Circumventing Tariffs: The Anatomy of Supply Chain Rerouting*

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Abstract

This paper provides evidence of Chinese exports being rerouted to the US through Mexico following the 2018 US-China trade war. Using firm-level data, we document a 5 percentage point increase in rerouting for goods targeted by US tariffs. Rerouting firms systematically locate closer to customs posts than the average exporter. We document a pronounced expansion of warehousing capacity near the US-Mexico border that facilitated this shift. Rerouting is more pronounced among multinational firms operating solely in China and Mexico, and among experienced traders that newly enter into products targeted by tariffs. Additionally, products that are more price elastic and less differentiated exhibit lower rerouting.

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1 Introduction

International trade has shifted markedly over the past decade. A pivotal break came in mid-2018, when the United States initiated the US–China trade war (Bown, 2021) by imposing tariffs on more than $360 billion of Chinese imports, prompting retaliatory measures from China and altering the trajectory towards greater global integration established after World War II. These policies generated sizable bilateral trade losses (Fajgelbaum et al., 2020) and prompted firms to reallocate sourcing and production, both to limit tariff exposure and to capitalize on emerging opportunities (Fajgelbaum et al., 2024). Similar patterns have been observed in other policy shocks, such as the use of economic sanctions, where firms and countries adapt supply chains to preserve market access.[1]

Although a growing body of work has documented these bilateral effects (Amiti et al., 2019; Cavallo et al., 2021; Chang et al., 2021), far less is known about third-country spillovers, i.e., outcomes for nations neither targeted by nor party to the dispute. In this paper, we ask – how such policies, tariffs in our case, reshape bystander countries' trade patterns? More specifically, do these countries become active intermediaries for rerouting targeted products, thereby diluting the intended impact of the policy? A natural channel is through global value chains (GVCs): multinational firms (MNCs) can reassign orders across affiliates and contract manufacturers and adjust light processing to meet rules of origin, making rerouting operationally feasible at short notice and scale. This may attenuate and in some instances effectively circumvent the intended incidence of policy actions.

We use Mexico as a laboratory to study rerouting in the context of the US-China trade war. Mexico provides a particularly informative setting given the country's free trade agreement with the US, exports (imports) substantial volumes of goods to the US (from China), and has a manufacturing base tightly integrated into North American supply chains. These features make Mexico a natural candidate for trade diversion, especially if Chinese producers sought

[1] On sanctions, one prominent example includes Russian crude oil routed to India for refining and subsequently exported to Europe and US (see Al Jazeera) following sanctions on Russian exports after the 2022 Russia-Ukraine war (Dutt et al., 2025).

to preserve US market access and Mexican firms are willing to act as intermediaries.

Using granular bills of lading data from S&P Panjiva, we construct a firm-product-quarter panel covering Mexican exports to the US and imports from China from 2016 through 2022. We match this comprehensive product-level data with tariff information from Bown (2021). For our baseline analysis, we focus on the first tranche of tariffs imposed in mid-2018.

Our empirical design uses a difference-in-differences strategy that exploits product-level variation in US tariffs. Specifically, within each HS 4-digit category, we compare tariffed and non-tariffed HS 8-digit products before and after the trade war, using both Mexico-US export and Mexico-China import outcomes. We include firm-by-product (HS 8-digit) fixed effects to absorb time-invariant heterogeneity, such as firm-product quality, that could otherwise confound the estimates. Additionally, including HS(4-digit)-by-quarter fixed effects absorbs any HS 4-digit specific shocks over time.

As a first-pass, we evaluate the impact of the tariffs on Mexican firms' likelihood to export to the US and import from China. We find that tariff exposure is associated with sizable increases in both exports and imports. For instance, the probability of exporting tariffed products rises by 16 percent after the trade war. We document similar increases in export quantities and values for products experiencing tariff hikes.

The concurrent increase in imports from China and exports to the United States provides prima facie evidence of rerouting through Mexico. To test this more formally, we construct firm-level indicators of intra-firm rerouting that capture cases in which a firm imports from China and exports the same product to the United States.[2] We focus on two binary measures, $ExIm$, which captures cases where the same HS 8-digit product is both imported and exported by the firm within the same quarter, and $ExIm_{1Y}$, which captures cases where exports follow imports of the same product within the prior year. The $ExIm$ measure provides a stringent

[2]Mexican firms can serve as conduits for rerouting Chinese goods to the US to evade tariffs in four ways: intra-firm (A: same product import/export; B: import one product, export a different one with possible value addition) or inter-firm (C and D, analogous channels involving multiple firms). Data limitations, such as supply chain linkages for all Mexican firms, prevent empirical analysis of inter-firm channels (C/D), hence, we focus instead on intra-firm rerouting.

definition of rerouting, implying very limited time for processing or transformation. Across these measures, rerouting rises for tariffed products after the policy shock; under the most conservative *ExIm* definition, the incidence increases by at least 5 percentage points.

Next, we evaluate intensive margin changes in rerouting. However, identifying rerouting on the intensive margin is challenging for many reasons. For example, a firm could import a bag from China and add a zipper before re-exporting to the US. Although this includes some domestic value creation, it represents only nominal processing and can reasonably be classified as rerouting. In contrast, if a firm imports unfinished bag shells and undertakes full-scale production of high-end leather handbags, adding lining, hardware, stitching, and branding, the domestic value added is substantial and should not be considered rerouting. To separate such cases, we develop a value-added measure and classify transactions as rerouting when domestic value added is below a threshold (20 percent).[3] Failing to account for such value addition threshold may misclassify high value addition cases as rerouting, which are genuine exports to the US and not just country hopping. This concern is quantitatively important as our measure indicates that over 38 percent of observations flagged as rerouting by naive approaches are misclassified. Using our value-adjusted measure, we find that the incidence of rerouting for tariffed products increases by approximately (0.10/0.12) percent in the post period. Importantly, the adjustment is not immediate as the effects become pronounced only by 2021 and persist through end-2022, consistent with nontrivial adjustment frictions.[4]

We next examine the geographic dimension of rerouting. Our firm-choice model predicts that rerouting is more profitable when transport costs are low because rerouting firms bear logistics costs on both the import and export legs of the transactions. Using firm coordinates and the universe of Mexican customs offices, we compute each firm's distance to its nearest customs office. Consistent with the model, we find that rerouting firms are systematically closer to customs offices than average exporters. Although exporters, in general, choose

[3]The rerouting results are robust to using alternate thresholds for value addition.

[4]This is in line with Freund (2025) who use product-level trade data to document a similar lag before the rise in Mexican exports to the US.

locations near customs posts (Coşar and Fajgelbaum, 2016; Hanson, 1996), we find that rerouters are, on average, 31 percent closer than average exporters to these posts.

We further complement this spatial analysis with novel evidence on infrastructure buildup along the US-Mexico border. Because Mexican trucks are restricted to operate within commercial zones near ports of entry in the US (Frittelli, 2014), logistics/warehousing facilities are needed close to the border to support trade. Using geospatial data from OpenStreetMaps, we document a sharp increase in the construction of new warehouses near major ports of entry in the post period, consistent with an expansion in logistics capacity to support rerouted trade flows.

We then turn to firm-level determinants of rerouting, focusing on multinational status and prior trade experience. We merge the trade data with S&P BECRS data to identify firms' multinational status and their countries of operations. Counterintuitively, we find that MNCs, despite logistical expertise and global reach are, on average, no more likely to reroute than other Mexican firms. Two mechanisms may explain this pattern: large MNCs may act cautiously because their scale raises the risk of anti-dumping investigations by the US International Trade Commission (USITC) (Flaaen et al., 2020). Additionally, diversified MNCs with operations across many countries have alternate options rather than solely rely on Mexico for rerouting tariffed products. A closer examination confirms the latter hypothesis. MNCs operating only in China and Mexico are significantly more likely to reroute through Mexico than other MNCs, consistent with the fact that they have limited geographic options available to substitute Chinese exports. No such increase is observed even for the set of MNCs that operate a subsidiary in China but simultaneously operate in multiple locations other than Mexico.

We also examine the margins of adjustment, asking whether rerouting is driven by entry of new firms or firm-product pairs, or by incumbent adjustments at the firm-product level. On average, for tariffed products rerouting is higher for firm-product pairs with no prior rerouting experience. However, these results are entirely due to firms that were already rerouting at least some products before the shock. In other words, incumbent rerouters add newly tariffed products to their portfolios, while firms with no prior rerouting show no comparable increase. These results are consistent with a model of significant fixed costs of entry in rerouting, where incumbents' know-how and established rerouting networks lower the marginal cost of adding new products to their product portfolio.

Finally, we examine which products are more amenable to rerouting. After the tariff increase, products with high demand elasticity are less likely to be rerouted, even though post-rerouting prices via Mexico are lower than post-tariff direct imports from China. A plausible explanation is substitution toward suppliers outside China and Mexico that can offer even lower prices relative to rerouting option. In contrast, more differentiated goods witness a modest increase in rerouting.

Based on the above empirical evidence, we develop a simple three-country model of trade rerouting under tariffs. In the model, a firm chooses between direct export to the US or routing through Mexico with light processing. Rerouting adds two-leg shipping and coordination costs plus a setup cost. Rerouting is feasible when the tariff penalty on direct entry exceeds these extra costs. The model yields clear takeaways, (i) higher tariffs raise the share of goods that are rerouted, (ii) higher transport costs and stricter rules of origin reduce it, and (iii) experience and proximity lower effective costs so incumbent rerouters and firms near customs reroute more. A key implication of the model is attenuation, i.e., as more trade gets rerouted, the tariff's pass-through to US prices and quantities falls, thereby diluting the intended impact of the tariff. The model maps these costs to observables such as distance to customs, prior rerouting, and product elasticities and differentiation. Estimated structurally, the model delivers parameters that are closely aligned with those obtained from the reduced form difference-in-differences specification.

Our paper contributes to the emerging literature on post-trade war adjustment and, specifically, tariff circumvention via third-country rerouting. Our contribution is threefold. First, we provide causal evidence of rerouting through third countries after the US-China trade war, highlighting the conditions under which such circumvention is feasible. Rerouting is more common among firms located closer to customs offices, among incumbents with prior rerouting experience that add newly tariffed products, and in products with lower demand elasticities. A simple firm-choice model with trade costs and sunk setup costs rationalizes these patterns. Recent work has documented rerouting at the product level (Freund, 2025; Liu and Shi, 2019), and at transaction level (Iyoha et al., 2025). We build on this literature by showing how rerouting varies systematically with firms' characteristics and locations, and by providing a structural framework to interpret these patterns. Our paper also relates to the literature documenting rerouting activity in single product categories, such as apparel (Rotunno et al., 2013) and washing machines (Flaaen et al., 2020). Our results generalize these findings by identifying the types of products for which rerouting is most feasible.

Second, we advance methods for identifying rerouting in transaction-level trade data, addressing key misclassification challenges.[5] We show that conventional origin switching metrics can misclassify bona fide export activity as rerouting. For instance, in our data, such naive metrics would wrongly label about 38 percent of high value added exports as rerouted. We mitigate this problem by combining intra-firm indicators with a value-added adjustment, which reduces misclassification.[6]

Our third contribution is to highlight the role of logistics infrastructure in enabling rerouting. We document a substantial buildup of warehousing capacity near the US-Mexico border in the post-tariff period, consistent with the need for storage and transshipment facilities to support the increase in US-Mexico trade flows. This connects our work to the large literature on trade-related infrastructure, which emphasizes the importance of ports, roads, and other transport networks in facilitating trade flows (e.g., Ducruet et al., 2024; Allen and Arkolakis, 2022; Donaldson, 2018; Donaldson and Hornbeck, 2016). One distinction is that, unlike most of this work, which studies the long-term effects of public infrastructure

[5]Our approach is conservative as inter-firm rerouting is not identifiable using transaction-level trade data. Using information on domestic supply chains may help identify inter-firm rerouting patterns.

[6]This classification problem can persist even with other firm-level datasets, such as balance sheets, if one does not observe all firm-product transactions, both domestic and international.

projects, we capture a rapid, private-sector response that expands warehousing capacity in response to a policy shock. In line with this mechanism, we find that rerouting firms are disproportionately located near customs posts, suggesting that proximity to this newly expanded logistics network is an important enabler of rerouting behavior.

More broadly, our paper is related to the supply chain realignment literature that has emerged in the post-trade war era. Fajgelbaum et al. (2024) provide theoretical underpinning for the spillovers to bystander countries.[7] There is growing empirical evidence of such production reallocation (Dang et al., 2023) towards major beneficiaries, Vietnam and Mexico (Alfaro and Chor, 2023; Utar et al., 2023; Lee and Rhee, 2025; Wu, 2024; Nguyen and Lim, 2023; Rotunno et al., 2023). Our analyses suggests that part of this shift reflects rerouting rather than changes in comparative advantage post trade war, and may unwind as enforcement tightens. Overall, our analyses highlight the limits of unilateral trade policy in an interconnected global economy.

2 Data

We construct our sample using two primary datasets: (i) international bill of lading data from S&P Panjiva, and (ii) product-level tariff data from Bown (2021) on U.S. tariffs imposed on Chinese goods during the 2018 trade war. Below, we describe each source and the steps used in sample construction.

2.1 S&P Panjiva Bill of Lading Data

We use shipment-level trade data from S&P Panjiva, which compiles data from customs records and bills of lading. Each bill of lading includes information on trading partners (names, addresses, identifiers etc.), shipment dates, HS 8-digit product codes, trade values

[7] A sizable literature quantifies the direct impact of trade war on US and China. This literature shows near-complete pass-through in prices and loss in welfare for consumers (Amiti et al., 2019; Fajgelbaum et al., 2020; Cavallo et al., 2021; Waugh, 2019; Ma et al., 2021).

(USD), quantities, carrier and vessel details.

For baseline analyses, we use Mexico's imports from China and exports to the United States from 2016 to 2022. We use Mexican exports data rather than US imports data for two reasons. First, while Mexican records report actual transaction values, Panjiva imputes these values in US imports data, with about 80% missing. Second, the Mexican data cover all transport modes, while the US imports data include only maritime shipments, omitting the bulk of US-Mexico trade by road and railways.

