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The US-China Trade War and the Relocation of Global Value Chains to Mexico*

Hâle Utar† , Alfonso Cebreros Zurita‡ and Luis Torres§

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Using confidential longitudinal firm-level trade data from Mexico (2015–2021), we examine whether the 2018–19 US-China trade war triggered adjustments in Global Value Chains (GVCs) and nearshoring to Mexico. Leveraging the abrupt US trade policy shift as a natural experiment, we construct firm-level trade policy exposures based on pre-shock product portfolios and find that US tariff hikes on China significantly increased Mexican firms' exports to the US, imports from Asia and the US, and net exports overall. By distinguishing firms in GVCs and identifying their parent countries, we show that foreign Multinational Enterprises (MNEs) in technology-intensive industries were the primary drivers of this adjustment. The trade war also reshaped sourcing patterns, boosting the use of firm-specific duty permits. Heterogeneous responses between US and non-US MNEs highlight nearshoring dynamics and GVC reorganization toward Mexico. Our findings provide firm-level evidence of the transformative impact of trade policy on GVCs and the role of MNEs in channeling trade policy spillovers to third countries.

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1 Introduction

China's dominant position in the US market suffered a significant blow when the US invoked Section 301 of the Trade Act of 1974, citing discriminatory trade practices and harm to US intellectual property rights and innovation. After decades of stable and liberalizing trade policies, in 2018–19, the US and China engaged in a trade war, mutually escalating tariffs that covered about $450 billion in trade flows (Fajgelbaum et al. 2021). In a world with fragmented production and services (Johnson and Noguera, 2012), bilateral trade policies may have important implications for bystander countries. The US-China trade war, characterized by its sudden and unprecedented nature, represents a major shock to integrated production and services worldwide. As a potential trigger of a broader decoupling of the two major economies, it raises the question of whether it led to adjustments in global value chains (GVCs) and increased nearshoring activities to Mexico.

Deep integration with the United States through the North American Free Trade Agreement (NAFTA) and its successor, the United States–Mexico–Canada Agreement (USMCA), competitive labor costs, and geographic proximity with a shared 3,000-kilometer border have long made Mexico an attractive manufacturing hub for North America. Consequently, it was the most important emerging-market trade partner of the US until China's rise at the turn of the century. Since then, China overtook it as the leading manufacturing base for the US, as Mexican producers faced mounting competition from Chinese firms in the US market (Utar and Ruiz, 2013). Now, two decades later, Mexico has reclaimed its position as the top US trade partner. Are the tables turning in its favor?

In this paper, we study whether and how Mexican firms were impacted by the trade war between the US and China, and examine the extent to which it strengthened Mexico's involvement in global value chains and its integration with the US. To address this question, we employ firm-level trade data that cover the universe of international trade transactions in Mexico from 2015–2021. Mexico's legislative framework offers strong incentives for firms in GVCs to register under the *Industria Manufacturera, Maquiladora y de Servicios de Exportación* (IMMEX) program, which facilitates production sharing with the US and supports export-oriented operations through a 16% value-added tax exemption and preferential duty and customs processing.

By integrating monthly directories of firms registered under IMMEX with parent-country information from the Dun & Bradstreet Hierarchy and Connections database using firms' unique tax identification numbers, and merging this data with confidential transaction-level customs records, we provide the first study to conclusively identify GVC firms and foreign MNEs in Mexico's customs data. The resulting unique dataset enables sharper insights into the roles that GVCs and foreign MNEs play in shaping how economies respond to changes in domestic and foreign trade policy. The availability of longitudinal, firm-level trade data, spanning both manufacturing and non-manufacturing sectors, combined with the sudden and unprecedented shift in US trade policy across a wide range of products and sectors, allows for rigorous causal analysis to quantify the potential nearshoring impact of the US–China trade war.[1]

We construct firm-level measures of trade policy exposures, based on firms' pre-shock trade across HS 6-digit product–destination pairs, and examine within-firm changes before and after the implementation of tariffs, controlling for aggregate, sectoral, and firm-specific trends. Our analysis shows that the 2018–19 US tariff hikes on Chinese goods had a significant positive effect on Mexican firms' exports to the US, an effect that is almost entirely attributable to GVC firms.[2] A 90/10 percentile difference in tariff exposure (0.198)—which approximately matches the average increase in US tariffs on Chinese goods based on GVC firms' pre-shock export portfolios—implies a 37% increase in their exports to the US. Among GVC firms, exports by foreign MNEs grew 2.5 times more than those of domestic GVC firms, highlighting the central role of foreign MNEs in this shift.

