Trade Wars on the Income Statement: The Effects of Tariffs on Firms*

Omar Barbiero
Federal Reserve Bank of Boston

Viacheslav Sheremirov
Federal Reserve Bank of Boston

Alvaro Silva
Federal Reserve Bank of Boston

Hillary Stein
Federal Reserve Bank of Boston

May 28, 2026

Abstract: We study the firm-level effects of the 2018 and 2025 US tariff episodes. Combining bill-of-lading, supply chain, and financial data, we construct exposure measures across three channels: direct import costs, upstream suppliers' costs, and retaliatory tariffs on exports, validated using stock returns and earnings calls. We provide new evidence that, in 2025, cost exposure reduced sales and variable costs by about 1 percentage point for firms with average tariff exposure, with no margin or investment effects, consistent with demand-driven contractions under constant markups.

JEL Classification: F13, F14, F23, F41, F62, G38

Keywords: import tariffs, export tariffs, trade war, supply chains, firm-level evidence

*We thank participants at seminars at the Federal Reserve Bank of Boston's 69th Annual Economic Conference and the Spring 2026 Midwest Macro meetings for useful feedback. We also thank Andrei Levchenko (discussant) and Philippe Andrade for comments and suggestions. We are indebted to Sophie Handley and Lilia Qian for outstanding research assistance, and Larry Bean for expert copyediting. An early version of this paper circulated under the title, "U.S. Firms' Exposure to Tariffs: A Comparison of the 2018 and 2025 Episodes." The views expressed in this paper are those of the authors and do not indicate concurrence by the Federal Reserve Bank of Boston, the principals of the Board of Governors, or the Federal Reserve System.

Omar.Barbiero@bos.frb.org, Viacheslav.Sheremirov@bos.frb.org, asilvub@gmail.com, Hillary.Stein@bos.frb.org .

1 Introduction

What happens to firms affected by tariff policies? The incidence of tariffs is usually measured where the policy is applied: at the product, border, or industry level. But many of the economically relevant effects are resolved inside firms. A company may import some goods, source other inputs from tariff-exposed domestic suppliers, sell in markets targeted by retaliation, and adjust prices and quantities across several lines of business. Looking at firm outcomes therefore captures the net effect of these channels after they have been aggregated through production, sourcing, and sales decisions. It also makes it possible to study heterogeneity across firms and to trace shocks through observed supplier linkages. We use this perspective to compare the 2018 and 2025 US tariff episodes, combining transaction-level import data, firm-to-firm supply-chain data, geographic revenue data, and financial statements to measure how tariff exposure affects observed firm performance.

While there are some studies focusing on the effects of these tariff episodes on border prices (e.g., Cavallo et al. 2021), global production networks (e.g., Huo, Levchenko, and Pandalai-Nayar 2025), or the domestic aggregate implications of recent tariffs (e.g., Amiti, Kong, and Weinstein 2020), the tariff effects on US companies' financial performance are still relatively unexplored. We focus on public companies because they contribute substantially to domestic aggregate production and employment and tend to be more exposed to international trade relative to private firms. In addition, the legal requirement of public companies to file quarterly financial statements facilitates our analysis.

Firms can be exposed to tariff shocks in several ways. First, import tariffs raise the direct cost of imports unless foreign suppliers fully absorb the increase in customs duties. Second, domestic production costs can rise due to higher prices set by domestic suppliers that import intermediate goods. Third, domestic exporters and multinationals face higher barriers to entering and operating in foreign markets due to retaliation practices whereby foreign governments raise tariffs on US exports.

To construct economically interpretable measures of exposure across these three channels, and to understand the impact of these exposures on firms' production costs, sales, profits, and investment, we merge and homogenize several data sets. First, we merge S&P Panjiva bill-of-lading data on product-country import flows with financial statements from Compustat at the parent-company level.[1] We thus are able to construct a direct measure of each firm's import exposure to tariffs

[1] Note that the bill-of-lading data for US imports include only *maritime* transportation flows. We supplement missing land and air trade between US and Mexico using Panjiva Mexico exports data, which covers maritime as well as non-maritime trade. However, exports data for Canada is not available through Panjiva. Hence, our import intensity measure represents a lower bound of the true measure. This limitation could be particularly important for the 2025 episode, wherein substantial tariffs were imposed on Canada and a broader set of goods for which land and air transportation may play a larger role in trade with the United States. Note also that the imports of a company identified

based on its actual trading relationships, and we are able to compare this exposure to financial outcomes. To construct the indirect supplier exposure measure, we use Factset Supply Chain data, which comprise time-varying information on the set of large suppliers of listed companies. We link each supplier, whether private or public, to their import records from Panjiva, allowing us to trace tariff shocks through the supply chain to downstream firms. To compute exposure to foreign retaliation, we use Factset Georev to understand the foreign markets to which a company exports.

We validate our three exposure measures using two independent sources of evidence. First, we study stock returns around major tariff announcement dates and show that firms with higher exposure to each channel experienced more negative abnormal returns, consistent with financial markets pricing in the costs of tariff exposure at the firm level. Second, we construct keyword-based sentiment measures from earnings call transcripts and show that all three exposure measures are significantly associated with higher negative sentiment and perceived risk in both episodes, with the 2025 episode generating substantially more negative language and concern than 2018. Together, these results support the interpretation that our exposure measures capture the tariff-related risks that are priced by financial markets and articulated by firm managers.

The firm-level granularity of our exposure measures allows us to document features of the two episodes that are not visible in aggregate or industry-level data. The 2025 episode, while involving roughly the same set of globally exposed companies as 2018, is a much larger shock to direct import exposure: the average tariff rate increase faced by firms in our sample was about 2.5 percentage points in 2018 compared with approximately 12 percentage points in 2025, and the direct import exposure measure is approximately 10 times larger. At the same time, the 2025 episode involved a considerably smaller retaliatory response, with a more limited effect on foreign sales exposure than in 2018. The supplier channel tells a similar story: the average number of affected suppliers is comparable across the two episodes, but the tariff increases those suppliers face are far larger in 2025. These patterns, and the substantial variation across firms within each episode, are only recoverable with firm-level exposure measures linked to actual import and supply chain relationships. Import cost and export retaliation exposure both tend to be larger for bigger firms, reflecting the greater import and export intensity of large public companies. The supplier cost channel, by contrast, is not correlated with firm size: upstream tariff shocks propagate through supply chains to small and large downstream firms alike. In terms of sectoral reach, import cost and supplier cost exposure are dispersed broadly across industries, while export retaliation exposure is concentrated mainly in manufacturing, mining, and agriculture.

We estimate the effects of tariff exposure on firms using local projections (Jordà 2005) at the firm level. We focus on the responses of nominal sales, cost of goods sold (COGS), earnings before interest, taxes, depreciation, and amortization (EBITDA) normalized by sales, and capital

as a subsidiary are attributed to that subsidiary's associated ultimate parent company.

expenditure (CAPEX) normalized by total assets. Our firm-level specification allows for both firm-level and industry-time fixed effects. This empirical strategy offers several advantages over industry-level analyses or those based on equity returns around tariff announcements. First, our fixed effects specification allows us to control for potential general equilibrium effects related to demand factors co-moving with tariffs. Second, accounting for all three channels of exposure contemporaneously allows for a tighter identification given the high level of correlation between the exposure measures. Third, we can provide a direct and intuitive economic linkage between the exposures of US companies to foreign markets and the firm-level effects of those exposures.

Our main empirical findings are as follows. The 2018 estimates are generally close to zero across outcomes and exposure channels, with small positive and negative movements but no persistent economic pattern. By contrast, the 2025 cost shocks generate a much clearer response: sales and COGS fall together for firms exposed through their own imports or through their suppliers' imports, while EBITDA margins and investment remain essentially unchanged. Since the reported responses are scaled by the average exposure in each episode, this comparison should be interpreted as a comparison of the realized effects of the two tariff episodes on an average exposed firm, rather than as a direct comparison of pass-through per unit of exposure.

The common thread across both episodes is the absence of margin effects: whenever tariff exposure moves outcomes, sales and COGS decline by roughly the same magnitude, leaving EBITDA unchanged. We interpret this co-movement using a standard partial equilibrium model of firm pricing and production that delivers two propositions. For the cost channels, under constant markups, a cost shock passes through proportionally to prices; a sufficiently elastic demand response then compresses both revenues and variable costs simultaneously while leaving the markup intact. For the export retaliation channel, the model characterizes retaliation as a negative demand shifter: reduced foreign demand lowers sales and, through scale, also reduces variable costs, again leaving margins unchanged. Both propositions predict the same empirical signature: co-movement of revenues and costs with no change in margins. This interpretation is consistent with the price pass-through evidence in the literature and implies that the aggregate impact of tariffs on firm profitability is more limited than a simple cost-burden view would suggest.

Related Literature This paper contributes to the recent literature on the effects of trade wars on the US economy. Many papers in this literature find full pass-through of import costs at the border and at least partial pass-through into domestic prices (e.g., Amiti, Redding, and Weinstein 2020, Fajgelbaum et al. 2020, Flaaen, Hortaçsu, and Tintelnot 2020, Cavallo et al. 2021, Barbiero and Stein 2025, Cavallo, Llamas, and Vazquez 2025). While we do not observe prices and therefore cannot estimate the pass-through of import costs, we contribute to this literature by providing indirect evidence on pricing behavior based on the joint responses of sales, costs, and profit margins.

Another important strand of literature focuses on the trade reallocation impact of the 2018 trade war. For example, Handley, Kamal, and Monarch (2025) find that US import tariffs led to lower exports for firms that used affected products in their production. Gopinath et al. (2025) find increased global trade fragmentation along regional blocks after 2018. Fajgelbaum et al. (2024) find that countries that were not directly involved in the trade war benefited from it due to increased export sales of affected products. Freund et al. (2024) show that, despite strong decoupling in direct trade between the United States and China after 2018, the two countries' supply chains still strongly depend on each other. Alfaro et al. (2025) show that US banks have been instrumental in channeling credit toward investment in new supplier linkages. We contribute to this literature by providing new evidence on how import tariffs could dislocate exports through retaliation and domestic production through the supplier channel.

Much of the literature on tariffs employs industry variation. For instance, Flaaen and Pierce (2024) use industry-level 2018 tariff exposure data to show that exposure to higher input tariffs and import protection are more important than foreign retaliation. They find that the tariffs, on net, lowered US manufacturing employment and raised producer prices. Our main contribution to this literature is our construction and use of firm-level tariff exposure measures, which enable us to control for time-varying industry factors and to additionally trace the propagation of tariff shocks through supply chains to downstream firms.

Our paper is related to Amiti, Kong, and Weinstein (2020), who also use firm-level Compustat data. They identify common and idiosyncratic factor returns around trade war announcements to measure the implied effect of the 2018 trade war on investment. By contrast, we focus on realized financial outcomes and rely directly on our exposure measures to identify multiple channels of exposure from the cross section of firms.

Our paper is also related to Carreras-Valle and Lee (2026), who use Panjiva data to show that firms front-ran the 2018 tariffs by increasing inventory. While they focus on the effect of tariffs on firms' importing behavior, we focus on the effect on firm sales, costs, and profits. However, their results can help inform our null results for the 2018 episode.

We also contribute to the literature that uses earnings calls data to analyze sentiment about tariffs. For instance, Clayton et al. (2025) construct instruments of geoeconomic pressures such as tariffs and export controls via large-language-model (LLM) querying of earnings calls. While they focus on a wider set of policies, their methodology measures the proportion and intensity of tariff-related language rather than directly linking it to quantitative tariff and outcome measures. Our paper instead focuses on quantitative measures of firm-level tariff exposure. We show that sentiment about tariffs measured from earnings calls is correlated with our tariff exposure channels; in other words, firms that are more exposed to tariffs view them more negatively.

To sum up, we contribute to the literature in two major ways. First, to the extent of our knowledge, this is the first paper that uses firm-level data on multiple channels of exposure to the 2018 and 2025 trade wars to estimate and compare their effects on large firms' financial performance and investment decisions. Second, we compare the effects of the 2018 tariff episode with the 2025 tariff episode. While these two events differ in magnitude and breadth, they are similar in many other dimensions. Tariffs in both episodes appear to be permanent or, at least, exhibit higher persistence relative to previous post–World War II tariff episodes in the United States (see Schmitt-Grohé and Uribe 2025).

The paper proceeds as follows. Section 2 describes the two tariff episodes in our analysis. Section 3 defines our tariff exposure channels and provides construction details. Section 4 provides new stylized facts, discernible using our exposure measures. Section 5 provides external validation based on stock market responses around tariff announcements and firm sentiment. Section 6 presents our main results on firm financial outcomes. Section 7 interprets these results through the lens of a standard model of firm pricing and production. Section 8 concludes.

2 Tariff Episodes

In this paper, we study two periods of increasing tariff rates in the US. The first episode began in 2018 and followed a decades-long period of generally low tariffs. This episode started with a wave of tariffs in February 2018, followed by five more waves from March until September 2018 and additional tariffs in May and September 2019. While the first three waves involved tariffs on specific products, including solar panels, washing machines, steel, and aluminum, the subsequent waves primarily targeted goods imported from China. Overall, this relatively fast and persistent tariff implementation covered more than $350 billion of annual US imports (16 percent of total imports) at an average tariff rate increase of 15.9 percentage points. In response, some of the major US trade partners (Canada, China, the European Union, Mexico, Russia, Turkey) retaliated by imposing tariffs on US exports on a comparable scale.

In 2025, another major ramping up of tariffs impacted US imports. The magnitude and breadth of this episode is unusual in several ways. First, in February and March 2025, exports from only Canada, Mexico, and China were targeted, but by April, all US trading partners had been impacted, albeit at different rates. Second, while some tariffs—including those on steel (March 12), aluminum (June 6), and automobiles (April 3)—were applied at the product level, most were applied at the country level. Third, the retaliatory effect experienced by the United States was subdued relative to the 2018 episode. Only China and Canada retaliated against the 2025 tariffs—and not broadly across product categories.