The Panjiva data are highly granular and are reported at the date-firm-transaction level. We aggregate the data to the quarterly firm-product (HS 8-digit level). Next, we filter the data to focus on persistent trade relationships, retaining firm-product pairs that appear for at least four quarters during the entire sample period. This filter isolates persistent trade from incidental transactions.[8] Table 2 reports summary statistics for the resulting data. The panel spans 28 quarters from 2016-2022, covering over 21,000 firms and 8,400 HS 8-digit products in the exports sample, and nearly 28,500 firms and 8,600 HS 8-digit products in the imports sample.

We further use S&P BECRS data that provides auxiliary datasets on firm location and its ultimate parent company, allowing us to identify multinational firms (MNCs) and the presence of their affiliates in other countries.

2.2 Product-level Tariff Data

We use the dataset of Bown (2021), which compiles product-level US tariffs on Chinese goods implemented during the trade war. The dataset is constructed from official sources, including announcements from the Office of the US Trade Representative and the US International Trade Commission. Our baseline analysis focuses on the three major tariff tranches introduced in 2018 - July 6 ($34 billion), August 23 ($16 billion), and September 24 ($200 billion), all of which fall within 2018Q3, allowing us to define a uniform treatment period at the quarterly

[8] Since persistent relationships represent a substantial share of overall trade value, we still cover about 98% (94.95%) of exports (imports) trade value.

level. For each HS 8-digit product, we construct a binary indicator for tariff imposition as well as a continuous measure of the change in the tariff rate. We merge these tariff data with Panjiva's trade data, producing a panel of more than 6.5 million firm-product-quarter observations, covering 21,210 unique firms and 232,575 firm-product pairs.

For robustness, we also incorporate the additional tariff changes introduced in 2019 in supplementary analyses.

3 Empirical Strategy

In this section, we assess how U.S. tariffs on Chinese goods affected bystander country firms located in Mexico. Our analysis evaluates the impact of tariff changes on Mexican exports to the U.S., imports from China, and the extent of trade rerouting. We examine a panel of Mexican firms $f \in \{1, \ldots, F\}$, exporting products $p \in \{1, \ldots, P\}$ at the HS 8-digit classification level, over quarters $t \in \{1, \ldots, T\}$. We also exclude 2020 data from our analyses as international trade witnessed significant disruption during this period due to the COVID-19 pandemic. Let Y_{fpt} denote the quarterly outcome variable for firm f, product p, and quarter t. Each product p belongs to an HS 4-digit category, denoted by $\tilde{p} \in \{1, \ldots, \tilde{P}\}$.

We estimate the following difference-in-differences specification at the firm-product-quarter level:

$$Y_{fpt} = \alpha + \beta_1 Tariff_p + \beta_2 Post_t + \beta_3 (Tariff_p \times Post_t) + \delta_{fp} + \delta_{\tilde{p}t} + \varepsilon_{fpt} \qquad (1)$$

where, the variable $Tariff_p$ is an indicator set to 1 if product p is subject to US tariffs on China. $Post_t$ is a time indicator equal to 1 for quarters after tariff implementation i.e., beginning 2018Q3. Our main coefficient of interest is β_3, which captures the differential effect of the US-China trade war on tariffed products in the post-treatment period. Errors ε_{fpt} are clustered at HS 8-digit product level.

We include a rich set of fixed effects in our specification. First, we include firm $\times$ product fixed effects, δ_{fp}, to control for time-invariant characteristics specific to each firm-product pair. They account for factors like firm size and average quality of products supplied by a firm. Also, we include 4-digit HS product × time fixed effects $\delta_{\tilde{p}t}$ that control for broader category trends like global price changes or demand shifts.[9] δ_{fp} allow us to compare outcomes for a tariffed product p at time t within its product group ($\tilde{p}$) at 4-digit level over time. In essence, our DiD specification compares a given outcome for a tariffed product p before and after June 2018, against changes in non-tariffed products within the same narrowly defined HS 4-digit category $\tilde{p}$.

We also estimate an event study version of the baseline Equation (1) as:

$$Y_{fpt} = \phi + \sum_{\tau=2016\text{H1}}^{2022\text{H2}} \gamma_\tau \left(Tariff_p \times \mathbb{1}_{t=\tau}\right) + \delta_{fp} + \delta_{\tilde{p}t} + \varepsilon_{fpt} \tag{2}$$

where $\mathbb{1}_{t=\tau}$ is an indicator equal to one for a given half year τ and zero otherwise. The coefficient γ_τ captures the impact on tariffed products in that period. We continue to use the same set of fixed-effects as in Equation (1) and use the year 2017 as the baseline.

4 Impact of Tariffs on Mexican Firms' Trade

We estimate Equation (1) and report the results in Table 3. The first three columns report the effects of the tariffs on Mexican exports to the US. Column (1) captures the decision to export, where Exported is a dummy variable that equals 1 if the firm exports a given product to the US and zero otherwise. We find that the coefficient on $Tariff_p \times Post_t$ is positive and significant, meaning firms more often exported tariffed products to the US. Specifically, the probability of exporting such products rise by 16 percent after the tariffs. Exports also increase in value (column (2)) and quantity (column (3)). The interaction coefficient for the

[9] Since we have firm-product-time level data, our identification strategy relies on the granularity of data and observing changes in exports and imports by Mexican firms each quarter. It differs substantially from Fajgelbaum et al. (2020) who use aggregate product-level trade data for identification. Another significant difference is that we are mainly interested in studying the impact of US tariffs on China and not the retaliatory tariffs imposed by China on US.

value regression is insignificant in column (2), but as we discuss below, it is on account of noise in some quarters in the post period. Columns (4) to (6) show the corresponding results for Mexican imports from China. We find that tariffed products are 20% more likely to be imported (column (4)), and their import value (column (5)) and quantity (column (6)) also increase significantly.

We report the event-study estimates in Figure 2. Panel (a) shows the effects on the probability of exporting tariffed products to the US or importing them from China. We note that no significant pre-trends appear before June 2018, i.e. the trade war. Subsequently, we find that exports (imports) witness minimal change in the period immediately after the tariff imposition. However, the magnitude of the impact grows substantially from 2021 onward. By 2022, the probability of exports to the US increases by 30 percent, and the probability of imports increased by 37 percent. Panel (c) shows similar patterns for trade quantity, with comparable increases in exports and imports. In contrast, Panel (b) shows that exports value to the US rise by about 32 percent, but the effect is significant only in select quarters. These results suggest that while Mexican firms trade more often and in larger volumes from 2021 to 2022, decline in prices limit the rise in export value to the US.

In summary, the results indicate that Mexican firms' exports to the US and imports from China increase following the onset of the US–China trade war. Notably, these effects become evident by 2021, suggesting that supply chain realignment involves substantial adjustment costs and time for firms.

5 Do Mexican Firms Help in Rerouting?

Given the above results, we now explore whether these shifts in trade by Mexican firms can be explained by the rerouting of Chinese exports through Mexico to the US. We test if the tariffed products witness higher rerouting in the post period.

Figure 1: Typology of Firm and Products for Rerouting

	Same Product	**Alternate Product**
Intra-Firm	A	B
Inter-Firm	C	D

Notes: This matrix gives the possible combinations of firms and products that could facilitate the rerouting of Chinese exports to the US through Mexico. In our case, the rerouting firms are located in Mexico.

5.1 Construction of Rerouting Measures

We first highlight that rerouting can be executed in several ways. Figure 1 outlines the main scenarios. In case A, a firm imports a product from China and exports it to the United States. In case B, the firm imports a product x from China and exports a different product y to the US, with mininal value addition before exports. Cases C and D involve different firms handling imports and exports, either for the same product or for different products. While these inter-firm rerouting cases C and D matter in theory, the absence of data on domestic supply chain linkages among firms limits our ability to empirically assess rerouting through these channels.[10]

5.1.1 Extensive Margin Measures

To test the prevalence of rerouting, we focus on the Intra-firm case of rerouting (case A). For testing the extensive margin, we define two indicator variables. Let $ExIm_{fpt} = \mathbb{1}\{\text{Imported}_{fpt} > 0 \wedge \text{Exported}_{fpt} > 0\}$, which equals 1 if firm f imported and exported HS 8-digit product p in quarter t. Let $ExIm_{1Y,fpt} = \mathbb{1}\{\text{Exported}_{fpt} > 0 \wedge (\exists t' \in \{t-4, \ldots, t-1\} : \text{Imported}_{fpt'} > 0)\}$, which equals 1 if the firm exported product p in quarter t and imported

[10] Cases B and D pose an ambiguous and difficult to identify form of rerouting. Firms may import a product from China, add value, and export a different product to the US.

in the year preceding t. The $ExIm$ measure provides a stringent definition of rerouting by requiring that imports and exports match at the HS 8-digit level within the same firm and quarter, leaving very little time for processing or transformation. The $ExIm_{1Y}$ measure represents a weaker notion of rerouting by relaxing the timing restriction as it classifies a product as rerouted if exports occur within a year of imports. This broader measure captures slower forms of rerouting, including cases where goods are stored or undergo limited processing before re-export.

5.1.2 Value-Addition Based Rerouting Measures

We next define rerouting measures on the intensive margin. As a first pass, consider a simple measure based solely on the overlap between imports and exports:

$$RR^{U}_{fpt} = \frac{min(exports_{fpt}, imports_{fpt})}{exports_{fpt}} \tag{3}$$

which we refer to as the Unadjusted Rerouting Ratio (URR), in the spirit of Iyoha et al. (2025). This ratio works well when import and export values are of similar magnitude. However, when exports are much larger than imports, which potentially signifies high value addition, RR^{U}_{fpt} can spuriously indicate positive rerouting. For instance, if a firm exports USD 100 to the US, but imports USD 50 from China, $RR^{U}_{fpt} = 0.5$. Despite the high value addition, the URR would incorrectly flag this case as rerouting.

To overcome these issues, we define a new adjusted measure of rerouting that accounts for value addition. We proceed in two steps. We first define the lower bound of value added as:

$$\mathrm{VA}^{\mathrm{lb}}_{fpt} = \begin{cases} 0, & \text{if } E_{fpt} = 0 \text{ and } I_{fpt} = 0, \\ \max\left\{ 0,\ \dfrac{E_{fpt} - I_{fpt}}{E_{fpt} + \epsilon} \right\}, & \text{otherwise.} \end{cases}$$

where E_{fpt} (I_{fpt}) is the export (import) value of firm-product fp in quarter t to the US (from

China). The ratio $\dfrac{E_{fpt} - I_{fpt}}{E_{fpt} + \epsilon}$ captures value addition and ϵ is a small value to guarantee that the ratio exists. We subsequently define the adjusted rerouting measure as:

$$RR^{A}_{fpt} = \max\left\{0,\ 1 - \frac{\text{VA}^{\text{lb}}_{fpt}}{\theta}\right\}, \tag{4}$$

where θ is the maximum value added in Mexico for quarterly transactions to still be considered under rerouting. For our baseline empirical results, we fix $\theta = 0.2$ or 20% maximum value addition.[11] For the above example, where RR^{U}_{fpt} equals 0.5, the new measure RR^{A}_{fpt} assigns a value of 0, i.e., no rerouting since the lower bound of value added is above the threshold value of 0.2.

Figure 3 demonstrates mis-classification as a function of import value for a given export value of USD 100 and $\theta = 0.2$. The red line corresponds to RR^{U}_{fpt} and assigns a non-zero rerouting value for all cases except when imports are exactly equal to zero. RR^{A}_{fpt} is denoted by blue line and takes a value zero where $E_{fpt} - I_{fpt}$ is large, implying significant value addition. The shaded area corresponding to the gap between the two lines gives the import values where exports are plausibly mis-classified as rerouting by the simple rerouting measure.

Table 1 quantifies the extent of this misclassification in our sample. Nearly two-fifths of observations (38 percent) are low import cases in which $RR^{A}_{fpt} = 0$ but $RR^{U}_{fpt} > 0$, so the unadjusted measure incorrectly flags rerouting with an average excess of 0.19. A small intermediate segment (2.76 percent) has $0 < RR^{A}_{fpt} < 1$ while $RR^{U}_{fpt} > 0$; here the mean gap is larger (0.39), again indicating overstatement of rerouting by the unadjusted metric. For the remaining 59 percent of cases, the two measures agree ($RR^{A}_{fpt} = RR^{U}_{fpt} = 1$), implying no discrepancy. This example demonstrates how and in what scenarios, our measure improves the unadjusted rerouting measures.

Finally, to avoid sharp discontinuities at the threshold, we propose a smoothed rerouting measure RR^{S}_{fpt}. Once again, we begin by defining value added, but now using a smooth

[11]The results are similar for variations of θ around this threshold. We report robustness checks with alternate values of θ.

approximation:

$$VA_{\text{smooth}} = \frac{1}{k} \log\left(1 + \exp\left(k \cdot \frac{E_{fpt} - I_{fpt}}{E_{fpt} + \epsilon}\right)\right)$$

where the parameter k governs the sharpness of the transition. The smoothed rerouting measure is then defined as:

$$RR^S_{fpt} = \frac{1}{k} \log\left(1 + \exp\left(k \cdot \left(1 - \frac{VA_{\text{smooth}}}{\theta}\right)\right)\right). \tag{5}$$

Once again, the variable θ captures the threshold for value addition, which we fix at 0.2 for our baseline regressions. Qualitatively, the behavior of RR^S_{fpt} parallels that of RR^A_{fpt}, assigning zero values to high value added cases. Even quantitatively, there is high agreement between these two measures for θ equals 0.2. Appendix Figure A.1 shows the measure's behavior across alternative choices of θ.

