Importers Big and Small: The Heterogeneous Impacts of U.S.-China Tariffs on Sourcing and Prices

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Abstract

This paper employs the universe of transaction-level trade data to examine how U.S. importers have adjusted their foreign sourcing patterns in response to the 2018-19 U.S. tariffs on China. We show that a substantial reallocation and diversification of importers' source countries has come with notable costs, including a decline in overall import flows. The tariff-induced shift to ex-ante less-desirable source countries also led to changes import prices that were profoundly different for different types of importers. Big importers were already importing from multiple countries and, following an initial scramble in 2018, were able to reallocate trade without paying higher prices. In addition, we find evidence consistent with them leveraging market power, as the average big importer benefits from lower prices on goods sourced from China. By contrast, small importers faced a more disruptive adjustment, paying higher unit values for their new mix of source countries, facing larger penalties when adding new countries, and being unable to extract price concessions from Chinese suppliers.

JEL classifications: F13, F14, F15

Keywords: Tariffs; Trade Fragmentation; Trade War; Firms; Importers

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1 Introduction

An extensive literature has explored the wide-ranging distributional effects of trade policy changes on industries, producers, workers, and consumers. However, much less attention has been paid to the distributional impacts of trade policy shocks on different types of importing firms. While only a minority of firms engage in direct importing, these firms form a highly heterogeneous group. For example, in 2017, the average firm importing into the U.S. sourced a particular product from a single country.[1] In contrast, the average dollar of trade came from an individual firm sourcing the same product from more than six different countries (see Figure 1). This highlights the significant diversity within the importing sector, where many small firms operate alongside large firms that dominate U.S. imports by volume.

Understanding the potentially different implications of trade policy changes on importing firms of different sizes has gained importance since 2018, as the U.S. began imposing substantial tariffs on hundreds of billions of dollars of imports from China. Importing firms have faced important decisions on how to respond. Some have continued to import from China and paid the tariffs, while others have shifted imports from China to other countries. Very little is known about the implications of these decisions for firms, especially the impact of reallocating imports across countries.

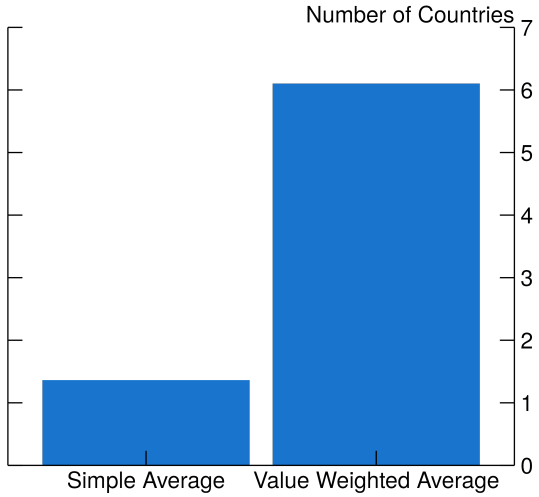
Large firms with diversified source countries and an extensive network of arm's-length suppliers and foreign affiliates may have been significantly better positioned to respond to trade policy changes than smaller importers that depend on a single country. Additionally, the greater bargaining power enjoyed by large importers in negotiations with foreign suppliers may have enabled them to secure price concessions when trade policies shifted. Consequently, trade policy shocks may have had different impacts on large and small importers, with smaller firms becoming less competitive when faced with increased tariffs.

This paper examines the implications of the 2018-19 US import tariff hikes on China for the global sourcing decisions of US firms. We use confidential data on US imports, which allow us to study differential responses of large and small importers, calculate measures of source-country diversification, distinguish between related-party and arm's-length transactions, and observe changes in unit values taking place over time for a given firm importing a given product from a given country. Thus, we are able to shed light on adjustments at a highly disaggregated level that is not visible in aggregate trade statistics.

The 2018-19 tariffs provide a very useful setting for the purposes of our study. It was a concrete and substantial shock, with meaningful variation in tariff hikes across firms

[1] This was also true in 2007, as documented by Antràs et al. (2017).

Figure 1: Avg. Number of Source Countries for Firm-Product Pairs



Note: Figure displays the average (simple or import value weighted) number of countries from which firms import ten-digit HS products.
Source: LFTTD and authors' calculations.

importing a given product, which we refer to as as firm-product "pairs." It can also be considered plausibly exogenous from the perspective of individual firms and pairs.[2] Moreover, while initially the US tariff increases may have been seen as temporary, by the end of 2019 it became clear that there was no speedy resolution to the conflict in sight.

We consider cumulative changes to sourcing patterns between 2017 (i.e., the year preceding the imposition of tariffs) and the subsequent years up to 2021. We focus on an array of variables measuring changes in firms' sourcing behavior in response to the change in US tariffs on imports from China. Because a pair's exposure to tariffs is weighted by the value of the pair's 2017 imports, our continuous treatment variable increases in the tariff applicable to a given product and in the firm's reliance on importing this product from China in the pre-tariff period. Moreover, because our sample period contains the onset of the Covid-19 pandemic, our baseline specification includes product fixed effects that control for factors common to all firms importing a product, including changes in relative

[2]For instance, Amiti et al. (2019) and Fajgelbaum et al. (2020) have treated the tariffs as plausibly exogenous due to the uncertain timing of the tariff waves and exact composition of products and countries targeted. Although it was possible to apply for exclusions, of 52,746 requests made, only 13% (6,804) were granted. Moreover, exclusions applied to a product code rather than to an individual importer (Congressional Research Service (2024)), and factors other than exclusions accounted for a larger portion of the deviation between announced and actual duties collected (Flaaen et al. 2021). Finally, our findings that both small and large firms reacted strongly to tariffs, albeit in somewhat different ways, suggesting that exclusions most likely played only a minor role.

demand that might occur, for example, as consumers demand less formal clothing and more home office equipment.

Our findings document substantial changes taking place in firms' sourcing patterns in response to the US import tariff hikes. We find that US importers have lowered the share of imports sourced from China and increased sourcing from other Asian and Latin American countries, consistent with existing work.[3] Using firm-product-level data for the universe of U.S. trade, we find that this shift in trade flows has led to an overall diversification of the supply sources—as measured by a Herfindahl index of source countries—for products hit by import tariffs. We document a decline in the overall value of imports and an increased reliance on intra-firm trade. We find no response of the average f.o.b. unit value of imports sourced by a given firm from all countries to the tariff. In sum, while the increased diversification that has occurred in response to tariffs may have reduced the risk of future supply chain disruptions, our results indicate that it has come at the cost of reduced trade flows.

The aggregate results, described so far, mask significant differences in how firms of varying sizes have adjusted to tariffs. To examine this heterogeneity, we divide the sample into large and small importers of a particular product. A firm is defined as being a large importer for a given product if the value of its imports of that product in 2017 was above the 90th percentile across firms importing that product.

Both large and small importers have reduced their reliance on China while increasing their dependence on other Asian countries and Mexico. However, the nature of these adjustments has differed significantly between the two groups. Small importers have reallocated sourcing shares across countries rather than inceasing the number of countries they source from. The increased reliance on more expensive manufacturing locations has led to higher average unit values of imports.

In contrast, large importers have been able to source from China at lower unit values and to expand the number of countries they source from, without experiencing a rise in overall unit values. These findings are in line with the idea that larger importers benefit from greater market power in negotiations with Chinese suppliers and can effectively leverage their established trade networks to diversify their sources further.

Delving deeper into the changes in unit values, we find that they have been primarily driven by arm's-length transactions, which alleviates concerns that the changes we observe stem from transfer pricing practices. Furthermore, there is no evidence that the unit values of products sourced from countries other than China have responded to the tariffs imposed on China. Therefore, for small importers, the increase in average unit values is

[3]See Nicita (2019), Bown (2022), Freund et al. (2023), and Alfaro and Chor (2023), among others. As shown by Fajgelbaum et al. (2024), the US-China trade war created net export opportunities rather than simply shifting trade across destinations.

entirely attributable to the reallocation of sourcing shares across countries.

Overall, our findings are in line with the US import tariffs having substantial implications for the pattern of US imports, with distributional consequences for small and large importing firms.

Our paper contributes to the growing literature on the implications of the 2018-19 U.S.-China trade tensions.[4] The strand closest to our work documents substantial reallocation of U.S. imports across source countries and supplier firms (see Nicita (2019), Bown (2022), Freund et al. (2023), Alfaro and Chor (2023) and Handley et al. (2024)), while Alfaro et al. (2025) examines the role of specialized banks in aiding reallocation and expansion across countries and suppliers. A complementary strand investigates the impacts of the tariffs with on firms' financial performance, finding negative effects for stock returns and investment (see Huang et al. (2021) and Amiti et al. (2020)).[5] Our contribution to this body of work lies in examining diversification in supply patterns at the firm-product level, using the universe of US trade transactions. The greater detail available in our data allows us to document differential adjustments made by small and large importers, thus pointing out distributional consequences of tariffs across firms of different sizes. The sourcing patterns we consider have not been examined to date.