For each tariff episode, we construct monthly tariff rates at the HS6-by-country level in two steps. First, at the HS10-by-country-of-origin level, we compute the observed (effective) tariff rate $\tilde{\tau}_{c\tilde{p},m}$ (where $\tilde{p}$ denotes the HS10-level product code and c denotes the origin country) in month m as the ratio of duties collected to the customs value of imports, using the publicly-available monthly merchandise trade data from the US Census Bureau:

$$\tilde{\tau}_{c\tilde{p},m} = \frac{\text{Duties Collected}_{c\tilde{p},m}}{\text{Imports}_{c\tilde{p},m}}. \tag{1}$$

Second, we aggregate these HS10-level rates up to the HS6-by-country level using import-value weights from a fixed pre-episode reference year—2017 for the 2018–19 episode and 2024 for the 2025 episode:

$$\tau_{cp,m} = \sum_{\tilde{p}\in p} \omega^{\text{ref}}_{c\tilde{p}}\, \tilde{\tau}_{c\tilde{p},m}, \qquad \omega^{\text{ref}}_{c\tilde{p}} = \frac{\text{Imports}_{c\tilde{p},\text{ref}}}{\sum_{\tilde{p}'\in p} \text{Imports}_{c\tilde{p}',\text{ref}}}, \tag{2}$$

where p denotes the HS6-level product code. Conceptually, $\tau_{cp,m}$ is a statutory rate that incorporates exemptions but holds trade shares fixed at their pre-episode values. Holding the within-HS6 weights at their pre-episode values purges the index of movements that arise as importers reallocate away from the tariffed HS10 lines toward exempted ones within the same HS6.

The resulting measure combines two desirable properties. Using observed rates at the HS10-by-country level captures the binding tariff schedule actually faced by importers, including the dense layer of statutory exemptions, suspensions, and product-specific carve-outs that are particularly prevalent in the 2025 episode and that are not visible in nominal statutory rates. It also avoids attributing economic weight to tariffs that were announced and then rescinded before any shipment cleared customs, an issue that recurs throughout 2025. Holding shares fixed at pre-episode values in the second step then ensures that the variation in $\tau_{cp,m}$ reflects changes in the rate schedule rather than the endogenous response of trade flows to it.[2]

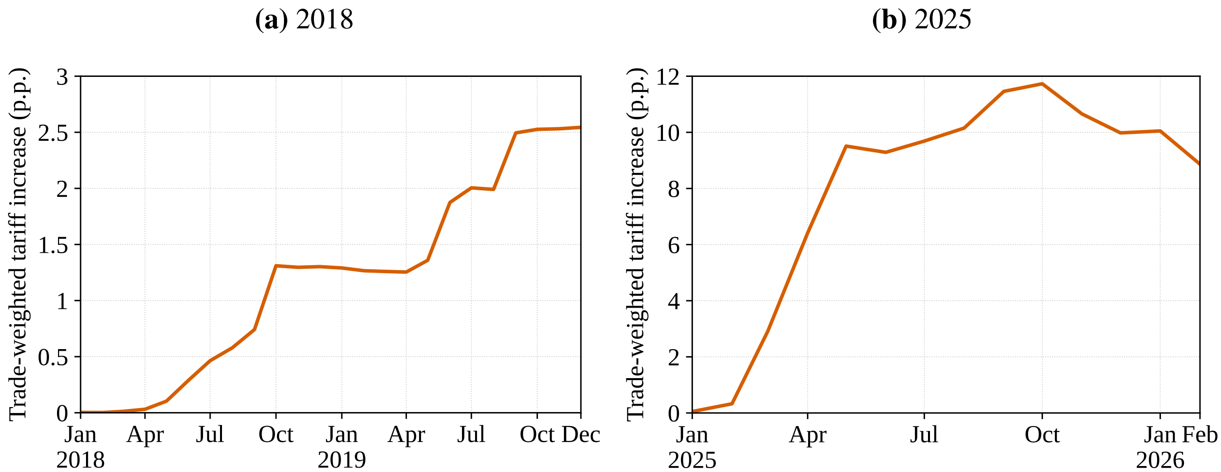
We also use statutory retaliatory tariff hikes that other countries enacted on their imports of US goods, gathering information at the country c product p level.[3] For the 2018 episode, we use data from Fajgelbaum et al. (2020), which in turn sources from official documents released by foreign governments. For the 2025 episode, we gather information from the Department of Finance Canada and the Ministry of Finance of China. All legal exemptions declared in such notices are considered.

Figure 1 shows the average import tariff rate in the 2018 and 2025 episodes. The first panel shows how import tariffs rose throughout the 2018-2019 episode, such that by September 2019 the tariff had risen 2.49 percentage points. The 2025 episode, shown in the second panel, was

[2] One limitation of using observed rates is timing: a tariff levied on product p from country c in month m will not appear in the data until shipments of p from c actually clear customs, which may occur in a later month.

[3] We are not able to construct effective retaliatory tariffs, since US customs does not report the duties paid to foreign countries on US exports.

Figure 1: Cumulative Increase in Tariff Rates



Notes: This figure shows the monthly trade-weighted implemented tariff increase in US imports in 2018 and 2025. We use annual 2017 import weights for the 2018–2019 episode and annual 2024 import weights for the 2025–2026 episode. Import tariff rate increases are effective tariff changes since January of the corresponding year at the HS10 industry-country level. The day of implementation of the tariff is assigned to month *m* if it comes 15 days before or after the first day of month *m*.
Sources: US Census Bureau, author's calculations.

characterized by a sharp tariff increase in the first half of the year of over 9 percentage points, a significantly larger amount than the earlier episode. The tariff rate rose another few percentage points over the next couple months, peaking at 11.7 percentage points in October, before falling again over the next few months. In our most recent month of data, February 2026, the tariff rate had risen a cumulative 8.87 percentage points since the start of the episode.

3 Constructing the Tariff Exposure Measures

We consider three channels through which an increase in import tariffs can affect the cost and revenue of domestic firms. First, domestic importers face a direct increase in marginal cost associated with the higher tariffs they pay on imported goods. We call this the direct import cost channel. Second, domestic firms may face an increase in marginal costs due to higher prices charged by importing suppliers of intermediate goods. We call this the importing suppliers' pass-through channel. Third, exporters experience a decline in foreign revenue due to retaliatory tariffs imposed by foreign governments in response to US tariffs.

3.1 Direct Import Cost Channel

Our first channel of interest is the direct import cost exposure. To construct this measure, we merge the universe of US maritime trade transactions from S&P Panjiva with US Compustat firms.[4] The Panjiva data provide information on the pre-tariff value of goods imported by each listed firm f (and its subsidiries), disaggregated by country of origin c and HS6 product-level code p. To our knowledge, this is the first paper to merge Panjiva with Compustat; we are able to merge 3562 parent-level firms, or 2% of Panjiva importers and 40% of Compustat firms, representing 33% of Panjiva import value.[5]

For each country-product specific tariff increase $\Delta\tau_{pc,t}$ in quarter t, we define the direct import cost exposure of each consolidated firm as follows:

$$\begin{aligned} \text{Import Cost}_{f,t} &= \frac{\sum_c \sum_p \text{Imports}_{fcp,t0} \Delta\tau_{cp,t}}{\text{Costs of Goods Sold}_{f,t0}} \\ &= \underbrace{\frac{\sum_c \sum_p \text{Imports}_{fcp,t0}}{\text{Costs of Goods Sold}_{f,t0}}}_{\text{Import Intensity}_{f,t0}} \times \underbrace{\frac{\sum_c \sum_p \text{Imports}_{fcp,t0} \Delta\tau_{cp,t}}{\sum_c \sum_p \text{Imports}_{fcp,t0}}}_{\text{Change in Effective Tariff Rate}_{f,t}} \end{aligned} \quad (3)$$

This calculation weights country-product level tariff changes by the firm's exposure to that country-product. Because the entirety of the firm's costs are not imported, we divide the weighted tariff change by the firm's total cost of domestic goods sold, such that the import cost exposure metric can be interpreted as the firm's marginal cost change. To prevent firms' endogenous adjustments from contaminating the exposure measure, we evaluate both imports and the cost of goods sold at their values in the year preceding each tariff episode (2017 and 2024, respectively).[6]

Empirically, costs of goods sold is computed as global consolidated costs of goods sold, as reported by Compustat, adjusted by the firm's share of sales in the US, available from Factset GeoRev.[7] The tariff change in quarter t is calculated as the difference in tariff rates between the last month in quarter t and the last month in quarter $t-1$. The equation also illustrates how we can decompose direct import cost exposure changes into the import intensity of the firm multiplied by the firm-specific average tariff rate applied on its imports.

[4]Since Compustat generally represents consolidated financials of several subsidiaries that might be in charge of US imports, we first consolidate both variables to the ultimate parent level using quarterly subsidiary-to-ultimate-parent mapping from S&P Capital IQ.

[5]This value is calculated based in 2017 Panjiva imports.

[6]The country-product shares respond to the tariff itself, and we follow the shift-share convention of treating $\Delta\tau_{cp,t}$ as the exogenous shifter while holding the shares predetermined. The same logic underlies the standard practice in policy evaluation of measuring exposure at pre-policy values, so that the estimand captures the effect of the policy rather than of the adjustment margins it induces. Using contemporaneous shares would bias the estimated tariff effect upward: firms least able to substitute away from tariffed inputs would mechanically appear most exposed, and these are the same firms most likely to experience adverse outcomes for reasons tied to their inability to adjust.

[7]We are able to merge in this data for 3010 of our (parent-level) Panjiva-Compustat merged firms.

3.2 Importing Suppliers' Cost Pass-through Channel

Tariffs can affect the cost of production for firms via direct purchases of foreign goods subject to tariffs or more indirectly via the supply chain. Specifically, tariffs may increase the import costs of a firm's domestic supplier, and this supplier may pass this on by charging the firm a higher price for its product.

In line with our focus on detailed firm-level information, we go beyond using input–output information at the sectoral level to measure these indirect costs (see Barbiero and Stein 2025, for such sectoral calculations). Instead, we measure firm-to-firm linkages using data from Factset Supply Chain (formerly Factset Revere) and link each supplier to its US imports declarations as reported in Panjiva. We find 73% of firms in Compustat report at least one supplier, and we are able to link 45% of these suppliers to Panjiva importers.[8] We retrieve information on the sales size of each supplier as a normalization parameter. The sales information is generally available from both private and public companies at the yearly level from Capital IQ. Because FactSet sources its relationships from 10-Ks, investor presentations, and analogous disclosures, the recorded links correspond to relationships skewed toward the largest counter-parties. Therefore, the network is concentrated on economically significant linkages and silent on small or transient ones. FactSet records that a linkage exists but quantifies its size for only about 10% of customer-supplier pairs, so we cannot weight suppliers by their importance to the focal firm and instead use an unweighted average in (Equation (4)). For this reason, we compute a simple average tariff exposure as follows:

$$\text{Suppliers' Cost}_{f,t} = \frac{1}{\#S_{f,t0}} \sum_{s \in S_{f,t0}} \frac{\sum_p \sum_c \text{Imports}_{scp,t0} \Delta\tau_{cp,t}}{\text{Sales}_{s,t0}}, \tag{4}$$

where $S_{f,t0}$ is the set of suppliers of firm f before each tariff episode begins (from 2016-2017 or 2023-2024) and $\#S_{f,t0}$ indicates the number of suppliers. $\text{Sales}_{s,t0}$ indicates the total sales of supplier s, as reported in Factset, and $\text{Imports}_{scp,t0}$ indicates the imports of supplier s from country c of product p, as reported in Panjiva.

3.3 Export Exposure Channel

As discussed in Section 2, US exporters experienced retaliatory tariffs in both the 2018 and 2025 episodes. To account for the effect of such retaliation on exporters' foreign sales, we construct a measure that weights tariff retaliation from country c by a firm's revenue in country c. Specifically,

[8] 82% of Panjiva-Compustat merged firms report at least one supplier.

we define the Export Retaliation Exposure index as

$$\text{Export Retaliation}_{f,t} = \frac{\sum_c \text{Revenue}_{f,c,t0} \Delta\tau^*_{f\to i,c}}{\sum_c \text{Revenue}_{f,c,t0}}, \tag{5}$$

where $\Delta\tau^*_{f\to i,c}$ represents the tariff applied by the foreign country c on the primary industry i to which that firm f belongs.[9] We gather detailed year-by-firm geographic revenues from Factset GeoRev.[10] Note that this geographic revenue sales measure includes both revenue coming from US exports and revenue coming from foreign subsidiaries.[11] All three exposure measures are winsorized at the 2.5 and 97.5 percentiles.

4 Descriptive Facts about Tariff Exposure

We start by providing descriptive details of our novel firm-level tariff exposure measures. This section presents three stylized facts, which provide insights into firm exposure during the two tariff episodes considered in this paper.

All descriptive statistics refer to the merged Compustat-Panjiva sample.[12] This sample presents several advantages for our analysis. First, as discussed, Compustat companies (and their subsidiaries) account for about 30 percent of US imports.[13] When we also include their largest direct suppliers, this accounts for 45 percent of US imports.[14] Almost half of US public companies have a substantial volume of sales coming from outside the United States, leaving them highly exposed to trade wars. Available data on public companies enable us to study their activity at a quarterly frequency and with a high level of detail. Furthermore, because publicly traded companies are large, the estimated effects can be generalized to the economy as a whole.

[9] If the industry code is specified at different levels of aggregation, we compute the export weighted average retaliatory tariff at the correct level of aggregation because our level of sales disaggregation is country-firm-time specific rather than product-country-firm-time specific.