Table 1: Misclassification of Rerouting Measures in Mexican Trade Data

Segment	Percentage (1)	Mean Difference (2)
$RR^A_{fpt} = 0$ & $RR^U_{fpt} > 0$	38.00	0.19
$0 < RR^A_{fpt} < 1$ & $RR^U_{fpt} > 0$	2.76	0.39
$RR^A_{fpt} = 1 = RR^U_{fpt}$	59.24	0

Notes: This table compares how alternative measures classify a firm-product-time observation as rerouting, based on exports to the United States and imports from China. Row 1 illustrates a case where the unadjusted measure (RR^U_{fpt}) flags rerouting while the adjusted measure (RR^A_{fpt}) does not. Row 2 shows a case where both measures indicate rerouting but differ in intensity. Row 3 reports a case where the two measures are aligned.

5.2 Evidence of Rerouting through Mexico

We estimate Equation 1 with different rerouting measures as outcomes. This allows us to test whether tariffed products experienced differential rerouting after the trade war. Table 4 reports the results for extentive margin. We find that across both specifications, treated products exhibit more rerouting, with estimated effects indicating more than a 5.2 percentage points increase in the post period. It is (5.2/11.8 =) 44 percent increase in rerouting activity over the baseline period. Among these, the *ExIm* measure represents the most conservative estimate of rerouting and hence has a slighlty lower coefficient. We next report event studies in Figure 4. We find similar magnitudes of effects as well as dynamics for all the measures. Notably, we observe that rerouting begins to materialize in 2021, consistent with the import-export patterns documented in Section 4. Given the similarity of these results, we focus on *ExIm* measure to report the results in the subsequent analyses.

We also find evidence for increase in rerouting intensity for tariffed products in the post trade war period. We report the results in Figure 5. Similar to the extensive margin results, we find a significant increase in rerouting for both measures, adjusted and smoothed, beginning 2021. The coefficient estimates are around 0.08 suggesting a 8 percentage points increase in the share of rerouting for tariffed products, which is (0.08/0.12=) 66 percent increase in rerouting activity over the baseline period.

Rerouting evidence for quantity: The previous analysis focused on changes in the value of rerouting after the trade war. We now examine whether similar patterns hold for quantities (Table 5). For each firm-product-quarter, the outcome variable is defined as the share of quantity rerouted,

$$\frac{\min\{\text{exports to US, imports from China}\}}{\text{imports from China}} \times \mathbb{1}(RR = 1), \tag{6}$$

where $\mathbb{1}(RR = 1)$ equals one if the rerouting measure RR^A or RR^S is one and zero otherwise.[12]

We estimate two specifications, using either the adjusted measure RR^A or the smooth measure RR^S. Because quantity rerouting is nonzero only when RR^A or RR^S equals one, this provides a strict test. The results show that the coefficients on the interaction terms are

[12] Unlike the case of value-based rerouting (Section 5.1.2), an analogous measure cannot be defined for quantities. We therefore interact the quantity share with $\mathbb{1}(RR = 1)$ so that cases with high value added are coded as zero quantity rerouting.

positive and significant after 2021, indicating that quantity rerouting increased for tariffed products in the post-period.

5.3 Robustness

In this subsection, we present the robustness of our baseline rerouting results.

Continuous Treatment: We replace the baseline specification, which uses a tariffed products dummy interacted with the post period, with a continuous treatment measure that reflects tariff elasticity. The results are similar and are reported in the Appendix Table A.1.

Alternate Threshold for Value Addition (θ): We test the sensitivity of our results to alternate thresholds for defining value addition, θ. The results remain robust in these alternative cut-offs ($\theta = 0.15$ and $\theta = 0.25$), as shown in the Appendix Table A.2.

US as the Major Export Destination: Our baseline measures of rerouting rely on total imports from China and exports to the US. However, Chinese inputs may also be used for general value addition with final goods exported to destinations other than the US, which may lead to overestimation of rerouting. To address this, we restrict the sample to firm-product pairs where the US accounts for the majority of export revenues (at least 80 or 90 percent). The rerouting results remain consistent and reported in the Appendix Table A.3.

Comparison within HS 6-digit: Our main specification compares treated products to controls within the same HS 4-digit category. As robustness, we narrow the comparison group by restricting controls to products within the same HS 6-digit category and get similar results (Appendix Table A.4) .

6 The Geography of Trade Rerouting

6.1 Spatial Location of Rerouting Firms

In the previous sections, we presented robust evidence that firms responded to U.S.-China tariffs by rerouting trade through Mexico. However, successful rerouting requires more than just altering trade flows; it also depends heavily on logistics infrastructure. Firms may strategically benefit by locating near customs offices, where shipments must undergo inspection and clearance. Such proximity can reduce transit times, expedite regulatory processes, and lower transportation costs, particularly for perishable or time-sensitive goods.

Hence, for firms involved in intra-firm rerouting (importing from China and rapidly re-exporting to the United States) proximity to customs offices is particularly advantageous. This leads to a key behavioral question: Do rerouting firms tend to be located closer to customs offices compared to general exporters? To answer this, we analyze the spatial distribution of rerouting firms in relation to customs office locations.

We begin by manually collecting geospatial data on Mexican customs offices. Figure A.2 shows the locations of customs offices in Mexico.[13] On the firm side, we extract all shipment cities from which Mexican firms export using the Panjiva dataset. We link a shipment city to its nearest customs office by calculating the geodesic distance from each city to the nearest customs office. Specifically, let S denote the set of shipment cities, with $|S|$ elements, and let C denote the set of customs locations, with $|C|$ elements. Let $D \in \mathbb{R}^{|S|\times|C|}$ be a distance matrix, where each element $D_{s,c}$ represents the geodesic distance between shipment city $s \in S$ and customs location $c \in C$, computed using the Haversine formula. For each shipment city s, we assign the nearest customs location $c_s^* = \arg\min_{c\in C} D_{s,c}$, with the corresponding minimum distance $d_s^* = \min_{c\in C} D_{s,c}$.

To assess spatial patterns, we compute kernel density plots of the distance between firm locations and the nearest customs ports. Figures 6 show these density plots. We

[13] These locations fall into four categories based on function and geography: northern border, southern border, maritime, and interior customs posts.

see that rerouters are systematically closer to customs offices than general exporters. The distribution for rerouters skews noticeably to the left, close to zero kilometres, indicating a tighter clustering of these firms near customs offices. Exporters, by contrast, are more evenly spread across the space and relatively farther from their closest customs office. Specifically, the mean distance of the rerouters and exporters from the nearest customs offices is 22 and 37 kilometres, respectively. Kolmogorov-Smirnov tests confirm that the distance distributions differ significantly between the two groups. Specifically, the test rejects the null hypothesis of equal distributions with low p-values when comparing rerouters to exporters.[14]

We also test these spatial patterns in a regression framework in Table 6. The dependent variable is the log distance between a firm-product pair and its nearest customs office. Our key regressor is an indicator for whether the firm is a rerouter. All specifications include product fixed effects to account for product-specific geography. In column (1), the coefficient on the rerouter indicator is negative and highly significant, indicating that rerouters are systematically closer to customs posts. Column (2) adds controls for firm size, since large exporters may have a greater incentive to locate near ports to reduce transportation costs. Column (3) interacts firm size with the rerouter indicator and finds a negative interaction term, suggesting that larger rerouters locate even closer to customs offices. The estimated coefficients suggest that rerouters are, on average, located approximately 31 per cent closer to their nearest customs post relative to comparable exporters.

Our findings indicate that companies respond to trade policy not only by changing their trade flows but also by reorganizing their physical operations to cluster near customs offices. This reorganization improves the feasibility and speed of rerouting goods. Additionally, it highlights a way in which the effectiveness of tariffs may be diluted: through geographic adjustments that make it easier to circumvent policies.

[14] The KS test yielded a p-value of less than 2.2e-16. The value of the D statistic, which represents the maximum vertical difference between the empirical CDFs is around 0.17

6.2 Infrastructure Development along the US Border

While the preceding analysis shows that rerouting firms cluster geographically near customs posts, their success largely depends on the overall logistics environment. Notably, the increase in rerouting activities after the implementation of US-China tariffs should be accompanied by a significant development of logistics infrastructure along the US-Mexico border. According to US Department of Transportation regulations, Mexican trucks are generally not allowed to operate beyond the 25-mile border zone, known as commercial zones.[15] This restriction creates strong incentives for warehousing and cross-docking facilities to be situated near border crossings, where goods can be transferred to US carriers for further distribution.

Figure 7 provides visual evidence of such transformation near the border crossing in El Paso using satellite imagery. The two images show the same location in 2016 (Panel (a)) and 2022 (Panel (b)). The 2016 image displays largely undeveloped land, while the 2022 image reveals a dense concentration of newly constructed warehouses and logistics facilities adjacent to the US Customs and Border Protection. Appendix Figure A.3 provides a closer look at containers and trucks in one of the new warehouses in this area. This stark contrast underscores the rapid pace of infrastructure development that has followed the increase in trade rerouting through Mexico.

We complement this visual evidence by quantifying the growth in warehousing capacity around five major US-Mexico border counties, which handle a significant portion of US-Mexico trade. For each country, we compare warehouse growth in the near-border zone (0-70 km from the US customs office) to a control area (70-100 km), which provides a geographically similar benchmark area. Appendix Figure A.4 illustrates the construction of these spatial bands around the El Paso country.

Using features (labeled as "warehouse") extracted from the OpenStreetMap API, we

[15] US Federal Motor Commercial Safety Administration manages the operating requirements for Mexico-domiciled Motor Carriers (FMCSA) (See Commercial zone definition and Title 49 details the rule for commercial zones.). Frittelli (2014) provides detailed information on the operations of Mexican trucks in the US.)

track the cumulative number of new warehouses from 2016 to 2022. Figure 8 illustrates this growth in warehouses over time. Consistent with construction lead times, we observe a steady increase in the number of warehouses located near the border beginning in 2018, while the control group shows significantly slower growth. This divergence is evident across all major counties.[16]

Taken together, these developments suggest that complementary investments in border logistics capacity facilitated increased Mexican exports. Logistics providers adapted by expanding warehousing and related services along the border as firms relocated closer to customs offices.

7 What Determines rerouting?

In the previous section, we documented robust evidence of trade rerouting through Mexico. We now ask – which firms are more likely to adopt rerouting, and which products are better suited for this transition?

7.1 Firm Level Determinants

Role of MNCs: We first examine whether multinational corporations (MNCs) are more likely to reroute trade through Mexico. Prior work shows that MNCs account for a large share of global trade (Antràs and Yeaple, 2014) and play a central role in Global Value Chains (GVCs). Their scale, logistical expertise, and cross-country footprint give them the flexibility to shift supply chains if/when needed. However, on the other hand, this same flexibility may reduce their need to reroute via Mexico. With diversified global operations and multiple export bases, MNCs might be less affected by US tariffs on China and, hence, less inclined to reconfigure trade through Mexico.

To test these competing hypotheses, we assess whether MNCs are more likely to use

[16]The results remain robust when using alternative definitions of the near-border area, with most of the warehouse growth concentrated near ports of entry.

rerouting via Mexico. Specifically, we incorporate a triple interaction term in the baseline regressions to capture the differential effect of tariffs on MNCs. Table 7 presents the results for exports, imports, and rerouting measures. Across these specifications, the coefficients on the triple interaction are either significantly negative or statistically insignificant. This suggests that MNCs are not much different than average Mexican exporters in rerouting.

Role of MNCs with Chinese Affiliates: We next ask whether rerouting pattern depends on on the depth of MNCs' operations in China. We distinguish between two groups: (i) MNC_{CHN} - firms with at least one known subsidiary in China, and (ii) $MNC_{CHNonly}$ - firms whose only foreign affiliate (outside Mexico) is in China. Thus, while firms in the MNC_{CHN} group operate in China, Mexico, and at least one additional country, $MNC_{CHNonly}$ firms are limited strictly to China and Mexico. This classification allows us to test whether MNCs with linkages with China influence their rerouting probability. Table 8 reports the results for MNCs with China affiliates.

In Panel (a), we find strong evidence of rerouting among $MNC_{CHNonly}$ firms-those with operations only in China and Mexico. For this group, the most coefficients are positive and statistically significant, indicating a much higher likelihood of rerouting trade through Mexico. These results suggest that $MNC_{CHNonly}$ firms lack alternative operational locations outside of China and Mexico, leaving them with no viable option other than to reroute through Mexico. For MNC_{CHN} firms in Panel (b), there is no meaningful difference in outcomes relative to the average Mexican exporter.

Role of Prior Export-Import Experience: We next examine whether firms' pre-tariff trade relationships, specifically, exports to the US and imports from China, affect their likelihood of rerouting. We define these relationships based on whether a firm (or firm-product pair) had any rerouting activity in the six quarters before the trade war. To test this, we augment our baseline equation 1 with triple interaction terms between $Tariff \times Post$ and binary indicators for pre-existing rerouting relationships. Table 9 presents the regression results.

In column (1), we include a triple interaction term with the binary firm-level indicator $\text{Reroute}_{f,pre}$, which equals one if in any quarter a firm did not simultaneously import from China and export to the US in the pre-period. This captures relationships with both countries at the firm level. We find that the coefficient on this triple interaction is statistically insignificant. This suggests that firms with prior experience exporting to the US and importing from China do not show a differential rerouting response after the tariff shock.

Column (2) replaces this firm-level indicator with a firm-product-level one: No $\text{reroute}_{fp,pre}$, which equals one for firm-product combinations not rerouted in the pre-period. Here, the triple interaction is positive and statistically significant. This indicates that rerouting is more likely for tariffed products that were not previously rerouted by the firms.

Columns (3) and (4) split the sample by whether firms rerouted before the tariff shock. Column (3) focuses on firms that rerouted at least one product in the pre-period. For this group, the triple interaction term is positive and statistically significant, indicating a 17 percentage point increase in rerouting for tariffed products. In contrast, column (4) examines firms with no prior rerouting experience and finds a much smaller effect, a 1.2 percentage points increase, suggesting that firms without any prior rerouting activity are far less likely to reroute tariffed products.

In summary, rerouting in response to tariffs is primarily driven by firms with preexisting trade links to the US and China. Following the tariff shock, these firms begin rerouting the tariffed products. This indicates that the trade war induced a higher rate of product-level entry within incumbent rerouters, rather than entry of new firms.