The US tariffs targeting China also lead GVC firms in Mexico to increase their imports, primarily

[1] Studies find that the 2018–19 tariff changes associated with the trade war were uncorrelated with prior price and import trends across products, making the event an ideal natural experiment for understanding trade policies and GVCs (e.g., Cavallo et al. 2021, Fajgelbaum et al. 2020, Amiti et al. 2020). For a comprehensive overview, see Fajgelbaum and Khandelwal (2021).

[2] Throughout the paper, we refer to firms operating under the IMMEX program as "GVC firms," as IMMEX status directly reflects participation in international production and service networks.

from the US and Asian countries, but to a lesser extent than their exports, resulting in a marked rise in net exports. These results point to growing North American integration and provide compelling evidence of GVC relocation toward Mexico.

The question of how trade policy unfolds in an integrated global economy is of great interest to policymakers and scholars. GVC firms in Mexico, which we show are responsible for the spillover effect of the US-China trade disputes to Mexico, tend to be larger and account for 84% of exports and 64% of imports nationwide. This aligns with Handley et al. (2020), who document that firms affected by the 2018–19 US tariffs were similarly large, contributing 84% of US exports and 65% of manufacturing employment. Likewise, Huang et al. (2023) emphasize the importance of global value chains in transmitting the effect while Flaaen et al. (2020) highlight MNEs' tariff-jumping strategies. Given the extensive production sharing between Mexico and the US through IMMEX, it becomes essential to study the impact of the trade war on Mexico with particular attention on GVC firms, to better understand the responses of US firms and industries and the underlying mechanisms. Our paper fills this gap.

Despite the US government's objective of helping domestic manufacturing through its trade policy shift against China, recent studies find no positive effect on domestic production or employment (Flaaen and Pierce, 2024; Autor et al., 2024). In contrast, our analysis shows that the positive effects of the 2018–19 US tariffs on Mexican exports are primarily driven by manufacturing GVC firms. Within the manufacturing sector, the gains are absent in traditionally labor-intensive industries, such as textiles and footwear, but are concentrated in relatively skilled industries such as electrical machinery, aerospace, and automotive.[3] Similarly, across product types, the beneficial effect of the US tariff hikes is most pronounced in intermediate and capital goods and mid- to high-tech exports. While we find causal evidence that firms adopt new tariffed products in response to the US trade policy shift, the expansion in exports is largely concentrated in firms' existing product lines in intermediate and capital goods.

[3] This aligns with Utar and Ruiz (2013), who document Mexico's shift toward more sophisticated GVCs during China's dominance in labor-intensive manufacturing, and with Hanson (2020), who identifies 14 emerging economies like Vietnam and Bangladesh as poised to replace China in labor-intensive manufacturing, with Mexico notably absent.

Export growth among GVC firms is accompanied by shifting sourcing patterns and increased use of firm-specific duty permits, which enable firms to import critical inputs at lower duties. Non-US foreign MNEs, which experienced substantial export growth due to US tariffs, increased imports from the US and key Asian countries with strong GVC integration—such as Japan, Korea, Taiwan and Vietnam—but not from China, signaling a restructuring of their networks toward Mexico as a substitute for China. In contrast, manufacturing subsidiaries of US firms in Mexico responded to higher tariffs on Chinese goods by increasing imports from both China and the US, suggesting expanded production in Mexico to offset domestic costs.

These results suggest that the dramatic protectionist shift in US trade policy—estimated to cost US consumers and producers \$4.6 billion per month (Amiti et al., 2019)—may have partially achieved its 'stated' aim of revitalizing manufacturing, though potentially in southern North America rather than within the US. They also demonstrate how trade policies can spill over between countries through the complex international production and service networks led by MNEs, revealing unexpected effects of trade policies in the context of GVCs.