Our paper also speaks to the broader literature on the implications of the 2018-19 tariffs for the US economy. Flaaen and Pierce (2024) investigated the impact of the tariffs on manufacturing employment at the industry level and found that the US tariffs on China were associated with relative declines in US manufacturing employment due to the rising imported input costs and export retaliation, which more than offset the gains from import protection. Javorcik et al. (2024) found evidence that both tariffs on imported inputs and retaliatory tariffs led to a relative decline in online job postings in affected commuting zones. The effects of imported input tariffs were stronger for lower skilled postings than for higher skill postings and for part-time than full-time jobs. By contrast, they did not find any evidence of positive impacts of import protection on job openings. Their estimates suggest that the tariffs led to a combined effect of 137,000 fewer job postings in 2018, or 0.5 percent of the US total. These patterns are echoed in the work of Goswami (2020) who showed that commuting zones subject to higher retaliatory tariffs experienced lower employment growth, with no effects found from import protection and in the work of Waugh (2019) who concentrated specifically on the retaliatory Chinese tariffs and showed that retaliatory tariffs lowered retail employment growth.

This paper is structured as follows. The next section outlines the timeline of the US-China trade tensions and is followed by a section describing the data and defining the

[4]For a recent survey on this literature, see Fajgelbaum and Khandelwal (2022).

[5]On the China side, Chor and Li (2021) also show how the US tariffs lowered industrial activity of Chinese firms.

variables we use to observe sourcing patterns. Section 4 presents the empirical strategy and main results. Section 5 explicitly distinguishes between small and large importing firms and Section 6 explores changes in sourcing patterns across sectors. Section 7 reports results of additional robustness checks, and the final section concludes.

2 US-China Trade Tensions and Tariffs

In August of 2017, the US Trade Representative (USTR) initiated an investigation into whether any of China's laws, policies, practices, or actions "may be unreasonable or discriminatory and may be harming American intellectual property rights, innovation, or technology development" (Section 301 of the Trade Act of 1974). In March of 2018, the conclusions of the investigation were published, with a finding of unfair trade practices in all three of these areas. In response to these conclusions, the Trump Administration announced that it would respond with new tariffs, new rules on investment, and a WTO dispute.

A list of products, on which a tariff of up to 25 percent was to be imposed, was published on the 3rd April covering about $46.2 billion of imports from China and including products such as machinery, mechanical appliances, and electrical equipment. In response, one day later, China published its own list of products for retaliatory tariffs covering $50 billion of US exports in products including vehicles, aircraft, vessels and soybeans. Again escalating the confrontation, the US started to consider tariffs on an additional $100 billion of imports from China on the 5th April.

On the 15th June, the USTR released a revised list of products, splitting the implementation into two phases, the first starting on the 6th July and covering $34 billion in imports from China and the second phase planned to cover $16 billion in imports. On the same day, China also released its revised retaliatory list, also including a two-phase approach, and covering vehicles as well as agricultural and food products. In response to China's retaliation, President Trump directed the USTR to identify an additional $200 billion of imports from China to potentially face a rate of 10 percent, along with threatening yet another $200 billion if China was to retaliate again.

The first phase of the tariffs (defined on the 15th June) came into effect on the 6th of July. Four days later the USTR released the list of $200 billion of imports from China to be subject to a 10 percent tariff after public hearings in August.

On the 20th July, President Trump indicated intentions of introducing tariffs on the remaining $262 billion of imports from China, therefore including all $504 billion of 2017 imports. Moreover, he instructed the USTR to consider 25 percent tariffs on the July 10th list of $200 billion, rather than the initial proposal of 10 percent. In response, China

warned that another $60 billion of US exports that could be covered by new tariffs, ranging from 5-25 percent.

On the 7th August, an updated list for the second phase of the $50 billion tariffs announced on the 15th June was released. Only 5 out of the 284 products initially identified were removed, and the tariff rate was increased from 10 percent to 25 percent on the remaining $16 billion. China also revised its second phase list the following day, covering a similar value of US exports, and removing crude oil and introducing a few other products. Both lists were then implemented on the 23rd of August as planned.

On the 17th of September, the $200 billion list of imports from China that would face a 10 percent tariff from the 24th September onwards was finalized. President Trump also announced that this rate would increase to 25 percent on the 1st of January 2019. China responded with its own finalized list of $60 billion of US exports, with tariffs ranging from 5-10 percent. Both sets of tariffs then went into action on the 24th September.

In February of 2019, President Trump announced that he would delay the scheduled March 1 tariff increase on $200 billion of imports from China. The increase would have raised the 10 percent tariffs to 25 percent.

On the 5th of May, after several weeks of US-China trade negotiations, President Trump announced that the 10 percent tariff will increase to 25 percent on May 10th, covering $200 billion of imports from China. Additionally, a 25 percent tariff is announced on the rest of US imports from China that were not targeted by the Section 301 tariffs.

Following retaliatory tarifs by China, in August 2019, President Trump announced a 10 percent tariff on an additional $300 billion of imports from China. These were scheduled to take effect on September 1, 2019 (on $112 billion of imports) and December 15 (on $160 billion of imports). The finalized list includes final consumer goods not targeted by the previous tariffs.

After threats of additional tariffs by both the U.S. and China in August, in September, tensions begin to cool. On December 13, just prior to the scheduled December 15 tariff increase, President Trump announces his administration and China have reached an agreement to be signed in January 2020. Under the agreement, China agrees to purchase an additional $200 billion worth of US exports, and most tariffs remain in effect, but future tariffs are temporarily halted.

3 Data

3.1 Primary Sources

Our primary dataset is the U.S. Census Bureau's (Census) Longitudinal Foreign Trade Transaction Database (LFTTD), which captures the universe of U.S. international trade

transactions. Our focus is on the U.S. import data, which record the value, quantity, ten-digit Harmonized Tariff Schedule (HTS) product code, country of origin, related party status, and, importantly, a longitudinal identifier for the importing firm. The data begin in 1992, and the most recent year available, as of this is draft, is 2021.

We link the LFTTD trade data with Census's Longitudinal Business Database (LBD), which records the six-digit NAICS industry code, employment, and payroll for the establishments of essentially all U.S. private employers.[6] We use data from the LBD to classify firms by their primary sector of operation.

Our unit of analysis is a firm-product pair, which is the level of aggregation best suited to examining the implications for firms' sourcing activities as they reallocate imports across countries in response to tariffs. Because HTS codes change over time, we use an updated version of the concordances from Pierce and Schott (2012) to create time-consistent product codes.[7]

3.2 Measures of Pair-Level Sourcing Behavior

In the empirical analysis that follows, we examine the relationship between tariffs and a range of measures of firm-product-pair level sourcing behavior. Here, we define these measures of sourcing behavior, which we categorize into three groups. Summary statistics for all variables are provided in Section A of the appendix.

Reallocation: The first group of measures examines the extent of reallocation of U.S. imports across source countries in response to tariffs. These measures are simply the share of a pair's imports coming from particular countries or sets of countries (e.g. the share of imports from China, Asia excluding China, etc.):

$$Country\ Share^{c}_{fht} = \frac{imp_{fhct}}{\sum_{c \in C} imp_{fhct}}. \tag{1}$$

Risk Reduction: The second group of measures of sourcing behavior pertains to activities that might be associated with reducing risk in firms' supply chains or increasing supply chain resilience.

The first of these measures is a Herfindahl index of pairs' imports across source countries:

$$Herf_{fht} = \sum_{c \in C} (\frac{imp_{fhct}}{imp_{fht}})^2. \tag{2}$$

[6]The LBD excludes employment in agriculture and forestry. For industry classification, we use the time-consistent NAICS codes from (Fort and Klimek 2016).

[7]Without incorporating these time-consistent product codes, there can be discrete jumps in measures of firms sourcing behavior at the time of revisions to the U.S. Harmonized Tariff Schedule or to the World Customs Organization's six-digit Harmonized System Product classifications.

This traditional measure is useful for measuring the extent of a pair's concentration or diversification across source countries, and therefore the extent to which a pair's sourcing may be subject to risk of tariffs on a particular country.[8]

The next risk reduction measure is the share of imports coming from "related parties," i.e. from overseas affiliates. Census considers firms to be related if either party owns, controls, or holds voting power equivalent to 6 percent of the outstanding voting stocks or shares of the other firm (Heise et al. 2021). Importing from affiliates may become more desirable given the possibility of tariffs if imports from affiliates are easier or faster to adjust or less subject to disruption than imports from unaffiliated "arm's length" suppliers. In addition, importing more from affiliates may allow for greater leeway to use transfer pricing to reduce tariff burden. We measure a pair's involvement in related party as the share of its imports sourced from related parties:

$$Related\ Party\ Share_{fht} = \frac{imp^{rp}_{fht}}{imp_{fht}}. \tag{3}$$

The final measure of "risk reduction" activities is simply the count of the number of countries from which a pair sources an input. Increasing the number of countries increases that possibility of avoiding country-specific tariffs. It provides a measure of extensive margin diversification that complements the Herfindahl measure of equation 2, which captures both extensive and intensive margin diversification.