[10] We are able to merge 76% of Compustat firms to the Factset GeoRev database.

[11] Given that tariffs may be circumvented if sales are not routed via US exports, this measure captures the trade war generally, but with some noise. Indeed, Amiti, Kong, and Weinstein (2020) provide suggestive evidence that the sales disaggregation may be a better proxy than export-only data for grasping the extent of the return declines for exporters. As a robustness exercise intended to reduce measurement error bias, we also test our results by constructing an indicator equivalent to Equation (5).

[12] Specifically, all descriptive statistics refer to a balanced panel around each episode. For the first tariff episode, our balanced sample includes the 3592 firms present in the merged Compustat-Panjiva sample from 2016q1 (that is, four quarters before the start of the sample) to 2019q4. For the second tariff episode, our balanced sample includes the 2769 firms present from 2023q1 to 2025q4. Note 1846 firms are present in both panels. Before filtering for balanced panels, there are 11640 unique parent-level firms in the dataset. As described, we use the word "firm" to refer to the ultimate-parent-company level.

[13] This estimate is computed as a percentage of 2017 import value in the S&P Panjiva data set for companies whose ultimate parent is available in Compustat data.

[14] The value for 2017 is estimated from S&P Panjiva as a percentage of import value of companies whose ultimate parent is in Compustat or directly linked to Compustat companies according to the Factset Supply Linkage data set.

Fact 1. *The 2025 tariff episode was characterized by both larger shocks and wider exposure.*

Table 1 shows summary statistics of our three exposure measures (direct import cost, supplier cost pass-through, and export exposure). It also gives summary statistics for the two components of direct import cost in Equation (3): import intensity in the year before the tariff shock and each firm's change in effective tariff rate over the course of the tariff episode (that is, from the end of 2017 until the end of 2019 and from the end of 2024 until the end of 2025). In the table, exposure measures are calculated once per episode using the cumulated tariff change, such that each observation is a single firm.

We can see that the effective firm-level average tariff rate increase was much higher during the 2025 episode, with an increase of 14.06% per firm versus 3.46% in the 2018 episode. Furthermore, a larger portion of firms in the 2025 episode experienced a positive increase in their effective tariff rate: 39% in 2018 versus 49% in 2025. A similar pattern emerges when considering each of the exposure measures. For all three, the average exposure in 2025 was higher than in 2018 and a greater percent of firms had positive values for each exposure measure.

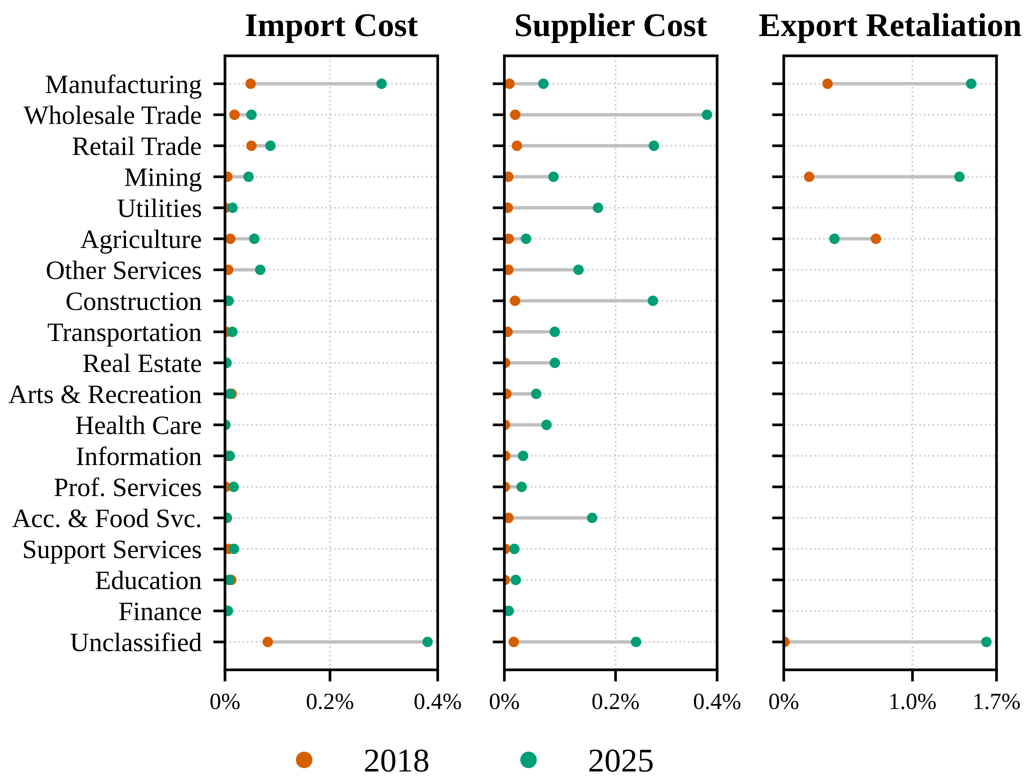
The 2018 and 2025 average firm-level effective tariff rate increases are somewhat larger than the aggregate increases shown in Figure 1a and Figure 1b. This implies a trade distribution that is skewed slightly more toward high-tariff goods in our sample than in the aggregate data.

Figure 2 splits average exposure by industry, conditional on firms having positive exposure. The green dots denote the 2025 episode and the orange dots denote the 2018 episode. It is especially clear that firms across industries faced higher exposures to supplier costs during the 2025 episode. This pattern is also seen in import cost exposure and export retaliation exposure, though both are driven by a subset of industries, something our next fact digs further into.

Fact 2. *Exposure via the suppliers' pass-through channel is broader than exposure via the direct import cost channel. Meanwhile, exposure via export retaliation was limited to specific industries during these episodes.*

Figure 3 shows the number of firms affected through each exposure channel in each episode. A firm is affected when it has positive exposure, calculated using the tariff change across the entire episode. We can see that in both episodes, more firms were affected by the supplier cost channel than the importer cost channel. Even if a firm did not directly import goods that were affected by the tariffs, it still may have purchased inputs from suppliers which in turn import affected goods.

Figure 2: Intensive Margin of Exposure by Industry



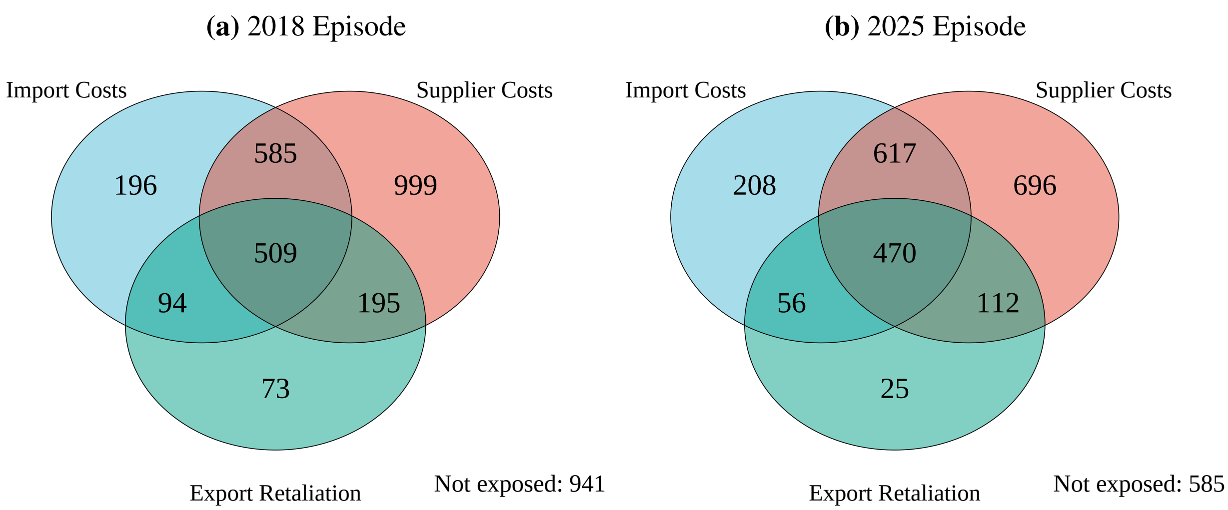
Notes: This figure shows, for firms with positive exposure, the size of each of our three exposure measures, as defined in Section 3, split by industry. The orange dots denote the 2018 episode and the green dots denote the 2025 episode. Exposure measures are calculated once per episode using the entire tariff change in the episode.
Sources: S&P Compustat, Panjiva, Factset GeoRev, Factset Supply Chain, US Census Bureau, Chinese and Canadian Ministry of Finance, author's calculations.

Table 1: Summary Statistics of Exposure Measures

Variable	Mean	SD	%>0	Min	Median	p60	p70	p80	p90	Max
All values in percent										
Panel A: 2018 Episode (N = 3,592)										
Import Intensity	3.50	10.16	49.14	0.00	0.00	0.04	0.39	2.06	8.56	51.39
Δ Tariff Rate	3.42	8.15	38.53	-0.09	0.00	0.00	0.67	3.37	12.55	37.33
Import Cost	0.10	0.26	38.53	0.00	0.00	0.00	0.00	0.04	0.34	1.15
Supplier Cost	0.03	0.05	63.70	0.00	0.00	0.01	0.03	0.07	0.13	0.13
Export Tariff	0.15	0.34	24.25	0.00	0.00	0.00	0.00	0.13	0.78	1.36
Panel B: 2025 Episode (N = 2,769)										
Import Intensity	2.67	7.48	49.77	0.00	0.00	0.02	0.26	1.63	7.16	37.82
Δ Tariff Rate	14.06	18.31	48.79	0.00	0.00	13.85	22.35	31.00	45.32	58.52
Import Cost	0.54	1.44	48.79	0.00	0.00	0.00	0.04	0.31	1.63	6.51
Supplier Cost	0.22	0.43	68.44	0.00	0.01	0.04	0.10	0.30	0.76	1.56
Export Tariff	0.59	1.41	23.94	0.00	0.00	0.00	0.00	0.50	2.56	5.84

Notes: This table shows summary statistics for the three firm-level exposure measures as defined in Section 3, as well as firm-level import intensity and firm-level tariff change. All variable values indicate percent. Summary statistics are split by episode and only include firms in each episode's balanced sample. Tariff changes are calculated from the start of the episode until the end of the episode (that is, from the end of 2017 until the end of 2019 and from the end of 2024 until the end of 2025), and exposure measures are calculated once per episode using the entire tariff change. Thus, each observation is a single firm. The statistic "$\% > 0$" indicates the percent of firms with positive values of the given variable.
Sources: S&P Compustat, Panjiva, Factset GeoRev, Factset Supply Chain, US Census Bureau, Chinese and Canadian Ministry of Finance, author's calculations.

Figure 3: Number of Firms with Positive Exposures



Notes: This figure shows the number of firms with positive exposures for our three exposure measures, as defined in Section 3. The sub-figures are split by episode and only include firms in each episode's balanced sample. Exposure measures are calculated once per episode using the entire tariff change in the episode. Thus, firms are determined to have positive exposures across the length of the entire episode.
Sources: S&P Compustat, Panjiva, Factset GeoRev, Factset Supply Chain, US Census Bureau, Chinese and Canadian Ministry of Finance, author's calculations.

Table 2: Average Exposure by Import Percentile Bin

	Import Intensity Percentile Bin			
	p0-50	p50-75	p75-90	p90-100
Panel A: 2018 Episode				
Import Intensity (%)	0.00	0.20	3.55	29.21
Import Cost (%)	0.00	0.02	0.25	0.62
Supplier Cost (%)	0.02	0.03	0.05	0.04
Export Tariff (%)	0.04	0.14	0.39	0.48
N	1827	867	539	359
Panel B: 2025 Episode				
Import Intensity (%)	0.00	0.14	2.94	23.14
Import Cost (%)	0.00	0.04	0.79	4.40
Supplier Cost (%)	0.20	0.21	0.26	0.22
Export Tariff (%)	0.25	0.47	1.25	1.76
N	1391	686	416	276

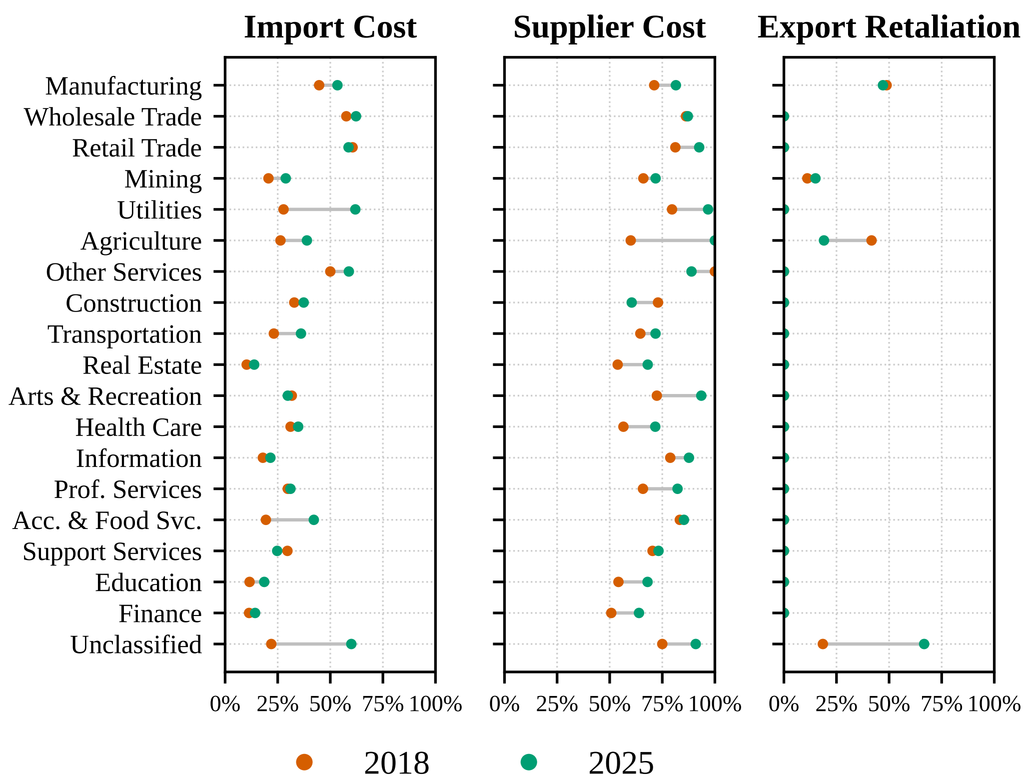
Notes: This figure shows the average exposure by import percentile bin for each episode. Import percentile bins are based on import intensity in the year before the episode.
Sources: S&P Compustat, Panjiva, Factset GeoRev, Factset Supply Chain, US Census Bureau, Chinese and Canadian Ministry of Finance, author's calculations.