7.2 Product Level Determinants

We next examine which types of products are more likely to be rerouted through Mexico, focusing on two key product characteristics, (i) product differentiation and (ii) demand elasticity. The theoretical effects of these variables are ambiguous. For differentiated products, rerouting could be limited if US importers value country of origin, brand, or specific attributes that are hard to replicate. However, if rerouting through Mexico preserves these characteristics without significant quality loss, such products may be more likely to be rerouted despite higher costs. Similarly, high-elasticity products might be sensitive to price changes from tariffs or rerouting. If rerouting raises prices substantially, these products could face substitution from other countries, reducing Chinese exports and rerouting. Conversely, if China is the main supplier and rerouting lowers the effective tariff burden, even high-elasticity products may benefit from rerouting.

To test this, we use product-level differentiation (Rauch, 1999) and elasticity measures (Fontagné et al., 2022) from the literature and include them as interaction terms in our regressions. Table 10 reports the results. For the extensive margin, column (1) shows a positive and significant effect of differentiation, suggesting that more differentiated products are modestly more likely to be rerouted. Column (2) shows that higher elasticity significantly reduces rerouting likelihood, consistent with price-sensitive products being harder to rerouting due to additional costs. In Column (3), we include both differentiation and elasticity measures. The negative and significant effect of elasticity persists, and the effect of differentiation remains positive but less precisely estimated.

Columns (4) and (5) repeat the analysis for the share varaible. The findings are similar: high-elasticity products are less likely to be rerouted, with negative coefficients on the elasticity interaction. For differentiation, the sum of the baseline treatment effect and the interaction term is statistically significant, implying higher rerouting for differentiated products. Joint significance tests confirm higher rerouting for differentiated products.

In summary, we find that rerouting is more likely for products that are less price-sensitive (i.e., low elasticity) and more differentiated.

8 A Model of Tariffs and Trade Rerouting

We develop a partial-equilibrium model with heterogeneous firms that links tariffs to the rerouting of trade through third countries. Building on theories of tariff evasion and intermediation (Bhagwati and Srinivasan, 1980; Antras and Costinot, 2011), we adapt the framework to a rerouting setting. The model shows that US tariffs on direct Chinese imports induce rerouting via third countries when the tariff exceeds the incremental costs of intermediation.

8.1 Environment and Firm Choice

We study three countries: China (producer), Mexico (intermediary), and the United States (consumer). The US market has inverse demand $p = a - bQ$, where Q is total quantity. Chinese producers share a common marginal cost c. A producer can export directly to the United States and pay a per-unit transport cost t_d and a specific tariff τ. The resulting unit cost for direct export is $k_d \equiv c + t_d + \tau$.

The same producer can reroute through Mexico. It ships to Mexico at cost t_{cm}, incurs a per-unit rerouting cost r_i that covers handling, minimal processing, and other steps needed to satisfy rules of origin, then ships from Mexico to the United States at cost t_{mu}. The unit cost under rerouting is $k_r(i) \equiv c + t_{cm} + r_i + t_{mu}$.

Assumption 1 (Triangle inequality)**.** $t_{cm} + t_{mu} > t_d$. *The baseline transport path through Mexico is longer than direct shipment.*

Assumption 2 (Heterogeneity in rerouting costs)**.** *Firms differ in* r_i*, drawn from a cumulative distribution* $G(r)$ *with support* $[0, \bar{r}]$ *and density* g*. Lower* r_i *reflects access to Mexican affiliates, prior trade experience, or MNC status.*

Assumption 3 (Competitive US market)**.** *Firms take the US price as given. Heterogeneity in* r_i *allows partial rerouting in equilibrium.*

Assumption 4 (Intra-firm rerouting)**.** *We focus on intra-firm rerouting. Extensions can allow inter-firm arrangements through input-output linkages.*

Assumption 5 (Rules-of-origin compliance)**.** *The cost r_i includes sufficient processing to avoid the tariff τ under rules of origin. When $r_i = 0$, pure transshipment may not qualify.*

Let $\delta \equiv t_{cm} + t_{mu} - t_d$ denote the extra transport burden of rerouting. A firm chooses the cheaper route. Producer i reroutes if and only if

$$r_i \leq \tau - \delta. \tag{7}$$

Define the cutoff $\tilde{r} \equiv \tau - \delta$. Firms with $r_i \leq \tilde{r}$ reroute and those with $r_i > \tilde{r}$ export directly. Corner cases are immediate: if $\tilde{r} \leq 0$ (sufficiently low tariffs) no firm reroutes, and if $\tilde{r} \geq \bar{r}$ all firms reroute.

8.2 Equilibrium and Comparative Statics

Define the rerouting indicator $\mathbb{1}_i \equiv \mathbb{1}\{r_i \leq \tilde{r}\}$, where $\tilde{r} \equiv \tau - \delta$. Then, the rerouting share is

$$s(\tau, \delta) \equiv \mathbb{E}[\mathbb{1}_i] \; = \; \Pr(r_i \leq \tilde{r}) \; = \; G(\tilde{r}) \in [0, 1].$$

For interior values $0 < \tilde{r} < \bar{r}$ with density $g = G'$, using the chain rule,

$$\frac{\partial s}{\partial \tau} = g(\tilde{r}) \geq 0, \qquad \frac{\partial s}{\partial \delta} = -\, g(\tilde{r}) \leq 0,$$

with corners $s = 0$ if $\tilde{r} \leq 0$ and $s = 1$ if $\tilde{r} \geq \bar{r}$.[17] In words, the rerouting share rises in the tariff ($\partial s / \partial \tau > 0$) and falls in the extra transport burden ($\partial s / \partial \delta < 0$).

Proposition 8.1 (Competitive equilibrium and comparative statics under rerouting)**.** *Maintain Assumptions 1-5 and a unit mass of potential exporters. Let $0 < \tilde{r} < \bar{r}$ and $s = G(\tilde{r})$*

[17] Uniform benchmark: If G is uniform on $[0, \bar{r}]$, then on the interior

$$s(\tau, \delta) = \frac{\tilde{r}}{\bar{r}} = \frac{\tau - \delta}{\bar{r}}, \qquad \frac{\partial s}{\partial \tau} = \frac{1}{\bar{r}}, \qquad \frac{\partial s}{\partial \delta} = -\frac{1}{\bar{r}},$$

with truncation to 0 or 1 outside $[0, \bar{r}]$.

denote, respectively, the cutoff and the rerouting share defined earlier. For any route with delivered marginal cost $k \in \{k_d, k_r\}$, firms have operating cost $C(q) = kq + \frac{\gamma}{2}q^2$ with $\gamma > 0$, which implies supply $q(p) = (p-k)/\gamma$ for $p \geq k$ and zero otherwise. Then:

1. Existence and uniqueness. *There is a unique competitive equilibrium with*

$$p^*(\tau, \delta) = \frac{a + \frac{b}{\gamma}\,\bar{k}(\tilde{r})}{1 + \frac{b}{\gamma}}, \qquad Q^*(\tau, \delta) = \frac{a - \bar{k}(\tilde{r})}{b + \gamma},$$

where $\bar{k}(\tilde{r})$ is the average delivered marginal cost,

$$\bar{k}(\tilde{r}) \equiv (1-s)\,k_d + s\,\mathbb{E}\big[k_r \mid r \leq \tilde{r}\big],$$

2. Effect of the rerouting share. *Holding (τ, δ) fixed except through s, the equilibrium price p^* is strictly decreasing in s and the quantity Q^* is strictly increasing in s.*

3. Tariff and transport-burden effects with attenuation. *Tariff pass-through scales with the share that does not reroute $(1-s)$, and the effect of the extra transport burden δ scales with the rerouting share s. Specifically, On the interior $0 < \tilde{r} < \bar{r}$,*

$$\frac{\partial p^*}{\partial \tau} = \frac{b}{b+\gamma}(1-s) \in \Big(0, \frac{b}{b+\gamma}\Big), \qquad \frac{\partial Q^*}{\partial \tau} = -\frac{1}{b+\gamma}(1-s) \in \Big(-\frac{b}{b+\gamma}, 0\Big),$$

and

$$\frac{\partial p^*}{\partial \delta} = \frac{b}{b+\gamma}\,s \in \Big(0, \frac{b}{b+\gamma}\Big), \qquad \frac{\partial Q^*}{\partial \delta} = -\frac{s}{b+\gamma} \in \Big(-\frac{b}{b+\gamma}, 0\Big).$$

Proof. Please see See Appendix B.1.

Intuition: The market has a unique competitive equilibrium pinned down by the average delivered marginal cost $\bar{k}(\tilde{r})$. Re-routing lowers $\bar{k}(\tilde{r})$ by moving mass from the direct route to the cheaper route, so as the rerouting share s rises, the price falls and quantity rises. Tariff pass-through is attenuated in proportion to the non-rerouting share $(1-s)$, while the effect of the extra transport burden δ scales with the rerouting share s.[18] The pass-through factors

[18]When $s = 0$ the model collapses to the standard case with full tariff exposure through the direct route.

$b/(b+\gamma)$ and $1/(b+\gamma)$ govern how changes in average cost translate into prices and quantities, with s acting as the sufficient statistic that links micro frictions to aggregate outcomes.

8.3 Modeling Rerouting Costs and Decisions

Sections 8.1 and 8.2 show that prices and quantities depend on the rerouting share $s = G(\tilde{r})$, where $\tilde{r} = \tau - \delta$. To take the model to the data we must explain how s varies across firms and products. We therefore parameterize rerouting costs r_{ip} with observables that shift access to the Mexican route and estimate their effects using a logit for the threshold decision.[19] Let

$$r_{ip} = r_0 + \beta\, d_i - \theta\, \text{MNCChina}_i - \phi\, \sigma_p + \varepsilon_{ipt},$$

where d_i is distance to the nearest customs facility, $\text{MNCChina}_i \in \{0,1\}$ indicates a ChinaâMexico multinational link, σ_p is a product elasticity shifter, and ε_{ipt} is idiosyncratic. Let D_{pt} denote tariff exposure at the product-time level (either the tariff rate or a treated×post indicator). The cutoff is $\tilde{r}_{pt} = \pi_\tau D_{pt} - \delta$. The routing decision is

$$y_{ipt} = \mathbf{1}\{\, r_{ip} \leq \tilde{r}_{pt} \,\} = \mathbf{1}\big\{\, \varepsilon_{ipt} \leq \pi_\tau D_{pt} - \delta - r_0 - \beta d_i + \theta\, \text{MNCChina}_i + \phi\, \sigma_p \big\}.$$

Assume ε_{ipt} follows the Type I extreme value distribution. With product and time fixed effects (η_p, η_t), the rerouting probability is

$$p_{ipt} \equiv \Pr(y_{ipt} = 1 \mid X_{ipt}) = \Lambda(Z_{ipt}), \qquad \Lambda(z) = \frac{1}{1+e^{-z}},$$

where, $Z_{ipt} = \kappa + \pi D_{pt} - \beta d_i + \theta\, \text{MNCChina}_i + \phi\, \sigma_p + \eta_p + \eta_t,$, and where π translates tariff exposure into the cutoff $\tilde{r}_{pt}$.

Structural-reduced form link. Please provide the details of the link between the structural

When $s = 1$ marginal tariff changes are neutral, and δ has the full cost-shift effect.

[19] This preserves the cutoff logic while allowing unobserved heterogeneity. The mapping to the saturated reduced form is given in Appendix B.2.

model and the reduced form in Appendix B.2. In brief, the structural logit implies that the reduced-form tariff coefficient equals the structural tariff sensitivity scaled by the mean logit slope, and the interaction coefficients identify heterogeneous treatment effects proportional to the cost shifters (distance, MNC ties, elasticity).

Sections 8.1-8.3 provide a structure that organizes our evidence. A single cutoff $\bar{r} = \tau - \delta$ yields a rerouting share $s = G(\tilde{r})$ that acts as a sufficient statistic for prices and quantities. The model predicts that tariff pass-through is attenuated in proportion to the non-rerouting share $1 - s$, while transport frictions affect outcomes in proportion to s. Parameterizing rerouting costs with distance, multinational ties, and product elasticity links these predictions to the reduced-form estimates and supports simple counterfactuals on enforcement and infrastructure.

9 Conclusion

In this paper, we document robust evidence of trade diversion and supply-chain rerouting through Mexico during the US-China trade war. Using granular firm-product-quarter data from S&P Panjiva matched with tariff schedules, our difference-in-differences estimates reveal significant increases in Mexican exports to the US and imports from China for tariffed products, emerging notably from 2021 onward. Intra-firm rerouting accounts for a substantial portion of these shifts, with firms leveraging prior trade relationships to enter new products rather than new markets. Multinational corporations with limited global footprints, particularly those tied to China, drive much of this activity, while products with high substitution elasticity and differentiation prove most amenable to rerouting.

These findings highlight the unintended spillovers of unilateral tariffs on third countries and underscore the resilience of global value chains. By facilitating rerouting, Mexico diluted the trade war's bilateral impacts, drawing unintended economic benefits while exposing the limits of targeted trade barriers. Firms adapt not only through trade flows but also spatially, clustering near customs offices to minimize transit times and costs. This behavior challenges policymakers to consider network effects in trade disputes, as third-country intermediaries can undermine efforts to protect domestic industries or address geopolitical tensions.

Our results also suggest broader implications for global trade policy effectiveness. Trade diversion through intermediaries like Mexico implies that unilateral measures may fail to achieve intended outcomes, instead fostering adjustments that integrate third nations into disrupted supply chains. The delayed emergence of effects from 2021 indicates significant adjustment costs, including time for firms to reconfigure operations and leverage existing networks. Policymakers must weigh these dynamics when designing tariffs, recognizing that global interdependence can render bilateral tools blunt instruments.

Future research could extend our analysis by incorporating inter-firm rerouting channels, which data limitations precluded here, or examining long-term welfare implications for Mexican firms and workers. Infrastructure developments in rerouting hubs merit investigation to discern value addition from mere transshipment. Broader studies might quantify the role of rerouting in other contexts, informing more effective multilateral trade frameworks amid rising protectionism.