Broader effects: The third group of measures, which we term "broader effects," includes variables that capture potential costs associated with any reallocation and risk reduction activities a pair may undertake to increase supply chain resilience.

The first of these broader effect measures is the total value of imports for the pair. Examining effects on the total value of imports shows whether any reallocation away from China simply leads to a deflection of trade or instead leads to trade destruction (Bown and Crowley (2007)). The second broader effect measure is the Average Unit Value a pair pays for its imports:

$$AUV_{fht} = \frac{imp_{fht}}{qty_{fht}} \tag{4}$$

where imp_{fht} is the value of imports for firm f importing product h at time t and qty_{fht} is the quantity imported. This proxy for price is useful for determining whether a pair must pay higher unit values as it reallocates trade away from China in response to tariffs. We note that AUV_{fht} is defined exclusive of tariffs.

[8]Note that this measure of source country concentration differs from that used by Handley et al. (2024), which is based on the number supplier firms, irrespective of country, and is defined at the product level. While that measure captures risks associated with failure of a particular supplier firm due to idiosyncratic factors, the measure we employ is useful for capturing risks of trade policy that pertain to all suppliers within a country. In addition, the Herfindahl measure in equation 2 is defined at the firm-product-year level, and it is treated as a decision variable for the firm importing a given product, which could be influenced by tariffs.

4 Empirical Strategy and Results

To examine how U.S. importers' sourcing behavior responds to the imposition of tariffs, we estimate a simple long-differenced specification,

$$\Delta y_{fh,2017:t} = \alpha + \beta \Delta Tariff_{fh,2017:t} + \gamma_h + \epsilon_{fh}. \tag{5}$$

where the dependent variable is the change, from 2017 to year t, in one of the pair-level (specific to firm f and product h) measures of sourcing behavior described above. We will estimate this equation separately for t=2018,..., 2021. The independent variable of interest is the change, over the same period, in the import-value-weighted average tariff across all countries from which firm f imports product p in year t. While the tariffs themselves are time varying, the weights are based based on product and mix of source countries in 2017:

$$Tariff_{fht} = \sum_{c \in C} \frac{imp_{c,2017}}{imp_{2017}} * Tariff_{cht}. \tag{6}$$

This continuous treatment variable increases in the tariff applicable to a given product and the firm's reliance on importing this product from China in the pre-tariffs period. Thus, to experience an increase in tariffs, a firm must have imported a given product from China in 2017 (the year before the tariffs were put in place) and the product must be covered by U.S. Section 301 tariffs.

The product-level fixed effects, γ_h, control for shocks that have common effects on the sourcing characteristics of all firms importing a given product in the period considered. Key among these are demand shocks associated with the Covid-19 pandemic, which occurs during our sample period. It's well known that the pandemic led to substantial changes in the composition of goods demanded, and that high demand combined with constrained supply for certain products led firms to scramble to change their sourcing patterns (Arriola et al. 2021). Product fixed effects control for these changes in demand across products. Changes in sourcing patterns that are common to all products, such as changes in technology that allow for easier coordination of imports across countries, are captured in the constant of our long-differences specification.

4.1 Reallocation across Countries

We begin by examining the relationship between tariffs and any subsequent reallocation of imports across countries. Our dependent variable is the share of imports of product h sourced by firm f from each of the following: China, Asian countries other than China, Vietnam and Mexico. As a starting point, we present estimates for import-value-weighted regressions, which means that the reported estimates should be interpreted as representing the effect of tariffs on the average dollar of U.S. imports. By construction, these regressions will be heavily influenced by the large importers that dominate U.S. trade. As we consider separately, changes between 2017 and each of the subsequent years, the estimates depicted in Figure 2 capture cumulative effects.

The results indicate that increases in tariffs are associated with reductions in the share of imports coming from China, with most of the adjustment taking place already in 2018. One standard deviation increase in tariff rates is associated with a 14.3 percentage point reduction in the share of imports coming from China in 2021. By contrast, higher tariffs are associated with higher shares of imports from Asia excluding China, Vietnam and Mexico. Imports from Asia (excluding China) are particularly responsive to the tariff. Again, a large jump in the share of those imports is visible already in 2018, followed by slower adjustment in subsequent years. The estimates for Vietnam and Mexico are similar to each other, though it is worth noting that Vietnam saw a large increase in exports to the US from a very low base, while Mwxico was already a very large supplier prior to the tariff shock.

These patterns of reallocation across countries have been documented in other papers using more aggregate data, including Nicita (2019), Bown (2022), Freund et al. (2023) and Alfaro and Chor (2023). Therefore, we consider our finding of similar patterns using more disaggregated data at the firm-product level and a different empirical strategy to be a proof of concept of our approach.

4.2 Risk Reduction in Supply Chains

Next we focus on outcomes that might reduce risk in firms' supply chains, again focusing on import-value-weighted results reported in Figure 3. There is a clear negative relationship between tariffs and a Herfindahl index of pairs' suppliers, where suppliers are defined at the country-level (see the middle panel). That is, as tariffs increase, pairs diversify their supplier base by making it less concentrated across countries. It is a level effect with the adjustment taking place immediately. Interestingly, as shown in the right panel, this diversification does not occur—on average—via the addition of new source countries, but rather by a shift in imports across existing source countries.

The left panel focuses on the share of imports sourced from related parties. Here we do not find a statistically significant effect of tariffs.[9] However, when we consider the share of related-party trade coming from affiliates, from whom a given product was not sourced in 2017, we see that it has responded to the tariff increase. In other words, the tariff shock has induced firms to start sourcing tariff-affected products from the affiliates that were not supplying the affected product to the US market before. The big jump in 2018 is followed by the effect tapering off and stabilizing at a lower level.

4.3 Trade Destruction

The previous two sub-sections report that U.S. importers undertook substantial reallocation and supply chain risk-reduction activities in response to the 2018-19 tariffs. Now, we examine whether there are costs associated with these activities. For example, while firms shifted trade away from China and toward other countries, they may shrink the overall amount of imports as they find some trade no longer profitable. Moreover, firms had presumably optimized their import values among the set of potential source countries

[9]Our analysis pertains to U.S. importers and their foreign affiliates, regardless of ultimate corporate parent.

prior to tariffs. Given that new tariffs would induce a move away from this preferred allocation, firms may have to pay higher unit values for their imports as they shift trade toward less desirable source countries.

We examine the possibility in the left panel of Figure 4, which again reports import-value-weighted estimates. It shows that tariffs are associated with a decrease in *overall* trade, or trade destruction, rather than simply trade diversion. The estimates are statistically significant at the one percent level. The adjustment is immediate, suggesting again a level effect. In the right panel of the figure, we show that the tariff shock results in some pairs stopping imports from China altogether.

4.4 Unit values

What was the response of unit values to the tariff shock? In line with the previous results suggesting an immediate response of trade flows to the tariff, we find a statistically significant increase in overall unit values in response to the tariff change, visible already in 2018 (see the left panel of figure 5). This is intuitive as China is anecdotally considered a lowest-cost supplier for many goods. And indeed the right panel reveals that this effect is driven by the increase in unit values of goods sourced from countries outside China. These were presumably orders made at a relatively short notice, with some of them coming from foreign affiliates that did not previously supply the US market with a given good (recall figure 3). Interestingly, the results indicate a *drop* in unit values of goods sourced in China in response to the tariff, though the estimate for 2018 is very noisy. After the initial overshooting, the response of unit values to tariffs loses statistical significance, indicating that ultimately tariffs do not affect unit values of imports.

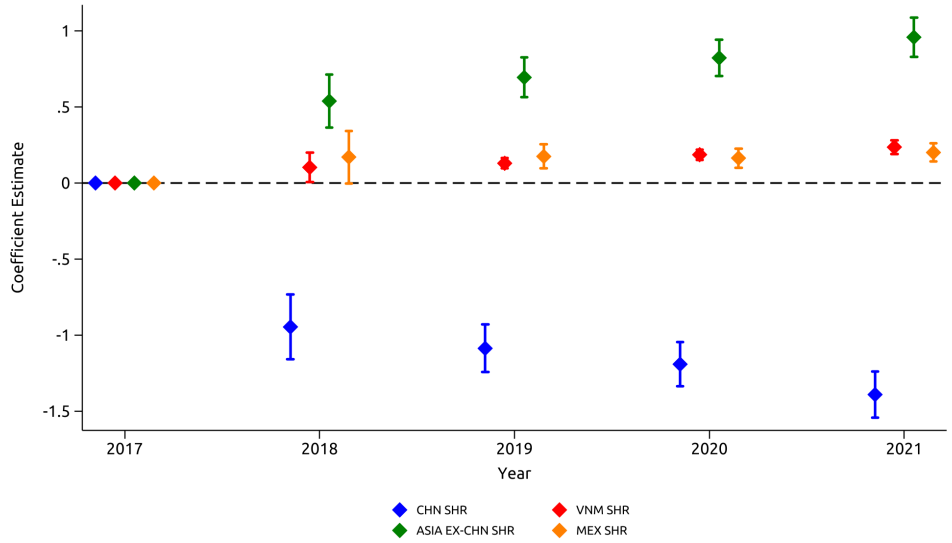
We also examine how the relationship between tariffs and average unit values differs between related or arm's length transactions. This question is interesting in its own right, as it sheds light on the role existing or newly established foreign affiliates play in redirecting trade. The additional advantage of this analysis is the ability to distinguish between the type of transactions that may be affected by transfer pricing undertaken to alleviate the tariff burden (related party) versus transactions that are unlikely to be affected by transfer pricing (arm's length). As visible in the middle panel of figure 5, in neither case do we find a statistically significant response of unit values to tariffs. This reinforces our conclusion that the 2018-19 tariffs did not affect the unit values of goods that continued to be imported into the U.S. However, it is worth reiterating that by their nature our weighted regressions capture the impact on the average dollar of U.S. imports. In the next section, we will consider heterogeneity among importers.