Table 2 shows the average exposure by import percentile bin for each episode. The first row in each episode gives the average import intensity in each bin. We can see that over half of firms in each sample have an import intensity of zero. This is not surprising given that a large number of publicly listed companies are in the services industries. However, the top 10 percent of firms have a substantial direct import intensity. This is because our mapping of every subsidiary's trade into imports from Panjiva in any given year shows us how many multinationals in manufacturing, trade, mining, and technology operate globally.

Table 2 again shows how exposure to suppliers' costs is broader than exposure to direct import costs. Among the most import-intensive firms, firms had substantially higher exposure to direct import costs. However, even when firms had no exposure to direct import cost changes due to lack of direct imports, they still could be exposed to supplier cost increases.

Exposure to export retaliation is much more narrow, as demonstrated by the lower percent of firms affected in both Table 1 and Figure 3. Figure 4 shows the percent of firms exposed to each episode by industry (it is the extensive margin version of Figure 2). We can see that import cost exposure and supplier cost exposure are relatively dispersed across industries. Export retaliation exposure, however, is concentrated in firms in manufacturing, mining, agriculture, and the unclassified category. This makes sense, as retaliatory tariffs were imposed by China and Canada on a relatively narrow set of industries in the United States, and our export retaliation exposure measure reflects that.

Figure 4: Extensive Margin of Exposure by Industry



Notes: This figure shows the percent of firms with positive exposures for our three exposure measures, as defined in Section 3, split by industry. The orange dots denote the 2018 episode, and the green dots denote the 2025 episode. Exposure measures are calculated once per episode using the entire tariff change in the episode. Thus, firms are determined to have positive exposures across the length of the entire episode.
Sources: S&P Compustat, Panjiva, Factset GeoRev, Factset Supply Chain, US Census Bureau, Chinese and Canadian Ministry of Finance, author's calculations.

Fact 3. *Import cost exposure and export retaliation exposure are correlated with firm size, while supplier cost exposure is not.*

Table 3 splits our exposure measures by firm size, showing average exposure measures for percentile bins determined by firm employment.[15] We can see from the table that larger firms have higher import intensity, a fact in line with established literature (see, for example, Bernard et al. 2018). In line with this, larger firms were more exposed to tariffs via the import cost channel. However, firms were equally exposed to the supplier cost channel across the distribution; even smaller firms source from importing firms. Export retaliation exposure was also increasing in size, indicating that foreign countries targeted industries that correspond to larger US firms.

[15] Appendix Table A.1 shows a similar split using firm sales, with similar results.

Table 3: Average Exposure by Employment Percentile Bin

	Employment Percentile Bin			
	p0-50	p50-75	p75-90	p90-100
Panel A: 2018 Episode				
Import Intensity (%)	1.88	4.06	5.07	7.83
Import Cost (%)	0.05	0.13	0.17	0.21
Supplier Cost (%)	0.03	0.03	0.03	0.04
Export Tariff (%)	0.08	0.20	0.27	0.30
N	1796	898	539	359
Panel B: 2025 Episode				
Import Intensity (%)	1.71	3.41	3.97	4.31
Import Cost (%)	0.36	0.67	0.85	0.83
Supplier Cost (%)	0.25	0.15	0.20	0.20
Export Tariff (%)	0.40	0.62	0.89	1.05
N	1243	621	374	247

Notes: This figure shows the average exposure by employment percentile bin for each episode. Sales percentile bins are based on employment, as in Compustat, in the year before the episode.
Sources: S&P Compustat, Panjiva, Factset GeoRev, Factset Supply Chain, US Census Bureau, Chinese and Canadian Ministry of Finance, author's calculations.

5 Validation of Tariff Exposure Measures

Before proceeding to our main empirical analysis, we first validate our three measures of tariff exposure. We do so in two different ways: First, we examine how these measures correlate with firm stock returns around tariff announcements, and second, we examine how they correlate with tariff risk and sentiment according to company earning call transcripts.

5.1 Tariff Exposure and Stock Returns

Our first validation exercise compares our exposure measures to firm stock returns around tariff announcements made during each of the two episodes. If markets perceive company exposure to tariffs via direct imports, suppliers' imports, or export retaliation, this should prompt returns to fall when tariffs are announced, as long as the announcements are unexpected. For the 2018-2019 episode, we examine 6 days on which US tariffs were announced and 5 dates on which Chinese retaliatory tariffs were announced (Amiti et al. 2022).[16] For the 2025 episode, we examine 13 dates with tariff announcements, which we gathered from the US Federal Register notices.[17] Stock returns in a 1-day window around each announcement are calculated using the equity return dataset of Center for Research in Security Prices (CRSP).[18] We aggregate subsidiary returns to the parent-firm-level, in line with our exposure measures, by taking the market capitalization-weighted daily average.

Because our exposure measures are calculated at frequencies no less than one month, we pursue two regression approaches to compare returns to exposure measures. First, we run panel regressions at the monthly level, for months with tariff announcements. When there are multiple announcements in a month, we average the returns around the announcements within the month. These regressions include time fixed effects, such that we are examining the cross-section of firms around each announcement month. In our second approach, we aggregate firm returns in each episode by averaging the daily returns across all announcement dates within an episode. We then compare this average return to firm exposures, calculated using tariff changes over the course of each episode. These regressions are cross-sectional in nature and include one observation per firm.

The results of both approaches are shown in Table 4. Columns (1) and (3) show the results of the first approach, and columns (2) and (4) show the results of the second approach. We can see how the majority of coefficients are negative, indicating that direct import cost, suppliers' cost, and export exposure metrics are all negatively correlated with a firm's stock returns around tariff announcements. This result is as expected and helps validate our construction of these three measures.

5.2 Tariff Exposure and Firm Sentiment

We next validate our measures of exposure by comparing them to earnings calls sentiment by the firms in our sample. Sentiment and textual analysis is a fruitful area of research to analyze and gather (perceived) exposure in real time (Hassan et al. 2023, 2019, Alfaro and Chor 2023). We define the following normalized sentiment measures for each earning call of firm f at quarter t, as

[16] The dates for this episode come from Amiti et al. (2022). Specifically, the six dates of the US tariff announcements were: January 23, 2018 (solar panels and washing machines); March 1, 2018 (steel and aluminum); March 22, 2018 (China); June 19, 2018 (China); May 6, 2019 (China); August 1, 2019 (China). The five dates of Chinese retaliatory tariffs were: March 23, 2018; June 15, 2018; August 2, 2018; May 13, 2019; August 23, 2019 (soy and autos).

[17] For the 2025 episode, the 13 dates are: February 1, 2025 (Canada, Mexico, and China); February 10, 2025 (steel and aluminum); March 3, 2025 (China); March 26, 2025 (autos); April 2, 2025 (global, "liberation day"); April 8, 2025 (China); June 3, 2025 (steel and aluminum); July 30, 2025 (Brazil and copper); July 31, 2025 (multiple countries); August 6, 2025 (India); August 19 (steel and aluminum); September 29, 2025 (timber); October 17, 2025 (MHDVs and buses).

[18] For announcements made during trading hours, we look at the returns over the day of the announcement. For announcements made after market close or on a weekend, we adjust timing accordingly.

Table 4: Comovement of Stock Market Returns with Tariff Exposure Channels

	2018 Episode		2025 Episode	
	(1) $\text{Returns}_{f,t}$	(2) Returns_{f}	(3) $\text{Returns}_{f,t}$	(4) Returns_{f}
Import Cost	-4.500***	-0.069***	-0.181**	-0.020***
	(0.492)	(0.012)	(0.073)	(0.004)
Suppliers' Cost	-20.087***	-1.038***	-0.754**	0.025
	(6.035)	(0.287)	(0.328)	(0.055)
Export Retaliation	-0.330	-0.063***	-0.018	-0.010***
	(4.173)	(0.011)	(0.012)	(0.003)
R^2	0.238	0.039	0.462	0.019
Within R^2	0.006		0.001	
Time FE	✓		✓	
N	16,324	2,745	13,982	2,334
Firms	2,745	2,745	2,334	2,334

Notes: This table shows the correlation of one-day stock returns around tariff announcements to for our three exposure measures, as defined in Section 3. The 2018 Episode includes 11 dates and the 2025 includes 13 dates. Columns (1) and (3) give the results of panel regressions at the firm-day level that include time fixed effects. Columns (2) and (4) are cross-sectional regressions that average returns across the announcement days in the episode by firm.
Sources: S&P Compustat, Panjiva, Factset GeoRev, Factset Supply Chain, US Census Bureau, Chinese and Canadian Ministry of Finance, CRSP, author's calculations.

in Hassan et al. (2019, 2023):[19]

$$\text{Tariff Exposure}_{ft} = \frac{\text{\# Sentences containing ``tariff''}}{\text{\# Sentences}} \tag{6}$$

$$\text{Negative Sentiment}_{ft} = \frac{\text{\# Sentences containing ``tariff'' and negative keyword}}{\text{\# Sentences with negative keywords}} \tag{7}$$

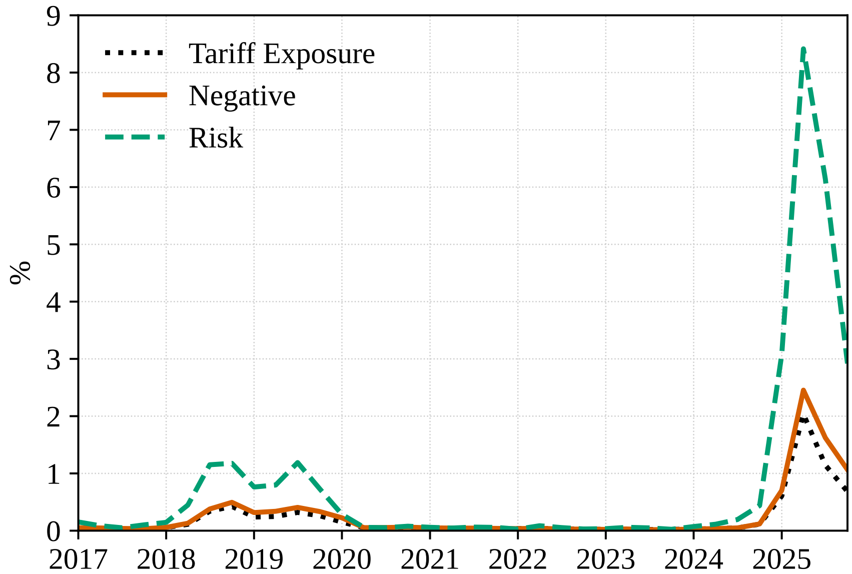
$$\text{Risk Sentiment}_{ft} = \frac{\text{\# Sentences containing ``tariff'' and a risk keyword}}{\text{\# Sentences with risk keywords}} \tag{8}$$

Each normalization is designed to emphasize the cross-sectional difference across companies within any given period and investigate whether it relates to our cross-sectional difference in tariff exposure.

Figure 5 presents the timeseries of tariff exposure, negative sentiment, and risk sentiment, averaged across the sample of all companies publishing earnings calls. The measures clearly intensify around tariff introductions. The first increase happens in mid-2018, around the time of the first wave of tariffs in the 2018-2019 episode. The second wave applied on finished Chinese goods is also visible in mid-2019. The 2025 episode notably came with a particularly higher perceived risk, and also higher perceived negative sentiment and exposure.

[19] We gather mentions and bigram instances of tariffs with sentiment and risk concept from NL Analytics.

Figure 5: Proportion of Tariff Mentions in Earnings Calls



Notes: Average quarterly tariff mentions for US Compustat companies. *Any* mention corresponds to the average number of sentences in which the word "tariff" appears in a given call, normalized by the number of sentences in the call. *Negative* mentions counts the share of sentences with negative keywords that also contain the word "tariff." *Risk* mentions counts the share of sentences with risk-related keywords that also contain the word "tariff."
Sources: NL Analytics, S&P Compustat.

We examine whether companies that we calculate to be exposed to tariffs also seem exposed via these textual analysis measures. We do so using the same two approaches as in Section 5.1. First, we run a panel regression at the quarterly level, in which we calculate our three exposure measures using tariff changes each quarter and compare these measures to the three earning call measures calculated from the call in a given quarter. We include time fixed effects to focus on comparisons across firms, within a quarter. Second, we run a cross-sectional regression, in which we calculate our three exposure measures using tariff changes over the course of an episode and compare it to earning call measures, averaged over the course of the episode. The results of the first approach is shown in Table 5, and the results of the second approach is shown in Table 6. We can see that all coefficients in both tables are positive and significant, supporting the relevance of each of our three channels of tariff exposure. Firms with higher calculated import cost exposure, suppliers' cost exposure, and export retaliation exposure also perceive themselves to have higher tariff exposure and risk. They also have higher negative sentiment around tariffs, in line with the fact that all of our calculated exposure measures constitute either higher costs for the firm or a negative output shock.