We also find a significant but temporary negative effect of China's retaliatory tariffs on GVC firms' exports. While manufacturing firms remain largely unaffected, export service firms, such as those in warehousing and logistics with export portfolios concentrated in goods targeted by China, experience negative effects, likely driven by US demand spillovers. Together, these findings show China's critical role in shaping US-Mexico trade integration.

Our results on firm specific duty-permits show an important role for trade facilitation instruments, especially in a trade war environment, in mitigating the negative effects of tariffs on domestic participation in GVCs while simultaneously leveraging the positive spillovers from third-country tariffs.

Using country–product-level data, Alfaro and Chor (2023) identify Mexico as a key beneficiary of the US–China trade war. Fajgelbaum et al. (2024) attribute heterogeneity in export growth across targeted products mainly to country-specific trade elasticities, rather than sector, size, or specialization differences. Our firm-level findings complement this work by showing that the strongly positive effect of the US trade policy shift against China on Mexico is driven by its export platform, IMMEX, particularly by foreign MNEs, which account for 77% of Mexico's exports to the US. This suggests that Mexico's integration into North American supply chains is a key country-specific factor behind its high tariff elasticity. While US-owned GVC firms represent the largest group of foreign MNEs in Mexico and closely mirror the aggregate export response to the US, we also find strong effects among subsidiaries of European and Asian MNEs.

By providing evidence that changes in trade costs induce value chain reorganization, our findings offer insights for quantitative trade models examining trade elasticity in the context of global value chains (Yi, 2003, 2010). They also highlight the role of related-party trade and within-firm substitution across production locations in shaping third-country responses to trade policy, and contribute to recent work on optimal trade policy and its welfare implications in the context of global supply chains and multinational production (Antràs et al., 2022a; Blanchard et al., 2023; Grossman et al., 2024; Gutiérrez et al., 2024).

Our paper also contributes to the growing literature on the effects of the US–China trade war on China and other Asian countries (Jiao et al., 2024; Ju et al., 2024; Chor and Li, 2021; Rotunno et al., 2023). Jiao et al. (2024) find that Chinese firms increased exports to Europe but not other destinations. In contrast, we show that the trade war reshaped Mexico–Asia trade through input purchases by GVC firms whose export portfolios were concentrated in tariff-targeted goods. These findings suggest that focusing solely on targeted goods may miss key margins of adjustment through global supply chains.

The next section outlines the legislative background of the IMMEX export platform and the 2018–19 tariff war, and introduces the firm-level data. Section 3 presents the empirical strategy. Section 4 shows that the US-China trade dispute significantly affected Mexican firms' exports, with GVC firms serving as the main channel of spillovers. Section 5 explores heterogeneity among GVC firms leveraging additional data, while Section 6 analyzes sourcing patterns among manufacturing GVC firms. Section 7 concludes. Supplementary results and information are provided in the Online Appendix.

2 Legislative Framework, Institutional Background, and Data

2.1 Identifying Global Value Chain Participants in Mexico

We briefly describe the legislative framework supporting GVC participation in Mexico; further details are provided in the Appendix.

Participation in GVCs has long been a central pillar of Mexico's economic development strategy. Since 1965, the government has maintained special legislative frameworks to attract foreign firms, including exemptions from import duties for firms engaged in export processing. In 2007, these programs were consolidated under the IMMEX framework. IMMEX-certified firms are exempt from the 16% value-added tax on imported inputs and capital goods, benefit from lower customs processing fees, and may defer tariffs on non-NAFTA inputs until re-export. To qualify, firms must either export at least \$500,000 annually or derive a minimum of 10% of total revenue from exports. Hosting a wide range of both US and non-US multinationals, including United Technologies, Abbott Labs, Honeywell, John Deere, Volkswagen, Lego, LG Electronics, Toyota, Novartis, and Foxconn, the program serves as a production-sharing arrangement for US firms and as an export platform for non-US MNEs targeting the US market.