In the right panel of figure **??**, we distinguish between the unit values of imports coming from China versus the rest of the world. Even though the estimates are noisy, the pattern is striking, if not unexpected. It reveals a jump in unit value of imports coming from the rest of the world and a decline in unit values of imports from China. In both cases, there is some overshooting before the values converge to the pre-tariff level.

4.5 Robustness checks

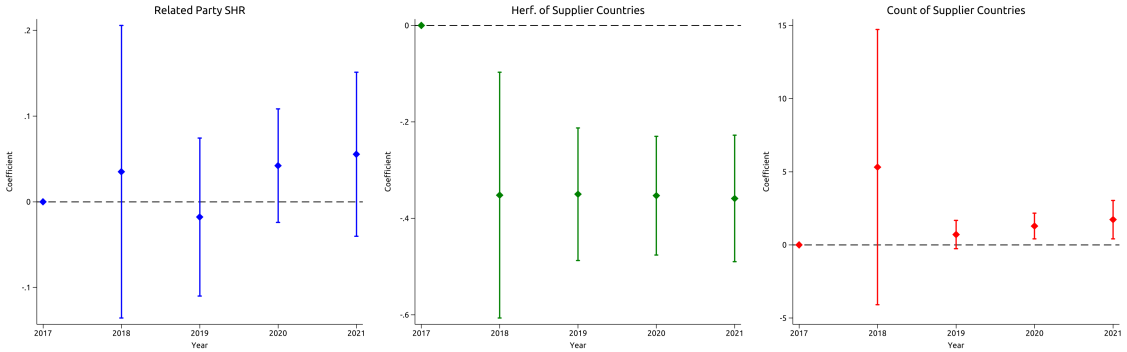
Tariff exclusions Companies were able to seek exclusions from US tariffs, introduced in 2018-19, using an administrative process managed by the Office of the US Trade Representative (Chor et al. 2025). To check whether these exclusions affect our results, we re-estimate the regressions presented so far, dropping products subject to exclusions. As visible from figure 6, our baseline results remain robust.

Figure 2: Reallocation across countries (weighted regressions)



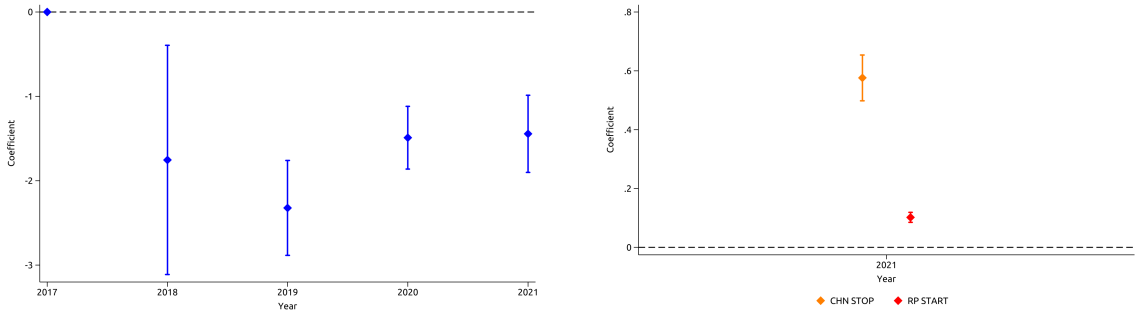
Source: U.S. Census Bureau and authors' calculations.
Notes: Place-holder.

Figure 3: Risk Reduction (weighted regressions)



Source: U.S. Census Bureau and authors' calculations.
Notes: Place-holder.

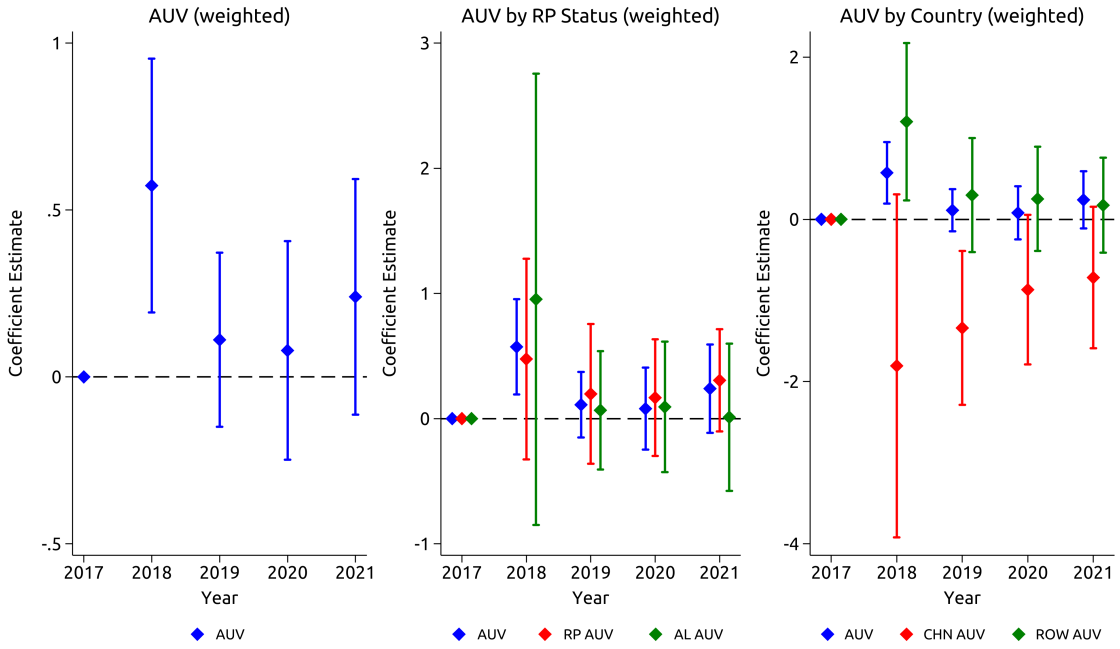
Figure 4: Trade destruction (weighted regressions)



(a) Value of Imports (b) Stop Importing from China

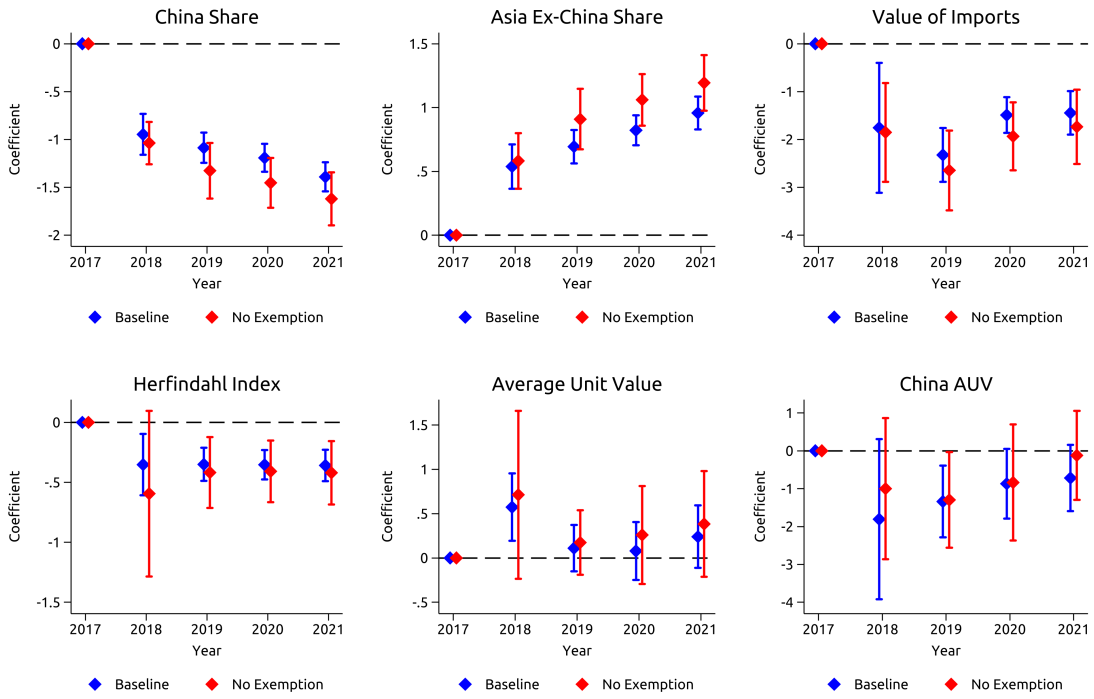
Source: U.S. Census Bureau and authors' calculations. Notes: Place-holder.