Table 5: Comovement of Firm Sentiment with Tariff Exposure Channels, Panel

	2018 Episode			2025 Episode		
	(1) Exposure	(2) Negative	(3) Risk	(4) Exposure	(5) Negative	(6) Risk
Import Cost	4.581***	5.138***	13.835***	1.646***	1.807***	4.418***
	(0.419)	(0.542)	(1.914)	(0.098)	(0.162)	(0.440)
Suppliers' Cost	8.857***	9.578***	29.741***	1.108***	1.278***	3.579***
	(1.091)	(1.588)	(5.982)	(0.255)	(0.360)	(1.202)
Retaliation	0.954***	1.315***	3.278***	0.656***	0.874***	2.353***
	(0.180)	(0.268)	(0.655)	(0.071)	(0.123)	(0.382)
R^2	0.129	0.080	0.042	0.423	0.281	0.219
Within R^2	0.081	0.046	0.024	0.199	0.103	0.048
Time FE	✓	✓	✓	✓	✓	✓
N	49,540	49,540	49,540	52,522	52,522	52,522
Firms	2,803	2,803	2,803	2,462	2,462	2,462

Notes: The exposure, negative, and risk sentiment measures are defined as in Equations (6) through (8). Standard errors clustered at the firm level are in parentheses. ***, **, * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.
Sources: S&P Compustat, Panjiva, Factset GeoRev, Factset Supply Chain, US Census Bureau, Chinese and Canadian Ministry of Finance, NL Analytics, author's calculations.

Table 6: Comovement of Firm Sentiment with Tariff Exposure Channels, Cross Section

	2018 Episode			2025 Episode		
	(1) Exposure	(2) Negative	(3) Risk	(4) Exposure	(5) Negative	(6) Risk
Import Cost	0.315***	0.380***	1.008***	0.090***	0.105***	0.247***
	(0.034)	(0.047)	(0.142)	(0.006)	(0.010)	(0.026)
Suppliers' Cost	0.962***	1.160***	3.334***	0.053***	0.067***	0.144**
	(0.161)	(0.232)	(0.595)	(0.019)	(0.026)	(0.069)
Export Retaliation	0.078***	0.127***	0.276***	0.029***	0.039***	0.122***
	(0.025)	(0.037)	(0.075)	(0.004)	(0.007)	(0.024)
R^2	0.104	0.095	0.114	0.210	0.141	0.090
Firms	2,804	2,804	2,804	2,462	2,462	2,462

Notes: The exposure, negative, and risk sentiment measures are defined as in Equations (6) through (8). Robust standard errors are in parentheses. ***, **, * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.
Sources: S&P Compustat, Panjiva, Factset GeoRev, Factset Supply Chain, US Census Bureau, Chinese and Canadian Ministry of Finance, NL Analytics, author's calculations.

6 The Effects of Tariff Exposures

6.1 Empirical Strategy

We now turn to the central analysis of the paper, in which we examine how tariff exposure impacts firms. To do so, we estimate local projection on firm-level outcomes. We focus on sales, variable costs (that is, COGS), EBITDA, and CAPEX, as reported quarterly in Compustat.[20] Note that all four variables are nominal quantities, such that each variable embeds both price and quantity effects. We estimate the following regressions:

$$\begin{aligned} y_{f,t+h} - y_{f,t-1} = \alpha_{f,h} + \alpha_{i,t,h} + \boldsymbol{\gamma}_h \boldsymbol{z}_{f,t} \\ + \beta_h^{IC} \text{Import Cost}_{f,t} + \beta_h^{SC} \text{Supplier Cost}_{f,t} + \beta_h^{ER} \text{Export Retaliation}_{f,t} + \varepsilon_{f,t,h}, \end{aligned} \tag{9}$$

where $\alpha_{f,h}$ is a firm fixed effect, $\alpha_{i,t,h}$ is an industry-time fixed effect, $\boldsymbol{z}_{f,t}$ is a vector of controls that include four lags of the dependent variable and exposure measures, plus an interaction between a firm import exposure and time fixed effects. We consider the following dependent variables:

$$y_{ft} = \left\{ \log \text{Sales}_{ft}, \log \text{COGS}_{ft}, \text{EBITDA}_{ft}, \text{CAPEX}_{ft} \right\}.$$

When considering EBITDA and CAPEX, we normalize each variable by sales and total assets, respectively. This implies that the long differences for these variables become:[21]

$$y_{f,t+h} - y_{f,t-1} = \begin{cases} \frac{\text{EBITDA}_{f,t+h} - \text{EBITDA}_{f,t-1}}{\text{Sales}_{f,t-1}} \\ \frac{\text{CAPEX}_{f,t+h} - \text{CAPEX}_{f,t-1}}{\text{Total Assets}_{,ft-1}}. \end{cases} \tag{10}$$

Our coefficients of interest are β_h^x for $x = \{\text{IC}, \text{SC}, \text{ER}\}$, which tell us the responses of our dependent variable to any of our import and export shock variables.

We control for concurrent exposures in our specification due to nonzero correlations between the three exposure measures. These correlations in the 2018 and 2025 episodes are shown in Figure 6 and Figure 7, respectively. For the most part, exposures are weakly positively correlated across the extensive and intensive margins for both episodes. The lone exception is that export retaliation exposure and supplier cost exposure are negatively correlated on the intensive margin for the 2025 episode. While Section 4 shows how different exposures vary across different dimensions, such as import intensity, industry, and size, these figures show how it is nevertheless important to control for other exposures in our regressions.

[20] See Appendix B for how each variable is constructed from Compustat data.

[21] In what follows, we use EBITDA and profits interchangeably whenever it causes no confusion.

Figure 6: Regression Coefficient Matrices of Exposure: 2018 Episode

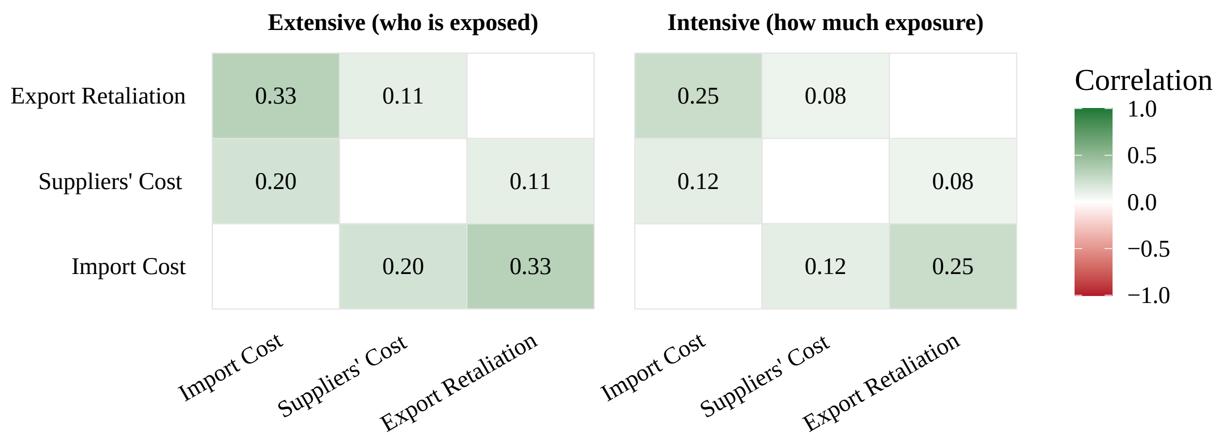
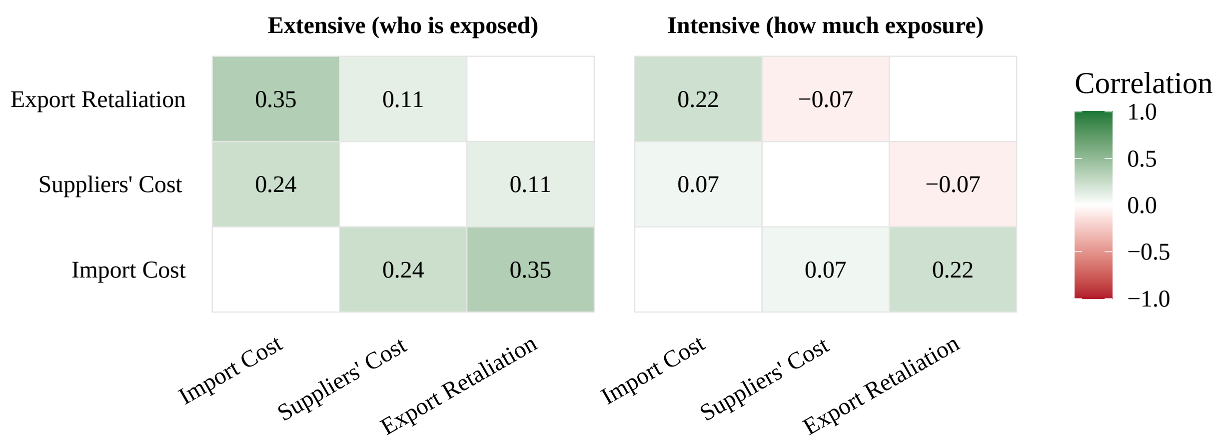


Figure 7: Regression Coefficient Matrices of Exposure: 2025 Episode



Notes: These figures show correlation coefficients across the three exposure measures, estimated separately for the two episodes.
Sources: S&P Compustat, Panjiva, Factset GeoRev, Factset Supply Chain, US Census Bureau, Chinese and Canadian Ministry of Finance, author's calculations.

6.2 Results

We estimate Equation (9) for the two episodes separately.[22] All results use a balanced sample in each period. To ease the interpretation of the results, we scale all coefficients by the average exposure across firms with non-missing exposure. Thus, the results can be interpreted as applying to firms with an average exposure. Throughout this section, green colors in the figures refer to the 2018 tariffs episode and orange colors refer to the 2025 tariffs episode. Shaded areas represent 68% (darker) and 90% (lighter) confidence bands.

Figure 8 shows the firm responses to tariff exposure via direct import costs. Panels (a) through (d) show that the responses of all our analyzed variables to a rise in import cost in the 2018 tariffs round were, on average, approximately zero. By contrast, both sales and costs decreased in the 2025 round, with the average firm experiencing a 1 percent decline in both sales and costs. As we discuss in the next section, this similar decline in both variables is consistent with a fall in quantities and full pass-through from input prices into sales prices.[23] Furthermore, the 2025 episode saw no significant effect of direct import cost exposure on EBITDA, which would be expected if sales prices and input prices changed by the same amount. Additionally, CAPEX does not seem to have been affected.

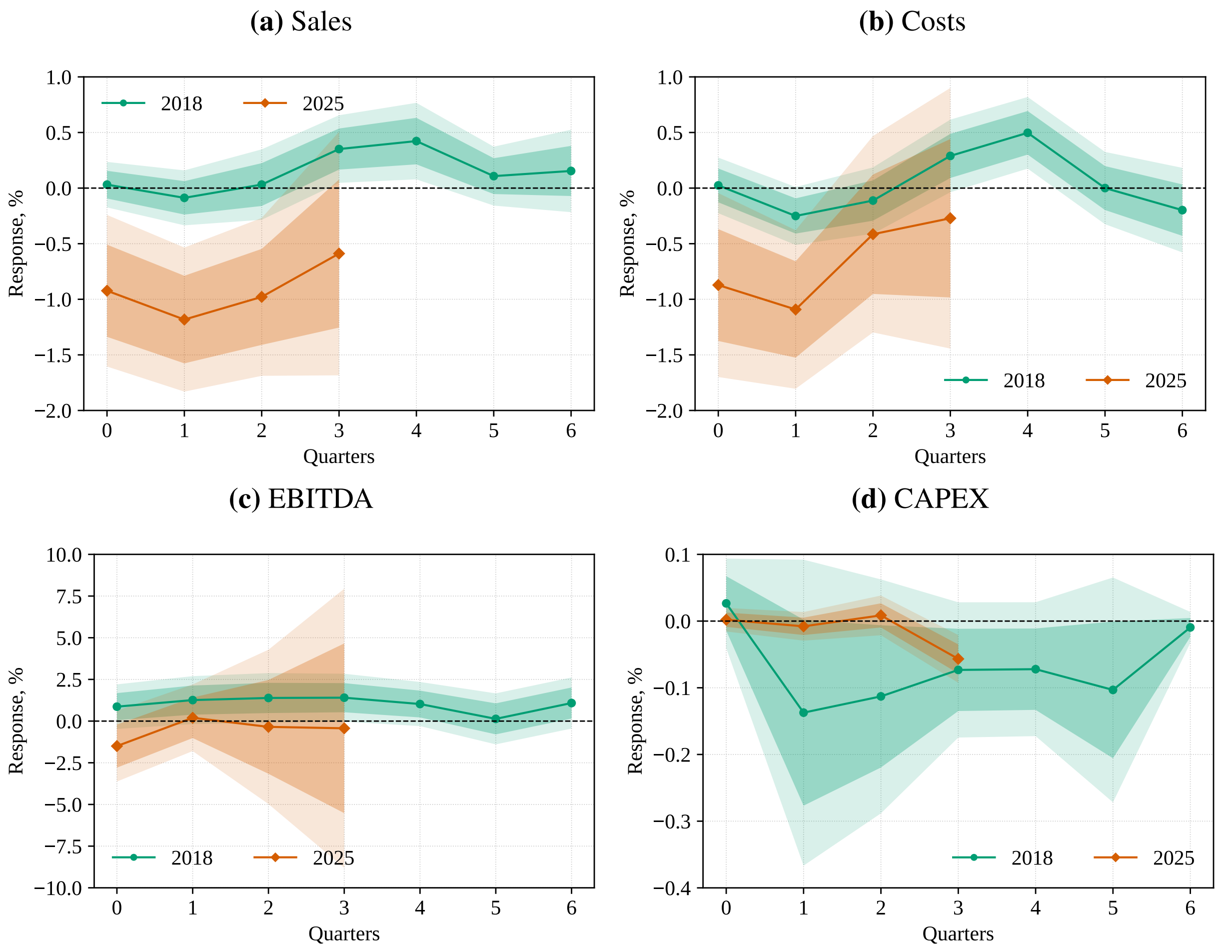
Figure 9 shows the responses to tariff exposure via supplier costs. The results look qualitatively similar to those analyzed in Figure 8. Again, we do not find any effect of supplier cost exposure on any of the outcome variables during the 2018 tariff round. We do find negative effects on sales and costs during the 2025 tariff round, with an average decline of 0.92 pp and 0.66 pp, respectively. Although non-significant and noisier than the results in Figure 8, EBITDA and CAPEX also do not seem to respond significantly to changes in tariff exposure via suppliers' costs.