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Tables

Table 2: Summary Statistics

	Count	Mean	Median	(Std. Dev.)
Exports to US				
Value	5489016	412491	0	13266578
log(Value)	5489016	1.1604	-4.6052	6.8777
No. of Firms	21034			
No. of HS 8-digit Products	8473			
Firm × HS 8-digit Products	228709			
No. of Quarters	24			
Imports from China				
Value	11582016	50550	0	1870250
log(Value)	11582016	0.2566	-4.6052	6.2734
No. of Firms	28360			
No. of HS 8-digit Products	8776			
Firm × HS 8-digit Products	482584			
No. of Quarters	24			

Notes: The table provides summary statisitics of the Mexican firm-level imports and exports data that we use for our analysis. The dataset is structured at the firm × Product (HS 8-digit) × quarter level.

Table 3: Impact of Trade War on Mexican Firm Trade

	Exports to the US			Imports from China		
Dep. Var	Exported (1)	Value (2)	Quantity (3)	Imported (4)	Value (5)	Quantity (6)
Treat × Post	0.163**	0.223	0.792**	0.202**	1.335**	0.713^{+}
	(0.050)	(0.139)	(0.214)	(0.065)	(0.469)	(0.428)
Obs.	5487648	5483663	5483663	11580360	11576237	11576237
R-Sq.	0.273			0.225		
Pseudo R-Sq.		0.911	0.935		0.856	0.898
Pr(F)	0.00	0.11	0.00	0.00	0.00	0.10
HS-4 × QnY FE	✓	✓	✓	✓	✓	✓
Firm × HS-8 FE	✓	✓	✓	✓	✓	✓

Notes: Columns (1)–(3) pertain to Mexico's exports to the US, while columns (4)–(6) pertain to Mexico's imports from China. The dependent variable in columns (1) and (4) is an indicator for propensity to trade (extensive margin), denoting whether a firm exported the HS 8-digit product to the US (column 1) or imported it from China (column 4) in a given quarter. Columns (2) and (5) use the USD value of trade for exports to the US (column 2) and imports from China (column 5). Columns (3) and (6) use quantity for exports to the US (column 3) and imports from China (column 6). *Post* is a binary indicator that equals 1 after 2018Q2, else zero. *Treat* is a binary indicator that equals 1 for tariffed products, else zero. Columns (1) and (4) are estimated using reghdfe, while columns (2), (3), (5), and (6) use ppmlhdfe. Regressions are at the firm × product (HS 8-digit) × quarter level. Standard errors, clustered at the HS 8-digit level, are in parentheses. ** $p < 0.01$, * $p < 0.05$, $^{+}$ $p < 0.1$.

Table 4: Rerouting of Trade via Mexico: Extensive Margin

Dep. Var	Ex-Im (1)	Ex-Im_{1Y} (2)
Treat × Post	0.052**	0.055**
	(0.020)	(0.019)
Obs.	5487648	5487648
R-Sq.	0.458	0.533
Pr(F)	0.01	0.00
HS-4 × QnY FE	✓	✓
Firm × HS-8 FE	✓	✓

Notes: The dependent variable is a binary indicator in all columns. Column (1) denotes whether a firm imported a particular HS8 product from China and exported the same HS8 product to the U.S. in a given quarter. Column (2) indicates the same but imports within the current quarter or any of the three previous quarters (one-year window). *Post* is a binary indicator that equals 1 after 2018Q2, else zero. *Treat* is a binary indicator that equals 1 for tariffed products, else zero. Regressions are at the firm × product (HS 8-digit) × quarter level. Standard errors, clustered at the HS 8-digit level, are in parentheses. ** $p < 0.01$, * $p < 0.05$, $^{+}p<0.1$.

Table 5: Rerouting of Trade via Mexico: Quantity Measure

Dep. Var	Quantity	
	RR^A	RR^S
Treat ×	(1)	(2)
2016h1	–0.000	0.001
	(0.005)	(0.005)
2016h2	0.006	0.006
	(0.004)	(0.004)
2017	.	.
2018h1	0.006	0.007^{+}
	(0.004)	(0.004)
2018h2	0.001	0.002
	(0.004)	(0.004)
2019h1	0.002	0.004
	(0.003)	(0.004)
2019h2	–0.002	–0.003
	(0.003)	(0.004)
2021h1	0.054*	0.065*
	(0.022)	(0.028)
2021h2	0.055**	0.071**
	(0.020)	(0.027)
2022h1	0.055**	0.070*
	(0.021)	(0.028)
2022h2	0.052*	0.071*
	(0.021)	(0.028)
Obs.	5487648	5487648
R-Sq.	0.421	0.451
Pr(F)	0.07	0.00
HS-4 × QnY FE	✓	✓
Firm × HS-8 FE	✓	✓

Notes: The dependent variable is a quantity rerouting measure as defined in Equation 6. Column (1) and (2) correspond to using adjusted (RR^A) and smoothed (RR^S) rerouting measures. *Treat* is a binary indicator that equals 1 for tariffed products, else zero. Regressions are at the firm × product (HS 8-digit) × quarter level. Standard errors, clustered at the HS 8-digit level, are in parentheses. ** p < 0.01, * p < 0.05, $^{+}p<0.1$.

Table 6: Distance to Customs: Rerouters vs. Other Exporters

Dep. Var	log(Distance)		
	(1)	(2)	(3)
Rerouter	-0.4600**	-0.4761**	-0.3174**
	(0.0181)	(0.0179)	(0.0450)
log(Total)		-0.1580**	-0.0953**
		(0.0077)	(0.0169)
Re-Router × log(Total)			-0.0692**
			(0.0187)
Obs.	409783	409783	409783
R-Sq.	0.137	0.140	0.140
HS-8 FE	✓	✓	✓

Notes: The outcome variable is the log of the distance between a given firm's location to its nearest customs port. Rerouter is a dummy that takes a value of one if the firm has rerouted products from China to US via Mexico, otherwise zero. log(Total) is the natural log of total number of exports for the rerouter. Regressions are at the firm × product level. Standard errors, clustered at the HS 8-digit level. ** $p < 0.01$, * $p < 0.05$, $^{+}p<0.1$.

Table 7: Rerouting: MNC vs. Other Firms

	Exports		Imports		Re-Routed		
Dep. Var	Exported (1)	Value (2)	Imported (3)	Value (4)	Ex-Im (5)	RR^A (6)	RR^S (7)
Treat × Post	0.171**	0.387*	0.206**	1.222**	0.053*	0.048**	0.046**
	(0.052)	(0.174)	(0.068)	(0.435)	(0.022)	(0.017)	(0.016)
Treat × Post ×	–0.051**	–0.317	–0.029	0.232	0.008	0.011	0.012
MNC	(0.017)	(0.211)	(0.026)	(0.172)	(0.009)	(0.009)	(0.008)
Obs.	3942312	3938615	7304592	7301365	3942312	3942312	3942312
R-Sq.	0.287		0.246		0.448	0.520	0.522
Pseudo R-Sq.		0.912		0.860			
Pr(F)	0.00	0.09	0.01	0.02	0.04	0.00	0.00
HS-4 × QnY FE	✓	✓	✓	✓	✓	✓	✓
Firm × HS-8 FE	✓	✓	✓	✓	✓	✓	✓

Notes: Columns (1) and (2) pertain to Mexico's exports to the US, columns (3) and (4) to Mexico's imports from China, and columns (5)–(7) to rerouting. Exported (Imported) is a binary variable capturing exports (imports) to the US (from China). MNC is a binary indicator if the firm belongs to a MNC group, else zero. *Post* is a binary indicator that equals 1 after 2018Q2, else zero. *Treat* is a binary indicator that equals 1 for tariffed products, else zero. Regressions are at the firm × product (HS 8-digit) × quarter level. Columns (2) and (4) are estimated using ppmlhdfe. Standard errors, clustered at the HS 8-digit level, are in parentheses. ** $p < 0.01$, * $p < 0.05$, $^{+}p<0.1$.

Table 8: Rerouting by MNCs with Affiliates in China

	Exports		Imports		Re-Routed		
Dep. Var	Exported (1)	Value (2)	Imported (3)	Value (4)	Ex-Im (5)	RR^A (6)	RR^S (7)
Panel (a): MNC with presence only in China and Mexico							
Treat × Post	0.146**	0.150	0.195**	1.255**	0.056*	0.053**	0.051**
	(0.051)	(0.138)	(0.066)	(0.481)	(0.022)	(0.017)	(0.016)
Treat × Post × $MNC_{CHN\ only}$	0.257**	1.915**	0.160^+	2.514**	0.183**	0.041	0.038
	(0.053)	(0.166)	(0.084)	(0.367)	(0.061)	(0.047)	(0.046)
Obs.	3942312	3938615	7304592	7301365	3942312	3942312	3942312
R-Sq.	0.287		0.246		0.448	0.520	0.522
Pseudo R-Sq.		0.912		0.860			
Panel (b): MNC with presence in China and Mexico							
Treat × Post	0.163**	0.394*	0.206**	1.214**	0.054*	0.049**	0.047**
	(0.051)	(0.170)	(0.069)	(0.427)	(0.021)	(0.016)	(0.016)
Treat × Post × MNC_{CHN}	–0.041*	–0.332	–0.036	0.251	0.007	0.012	0.013
	(0.017)	(0.210)	(0.029)	(0.186)	(0.010)	(0.010)	(0.010)
Obs.	3942312	3938615	7304592	7301365	3942312	3942312	3942312
R-Sq.	0.287		0.246		0.448	0.520	0.522
Pseudo R-Sq.		0.912		0.860			
HS-4 × QnY FE	✓	✓	✓	✓	✓	✓	✓
Firm × HS-8 FE	✓	✓	✓	✓	✓	✓	✓

Notes: Columns (1) and (2) pertain to Mexico's exports to the US, columns (3) and (4) to Mexico's imports from China, and columns (5)–(7) to rerouting. Exported (Imported) is a binary variable capturing exports (imports) to the US (from China). In Panel (a), $MNC_{CHN\ only}$ is a binary indicator if Mexican firm is part of MNC, and operates exclusively in China and Mexico. In Panel (b), MNC_{CHN} is a binary indicator for a Mexican firm that is part of MNC and has an affiliate in China. *Post* is a binary indicator that equals 1 after 2018Q2, else zero. *Treat* is a binary indicator that equals 1 for tariffed products, else zero. Regressions are at the firm × product (HS 8-digit) × quarter level. Columns (2), and (4) are estimated using ppmlhdfe. Standard errors, clustered at the HS 8-digit level, are in parentheses. ** p < 0.01, * p < 0.05, $^+p<0.1$.

Table 9: Rerouting: Role of Prior Rerouting Experience

Dep. Var	Ex-Im			
			No Reroute$_{f,\text{pre}}$ = 0	No Reroute$_{f,\text{pre}}$ = 1
	(1)	(2)	(3)	(4)
Treat × Post	0.036**	–0.049*	–0.042	0.012**
	(0.012)	(0.024)	(0.026)	(0.004)
Treat × Post × Reroute$_{f,\text{pre}}$	0.020			
	(0.023)			
Treat × Post × No Reroute$_{fp,\text{pre}}$		0.150**	0.171**	.
		(0.021)	(0.023)	
Obs.	5487648	5487648	3954336	1529808
R-Sq.	0.458	0.458	0.435	0.251
Pr(F)	0.00	0.00	0.00	0.00
HS-4 × QnY FE	✓	✓	✓	✓
Firm × HS-8 FE	✓	✓	✓	✓

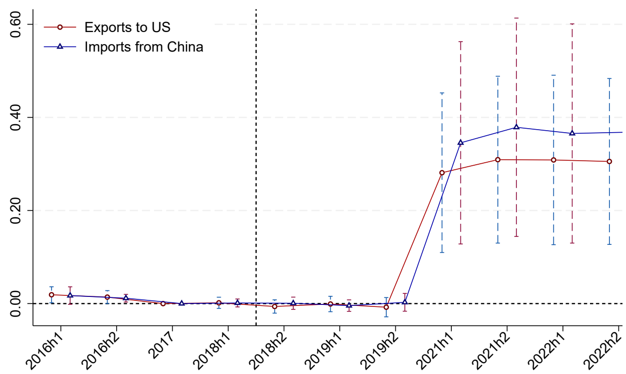
Notes: The dependent variable in all columns is the extensive-margin indicator equal to 1 if a firm rerouted HS 8-digit product in a given quarter. Columns (1) & (2) present estimates on the full sample. Column (3) reports results on the subset of firms that rerouted at least one product prior to the trade war. Column (4) reports results on the subset of firms that did not reroute any product prior to the trade war. *Post* is a binary indicator that equals 1 after 2018Q2, else zero. *Treat* is a binary indicator that equals 1 for tariffed products, else zero. Reroute$_{f,\text{pre}}$ is a binary that takes value one if the firm rerouted any product prior to the trade war, else zero, and vice-versa for No ReRoute$_{f,\text{pre}}$. Similarly, No Reroute$_{fp,\text{pre}}$ is a binary that takes value one if the firm did not reroute product p prior to the trade war, else zero. Regressions are at the firm × product (HS 8-digit) × quarter level. Standard errors, clustered at the HS 8-digit level, are in parentheses. ** p < 0.01, * p < 0.05, ^{+}p<0.1.