Figure 5: AUV Estimates (weighted regressions)



Source: U.S. Census Bureau and authors' calculations.
Notes: Place-holder.

Figure 6: No Exemption Robustness Checks: All Importers (weighted)



Source: U.S. Census Bureau and authors' calculations.
Notes: Place-holder.

Alternative fixed effects Recall that our baseline specification controls for product fixed effects. In another robustness check, we allow for alternative fixed effects: (i) none, (ii) firm fixed effects; or (iii) firm fixed effects and product fixed effects. As evident from figure C4, the results are robust to these alternative specifications.

5 Importers Big and Small

One may expect a differential adjustment process among large and small importers. In this section, we address this question explicitly by comparing the tariff responses in the subsamples of large and small importers.

We define a firm importing a given product as a large importer if its import value in 2017 is at or above the 90th percentile of firms importing the product. Small firms are those whose 2017 import values are below the 90th percentile. We note two features of this definition. First, this measure is an indicator for a firm's importance in the import market for a given product, which is the relevant measure of interest for our research questions, particularly when we examine the possibility of importers exercising market power with their foreign suppliers. While this measure may be correlated with firm size, it is not necessarily the case that large importers are large firms in terms of their U.S. employment, revenue, profit, etc. Second, and relatedly, because the measure is defined based on a firm's importance in *product-level* imports—rather than overall firm-level imports—a firm may be large importer of one product, but a small importer of another.

In the analysis that follows, we report results for unweighted regressions, which represent effects for the average firm in each sub-sample, i.e. the average small importer and the average large importer. We choose to do so, as weighted results would mask distinctions between the two sets of importers as results in the small importer sample would become dominated by the largest of the "small" importers.

5.1 Reallocation across Countries: Importers Big and Small

In figure 7, we focus on reallocation patterns across countries, in each graph denoting the results for the subsample of large vs small importers with a different color. The results suggest that both large and small importers reallocate trade away from China and toward other countries in response to tariffs, with the impact on sourcing from other Asian countries being particularly pronounced. The responses of the two groups differ in two respects. First, small importers seem to overshoot ("overreact") in 2018 in terms of their shift away from China and their pivot towards other Asian countries and Mexico. In subsequent years, their response to tariffs adjusts to become comparable to that of large importers. Second, ultimately, large importers tend to respond to the tariff with a greater pivot towards Vietnam and Mexico than smaller imports do.

5.2 Risk Reduction: Importers Big and Small

Notable and striking differences between large and small importers become readily apparent when we consider diversification of the supply chain (see figure 8). First, while

large importers expand the number of countries they source from in response to the tariff shock, small importers keep the number of source countries unchanged. This is not surprising, given that small importers disproportionately import from a single country (Figure 1).[10] Second and related to the previous point, the concentration of imports across countries responds much more to the tariff in the case of large than in the case of small importers. Third, while large importers increase the share of related party transactions with affiliates that previously did not suppy a given product, small importers tend to do the opposite. Where the two groups do not differ is in terms of reliance on related party sourcing. Both large and small importers react to the tariff by increasing the share of within-firm imports.

5.3 Trade Destruction: Importers Big and Small

The results so far suggest that in response to tariffs large importers are making bigger adjustments than small importers do. In particular, large importers diversify their supply chain more than small importers do, by increasing the number of countries they source from and lowering concentration of imports across countries. But what about the total volume of imports? We find that the drop in the volume of imports is more responsive to the tariff in the case of large than in the case of small importers.

5.4 Unit values: Importers Big and Small

Next we focus on changes in unit values (see figure 10). In response to the tariff shock, average unit values increase immediately for small and big importers. They subsequently come down, though remain above their initial level in the case of small importers, while for the large importers they return to the pre-tariff level. As evident from the middle panel, there is no difference between the two groups when it comes to related party transactions. What is striking, however, is the trajectory of unit values in arm's-length transactions. In both cases, unit values jump immediately after the tariffs are introduced, but for small importers they end up above the pre-tariff level, while for large importers they drop below the previous level.

Figure 11 zooms in on unit values of imports from China and imports from the rest of the world and documents quite different responses in the two subsamples. For large importers, there is a statistically significant sustained decrease in the unit values of imports from China. In constrast, the unit values of imports by small importers remain broadly unchanged. This is consistent with the idea that large importers possess significant market power.

We note that there are important differences between our approach and those used in papers more broadly examining the effects of tariffs on import prices (Amiti et al. (2019), Fajgelbaum et al. (2020)). First, we focus on a different level of aggregation—the firm-product-level—rather than the country-product-level. Second, because our measure of tariff-exposure is based on a firm-product-pair's distribution of imports across countries in 2017, it accounts only for effects on unit values of continuing pairs; it does not account for entry and exit. Furthermore, we note that the import value-weighted regressions

[10] See Chung (2017) for additional information on firms' sourcing from multiple countries.

in Section 4 do not find a response of AUVs to tariffs. Nonetheless, our unweighted regressions here offer useful insights into heterogeneous effects of tariffs on unit values for continuing pairs of different sizes.

Finally, as visible in the right panel, neither large nor small importers experience a change in the unit values of imports from the rest of the world in response to the tariff shock. Therefore, the overall increase in the average unit value appears to be driven by a reallocation of sourcing from China to more expensive locations (rather than a demand shock driving up prices in locations that present an alternative to China).

6 Examining Sourcing Patterns by Sector

In this section, we examine how firms in different sectors alter their sourcing patterns in response to tariffs on imports from China. We find that despite substantial pre-tariff differences in sourcing behavior across sectors, firms in different sectors exhibit the same qualitative responses to tariffs, though responses are strongest for retailers.

6.1 Sourcing Patterns Over Time, by Sector: Descriptive Evidence

Figure 12 displays sourcing patterns over time for three major U.S. trading sectors, manufacturing, wholesale, and retail. The left panel displays the share of firm-level imports from China. As shown in that left panel, prior to the onset of tariffs, there is notable variation in the extent of reliance on imports from China by sector, with retailers import much more intensively from China than wholesalers or retailers. In terms of trends, while firms in all three sectors increased the share of imports from China in the 1990s and especially the early 2000s, the share peaks for manufacturers and retailers around the time of the Global Financial Crisis (GFC), while it continues to increase for retailers until the time of the tariffs. After the tariffs, firms from all sectors decrease the share of their imports coming from China.

As shown in the right panel of Figure 12, firms in different sectors also exhibit substantial differences in their extent of diversification across countries prior to the imposition of tariffs. Manufacturers had been increasing their diversification across source countries (decreasing Herfindahl) for decades prior to the tariffs, while retailers—with their increasing reliance on China shown in the left panel—had been becoming increasingly concentrated. Notably, the overall level of Herfindahl index for source countries only declines, on net, for retailers once tariffs are imposed, with a temporary jump during the Covid-19-affected year of 2020.

7 Conclusion

This paper analyzes firm-product-level panel data on importing behavior of US firms for the period 2017-2021 to shed light on their response to import tariffs introduced by the U.S. beginning in 2018. The analysis shows that higher tariffs were associated with a decline in the share of imports sourced from China and increased sourcing from other Asian countries and from Latin America, leading to an overall geographic diversification

of the supplier base. Additionally, the results show a decline in the overall value of imports and an increased reliance on related-party trade.

The paper documents notable differences in how firms of varying sizes have adjusted to the tariffs. To explore this variation, we analyze import-weighted versus unweighted regressions and separately assess large and small importers. Both approaches yield consistent results, underscoring the distinct responses of firms based on their size.

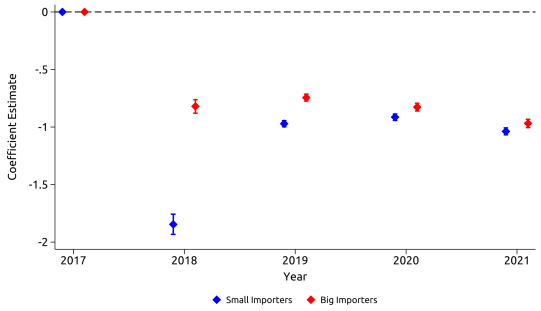
Both large and small importers have decreased their dependence on China while increasing their sourcing from other Asian countries and Mexico. However, the adjustments have been markedly different between the two groups. Small importers have made more substantial shifts away from China and have relied more on other Asian countries, ultimately reducing the number of countries they source from. This narrowing of sourcing options has contributed to higher average unit values for their imports, as they increasingly depend on more expensive manufacturing locations.

In contrast, large importers have been able to maintain lower unit values for imports from China and expand the number of countries they source from. This diversification has been achieved without any significant increase in their overall unit values. These results are consistent with the idea that large importers enjoy greater bargaining power with Chinese suppliers and can strategically use their existing trade networks to further diversify their sourcing.