Figure 10 shows the responses to export retaliation. We find some weak evidence that export retaliation depressed sales and costs in the 2018 tariff episode with no effect on any of the other variables. Our results also suggest that export retaliation did not have any effect on sales, costs, EBITDA or CAPEX during the 2025 tariffs episode.

[22] In order to provide enough of a pre-period for our lags, we use the years 2016–2019 and 2022–2025.

[23] Note that according to our estimates, these negative effects are relatively short lived: Sales recover their pre-shock level 3 quarters after the shock, while costs recover after 2 quarters.

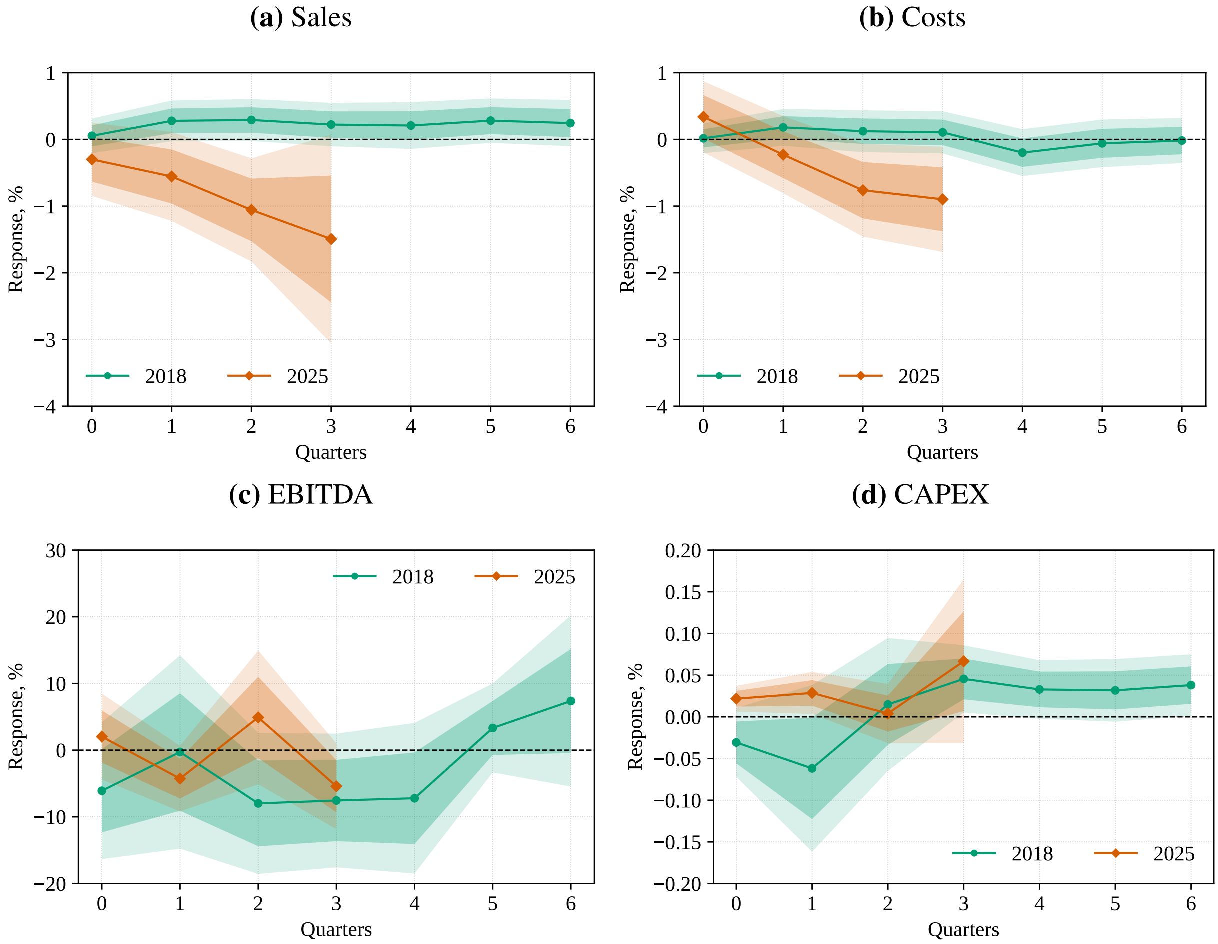
Figure 8: Firms Responses to Import Costs



Notes: This figure shows the responses of sales (a), costs (b), EBITDA (c) and capital expenditures (d) to import cost changes. Standard errors are clustered at the industry-time level. Each specification includes four lags (level) of dependent variable, import exposure control interacted with time fixed effects and four lags of each exposure variable plus all contemporaneous exposures. We scaled all exposures to be average of non-zero shocked firms. Confidence bands are 90% and 68%.

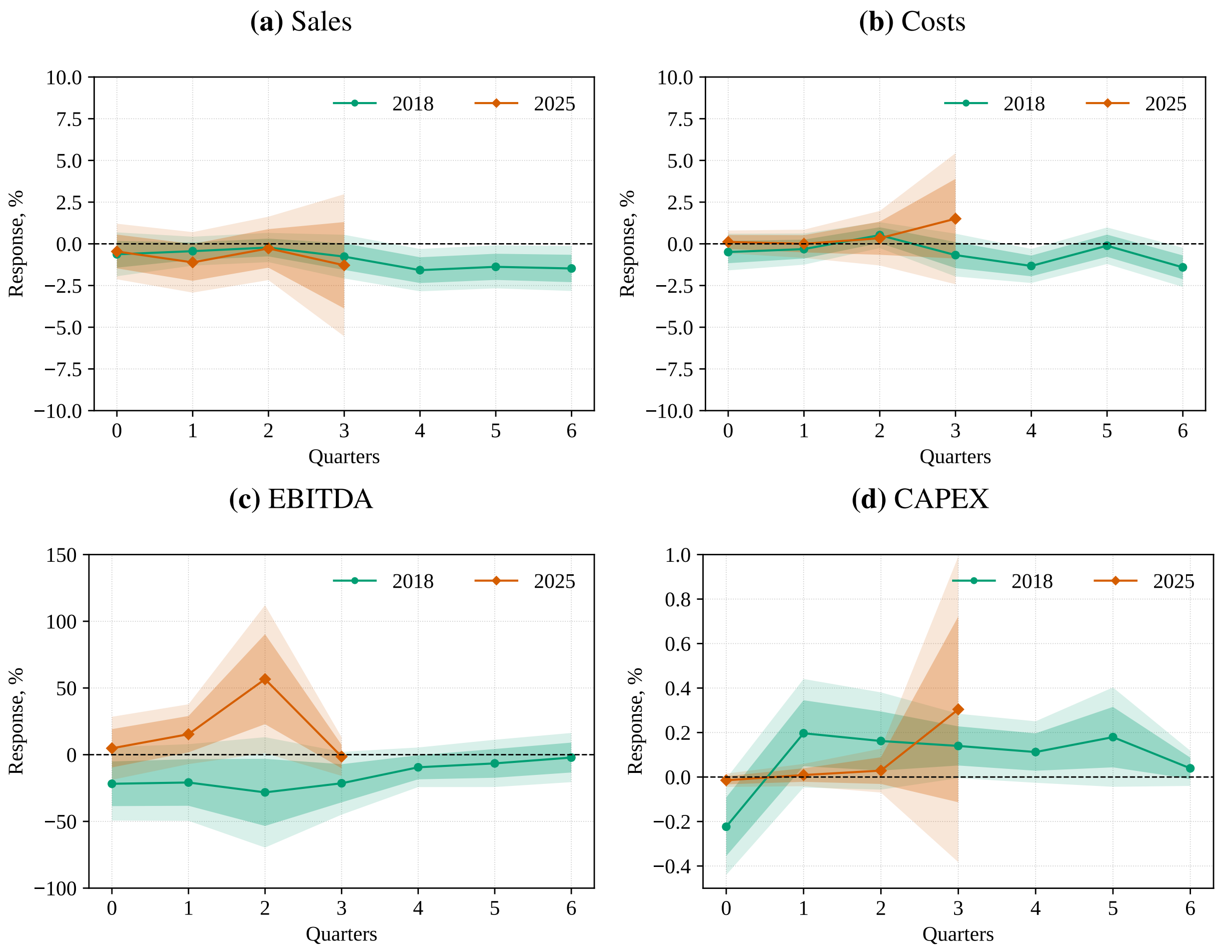
Sources: S&P Compustat, Panjiva, Factset GeoRev, Factset Supply Chain, US Census Bureau, Chinese and Canadian Ministry of Finance, author's calculations.

Figure 9: Firms Responses to Suppliers' Cost



Notes: This figure shows the responses of sales (a), costs (b), EBITDA (c) and capital expenditures (d) in response to supplier cost changes. Standard errors are clustered at the industry-time level. Each specification includes four lags (level) of dependent variable, import exposure control interacted with time fixed effects and four lags of each exposure variable plus all contemporaneous exposures. We scaled all exposures to be average of non-zero shocked firms. Confidence bands are 90% and 68%.
Sources: S&P Compustat, Panjiva, Factset GeoRev, Factset Supply Chain, US Census Bureau, Chinese and Canadian Ministry of Finance, author's calculations.

Figure 10: Firms Responses to Export Retaliation



Notes: This figure shows the responses of sales (a), costs (b), EBITDA (c) and capital expenditures (d) in response to export retaliation changes. Standard errors are clustered at the industry-time level. Each specification includes four lags (level) of dependent variable, import exposure control interacted with time fixed effects and four lags of each exposure variable plus all contemporaneous exposures. We scaled all exposures to be average of non-zero shocked firms. Confidence bands are 90% and 68%.
Sources: S&P Compustat, Panjiva, Factset GeoRev, Factset Supply Chain, US Census Bureau, Chinese and Canadian Ministry of Finance, author's calculations.

7 Interpreting Results through the Lens of Existing Theories

Our main results in Section 6 highlight that in response to both import and export tariffs in the 2018 and 2025 episodes, costs and sales either stayed constant or declined, while EBITDA and CAPEX did not move. We now examine what theory predicts regarding the movement of these variables. We focus on firms in partial equilibrium; that is, we take as given prices and quantities in other markets. This is consistent with our empirical strategy, which controls for firm and industry-time fixed effects, effectively leaving out any industry-time varying shocks or time invariant firm characteristics.

We consider a general model where firm f in industry i has access to a production technology of the form $Q^s_{fi} = Q^s_{fi}(\boldsymbol{X}_{fi}, Z^s_{fi})$, where $\boldsymbol{X}_{fi} = \{X_{fi,j}\}_{j\in\mathscr{J}_{fi}}$ is a vector of inputs and Z^s_{fi} is a production function shifter. We let $\boldsymbol{W} = \{W_j\}_{j\in\mathscr{J}_{fi}}$ be the vector of input prices used by the firm.

We first focus on the cost-minimization problem of the firm. This delivers the variable cost function:

$$VC_{fi}(\boldsymbol{W}, Z^s_{fi}, \bar{Q}^s_{fi}) = \min_{\boldsymbol{X}_{fi}} \left\{ \sum_{j\in\mathscr{J}_{fi}} W_j X_{fi,j} \quad \text{s.t.} \quad Q^s_{fi}(\boldsymbol{X}_{fi}, Z^s_{fi}) \geq \bar{Q}^s_{fi} \right\}. \tag{11}$$

The variable cost function depends on input prices ($\boldsymbol{W}$), the production function shifter (Z^s_{fi}) and the scale of production ($\bar{Q}^s_{fi}$).

We assume demand for firm f, industry i output, Q^d_{fi}, satisfies

$$Q^d_{fi} = Q^d_{fi}(P_{fi}, Z^d_{fi}), \tag{12}$$

where P_{fi} is the price set by firm f in industry i, and Z^d_{fi} is a firm-level shifter in demand.[24] Note that, without loss of generality, this demand shifter contains any shifter that affects firm demand, including aggregate and industry-level shifters common to all firms within an industry. For now, we leave it unspecified. We define firm sales as $S_{fi} = P_{fi}Q_{fi}$.

Given the variable cost function and the firm's demand in Equation (12), the firm maximizes variable profit:

$$\Pi_{fi}(\boldsymbol{W}, Z^s_{fi}, Z^d_{fi}) = \max_{Q_{fi}} \left\{ P_{fi}Q_{fi} - VC_{fi}(\boldsymbol{W}, Z^s_{fi}, Q_{fi}) \quad \text{s.t.} \quad \text{Equation (12)} \right\}. \tag{13}$$

For future reference, we define the variable profits-to-sales ratio as $\pi_{fi} = \frac{\Pi_{fi}}{S_{fi}}$.

[24] Given the partial equilibrium nature of our exercise, this can be understood as the residual demand faced by the firm within the industry.