We identify IMMEX firms using monthly registration records from the Ministry of Economy, which we merge with customs data via unique tax identifiers. In 2017, IMMEX firms accounted for 84% of Mexico's total exports and 64% of its imports.

The Rule of Origin and the Import Regime for GVCs

Following NAFTA's full implementation, which limited duty-free access to non-NAFTA inputs in GVCs, Mexico introduced the Sectoral Promotion Programs (PROSEC) in 2002 to support GVC firms. These programs allow registered firms to import government-designated sector-specific inputs at preferential tariff rates. Once registered, firms may also apply for an additional trade instrument, the Eighth Rule (Regla Octava), which permits duty-free or reduced-tariff (capped at 5%) imports of non-NAFTA inputs and machinery for firm-specific needs. Using customs data, we identify firms accessing these instruments and assess how such trade facilitation measures shaped their responses to the US–China trade war.

2.2 The US-China Trade War

In April 2017, the US launched an investigation under Section 232 of the Trade Act of 1962 to assess whether steel and aluminum imports threatened national security. In August 2017, it initiated a separate Section 301 investigation under the Trade Act of 1974, focusing on China's laws and practices related to intellectual property, innovation, and technology transfer. Both investigations concluded in early 2018, finding that steel and aluminum imports posed a national security threat and that China engaged in unfair trade practices harming US innovation.

In March 2018, the US imposed steel and aluminum tariffs under Section 232, prompting China to retaliate in April 2018. That April, both the US and China announced $50 billion worth of goods targeted for 25 percent tariffs. Implementation of the first wave of Section 301 tariffs began in July 2018, followed by four additional rounds through September 2019. In December 2019, the US and China canceled a planned sixth wave of tariffs in anticipation of an agreement. The two parties signed an agreement in January 2020 to halt further tariff escalations. Under this agreement, which entered into force on February 14, 2020, China committed to purchasing more US goods. However, most existing tariffs remained in place as of 2022, except for a few sets of US goods removed from China's retaliatory tariff list during 2020–21.

Tariff Escalation between the US and Mexico

Initially, the US government granted an exemption to Mexico, along with Canada and the European Union, from the Section 232 tariffs imposed on steel and aluminum products. However, this exemption was lifted in June 2018. In response, Mexico imposed a series of tariffs on US products, including some steel and aluminum items, farm products, pork, cheese, apples, potatoes, and certain beverages like bourbon. The trade flow impacted by these retaliatory measures amounted to approximately $1.4 billion. Together with the Section 232 tariffs on Mexico, the total US-Mexico trade flow affected by the trade war was $3 billion, minor compared to the US-China trade flow impacted by the trade war, which was a staggering $450 billion. In May 2019, Mexico removed the retaliatory tariffs it had imposed on imports from the US following the US's removal of the Section 232 tariffs targeting Mexico.

2.3 Data on Exporting Firms

We employ confidential transaction-level customs data covering all export and import activities of Mexican firms. Each record includes product codes, destination or origin countries, and transaction values in both Mexican pesos and USD. Products are classified under the Mexican Import and Export General Tariff Act (TIGIE), which closely aligns with the Harmonized System (HS) at the six-digit level.

We link the customs data with six-digit product–country pairs affected by newly imposed tariffs during the 2018–2019 US–China trade war. Tariff data on US imports and exports come from Fajgelbaum et al. (2020), updated in Fajgelbaum et al. (2021). We aggregate these tariffs to the HS 6-digit level, consistent with the detail available in the Mexican customs data.[4]

The registry of IMMEX firms from the Ministry of Economy includes firms' tax IDs, names, addresses, and industries. Using firms' unique tax IDs, we identified the country of the global ultimate parent company of firms operating under IMMEX as of 2017 through D&B's Hierarchy and Connections data. We then merged the IMMEX data with the customs data using firms' tax IDs. Our study is the first to identify IMMEX firms in the customs data and to characterize their trade patterns in comparison to other exporters.