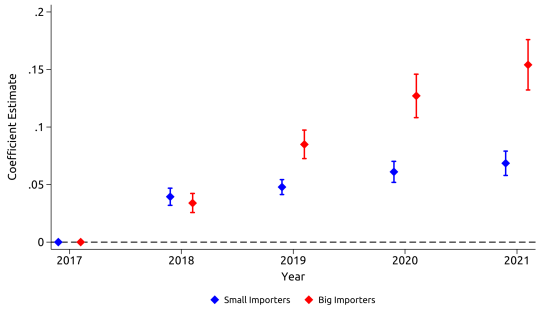
A closer look at the changes in unit values reveals that these shifts are primarily driven by arm's-length transactions, mitigating concerns about transfer pricing as the underlying cause. Additionally, we find no evidence of changes in the unit values of goods imported from countries outside of China. For small importers, this suggests that the rise in average unit values is purely a consequence of reallocating their sourcing shares.

Taken together, our findings highlight that the recent tariffs have reshaped the patterns of US imports, with significant distributional effects between small and large importing firms.

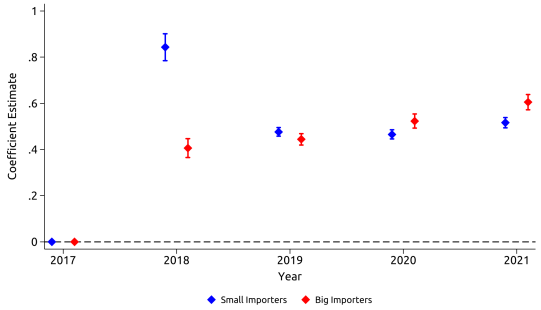
Figure 7: Import Shares by Source Country: Big vs. Small Importers



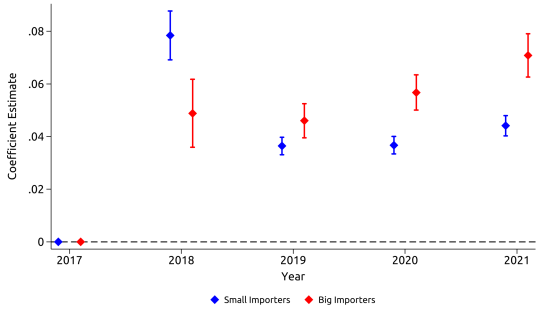
(a) China Share



(b) Vietnam Share



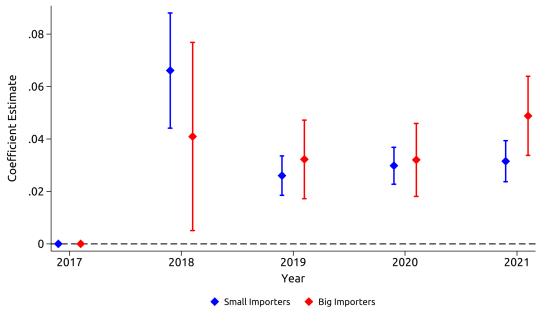
(c) Asia ex-China Share



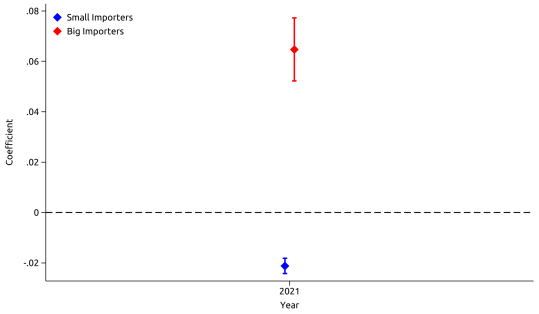
(d) Mexico Share

Source: U.S. Census Bureau and authors' calculations. Notes: Place-holder.

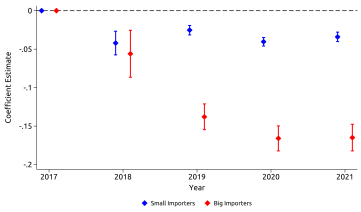
Figure 8: Risk Reduction and Import Outcomes: Big vs. Small Importers



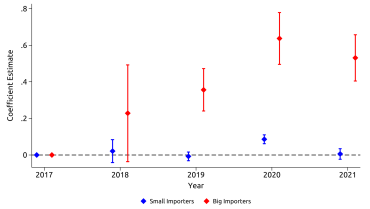
(a) Related Party Share



(b) Start Importing from Related Party



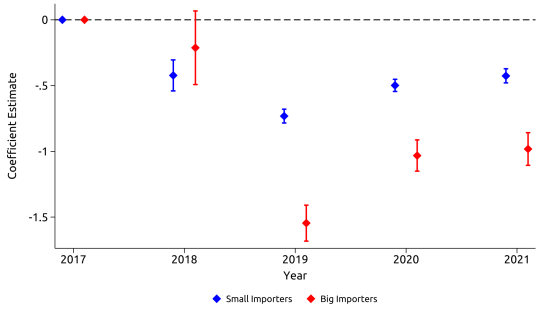
(c) Herf. of Supplier Countries



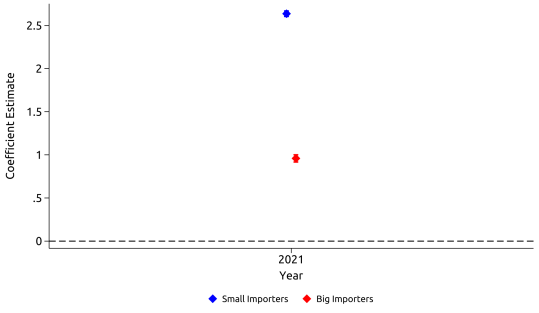
(d) Count of Supplier Countries

Source: U.S. Census Bureau and authors' calculations.
Notes: Place-holder.

Figure 9: Import Outcomes: Big vs. Small Importers



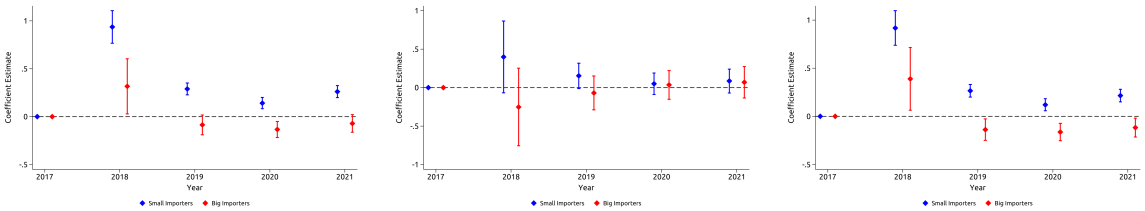
(a) Value of Imports



(b) Stop Importing from China

Source: U.S. Census Bureau and authors' calculations.
Notes: Place-holder.

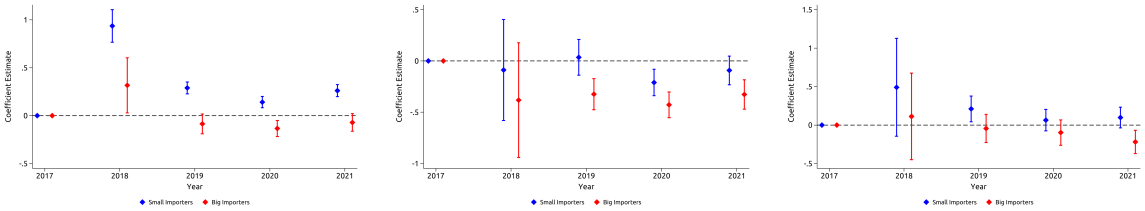
Figure 10: Average Unit Values: Big vs. Small Importers



(a) Average Unit Value (b) Related Party AUV (c) Arm's Length AUV

Source: U.S. Census Bureau and authors' calculations.
Notes: Place-holder.

Figure 11: Average Unit Values: Big vs. Small Importers

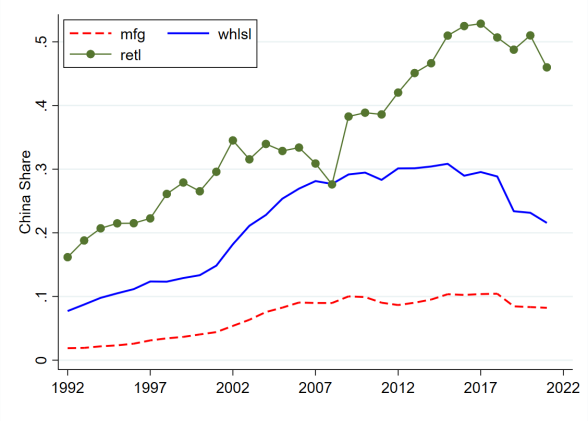


(a) Average Unit Value (b) China AUV (c) ROW AUV

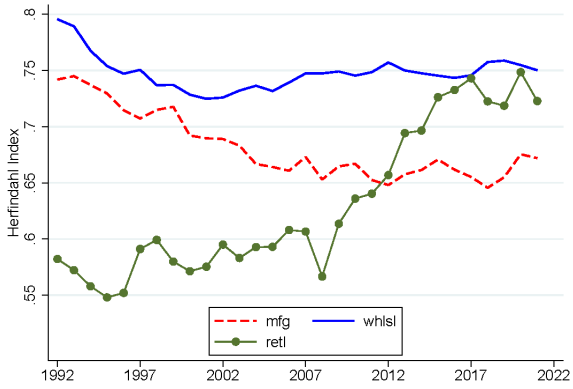
Source: U.S. Census Bureau and authors' calculations.
Notes: Place-holder.