The dynamic program in Equation (13) delivers a pricing condition that satisfies

$$P_{fi}(\boldsymbol{W}, Z^s_{fi}, Z^d_{fi}) = M_{fi}(Q^d_{fi}(P_{fi}, Z^d_{fi}))MC_{fi}(\boldsymbol{W}, Z^s_{fi}, Q^d_{fi}(P_{fi}, Z^d_{fi})), \tag{14}$$

where $MC_{fi} = \frac{\partial VC_{fi}}{\partial Q_{fi}}$ is a firm's marginal cost, and $M_{fi} = \frac{\varepsilon_P^{Q^d}}{\varepsilon_P^{Q^d}+1}$ is a firm's markup that depends on the price elasticity of demand, $\varepsilon_P^{Q^d} = \frac{\partial \log Q^d_{fi}}{\partial \log P_{fi}}$. For the markup to be well defined, we require $\varepsilon_P^{Q^d} < -1$. As a general rule, we denote elasticities as $\varepsilon_Y^X = \frac{\partial \log X}{\partial \log Y}$.

Change in Input Costs We are now ready to study how our cost channels affect sales, costs, and profits. We capture a tariff increase or an increase in supplier cost as a change in a given input price W_j. We let $x = \log X$ and $\hat{x}$ denote a (log) change in a given variable X. The following proposition characterizes variable costs, sales and variable profits-to-sales ratio under constant markups, which encompasses both perfect and monopolistic competition.

Proposition 1 (Cost, Sales, and Profits' Response to Input Cost Shocks)**.** *Under constant markups and no other shocks so that $\hat{z}^s_{fi} = \hat{z}^d_{fi} = 0$ and $\hat{w}_k = 0$ for all $k \neq j$, the changes in sales, costs and variable profits-to-sales ratios in response to a change in import tariffs/supplier costs satisfy*

$$\hat{s}_{fi} = \left(\frac{(1+\varepsilon_P^{Q^d})}{1-\varepsilon_{Q^s}^{MC}\varepsilon_P^{Q^d}} \right) \varepsilon_{W_j}^{MC} \hat{w}_j, \tag{15}$$

$$\hat{vc}_{fi} = \left(1 + \frac{\varepsilon_{Q^s}^{VC}\varepsilon_P^{Q^d}\varepsilon_{W_j}^{MC}}{\Omega_{fi,j}(1-\varepsilon_{Q^s}^{MC}\varepsilon_P^{Q^d})} \right) \Omega_{fi,j}\hat{w}_j, \tag{16}$$

$$\mathrm{d}\pi_{fi} = \frac{VC_{fi}}{S_{fi}} \left(\frac{(1+(1-\varepsilon_{Q^s}^{VC})\varepsilon_P^{Q^d})\varepsilon_{W_j}^{MC}}{1-\varepsilon_{Q^s}^{MC}\varepsilon_P^{Q^d}} - \Omega_{fi,j} \right) \hat{w}_j, \tag{17}$$

where $\hat{w}_j$ is a change in a particular input price j and $\Omega_{fi,j} = \frac{W_j X_{fi,j}}{VC_{fi}}$ is the expenditure of firm f on input j as a share of variable costs.

Proof. See Appendix C. □

Proposition 1 is expressed in terms of elasticities and shares. It captures how the change in input costs depend on both demand and supply side considerations.

Common trade and macroeconomic models have sharp predictions coming out of this proposition. For example, suppose firms have constant returns to scale. In this case, $\varepsilon_{Q^s}^{MC} = 0$, $\varepsilon_{Q^s}^{VC} = 1$ and $\Omega_{fi,j} = \frac{\partial \log MC_{fi}}{\partial \log W_j}$ because marginal costs are independent of the scale of production. The expressions for firms' outcomes become

$$\hat{s}_{fi} = \hat{vc}_{fi} = (1+\varepsilon_P^{Q^d})\Omega_{fi,j}\hat{w}_j, \tag{18}$$

$$\mathrm{d}\pi_{fi} = 0. \tag{19}$$

In this case, since $\varepsilon_P^{Q^d} < -1$, the increase in tariffs decreases sales and variable costs in the same proportion, leaving profits unchanged. Hence, a negative effect on both variables in this environment suggests that demand for the firm's output is sufficiently elastic so that in response to a price increase, the substitution effect, which governs the decline in demand, dominates the mechanical increase in sales and costs due to the increase in unit price. Our empirical results suggest that both sales and costs decline in response to cost shocks for the average firm in our sample. Hence, this points toward a demand elasticity for firms' output larger than 1 (in absolute value).

Retaliation by Foreigners The model also allow us to speak about the effect of export retaliation on the same variables. Without loss of generality, we can think of export retaliation as a negative demand shifter for the firm $\hat{z}_{fi}^d$. Under this interpretation, the following result characterizes the response of all variables to a demand shock:

Proposition 2 (Costs, Sales, and Profits' Response to Export Retaliation)**.** *Consider a shift in demand $\hat{z}_{fi}^d < 0$, with no other shocks $\hat{w}_j = 0$ for all j and $\hat{z}_{fi}^s = 0$. The response of sales, costs and variable profits-to-sales ratios are:*

$$\hat{s}_{fi} = \left(\frac{(1+\varepsilon_{Q^s}^{MC})}{1-\varepsilon_{Q^s}^{MC}\varepsilon_P^{Q^d}}\right)\varepsilon_{Z^d}^{Q^d}\hat{z}_{fi}^d, \tag{20}$$

$$\hat{vc}_{fi} = \left(\frac{\varepsilon_{Q^s}^{VC}}{1-\varepsilon_{Q^s}^{MC}\varepsilon_P^{Q^d}}\right)\varepsilon_{Z^d}^{Q^d}\hat{z}_{fi}^d, \tag{21}$$

$$\mathrm{d}\pi_{fi} = \frac{VC_{fi}}{S_{fi}}\left(\frac{1+\varepsilon_{Q^s}^{MC}-\varepsilon_{Q^S}^{VC}}{1-\varepsilon_{Q^s}^{MC}\varepsilon_P^{Q^d}}\right)\varepsilon_{Z^d}^{Q^d}\hat{z}_{fi}^d, \tag{22}$$

Proof. See Appendix C. □

We find that the demand shifter comoves positively with both costs and sales. Hence, a decline in z_{fi}^d, which is akin to an increase in the export tariff, reduces both sales and costs.

Recall from the local projection estimates that we did not find any evidence of export retaliation affecting any outcomes. Through the lens of the model, this can occur for mainly two reasons. One possibility is that the actual change was too small to affect demand for the average firm $\left(\varepsilon_{Z^d}^{Q^d} = 0\right)$.

The second possibility is that the residual demand elasticity was high ($\varepsilon_P^{Q^d} \to \infty$), so as to not generate an effective shift in demand. Intuitively, when demand is highly elastic, a negative shift in demand, at a given price, creates excess supply. Because demand is highly elastic, a small change in the price is enough to counteract the initial demand shifter. Thus, prices barely change in equilibrium. As a result, so do quantities, and hence sales.[25]

8 Conclusion

This paper studies the firm-level effects of the 2018 and 2025 US tariff episodes. Combining S&P Panjiva bill-of-lading data with Compustat financial statements and Factset supply chain and revenue data, we construct firm-level measures of exposure across three channels: direct import costs, upstream suppliers' costs, and retaliatory tariffs on exports. These measures, validated using stock returns and earnings call sentiment, reveal that the 2025 episode represents a direct import cost shock roughly ten times larger than 2018, with a comparatively muted retaliatory response. Unlike import cost and export retaliation exposure, supplier cost exposure is uncorrelated with firm size, implying that upstream tariff shocks propagate through supply chains to small and large firms alike.

In the 2018 episode, all three channels had approximately zero effects on firm sales, costs, margins, and investment. In 2025, import cost and supplier cost exposure each reduced firm sales and variable costs by approximately 1 percentage point for a firm with average exposure, with no effects on EBITDA or CAPEX. Across both episodes, the consistent absence of margin effects is in line with a model of constant markups in which tariff shocks generate demand-driven quantity contractions rather than changes in firm profitability-over-sales.

References

Alfaro, Laura, Mariya Brussevich, Camelia Minoiu, and Andrea Presbitero. 2025. "Bank Financing of Global Supply Chains." NBER Working Papers 33754, National Bureau of Economic Research.

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

Amiti, Mary, Matthieu Gomez, Sang Hoon Kong, and David E. Weinstein. 2022. "Trade Protection, Stock-Market Returns, and Welfare." *NBER Working Paper* .

Amiti, Mary, Sang Hoon Kong, and David Weinstein. 2020. "The Effect of the U.S.-China Trade War on U.S. Investment." NBER Working Papers 27114, National Bureau of Economic Research.

[25] Note that the inverse elasticity of demand satisfy up to a first order $\hat{p}_{fi} = -\frac{\varepsilon_Z^Q}{\varepsilon_P^{Q^d}} \hat{z}_{fi}^d + \frac{1}{\varepsilon_P^{Q^d}} \hat{q}_{fi}$. Higher demand elasticity thus effectively make the price response to a shifter smaller for a given quantity. This also makes clear the other channel: When $\varepsilon_Z^{Q^d} \approx 0$, the effective shift is small as well.

Amiti, Mary, Stephen J. Redding, and David E. Weinstein. 2020. “Who’s Paying for the US Tariffs? A Longer-Term Perspective.” *AEA Papers and Proceedings* 110: 541–546.

Barbiero, Omar. 2023. “The Channels of International Comovement.” Research Department Working Papers 23-16, Federal Reserve Bank of Boston.

Barbiero, Omar, and Hillary Stein. 2025. “The Impact of Tariffs on Inflation.” *Federal Reserve Bank of Boston Current Policy Perspectives* 25 (2).

Bernard, Andrew B., J. Bradford Jensen, Stephen J. Redding, and Peter K. Schott. 2018. “Global Firms.” *Journal of Economic Literature* 56 (2).

Carreras-Valle, Maria Jose, and Sang Min Lee. 2026. “Tariff Front-Running.” *Working Paper* .

Cavallo, Alberto, Gita Gopinath, Brent Neiman, and Jenny Tang. 2021. “Tariff Pass-Through at the Border and at the Store: Evidence from US Trade Policy.” *American Economic Review: Insights* 3 (1): 19–34.

Cavallo, Alberto, Paola Llamas, and Franco Vazquez. 2025. “Tracking the Short-Run Price Impact of U.S. Tariffs.” Working paper, Harvard Business School.

Clayton, Christopher, Antonio Coppola, Matteo Maggiori, and Jesse Schreger. 2025. “Geoeconomic Pressure.” NBER Working Papers 34020, National Bureau of Economic Research.

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

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

Flaaen, Aaron, Ali Hortaçsu, and Felix Tintelnot. 2020. “The Production Relocation and Price Effects of US Trade Policy: The Case of Washing Machines.” *American Economic Review* 110 (7): 2103–2127.

Flaaen, Aaron, and Justin Pierce. 2024. “Disentangling the Effects of the 2018-2019 Tariffs on a Globally Connected U.S. Manufacturing Sector.” *The Review of Economics and Statistics* : 1–45.

Freund, Caroline, Aaditya Mattoo, Alen Mulabdic, and Michele Ruta. 2024. “Is US Trade Policy Reshaping Global Supply Chains?” *Journal of International Economics* 152: 104011.

Gopinath, Gita, Pierre-Olivier Gourinchas, Andrea F. Presbitero, and Petia Topalova. 2025. “Changing Global Linkages: A New Cold War?” *Journal of International Economics* 153: 104042.

Handley, Kyle, Fariha Kamal, and Ryan Monarch. 2025. “Rising Import Tariffs, Falling Exports: When Modern Supply Chains Meet Old-Style Protectionism.” *American Economic Journal: Applied Economics* 17 (1): 208–238.

Hassan, Tarek A, Stephan Hollander, Laurence van Lent, and Ahmed Tahoun. 2019. “Firm-Level Political Risk: Measurement and Effects.” *Quarterly Journal of Economics* 134 (4): 2135–2202.

Hassan, Tarek A, Jesse Schreger, Markus Schwedeler, and Ahmed Tahoun. 2023. “Sources and Transmission of Country Risk.” *Review of Economic Studies* 91 (4): 2307–2346.

Huo, Zhen, Andrei A. Levchenko, and Nitya Pandalai-Nayar. 2025. “International Comovement in the Global Production Network.” *Review of Economic Studies* 92 (1): 365–403.

Jordà, Òscar. 2005. “Estimation and inference of impulse responses by local projections.” *American Economic Review* 95 (1): 161–182.

Schmitt-Grohé, Stephanie, and Martín Uribe. 2025. “Transitory and Permanent Import Tariff Shocks in the United States: An Empirical Investigation.” NBER Working Papers 33997, National Bureau of Economic Research.

Online Appendix *(not for publication)*

A Additional Tables

Table A.1: Average Exposure by Sales Percentile Bin

	Sales Percentile Bin			
	p0-50	p50-75	p75-90	p90-100
Panel A: 2018 Episode				
Import Intensity (%)	2.07	4.24	4.66	7.06
Import Cost (%)	0.06	0.13	0.15	0.19
Supplier Cost (%)	0.03	0.03	0.03	0.04
Export Tariff (%)	0.09	0.19	0.25	0.31
N	1796	898	538	360
Panel B: 2025 Episode				
Import Intensity (%)	1.88	3.43	4.20	3.54
Import Cost (%)	0.41	0.70	0.83	0.61
Supplier Cost (%)	0.25	0.18	0.17	0.22
Export Tariff (%)	0.45	0.70	0.82	0.85
N	1385	692	416	276

Notes: This figure shows the average exposure by sales percentile bin for each episode. Sales percentile bins are based off sales, as given in Compustat, in the year before the episode.
Sources: S&P Compustat, Panjiva, Factset GeoRev, Factset Supply Chain, US Census Bureau, Chinese and Canadian Ministry of Finance, author's calculations.