We conduct our analysis at the firm-year level after aggregating the transaction level data. Table 1 summarizes firm characteristics for 2017, showing approximately 36,500 exporters, half of which also imported. Close to 6,000 IMMEX firms make up 16% of all exporting firms while accounting for 88% of Mexico's US exports. Notably, 93% of all IMMEX firms import, reflecting their

[4] To construct HS 6-digit tariff changes, we use the share of each HS 10-digit good in total US HS 6-digit import in the pre-trade war year, 2017, as a weight to collapse the US import tariffs data into the HS6 level. Similarly, we calculate the share of each HS 8-digit good in total US HS 6-digit export as a weight to collapse the retaliatory tariff data into the HS6 level. See Appendix E.

participation in GVCs. IMMEX firms that do not import are concentrated in the agriculture, warehousing, and waste management sectors. The median exporter ships goods worth 70,000 USD and exports two HS-6 products, while the median IMMEX company exports approximately 3.9 million USD and ten products. In the empirical analysis, we account for size differences between exporters and allow for differential time trends based on firm size and GVC participation.

Table 1: Summary Statistics on Exporters in 2017

Variable	(1) Mean	(2) Median	(3) SD	(4) Min	(5) Max	(6) Obs
Panel A. All Exporters						
IMMEX	0.16	0	0.37	0	1	36,467
Firms w/ Preferential Duty License	0.06	0	0.24	0	1	36,467
Export	1	1	0	1	1	36,467
Import	0.50	0	0.50	0	1	36,467
Number of Goods (HS6) Exported	8.97	2	25.10	1	642	36,467
Number of Goods (HS6) Imported	31.22	0	74.79	0	1,667	36,467
Number of Countries Exported	2.40	1	4.38	1	122	36,467
Number of Countries Imported	5.31	0	9.99	0	225	36,467
Log Value of Exports	11.33	11.10	3.17	-3.00	23.72	36,467
Log Value of Imports	13.57	13.68	2.81	-0.03	24.00	18,213
Panel B. IMMEX (GVC) Firms						
IMMEX	1	1	0	1	1	5,943
Firms w/ Preferential Duty License	0.24	0	0.43	0	1	5,943
Export	1	1	0	1	1	5,943
Import	0.93	1	0.25	0	1	5,943
Number of Goods (HS6) Exported	28.33	10	46.53	1	617	5,943
Number of Goods (HS6) Imported	101.46	54	124.787	0	1,126	5,943
Number of Countries Exported	5.07	2	8.21	1	122	5,943
Number of Countries Imported	14.98	10	14.61	0	131	5,943
Log Value of Exports	14.86	15.17	2.91	0.020	23.52	5,943
Log Value of Imports	15.00	15.34	2.77	0.010	23.13	5,554

Notes: Variables, "IMMEX", "Firms w/ Preferential Duty License", "Export", "Import" are dummies. Values are expressed in USD.

Table A.1 presents the distribution of exporters' trade shares across broad regions, differentiating between non-IMMEX and IMMEX firms. Mexican exports are predominantly concentrated in the US market, with non-IMMEX exporters directing an average of 61% of their total exports to the US. Latin America emerges as the second most important destination, accounting for an average of 23% of non-IMMEX firms' exports. In comparison, IMMEX firms display an even stronger focus on the US market, with the US comprising 80% of their exports on average, while no other destination holds a significant share.

The US is the dominant source of imports for IMMEX firms, accounting for over half of their total imports. In contrast, non-IMMEX exporters source 40% of their imports from China and Europe combined, roughly matching their 39% share from the US. For IMMEX firms, however, imports from China and Europe together amount to only half the value of their US imports, underscoring their greater dependence on US inputs. IMMEX firms also rely less on Chinese imports (13.7%) than non-IMMEX exporters (19%), consistent with their role as substitutes for Chinese exporters in serving the US market.

Table A.1 also shows that six key Asian countries with significant GVC presence—Japan, Korea, Taiwan, Vietnam, Thailand, and India, collectively referred to as 'other Asia' throughout the paper—are notable import sources for IMMEX firms, accounting for an average of 12% of their imports.

Having introduced our data, we now describe how we construct firm-level measures of the trade policy exposures and introduce our empirical strategy.