Table 10: Role of Product Differentiation and Elasticity on Rerouting

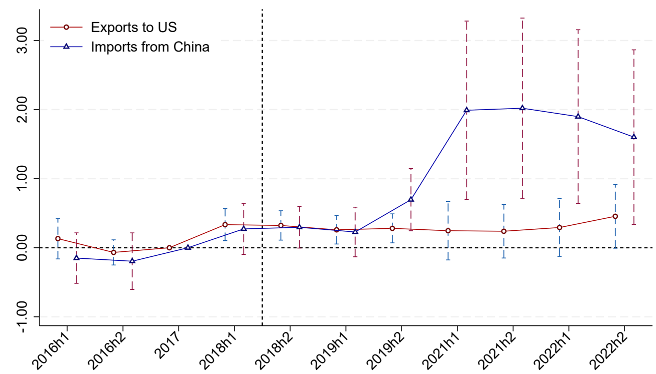
Dep. Var	Re-Routed				
	Ex-Im			RR^A	RR^S
	(1)	(2)	(3)	(4)	(5)
Treat × Post	0.003	0.123**	0.090^+	0.063^+	0.058^+
	(0.023)	(0.043)	(0.048)	(0.033)	(0.032)
Treat × Post × Differentiated	0.051^+		0.033	0.024	0.026
	(0.031)		(0.031)	(0.022)	(0.021)
Treat × Post × Elasticity		–0.014*	–0.014*	-0.008^+	–0.007
		(0.006)	(0.006)	(0.005)	(0.005)
Obs.	5471760	5463216	5459712	5459712	5459712
R-Sq.	0.458	0.458	0.458	0.529	0.531
Pr(F)	0.03	0.01	0.02	0.01	0.01
HS-4 × QnY FE	✓	✓	✓	✓	✓
Firm × HS-8 FE	✓	✓	✓	✓	✓

Notes: Columns (1)-(3) use an extensive-margin (Ex-Im) indicator equals one if firm rerouted HS 8-digit product in a given quarter. Columns (4) & (5) use adjusted (RR^A) and smoothed (RR^S) measures of rerouting. *Post* is a binary indicator that equals one after 2018Q2, else zero. $Treat$ is a binary indicator that equals one for tariffed products, else zero. Differentiated corresponds to product differentiation measure from Rauch (1999). Elasticity corresponds to elasticity measure from Fontagné et al. (2022). Regressions are at the firm × product (HS 8-digit) × quarter level. Standard errors, clustered at the HS 8-digit level, are in parentheses. ** p < 0.01, * p < 0.05, ^+p<0.1.

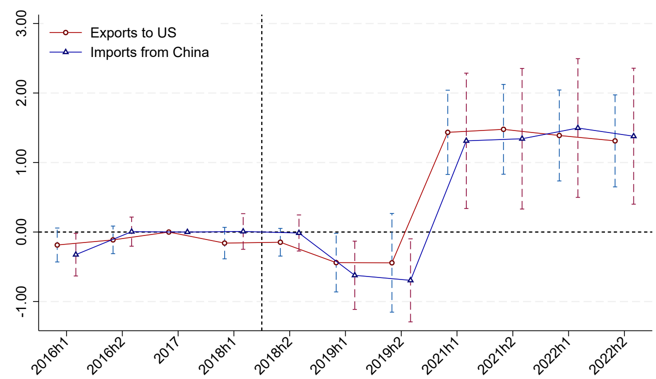
Figure 2: Event Study: Impact of Tariffs on Mexican Firms' Trade



(a) Exported/Imported



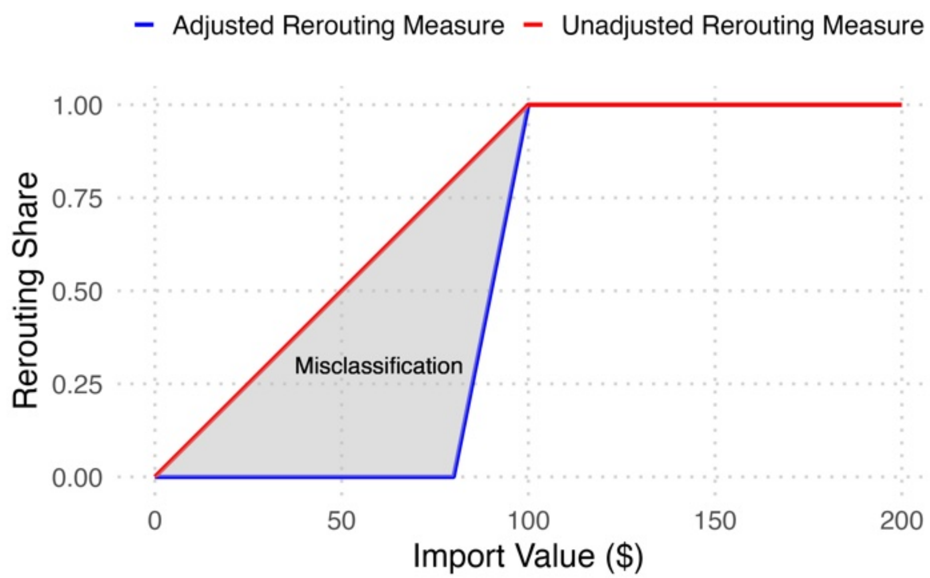
(b) Value



(c) Quantity

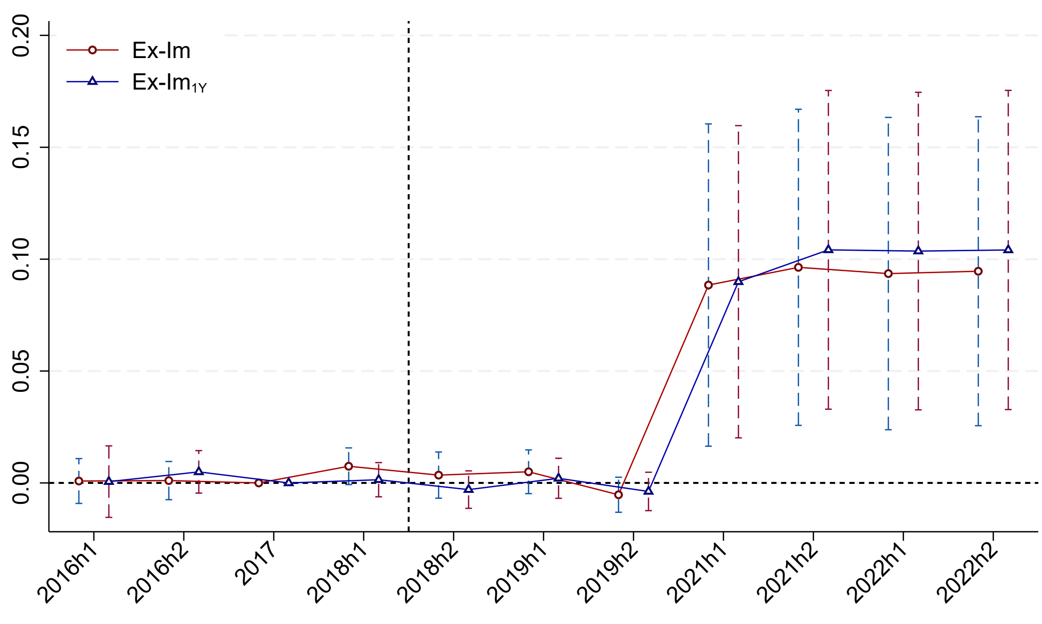
Notes: The event study plots give impact on Mexican firms trade, exports to the US and imports from China. Panel (a) corresponds to exported or imported dummy, Panel (b) corresponds to value of trade, and Panel (c) corresponds to quantity of trade. Panel (b) and (c) are estimated using ppmlhdfe. Regressions are at the firm × product (HS 8-digit) × quarter level. Standard errors are clustered at the HS 8-digit level, and 95 percent confidence intervals are shown.

Figure 3: llustration: Misclassification in Unadjusted Rerouting Measures



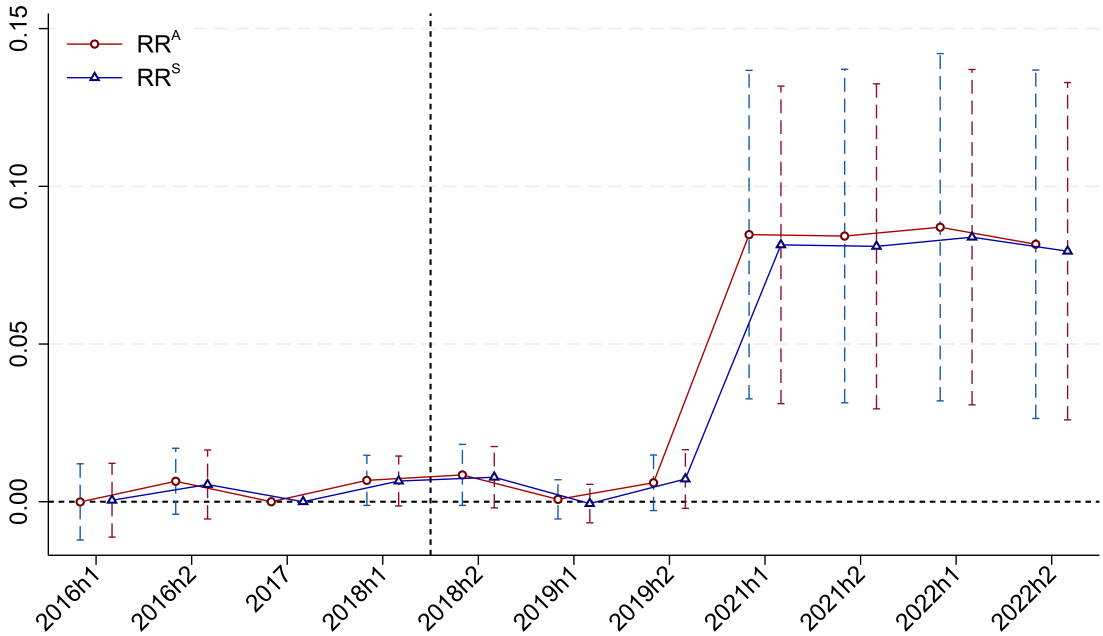
Notes: The figure provides an example of how rerouting classification works under different measures with varying values of imports from China. Blue (red) line corresponds to adjusted (unadjusted) rerouting measure RR^A (RR^U). The shaded area corresponds to the cases misclassified as rerouting by the unadjusted measure. Parameter values: Exports to the US is 100 USD, θ equals 0.2, and ϵ equals 0.1.

Figure 4: Extensive Margin: Rerouting of Trade via Mexico



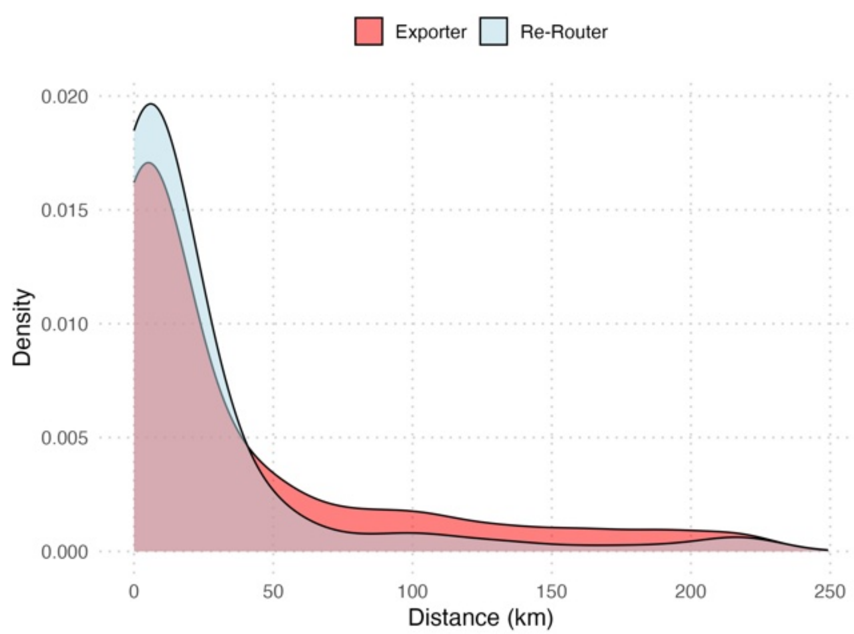
Notes: The event study plot gives the impact on rerouting for two measures of rerouting $Ex - Im$ and $Ex - Im_{1Y}$. Regressions are at the firm × product (HS 8-digit) × quarter level. Standard errors are clustered at the HS 8-digit level, and 95 percent confidence intervals are shown.