B Data Appendix

B.1 Firm-level Data

B.1.1 Panjiva

Our firm-level US import data come from Panjiva and include bill-of-lading data of all US maritime imports. So that our analyses includes the substantial volume of non-maritime trade occurring between the United States and Mexico, we supplement that data set with another Panjiva product, one covering Mexican exports. It includes maritime as well as non-maritime (truck, air, pipeline, etc.) trade records between Mexico and the United States. We append the two data sets by identifying in each data set the unique Panjiva firm ID of the importing US firm. Since Panjiva does not provide a similar database for Canadian exports, we are unable to account for non-maritime trade with Canada.

The resulting data set contains the Panjiva ID of the importing US firm, the six-digit Harmonized System (HS) product code of the goods shipped, a text field containing information about the goods' origins, the country from which the shipment departed for the United States, the volume of trade in twenty-foot equivalent units (TEU), and the Panjiva-imputed value of goods in US dollars.

Improving shipment's country of origin identification. Some further work needs to be done to identify each shipment's country of origin. The Panjiva field *shpmtorigin* is a well-formatted string indicating the country from which the shipment departed for the United States. In many cases, this country is not the country that produced the good. Another Panjiva field, *placeofreceipt*, does indicate the location from which the good originated. However, it is poorly formatted, often containing misspelled or truncated city or country names.

Given the importance of accurately determining a good's true origin for the purpose of calculating tariffs, we extracted country information from this text field. The process is as follows.

1. We combed the strings themselves to identify any known country names via fuzzy matching.
2. We systematically removed as much extraneous information as possible from the strings, leaving only what were plausibly city names.
3. We then applied a fuzzy matching algorithm to determine whether the cleaned string was plausibly a port city as listed in the UN location database.
4. We extracted the country corresponding to the city. When a match could not be identified, we defaulted to the country in *shpmtorigin*.
5. Using US Census imports data as a point of reference, we verified that this process improves the accuracy of import origin attribution.

After this process, the modified origin variable we create enables our data to explain 76 percent of the variation in 2017 import value by country,[26] whereas the Panjiva data that use only *shpmtorigin* to identify the country of origin explains only 65 percent.

Matching Panjiva to Compustat. Panjiva firms are identified by an S&P-assigned Panjiva ID. To match Panjiva firm IDs with Compustat data, we use historical records of an S&P-provided crosswalk matching Panjiva ID to Company ID, a firm identifier that is consistent across S&P data products including Compustat. We further match each Company ID to that firm's ultimate parent's Company ID using another crosswalk provided by S&P. For any given time, S&P provides a crosswalk for only the current maps from the Company ID to the ultimate parent's Company ID. We combine information from historical versions of the crosswalk to account for changes in firm ownership over time.

B.1.2 Factset Supply Chain

Factset Supply Chain collects and verifies supply chain relationship information using various sources: 10-K filings, conference call transcripts, company press releases, company websites, and news media reports. It provides records of supplier–customer relationships, competitors, joint ventures, creditors, and other factors that were in effect on any given date from 2003 to 2025. We exclude intra-company relationships and filter customer–supplier relationships active at any given time in 2017 or 2024.

Matching Factset and S&P Capital IQ. We then match each customer company ID from Factset with S&P CapitalIQ ID, the firm identifier in Panjiva. To do so, we use the following ordered criteria of matching, as in Barbiero (2023): Legal Entity ID (or Taxpayer Identification Number for US companies), historical CUSIP ID, and company name fuzzy matching conditional on two companies residing in the same state and country with a cosine similarity score of at least 90 percent. The master matching file contains successful matching between Factset ID and CapitalIQ ID for 5.3 million companies. This enables us to match 60 percent of the companies in the Factset Supply chain data set.

After matching the Factset IDs with the Capital IQ company IDs, we use Panjiva and CapitalIQ sales and import information for both private and public companies to build the supplier cost exposure in Equation (4).

[26]This calculation omits import values for Mexico and Canada due to Panjiva's data limitations for these countries.

B.1.3 *Factset Geographic Revenue*

The Factset Geographic Revenue (GeoRev) data set captures revenue exposures of global entities to different countries/regions over time. Factset exploits annual reports and regulatory filings to achieve a consistent record. GeoRev covers about 72,000 entities for both 2017 and 2024. Most of these entities are publicly listed. After applying our matching strategy with capital IQ, we cover 47,771 entities. Not all companies declare their revenue segments at the country level. For this reason, Factset harmonizes heterogeneous declarations of sales distribution across geographies at different levels of aggregation and assigns a "certainty rank" to each value according to whether it was declared directly by the firm, imputed from previous values, or imputed from more aggregate firm-level data.

The main advantage of this data set is the vast array of sources used to infer the geographic revenues of each company and its global coverage. The data set is not well suited to use for studying the extensive margin of foreign-revenue exposure, as 70 percent of the country-level records have some degree of imputation, even though most of them are associated with a high to medium degree of certainty. Jointly with the industry information from Compustat, it offers the best exposure predictor available for exposure to retaliation.

B.1.4 *Compustat*

From Compustat, we download firm characteristics including net sales, cost of materials. Our main results use cost of materials, sales, and capital expenditure as reported in Compustat. We detail our transformations of these variables in Table B.1, which also details which variables come from quarterly data (Compustat variable names ending in the letter "q") and which come from annual data.

From the Compustat sample, we filter for firms with invalid or outlier values, removing firms that report negative cost of goods sold and operating expenses, and firms that report quarterly sales of less than \$10,000 or total assets less than \$100,000. We winsorize all of our final independent and dependent variables at the 2.5 and 97.5 percentiles.

Compustat firms are identified by the Capital IQ identifier GVKEY, which we aggregate up to the Panjiva-provided ultimate parent Company ID. We first remove from the Compustat quarterly data all subsidiary firms whose ultimate parent is observed in the Compustat data to avoid double counting. When an ultimate parent company is identified but not present in the Compustat data, a synthetic ultimate parent Company ID is created by aggregating subsidiaries to their parent. To ensure accuracy in this aggregation within the quarter, subsidiary data are aggregated to the ultimate parent Company ID only if all subsidiary firms reported a value for the firm characteristic in the quarter.

Table B.1: Variable Definitions

Variable	Compustat Variables	Formula	Description
Sales	saleq	$\log(\texttt{saleq})$	The Compustat variable saleq is used as a dependent variable in our analysis after a log transformation.
Costs	cogsq and cogs	$\log(\texttt{cogsq})$	The Compustat variable cogsq is used as a dependent variable in our analysis after a log transformation. We use the annual COGS reported for the fiscal year prior to a tariff episode, scaled by the US sales share obtained from GeoRev, to get US COGS. We use this to divide our firm tariff expenditure to create our firm Import Cost increase.
CAPEX	capxq	$\frac{\texttt{capxq}}{\texttt{atq}}$	We create a quarterly flow capxq from the Compustat fiscal year-to-date variable capxy, and divide by the company's Total Assets (atq).
EBITDA	saleq, cogsq, and xsgaq	$\frac{\texttt{saleq-cogsq-xsgaq}}{\texttt{saleq}}$	We use the formula provided by Compustat to construct EBITDA as Net (saleq) minus Cost of Goods Sold (cogsq) minus Selling, General & Administrative Expense (xsgaq). Using the formula provides a more complete sample than the provided EBITDA.

Quarterly Compustat firm characteristics are reported according to fiscal and calendar dates, with firms having varying definitions of a fiscal year. Annual Compustat data are reported according to company fiscal years, so when annualizing quarterly variables and daily Panjiva data, we aggregate according to each company's definition of the fiscal year to ensure imports and cost of goods sold are computed on the same dates for each firm's tariff shock.

C Proofs

All elasticities are evaluated at the initial allocation. To simplify notation, we suppress firm-industry subscripts whenever it causes no confusion.

Proof of Proposition 1. Since markups are constant, log-linearizing Equation (14) gives

$$\hat{p} = \hat{mc}. \tag{C.1}$$

Under the input cost shock, $\hat{z}^s = \hat{z}^d = 0$ and $\hat{w}_k = 0$ for all $k \neq j$. Hence

$$\hat{mc} = \varepsilon^{MC}_{W_j} \hat{w}_j + \varepsilon^{MC}_{Q^s} \hat{q}, \tag{C.2}$$

$$\hat{q} = \varepsilon^{Q^d}_{P} \hat{p}. \tag{C.3}$$

Combining these two equations with $\hat{p} = \hat{mc}$,

$$\hat{q} = \varepsilon^{Q^d}_{P} \left(\varepsilon^{MC}_{W_j} \hat{w}_j + \varepsilon^{MC}_{Q^s} \hat{q} \right), \tag{C.4}$$

which implies

$$\hat{q} = \frac{\varepsilon^{Q^d}_{P} \varepsilon^{MC}_{W_j}}{1 - \varepsilon^{MC}_{Q^s} \varepsilon^{Q^d}_{P}} \hat{w}_j, \tag{C.5}$$

$$\hat{p} = \frac{\varepsilon^{MC}_{W_j}}{1 - \varepsilon^{MC}_{Q^s} \varepsilon^{Q^d}_{P}} \hat{w}_j. \tag{C.6}$$

Since $S = PQ$, $\hat{s} = \hat{p} + \hat{q}$. Therefore,

$$\hat{s} = \left(\frac{1 + \varepsilon^{Q^d}_{P}}{1 - \varepsilon^{MC}_{Q^s} \varepsilon^{Q^d}_{P}} \right) \varepsilon^{MC}_{W_j} \hat{w}_j. \tag{C.7}$$

Next, log-linearizing variable costs gives

$$\hat{vc} = \varepsilon^{VC}_{W_j} \hat{w}_j + \varepsilon^{VC}_{Q^s} \hat{q}. \tag{C.8}$$

By Shephard's lemma,

$$\varepsilon^{VC}_{W_j} = \frac{\partial VC}{\partial W_j} \frac{W_j}{VC} = \frac{W_j X_j}{VC} \equiv \Omega_j. \tag{C.9}$$

Thus,

$$\hat{vc} = \Omega_j \hat{w}_j + \varepsilon_{Q^s}^{VC} \left(\frac{\varepsilon_P^{Q^d} \varepsilon_{W_j}^{MC}}{1 - \varepsilon_{Q^s}^{MC} \varepsilon_P^{Q^d}} \right) \hat{w}_j \tag{C.10}$$

$$= \left(1 + \frac{\varepsilon_{Q^s}^{VC} \varepsilon_P^{Q^d} \varepsilon_{W_j}^{MC}}{\Omega_j (1 - \varepsilon_{Q^s}^{MC} \varepsilon_P^{Q^d})} \right) \Omega_j \hat{w}_j. \tag{C.11}$$

Finally, since $\pi = \Pi/S = (S - VC)/S = 1 - VC/S$,

$$\mathrm{d}\pi = -\mathrm{d}\left(\frac{VC}{S}\right) = \frac{VC}{S}(\hat{s} - \hat{vc}) \tag{C.12}$$

$$= \frac{VC}{S} \left(\frac{\left(1 + (1 - \varepsilon_{Q^s}^{VC}) \varepsilon_P^{Q^d}\right) \varepsilon_{W_j}^{MC}}{1 - \varepsilon_{Q^s}^{MC} \varepsilon_P^{Q^d}} - \Omega_j \right) \hat{w}_j. \tag{C.13}$$

Restoring firm-industry subscripts gives Equation (15)–Equation (17). □

Proof of Proposition 2. Since markups are constant Equation (C.1) still holds. Under the demand shock, $\hat{w}_j = 0$ for all j and $\hat{z}^s = 0$. Hence

$$\hat{mc} = \varepsilon_{Q^s}^{MC} \hat{q}, \tag{C.14}$$

$$\hat{q} = \varepsilon_P^{Q^d} \hat{p} + \varepsilon_{Z^d}^{Q^d} \hat{z}^d. \tag{C.15}$$

Using $\hat{p} = \hat{mc}$,

$$\hat{q} = \varepsilon_P^{Q^d} \varepsilon_{Q^s}^{MC} \hat{q} + \varepsilon_{Z^d}^{Q^d} \hat{z}^d, \tag{C.16}$$

so

$$\hat{q} = \frac{\varepsilon_{Z^d}^{Q^d}}{1 - \varepsilon_{Q^s}^{MC} \varepsilon_P^{Q^d}} \hat{z}^d, \tag{C.17}$$

$$\hat{p} = \frac{\varepsilon_{Q^s}^{MC} \varepsilon_{Z^d}^{Q^d}}{1 - \varepsilon_{Q^s}^{MC} \varepsilon_P^{Q^d}} \hat{z}^d. \tag{C.18}$$

Since $S = PQ$,

$$\hat{s} = \hat{p} + \hat{q} = \left(\frac{1 + \varepsilon_{Q^s}^{MC}}{1 - \varepsilon_{Q^s}^{MC} \varepsilon_{P}^{Q^d}} \right) \varepsilon_{Z^d}^{Q^d} \hat{z}^d. \tag{C.19}$$

Moreover,

$$\hat{vc} = \varepsilon_{Q^s}^{VC} \hat{q} = \left(\frac{\varepsilon_{Q^s}^{VC}}{1 - \varepsilon_{Q^s}^{MC} \varepsilon_{P}^{Q^d}} \right) \varepsilon_{Z^d}^{Q^d} \hat{z}^d. \tag{C.20}$$

Finally, using $\pi = 1 - VC/S$,

$$\mathrm{d}\pi = \frac{VC}{S} \left(\hat{s} - \hat{vc} \right) \tag{C.21}$$

$$= \frac{VC}{S} \left(\frac{1 + \varepsilon_{Q^s}^{MC} - \varepsilon_{Q^s}^{VC}}{1 - \varepsilon_{Q^s}^{MC} \varepsilon_{P}^{Q^d}} \right) \varepsilon_{Z^d}^{Q^d} \hat{z}^d. \tag{C.22}$$

Restoring firm-industry subscripts gives Equation (20)–Equation (22). □