3 Empirical Strategy

To identify the causal impact of the US-China trade war on firms in Mexico, we construct firm-level measures of exposure to tariffs based on firms' product-level exports and imports as of 2017.

3.1 Firm-Level Exposures to the US-China Trade War

3.1.1 US Import Tariffs on China

Nearshoring

Our primary focus is on the US import tariffs imposed on China, which covered \$350 billion in US imports from China (Fajgelbaum and Khandelwal, 2021). Let $USIT^{CN}$ represent the set of HS 6-digit products subject to the 2018/19 US tariffs on Chinese goods, and let $\Delta\tau_j^{USIT^{CN}}$ denote the change in the US import tariff rate on HS 6-digit good j from China, measured in percentage points and expressed as a decimal.[5] Additionally, let X_{ij}^{2017} be the value of exports of Mexican firm i in good j in year 2017. Then, the exposure of firm i in Mexico to the increased US tariffs on Chinese goods is given by:

$$TM_i^{US-CN} = \frac{\sum_{j \in USIT^{CN}} X_{ij}^{2017} \times \Delta\tau_j^{USIT^{CN}}}{\sum_j X_{ij}^{2017}} \tag{1}$$

Here, TM_i^{US-CN} measures the weighted value of Mexican firm i's exports in goods that will be subject to import tariffs from China in the US market, relative to the firms' total exports as of 2017. By multiplying firm i's exports in goods that will be subject to the increased import tariffs from China with $\Delta\tau^{USIT^{CN}}$, we assign varying weights to the exported goods based on the extent of the tariff increase they are set to encounter if they would have been originated from China.

The majority of exports from a typical Mexican firm are destined for the United States (see Panel A in Table A.1). Equation 1 does not distinguish export destinations, as the higher costs of Chinese goods entering the US market are expected to make the US more attractive to Mexican exporters relative to other markets. Even Mexican exporters previously selling affected goods in non-US markets are likely "treated" by the increased appeal of the US market. Additionally, firms participating in GVCs may export to third countries while indirectly catering to the US market. Nonetheless, we introduce an alternative measure of exposure specific to the US market and results based on this US-specific exposure yield similar findings (see Online Appendix Section C.1).

[5] Tariff changes are calculated by comparing the pre-2018 period to December 2019, since the increases occurred in multiple phases during 2018–2019.

3.1.2 Exposure to China's Retaliatory Tariffs on US Exports

Some GVC firms in Mexico provide manufacturing and export services such as polishing, packaging, and warehousing for US businesses. These activities likely complement US operations without altering the nature of the goods traded. As a result, their exports may decline when the entry of US goods into China becomes more costly. However, particularly in the agricultural sector, Mexican exports may also compete with US products in third markets.

To examine if China's retaliatory tariffs on US exports spill over to Mexican exporters and determine the direction of this effect, we identify Mexican firms that were exporting goods that would later be targeted by these tariffs. Let $USRT^{CN}$ represent the set of HS 6-digit products targeted by China's retaliatory tariffs, and $\Delta\tau_j^{USRT^{CN}}$ denote the increase in the retaliatory tariff rate for good j as of December 2019.

$$TX_i^{CN-US} = \frac{\sum_{j\in USRT^{CN}} X_{ij}^{2017} \times \Delta\tau_j^{USRT^{CN}}}{\sum_i X_{ij}^{2017}} \tag{2}$$

TX_i^{CN-US} measures the weighted value of exports in goods that are targeted by China's retaliatory tariffs relative to the total exports of firm i as of 2017. As before, we weight exported goods based on their respective retaliatory tariff rates, ensuring that Mexican firms with a greater concentration of exports in goods subject to higher export tariffs are regarded as more exposed, all else being equal.

3.1.3 Tariffs Escalation between Mexico and the US

To construct firm-level exposure to the increased US tariffs on Mexico, we focus on firms that, before the shock, were exporting goods to the US that will later be subject to Section 232 tariffs:

$$TM_i^{US-MEX} = \frac{\sum_{j\in USIT^{MEX}} X_{ij}^{2017,US} \times \Delta\tau_j^{USIT^{MEX}}}{\sum_j X_{ij}^{2017}} \tag{3}$$

Since the Section 232 tariffs targeted multiple countries, TM_i^{US-MEX} does not cleanly identify the specific effects of US tariffs on Mexico, but instead serves as a control for potential confounding effects of the Section 232 tariffs.