Figure 5: Intensity of Trade Rerouting via Mexico



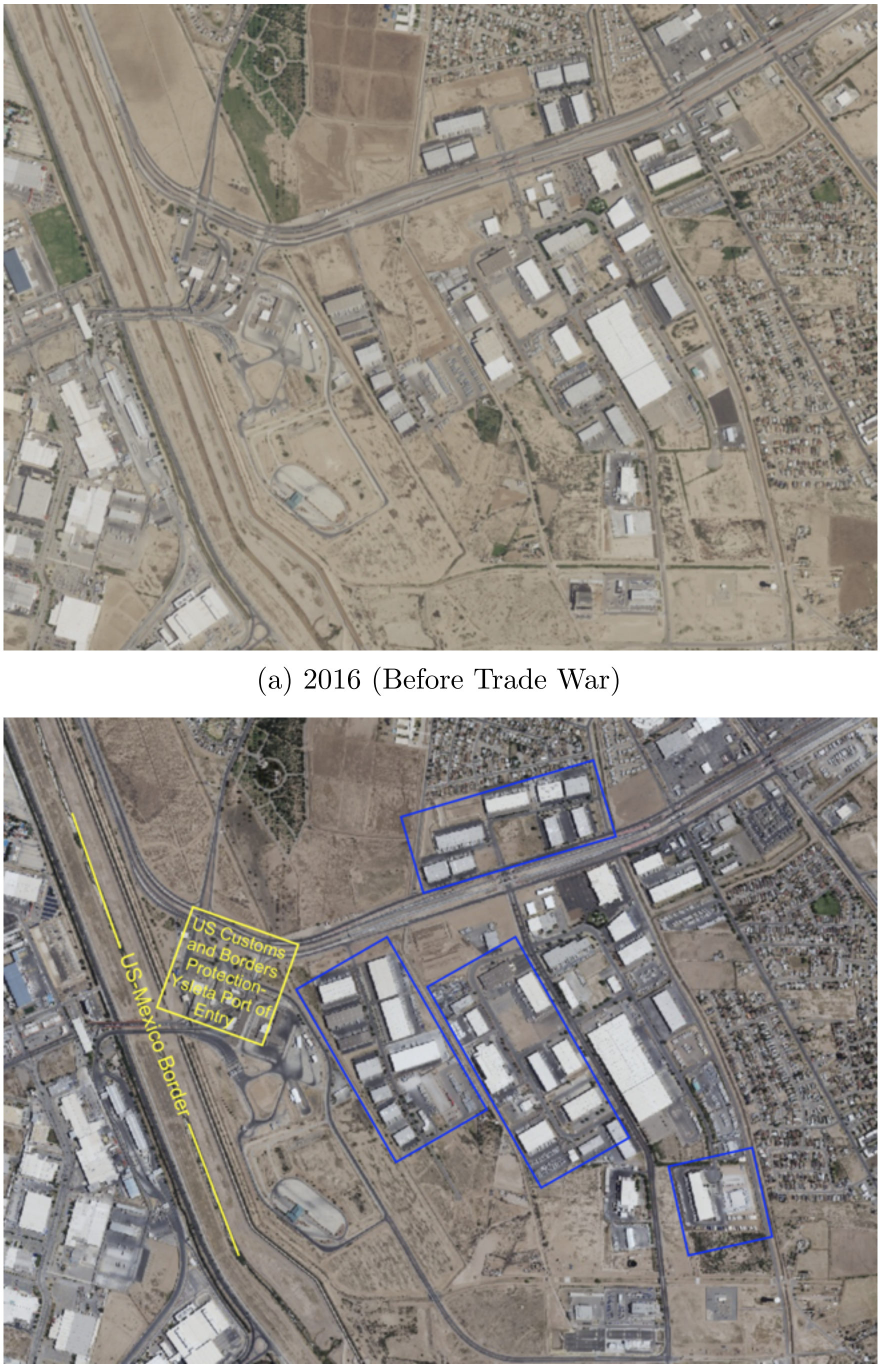
Notes: The event study plot gives the impact on rerouting for two measures of rerouting RR^A and RR^S. Regressions are at the firm $\times$ product (HS 8-digit) $\times$ quarter level. Standard errors are clustered at the HS 8-digit level, and 95 percent confidence intervals are shown.

Figure 6: Distance of Firms to their Nearest Customs Offices



Notes: The figure gives the distance of exporters and rerouters to their nearest customs offices. The rerouters are defined as those exporters which have at least one non-zero value for the rerouter indicator, $ExIm_{fpt}$, over the time period July 2017–Dec 2023. Distances are calculated using the Haversine formula, which accounts for Earth's curvature by converting latitude and longitude differences into great-circle distances in kilometers. Kolmogorov-Smirnov tests indicate that the density distributions differ significantly.

Figure 7: Satellite Evidence of Warehouse Development Near El Paso Port of Entry

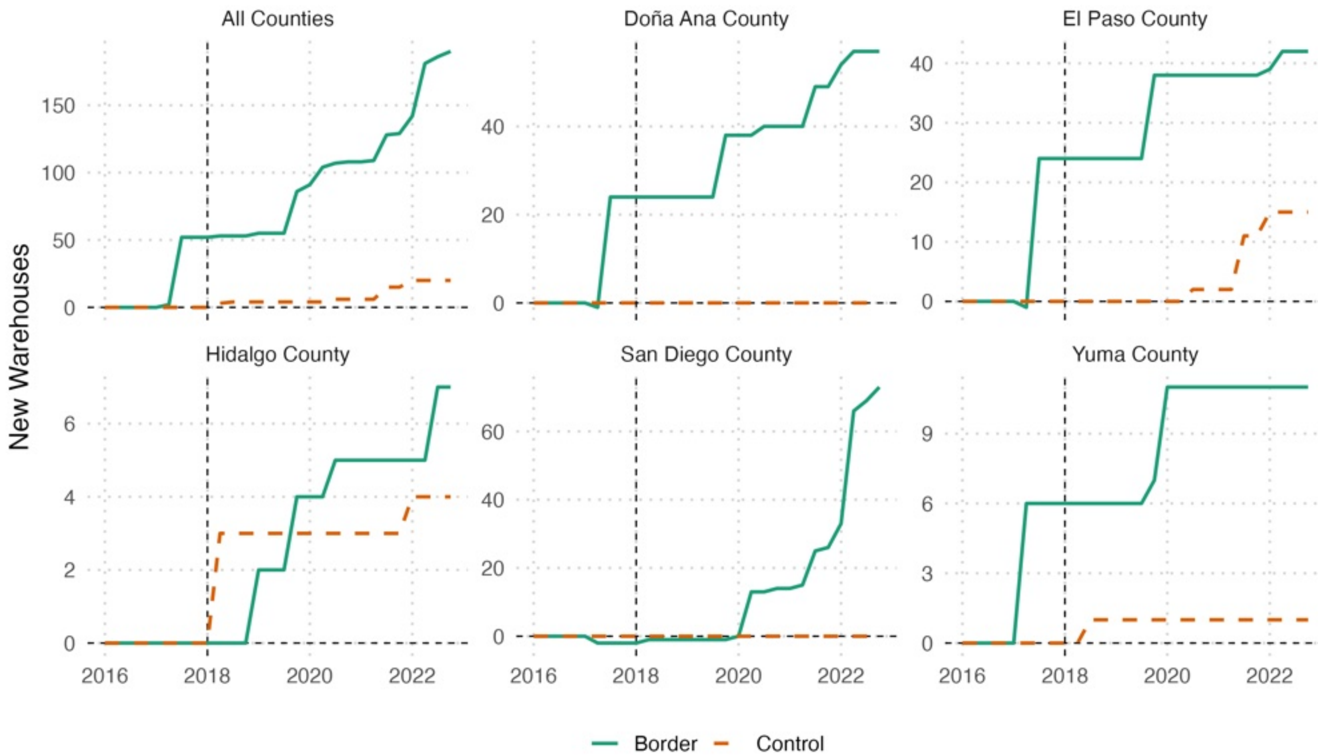


(a) 2016 (Before Trade War)

(b) 2022 (After Trade War)

Notes: The panels show the US commercial zone adjacent to the Ysleta Port of Entry, El Paso, Texas. Panel (a) and (b) give the satellite images from 2016 and 2022 respectively. The highlighted areas in Panel (b) mark new warehousing and logistics facilities that developed after the onset of the US-China trade war. Data Source: NAIP (National Agriculture Imagery Program).

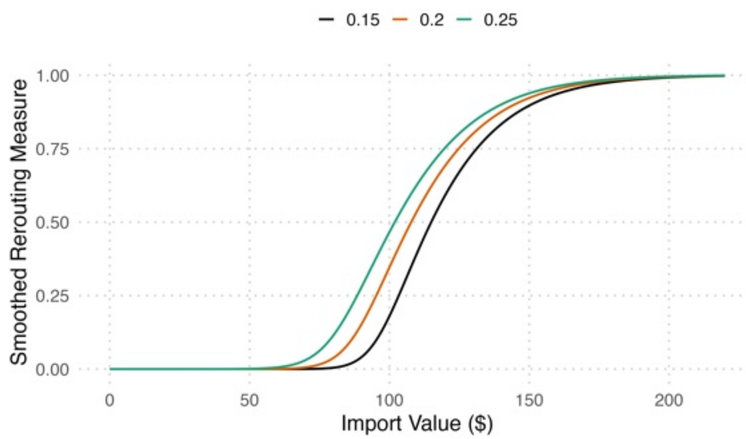
Figure 8: New Warehouses in Major Commercial Zones since 2016



Notes: This figure plots the cumulative value of new warehouses relative to 2016Q1 for locations within 0-50 km of the border (solid line) and for a comparison band 50-70 km away (dashed line) for major counties that handle US-Mexico trade. The âAll Countiesâ panel shows the sum across all the counties in our sample. The vertical dashed line marks 2018Q2. The five counties in the sample and their primary ports of entry are: Dona Ana County (Santa Teresa); El Paso County (Bridge of the Americas, Ysleta-Zaragoza); Hidalgo County (McAllen-Hidalgo-Reynosa, Anzalduas, Pharr); San Diego County (San Ysidro, Otay Mesa); and Yuma County (San Luis I and San Luis II). Data Source: OpenStreetMaps. We use the Overpass-turbo API in R to get count of warehouses in each band.

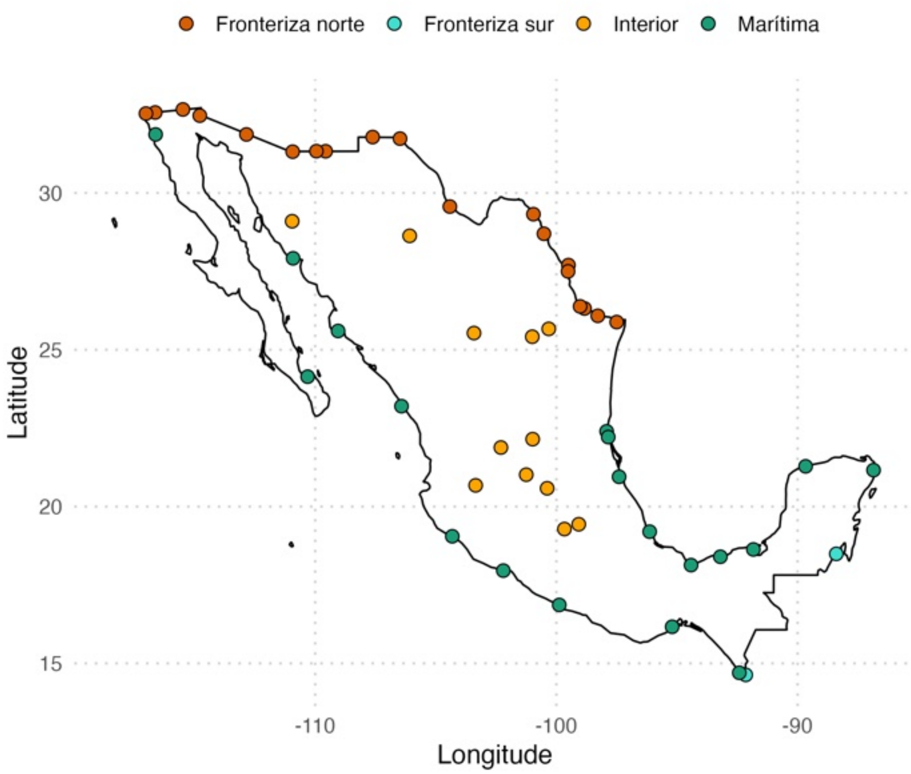
A Appendix: Tables and Figures

Figure A.1: Variation in Rerouting Measure for Different Value Addition Thresholds



Notes: The figure gives the value of smoothed rerouting measure, RR^S, for different values of θ. Parameter values: Exports to the US is 100 USD, and ϵ equals 0.1.

Figure A.2: Spatial Location of Major Customs Offices in Mexico

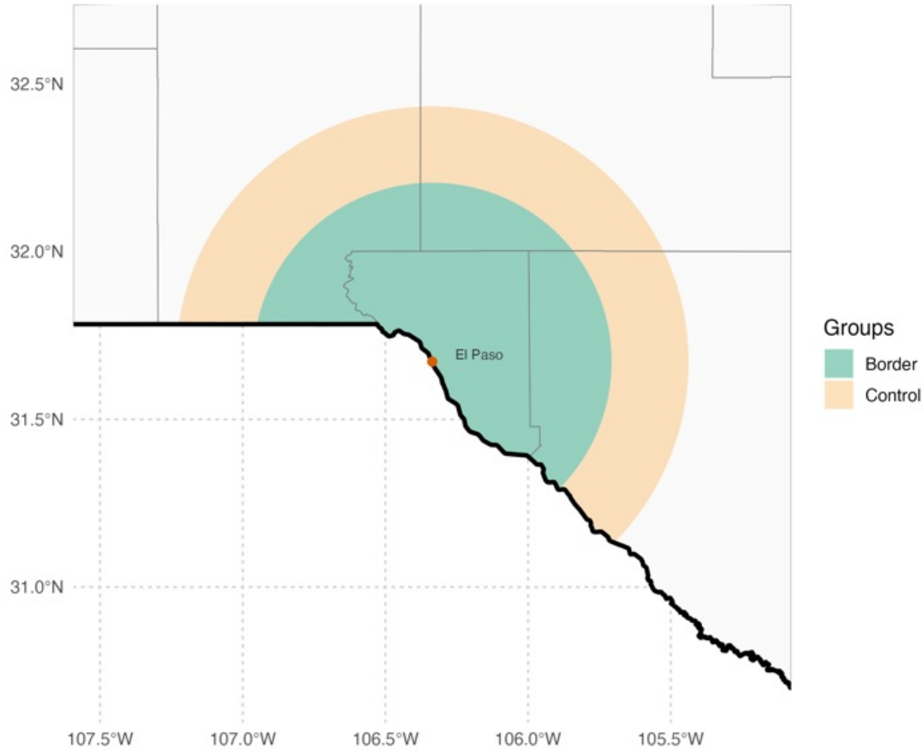


Notes: The locations of customs offices in Mexico, categorized by type: northern border (red dots), southern border (green dots), interior (black dots), and maritime (blue dots).

Figure A.3: Containers and Trucks in a Warehouse near El Paso

Notes: This figure shows containers and trucks in a new warehouse near Yselta Port of Entry, El Paso, USA.

Figure A.4: Illustration: Bands of Border and Neighboring Zone



Notes: This figure illustrates the construction of the two zones 0-70 km (Border) and 70-100 km (Control) in the Commercial Zone near El Paso county, USA. The orange dot represents the US customs office (YsletaâZaragoza) located in the county. The dark black line represents the US-Mexico border. We obtain the count of warehouses in the two shaded areas from OpenStreetMaps.