Figure 12: Sourcing Patterns by Major Sector of Firm

(a) Share of Imports from China



(b) Herfindahl Index of Source Countries



Source: LFTTD and authors' calculations.
Notes: Left panel displays the share of imports from China and right panel displays Herfindahl index of supplier countries. In both panels, a firm's sector is defined as the sector with the largest share of firm-level employment and the displayed data are import value-weighted.

References

Alfaro, Laura and Davin Chor, "Global Supply Chains: The Looming "Great Reallocation"," Working Paper 31661, National Bureau of Economic Research September 2023.

____, Mariya Brussevich, Camelia Minoiu, and Andera Presbitero, "Bank Financing of Global Supply Chains," 2025. Mimeo.

Amiti, Mary, Sang Hoon Kong, and David Weinstein, "The Effect of the U.S.-China Trade War on U.S. Investment," *NBER Working Paper*, May 2020, (27114), 46.

____, Stephen J. Redding, and David E. Weinstein, "The Impact of the 2018 Tariffs on Prices and Welfare," *Journal of Economic Perspectives*, November 2019, *33* (4), 187–210.

Antràs, Pol, Teresa C. Fort, and Felix Tintelnot, "The Margins of Global Sourcing: Theory and Evidence from US Firms," *American Economic Review*, September 2017, *107* (9), 2514–64.

Arriola, Christine, Przemyslaw Kowalski, and Frank van Tongeren, "The Impact of COVID-19 on Directions and Structure of International Trade," Technical Report 252, Organization for Economic Co-operation and Development 2021.

Bown, Chad, "Four Years Into the Trade War, are the US and China Decoupling?," Working Paper, Peterson Institute for International Economics 2022.

Bown, Chad P. and Meredith A. Crowley, "Trade deflection and trade depression," *Journal of International Economics*, 2007, *72* (1), 176–201.

Chor, Davin and Bingjing Li, "Illuminating the Effects of the US-China Tariff War on China's Economy," Technical Report w29349, National Bureau of Economic Research, Cambridge, MA October 2021.

____, Matthew Grant, and Bingjing Li, "Tariff Exclusions in the US-China Trade War," June 2025. Working paper.

Chung, Elaine, "Global Multisourcing and Supply Risk Diversification," Technical Report, SSRN 2017.

Congressional Research Service, "Section 301 Tariff Exclusions on U.S. Imports from China," Technical Report, In Focus 11582, version 21 2024.

Fajgelbaum, Pablo D. and Amit K. Khandelwal, "The Economic Impacts of the US–China Trade War," *Annual Review of Economics*, August 2022, *14* (1), annurev–economics–051420–110410.

Fajgelbaum, Pablo D, Pinelopi K Goldberg, Patrick J Kennedy, and Amit K Khandelwal, "The Return to Protectionism," *The Quarterly Journal of Economics*, February 2020, *135* (1), 1–55.

Fajgelbaum, Pablo, Pinelopi Goldberg, Patrick Kennedy, Amit Khandelwal, and Daria Taglioni, "The US-China Trade War and Global Reallocations," *American Economic Review: Insights*, June 2024, *6* (2), 295–312.

Flaaen, Aaron and Justin Pierce, "Disentangling the Effects of the 2018-2019 Tariffs on a Globally Connected U.S. Manufacturing Sector," *Review of Economics and Statistics*, 2024, *Forthcoming*.

____, Kathryn Langemeier, and Justin Pierce, "Factors Affecting Recent U.S. Tariffs on Imports from China," FEDS Notes 29401, Federal Reserve Board February 2021.

Fort, Teresa C. and Shawn Klimek, "The Effect of Industry Classification Changes on US Employment Composition," Technical Report, Tuck School at Dartmouth 2016.

Freund, Caroline, Aaditya Mattoo, Alen Mulabdic, and Michele Ruta, "Is US Trade Policy Reshaping Global Supply Chains?," Working Paper 2023.

Goswami, Sanjana, "Employment Consequences of U.S. Trade Wars," 2020.

Handley, Kyle, Fariha Kamal, and Ryan Monarch, "Supply chain adjustments to tariff shocks: Evidence from firm trade linkages in the 2018-2019 U.S. trade war," *Economics Letters*, 2024, *244*, 112009.

Heise, Sebastian, Justin R. Pierce, Georg Schaur, and Peter K. Schott, "Tariff Rate Uncertainty and the Structure of Supply Chains," 2021. mimeo.

Huang, Yi, Chen Lin, Sibo Liu, and Heiwai Tang, "Trade Networks and Firm Value: Evidence from the U.S.-China Trade War," 2021, p. 61.

Javorcik, Beata, Ben Kett, and Katherine Stapleton, "Did the 2018 TradeWar Improve Job Opportunities for US Workers?," *Journal of International Economics*, 2024, *Forthcoming*.

Nicita, Alessandro, "Trade and Trade Diversion Effects of United States Tariffs on China," Working Paper, UNCTAD Research Paper No. 37 2019.

Pierce, Justin R. and Peter K. Schott, "Concording U.S. Harmonized System Categories Over Time," *Journal of Official Statistics*, 2012, *28* (1), 53–68.

Waugh, Michael, "The Consumption Response to Trade Shocks: Evidence from the US-China Trade War," Technical Report w26353, National Bureau of Economic Research, Cambridge, MA October 2019.

A Summary Statistics

This section presents summary statistics for all variables considered in our empirical analysis. We present means and standard deviations, both import-value-weighted and unweighted.

Table A1: Summary Statistics

	(1)	(2)	(3)	(4)	(5)
	Δ Tariff$_{fh}$	Δ CHN Share$_{fh}$	Δ VNM Share$_{fh}$	Δ Asia Ex. CHN Share$_{fh}$	Δ MEX Share$_{fh}$
Mean (weighted)	3.3%	-7.5%	1.3%	1.6%	-0.5%
SD (weighted)	7.4%	23.9%	10.3%	23.0%	16.1%
Mean (unweighted)	5.9%	-21.0%	-0.4%	-9.5%	-1.8%
SD (unweighted)	10.9%	42.8%	9.7%	33.8%	15.2%

	(6)	(7)	(8)
	Δ Herf$_{fh}$	Δ RP Share$_{fh}$	Δ Country Count$_{fh}$
Mean (weighted)	-0.3%	-6.4%	-1.75
SD (weighted)	19.0%	29.3%	11.57
Mean (unweighted)	-0.5%	-7.1%	-0.73
SD (unweighted)	20.1%	29.8%	1.49

	(9)	(10)	(11)	(12)	(13)
	Δ ln(Val$_{fh}$)	Δ ln(AUV$_{fh}$)	Δ ln(RP AUV$_{fh}$)	Δ ln(AL AUV$_{fh}$)	Δ ln(CHN AUV$_{fh}$)
Mean (weighted)	-41.8%	2.1%	4.3%	8.3%	-6.5%
SD (weighted)	160.5%	96.4%	101.6%	118.8%	130.8%
Mean (unweighted)	9.3%	0.1%	0.5%	0.0%	-3.6%
SD (unweighted)	164.7%	131.8%	140.6%	131.8%	116.5%

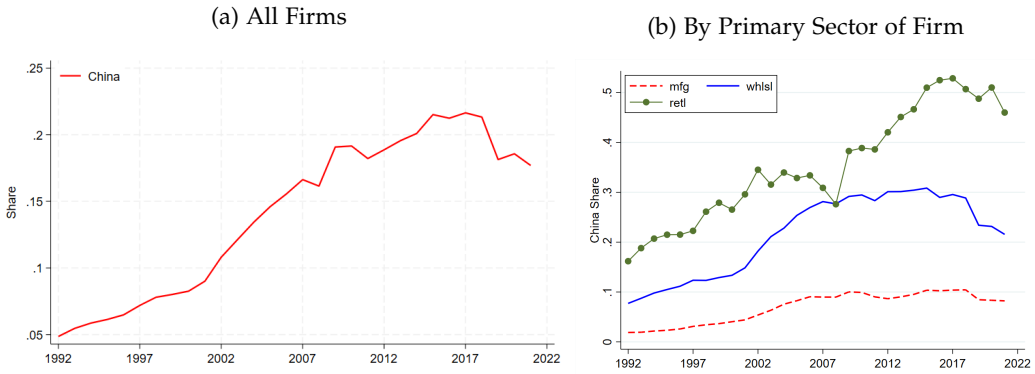
Note: Table displays means and standard deviations for all variables employed in the paper. The first two rows of each panel present import-value-weighted statistics, while those in the third and fourth rows are unweighted.
Source: LFTTD and authors' calculations.