To measure the effect of the Mexico's retaliatory tariffs, we focus on firms that, before the shock, were importing goods from the US, which will later be subject to Mexico's retaliatory tariffs. Let $USRT^{MEX}$ denote the set of HS-6 products subject to the retaliatory tariffs of Mexico, and $\Delta\tau_j^{USRT^{MEX}}$ measures the change in the Mexican import tariff rate for good j from the US in decimal points. The firm-level exposure to the Mexican government's retaliatory tariffs is then given by:

$$TX_i^{MEX-US} = \frac{\sum_{j \in USRT^{MEX}} M_{ij}^{2017,\mathrm{US}} \times \Delta\tau_j^{USRT^{MEX}}}{\sum_j M_{ij}^{2017}} \tag{4}$$

In Equation 4, M_{ij}^{2017} is firm i's 2017 imports of good j, and $M_{ij}^{2017,\mathrm{US}}$ is its imports of good j from the US. As some 2017 exporters do not import, TX_i^{MEX-US} is set to zero for those firms.

To capture input channels of tariff exposure, we construct firm-level measures based on the importance of targeted goods in firms' imports from China and the US. Incorporating these measures into our analysis reinforces our main findings, as detailed in Appendix Section C.2.

Table A.2 presents the summary statistics of the tariff exposure variables. The average exposure of Mexican exporters to the US tariffs on Chinese goods, as measured by Equation 1, is 17%, indicating that, on average Mexican exporters' Chinese competitors now confront a 17% increase in tariffs in the US. A similar exposure level of 16.5% is observed for Mexican exporters' exposure to China's retaliatory tariffs on US products. Reflecting the narrow scope of the US-Mexico tariff escalation, the Mexican exporters' exposure to the US tariffs and their exposure to Mexico's retaliatory tariffs via their US imports, are more restrained both at 0.1% and 0.2%, respectively.

Panel B of Table A.2 also presents these measures for IMMEX firms, showing no major differences overall. However, IMMEX firms are slightly more exposed to US tariffs, with an average tariff increase of 19.5%. This may be due to their typical role as GVC participants, as they are more likely to produce intermediate and capital goods—the primary targets of recent tariffs (Bown and

Kolb, 2021).[6]

3.2 Empirical Model

To identify the causal effect of the US–China trade war on Mexican firms, we use the firm-level trade policy exposures constructed for all firms with positive exports in 2017 and analyze their trade trajectories from 2015 to 2021.

Identifying the Impact of the US-China Trade War on Mexican Firms

Let Y_{it} denote firm i's outcome at time t, such as the log of its US exports. To examine the effects of the US-China trade war on Mexican firms in general, and on Mexico's GVC firms in particular, we form the following generalized difference in differences (DD) and triple difference in differences (DDD) equations:

$$Y_{it} = \beta_0 + \sum_{\substack{h=2015 \\ \neq 2017}}^{2021} \alpha_h \mathbb{1}_{h=t} \times TM_i^{US-CN} + P_{it} + Z_{it} + \eta_i + \varepsilon_{it} \tag{5}$$

In Equation 5, the continuous firm-level treatment variable TM_i^{US-CN} is interacted with time indicators to examine the year-by-year evolution of the impact. Using 2017 as the baseline year, we track exporters through 2021 to assess the effects of the trade war, while also looking backward until 2015 to identify any pre-existing trends.

The vector P_{it} includes controls for other concurrent trade policy changes, namely TX_i^{CN-US}, TM_i^{US-MEX}, and TX_i^{MEX-US} with year indicators. Interacting TX_i^{CN-US} with time indicators allows Equation 5 to distinguish the impact of China's retaliatory tariffs on Mexican firms. Incorporating TM_i^{US-MEX}, and TX^{MEX-US} both interacted with yearly dummies allows for differential time trends for those firms susceptible to temporary US tariffs on Mexican goods and those firms whose imports are affected by Mexico's retaliatory tariffs on US goods.