Table A.1: Robustness: Using Tariff Change as Explanatory Variable

Dep. Var	Ex-Im (1)	RR^A (2)	RR^S (3)
Δ Tariff × Post	0.287*	0.271*	0.262*
	(0.132)	(0.108)	(0.105)
Obs.	5487648	5487648	5487648
R-Sq.	0.458	0.530	0.532
Pr(F)	0.03	0.01	0.01
HS-4 × QnY FE	✓	✓	✓
Firm × HS-8 FE	✓	✓	✓

Notes: The dependent variable pertains to rerouting in all columns. Column (1) is a binary variable capturing if a Mexican firm imported a particular HS 8-digit product from China and exported the same HS 8-digit product to the US in a given quarter. Columns (2) & (3) use adjusted (RR^A) and smoothed (RR^S) measures of rerouting. *Post* is a binary indicator that equals 1 after 2018Q2, else zero. Δ Tariff is the change in tariff for tariffed products, else zero. Regressions are at the firm × product (HS 8-digit) × quarter level. Standard errors, clustered at the HS 8-digit level, are in parentheses. ** p < 0.01, * p < 0.05, ^+p<0.1.

Table A.2: Robustness: Rerouting Estimates with Variation in θ

	$\theta = 0.15$		$\theta = 0.25$	
Dep. Var	RR^A (1)	RR^S (2)	RR^A (3)	RR^S (4)
Treat × Post	0.048**	0.046**	0.048**	0.047**
	(0.015)	(0.014)	(0.015)	(0.015)
Obs.	5487648	5487648	5487648	5487648
R-Sq.	0.529	0.531	0.531	0.534
Pr(F)	0.00	0.00	0.00	0.00
HS-4 × QnY FE	✓	✓	✓	✓
Firm × HS-8 FE	✓	✓	✓	✓

Notes: The dependent variable pertains to rerouting in all columns. Columns (1) & (3) use adjusted (RR^A) and columns (2) & (4) use smoothed (RR^S) measures of rerouting, with different values of θ. *Post* is a binary indicator that equals 1 after 2018Q2, else zero. *Treat* is a binary indicator that equals 1 for tariffed products, else zero. Regressions are at the firm × product (HS 8-digit) × quarter level. Standard errors, clustered at the HS 8-digit level, are in parentheses. ** p < 0.01, * p < 0.05, ^+p<0.1.

Table A.3: Robustness: Sample of exporters with US as major export partner

	US Exports Share $\geq$ 80%			US Exports Share $\geq$ 90%		
Dep. Var	Ex-Im (1)	RR^A (2)	RR^S (3)	Ex-Im (4)	RR^A (5)	RR^S (6)
Treat × Post	0.044*	0.043**	0.041**	0.043*	0.043**	0.041**
	(0.018)	(0.013)	(0.013)	(0.017)	(0.013)	(0.012)
Obs.	4264416	4264416	4264416	4003416	4003416	4003416
R-Sq.	0.454	0.509	0.510	0.449	0.507	0.509
Pr(F)	0.02	0.00	0.00	0.01	0.00	0.00
HS-4 × QnY FE	✓	✓	✓	✓	✓	✓
Firm × HS-8 FE	✓	✓	✓	✓	✓	✓

Notes: The table uses the subset of firm-product pairs for which exports to the US account for more than 80 percent (columns 1–3) and more than 90 percent (columns 4–6) of their total exports. The dependent variable pertains to rerouting in all columns. Column (1) & (4) is a binary variable capturing if a Mexican firm imported a particular HS 8-digit product from China and exported the same HS 8-digit product to the US in a given quarter. Columns (2) & (5) use adjusted (RR^A) and, columns (3) & (6) use smoothed (RR^S) measures of rerouting. RR^A and RR^S are based on $\theta = 0.2$. *Post* is a binary indicator that equals 1 after 2018Q2, else zero. *Treat* is a binary indicator that equals 1 for tariffed products, else zero. Regressions are at the firm × product (HS 8-digit) × quarter level. Standard errors, clustered at the HS 8-digit level, are in parentheses. ** p < 0.01, * p < 0.05, ^+p<0.1.

Table A.4: Robustness: Using HS 6-digit Products as Controls

Dep. Var	Ex-Im (1)	RR^A (2)	RR^S (3)
Treat × Post	0.089**	0.069**	0.067**
	(0.023)	(0.019)	(0.018)
Obs.	5476512	5476512	5476512
R-Sq.	0.463	0.537	0.539
Pr(F)	0.00	0.00	0.00
HS-6 × QnY FE	✓	✓	✓
Firm × HS-8 FE	✓	✓	✓

Notes: The dependent variable pertains to rerouting in all columns. Column (1) is a binary variable capturing if a Mexican firm imported a particular HS 8-digit product from China and exported the same HS 8-digit product to the US in a given quarter. Columns (2) & (3) use adjusted (RR^A) and smoothed (RR^S) measures of rerouting. *Post* is a binary indicator that equals 1 after 2018Q2, else zero. *Treat* is a binary indicator that equals 1 for tariffed products, else zero. Regressions are at the firm × product (HS 8-digit) × quarter level. Standard errors, clustered at the HS 8-digit level, are in parentheses. ** p < 0.01, * p < 0.05, ^+p<0.1.

B Appendix: Model

B.1 Proof of Proposition 8.1

Preliminaries. For any route with delivered marginal cost $k \in \{k_d, k_r(r)\}$ and cost $C(q) = kq + \frac{\gamma}{2}q^2$ with $\gamma > 0$, the firm supplies $q(p \mid k) = (p-k)/\gamma$ for $p \geq k$ and zero otherwise. With a unit mass of potential exporters, aggregate supply around the average delivered cost $\bar{k}(\tilde{r})$ is

$$Q(p) = \frac{p - \bar{k}(\tilde{r})}{\gamma}, \qquad \bar{k}(\tilde{r}) = (1-s)k_d + s\,\mathbb{E}[k_r \mid r \leq \tilde{r}],$$

where $s = G(\tilde{r})$, $\tilde{r} = \tau - \delta$, $k_d = c + t_d + \tau$, and $k_r(r) = c + t_{cm} + t_{mu} + r$.

Lemma B.1 (Derivative of the truncated mean)**.** *Let $r \sim G$ on $[0, \bar{r}]$ with density g. For $\mu(x) \equiv \mathbb{E}[r \mid r \leq x]$ on $(0, \bar{r})$,*

$$\mu'(x) = \frac{x - \mu(x)}{G(x)}\, g(x), \qquad G'(x) = g(x).$$

Proof. By $\mu(x) = \frac{1}{G(x)} \int_0^x r\, g(r)\, dr$ and the quotient rule.

Item 1: Existence and uniqueness. Market clearing requires $p = a - bQ$. Substituting $Q(p)$ gives

$$p = \frac{a + \frac{b}{\gamma}\bar{k}(\tilde{r})}{1 + \frac{b}{\gamma}} \equiv p^*(\tau, \delta), \qquad Q^*(\tau, \delta) = \frac{a - \bar{k}(\tilde{r})}{b + \gamma}.$$

The left side is strictly increasing in p and the right side is constant for given (τ, δ), so equilibrium is unique. Positivity of Q^* holds on the interior where $a > \bar{k}(\tilde{r})$.

Item 2: Effect of the rerouting share. Differentiate $\bar{k}$ with respect to s:

$$\frac{\partial \bar{k}}{\partial s} = \mathbb{E}[k_r \mid r \leq \tilde{r}] - k_d < 0,$$

since $r < \tilde{r}$ implies $k_r(r) < k_r(\tilde{r}) = k_d$ on a set of positive measure. Hence

$$\frac{\partial p^*}{\partial s} = \frac{b}{b+\gamma}\frac{\partial \bar{k}}{\partial s} < 0, \qquad \frac{\partial Q^*}{\partial s} = -\frac{1}{b+\gamma}\frac{\partial \bar{k}}{\partial s} > 0.$$

Item 3: Tariff and transport-burden effects with attenuation. Write $\tilde{r} = \tau - \delta$, $s = G(\tilde{r})$, and let $\mu(\tilde{r}) = \mathbb{E}[r \mid r \leq \tilde{r}]$. Then

$$\bar{k}(\tilde{r}) = (1-s)k_d + s\,(c + t_{cm} + t_{mu} + \mu(\tilde{r})).$$

By Lemma B.1 and the chain rule,

$$\frac{\partial \bar{k}}{\partial \tau} = (1-s)\cdot 1 + s\,\mu'(\tilde{r})\cdot 1 + \big(c + t_{cm} + t_{mu} + \mu(\tilde{r}) - k_d\big)\,g(\tilde{r}).$$

Since $k_d = c + t_d + \tau$ and $\tilde{r} = \tau - (t_{cm} + t_{mu} - t_d)$, the last two terms cancel, yielding

$$\frac{\partial \bar{k}}{\partial \tau} = 1 - s, \qquad \frac{\partial \bar{k}}{\partial \delta} = s.$$

Therefore,

$$\frac{\partial p^*}{\partial \tau} = \frac{b}{b+\gamma}(1-s), \quad \frac{\partial Q^*}{\partial \tau} = -\frac{1}{b+\gamma}(1-s), \qquad \frac{\partial p^*}{\partial \delta} = \frac{b}{b+\gamma}s, \quad \frac{\partial Q^*}{\partial \delta} = -\frac{s}{b+\gamma}.$$

Because $s \in (0,1)$ on the interior, these effects lie strictly between the no-diversion bounds and zero, which gives the stated inequalities.

Remark 1 (Uniform benchmark)**.** *If G is uniform on $[0, \bar{r}]$, then on the interior $s = \tilde{r}/\bar{r}$ and $\mathbb{E}[r \mid r \leq \tilde{r}] = \tilde{r}/2$, so*

$$\bar{k}(\tilde{r}) = \Big(1 - \frac{\tilde{r}}{\bar{r}}\Big)k_d + \frac{\tilde{r}}{\bar{r}}\Big(c + t_{cm} + t_{mu} + \frac{\tilde{r}}{2}\Big),$$

which gives closed forms for p^* and Q^*.

B.2 Structural-to-Reduced-Form Mapping

Let the routing probability be $p_{ipt} = \Lambda(Z_{ipt})$ with

$$Z_{ipt} = \kappa + \pi\, D_{pt} - \beta\, d_i + \theta\, \text{MNCChina}_i + \phi\, \sigma_p + \eta_p + \eta_t, \qquad \Lambda(z) = \frac{1}{1+e^{-z}}.$$

Here D_{pt} is the productâtime tariff exposure, d_i is distance to the nearest customs facility, $\text{MNCChina}_i \in \{0,1\}$ indicates a China-Mexico multinational link, and σ_p is a product-level elasticity shifter. The structural parameters $(\pi, \beta, \theta, \phi)$ enter additively.

B.2.1 Population identities for average effects

Write $\Lambda'(z) = \Lambda(z)\big(1-\Lambda(z)\big)$ and $\Lambda''(z) = \Lambda'(z)\big(1-2\Lambda(z)\big)$. Differentiating $p_{ipt} = \Lambda(Z_{ipt})$ gives

$$\frac{\partial p_{ipt}}{\partial D_{pt}} = \pi\, \Lambda'(Z_{ipt}), \quad \frac{\partial^2 p_{ipt}}{\partial D_{pt}\, \partial d_i} = -\beta\, \pi\, \Lambda''(Z_{ipt}), \quad \frac{\partial^2 p_{ipt}}{\partial D_{pt}\, \partial \text{MNCChina}_i} = \theta\, \pi\, \Lambda''(Z_{ipt}),$$

$$\frac{\partial^2 p_{ipt}}{\partial D_{pt}\, \partial \sigma_p} = \phi\, \pi\, \Lambda''(Z_{ipt}).$$

Consider the saturated linear probability model used in the data,

$$y_{ipt} = \alpha + \beta_{\text{RF}}\, D_{pt} + \beta_d\big(D_{pt} \times d_i\big) + \beta_m\big(D_{pt} \times \text{MNCChina}_i\big) + \beta_\sigma\big(D_{pt} \times \sigma_p\big) + \xi_p + \xi_t + \upsilon_{ipt}.$$

With d_i, MNCChina_i, and σ_p mean-centered, and fixed effects (ξ_p, ξ_t) matching (η_p, η_t), the population linear projection yields

$$\beta_{\text{RF}} = \mathbb{E}\left[\frac{\partial p_{ipt}}{\partial D_{pt}}\right] = \pi\, \mathbb{E}\big[\Lambda'(Z_{ipt})\big],$$

$$\beta_d = \mathbb{E}\left[\frac{\partial^2 p_{ipt}}{\partial D_{pt}\, \partial d_i}\right], \quad \beta_m = \mathbb{E}\left[\frac{\partial^2 p_{ipt}}{\partial D_{pt}\, \partial \text{MNCChina}_i}\right], \quad \beta_\sigma = \mathbb{E}\left[\frac{\partial^2 p_{ipt}}{\partial D_{pt}\, \partial \sigma_p}\right].$$

Hence the signs are pinned down by the structural primitives: $\beta_d < 0$ if $\beta > 0$, $\beta_m > 0$ if $\theta > 0$, and $\beta_\sigma > 0$ if $\phi > 0$. The level coefficient satisfies $\beta_{\mathrm{RF}} = \pi\,\mathbb{E}[\Lambda'(Z)] \in (0, \pi/4]$.

B.2.2 Derivation via a local expansion

Let $Z_0 = \mathbb{E}[Z_{ipt}]$ and $\Delta Z_{ipt} = Z_{ipt} - Z_0$. A second-order Taylor expansion gives

$$p_{ipt} = \Lambda(Z_0) + \Lambda'(Z_0)\,\Delta Z_{ipt} + \tfrac{1}{2}\Lambda''(Z_0)\,(\Delta Z_{ipt})^2 + R_{ipt},$$

where R_{ipt} collects third and higher orders. Since ΔZ_{ipt} is affine in D_{pt}, d_i, $\mathrm{MNCChina}_i$, and σ_p, the population linear projection of y_{ipt} on D_{pt}, its interactions with the centered covariates, and the same fixed effects equals the expectations of the corresponding first and mixed partial derivatives above, with R_{ipt} absorbed by the error. This yields the identities for $(\beta_{\mathrm{RF}}, \beta_d, \beta_m, \beta_\sigma)$.