B The Evolution of Sourcing from China

In this section, we graphically present a series of summary statistics to set the stage for the analysis. As shown in Figure B1a, the aggregate share of imports from China rises in the 1990s, increases at a faster pace after China joins the WTO in 2001, and then

moves sideways in the years until tariffs are imposed. Once the U.S. begins imposing tariffs in 2018, the share of US imports sourced from China drops considerably. Figure B1b indicates that firms of multiple sectors—retailers, wholesalers, and manufacturers—decrease the share of imports they source from China. Figure B1b also shows that while retailers continued to increase their Chinese import share right until the onset of tariffs, wholesalers and manufacturers had held their China shares constant since around the time of the Global Financial Crisis (GFC).

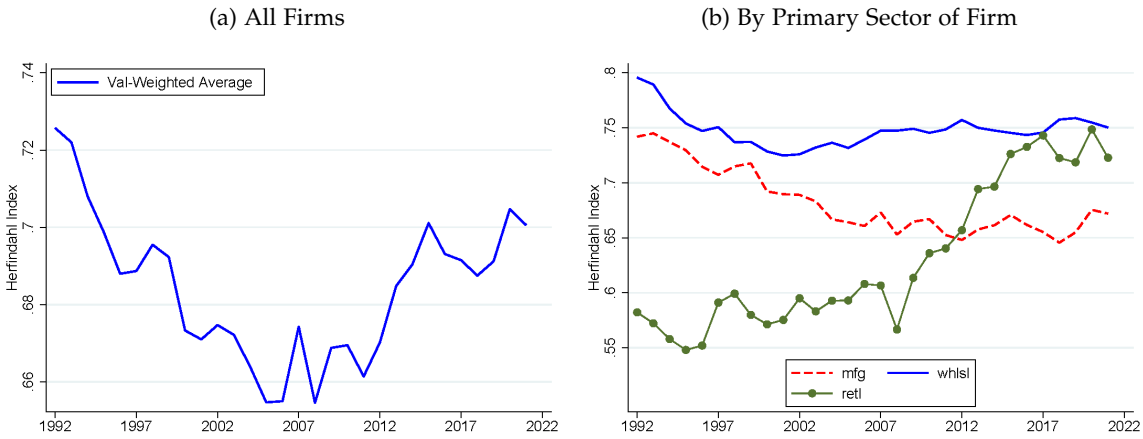
Figure B1: Share of U.S. Imports Sourced from China



Source: United States International Trade Commission and Longitudinal Foreign Trade Transaction Database, U.S. Census Bureau.
Notes: This figure displays the value-weighted average share of U.S. imports from China from 1992-2021, in aggregate (left panel) and by major sector of firms (right panel), where the top 3 sectors in terms of U.S. import value are displayed. The unit of observation is the firm-product pair. The major sector of the firm is the sector that accounts for the plurality of the firm's employment over the entire sample period.

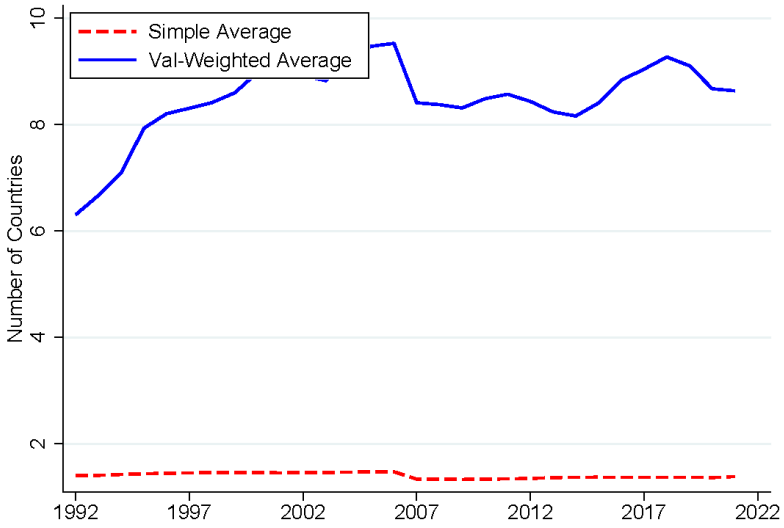
Figure B3 shows the average number of RoW countries (i.e., countries other than China) for firm-product pairs that import from China. The simple average indicates that the typical pair that imports from China imports from between 1 and 2 other countries. The value-weighted average shows that the average dollar of trade is occurring at a pair that imports from 7-8 additional countries. After the implementation of tariffs in 2018, there is a step up in the weighted average number of rest of world countries.

Figure B2: Concentration



Source: Longitudinal Foreign Trade Transaction Database, U.S. Census Bureau.
Notes: This figure displays the value-weighted Herfindahl index of supplier countries from 1992-2021, in aggregate (left panel) and by major sector of firms (right panel), where the top 3 sectors in terms of U.S. import value are displayed. The unit of observation is the firm-product pair. The major sector of the firm is the sector that accounts for the plurality of the firm's employment over the entire sample period.

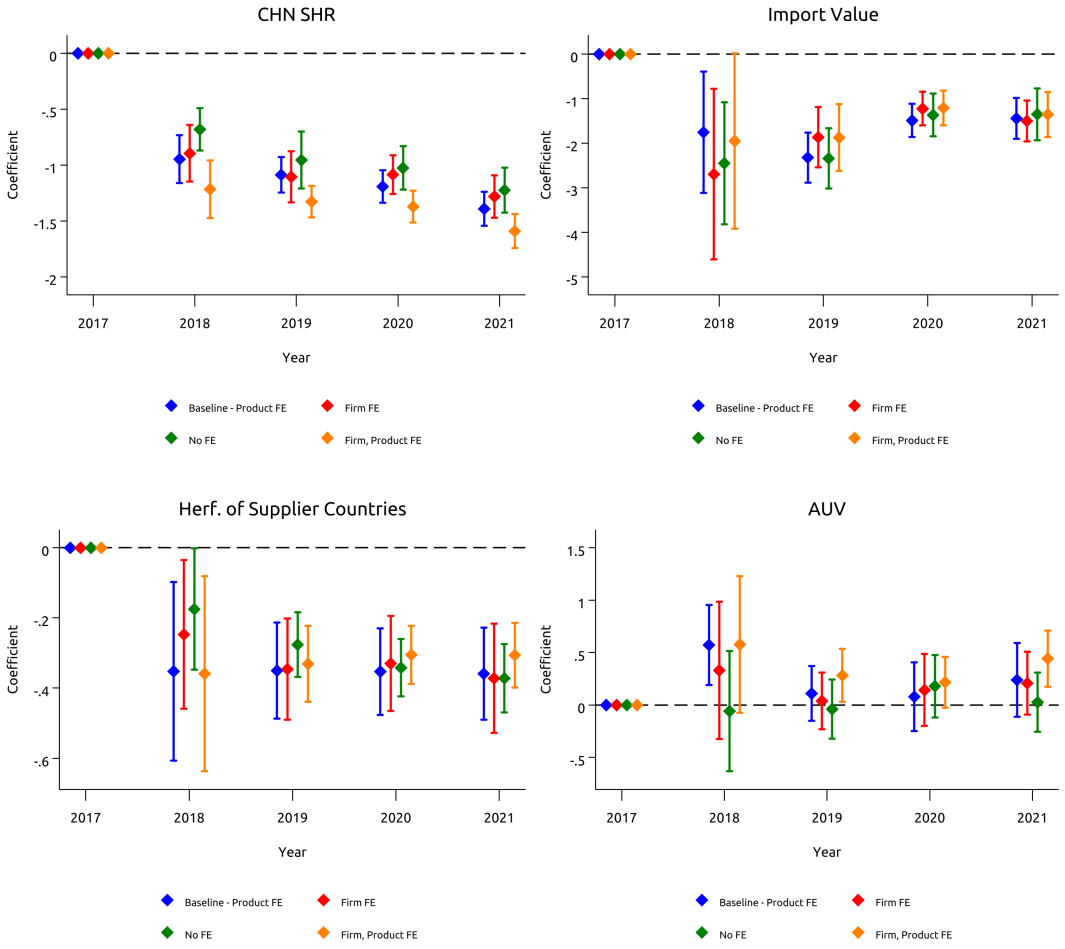
Figure B3: Number of "Rest of World" Countries for Firm-Product Pairs Importing from China



Source: Longitudinal Foreign Trade Transaction Database, U.S. Census Bureau.
Notes: This figure displays the simple and value-weighted average of "rest of world" countries for firm-product pairs that import from China from 1992-2021. The unit of observation is the firm-product pair. The "rest of world" countries are defined as any country other than China.

C Robustness checks

Figure C4: Robustness Checks: Alternative Fixed Effects Specifications (weighted regressions)



Note: Dependent variable is change in noted outcome from 2017 to noted end year.
That is, the figures show increasingly long differences in separate regressions, not an event study.

Source: U.S. Census Bureau and authors' calculations.
Notes: Place-holder.