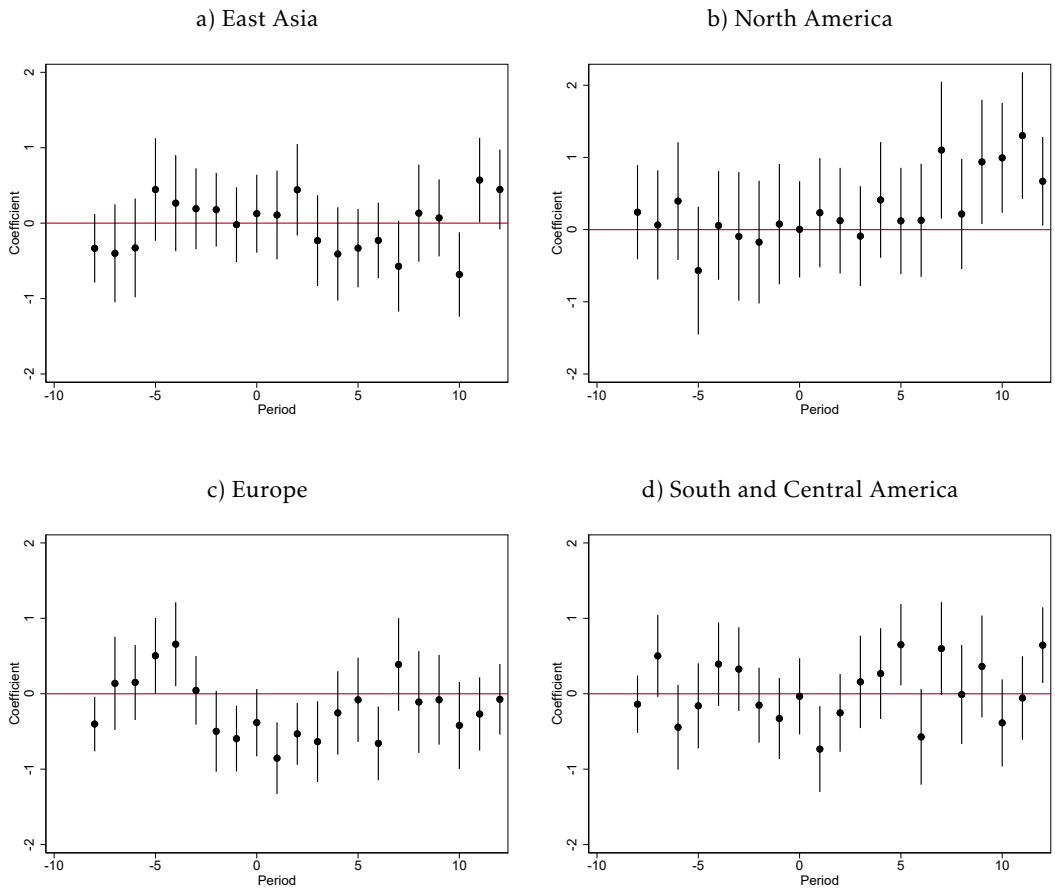
A.6 Were US exports rerouted away from Chinese tariffs and SOEs? Additional results

Figure A.2: Chinese tariffs and exports rerouting: Breakdown by destinations



Notes: This figure plots the coefficients γ_k obtained from the estimation of equation (7). Vertical bars represent 90% confidence intervals.

Figure A.3: Chinese SOEs and exports rerouting: Breakdown by destinations



Notes: This figure plots the coefficients φ_k obtained from the estimation of equation (7). Vertical bars represent 90% confidence intervals.