The vector Z_{it} includes controls for potentially confounding time trends that may vary across firms

[6] In 2017, intermediate and capital goods accounted for an average of 49% of export revenues among IMMEX firms, compared to 32% for other exporters.

with different characteristics. Based on firms' pre-shock export portfolios, we construct a non-manufacturing indicator for firms whose portfolios do not contain any manufactured products, and we allow for differential time trends for these firms. We also allow for differential time trends based on firm size, defined by the number of goods exported in the baseline year. This measure is constructed by interacting the firm size variable with year-fixed effects.

We control for time-invariant or relatively persistent firm characteristics such as management skills, production technology, and line of business with firm fixed effects, η_i. This means that coefficients are estimated from within-firm variation over time as the influence of any observed or unobserved initial firm characteristic that may be correlated with firm i's future exposure to the change in the US trade policy is absorbed by firm fixed effects. The error term ε_{it} is assumed to have a zero mean, and we allow for correlation within firms by clustering standard errors at the level of the firm, which is the level at which our treatment variables vary (Abadie et al., 2023).

In Equation 5, the continuous firm-level tariff exposure variables are interacted with time indicators to analyze the yearly evolution of the trade war's impact on different components. Using 2017 as the baseline year, we track exporters through 2021 to assess the effects of the trade war, while also looking backward to 2015 to identify any pre-existing trends.

Mexico made headlines following the sudden shift in US trade policy against China, due to its deep integration in GVCs with the US within the North American market. Since 2007, Mexico has consolidated all its GVC companies under IMMEX. To examine any particular impact of the US-China trade war on Mexico's GVC firms, the following DDD equation is constructed:

$$\begin{aligned} Y_{it} = \beta_0 + \sum_{\substack{h=2015 \\ \neq 2017}}^{2021} \gamma_h \mathbb{1}_{h=t} \times TM_i^{US-CN} + \sum_{\substack{h=2015 \\ \neq 2017}}^{2021} \gamma_h^{IMM} \mathbb{1}_{h=t} \times TM_i^{US-CN} \times IMM_i + \xi_t \times IMM_i \\ + P_{it} + P_{it} \times IMM_i + Z_{it} + \eta_i + \varepsilon_{it} \end{aligned} \tag{6}$$

We interact firms' exposure to US tariffs targeting China, TM_i^{US-CN}, with IMM_i, an indicator for whether firm i is an IMMEX firm as of 2017, to identify any disproportionate impact of the US-China trade war on GVC firms. Time trends specific to GVC firms are accounted by interacting year fixed effects ξ_t with IMM_i.

Elements of the vector P_{it}, which includes controls for concurrent trade policy changes, are also interacted with IMM_i to allow for differential responses based on GVC status. As before, Z_{it} controls for firm-size-specific and non-manufacturing-specific time trends.

The yearly coefficients α_h in Equation (5) represent the well-known difference-in-differences estimates, which measure any disproportionate impact on firms that are most susceptible to increased US import tariffs from China. Similarly, the treatment effect of China's retaliatory tariffs for US exporters is included in the vector P_{it} and the yearly evolution of the disproportionate impact of China's retaliatory tariffs are captured in $P_{it} \times IMM_i$.

The DDD coefficients γ_h^{IMM} in Equation (6) capture the particular impact of the increased US tariffs targeting China on GVC firms after accounting for an average effect across all firms, given by γ_h. Thus, the causal effect on GVC firms is given by $\gamma_h + \gamma_h^{IMM}$. The DDD coefficients γ_h^{IMM} for TM^{CN-US} along with the corresponding coefficients for TX^{CN-US} in $P_{it} \times IMM_i$ in Equation 6 capture the potential differential impact of the US-China trade war on GVC participant firms.

The triple difference design also helps address bias from differential trends between treated and control firms, as these are differenced out in the third difference, specifically the difference between non-GVC and GVC firms (Olden and Møen, 2022). In other words, the identifying assumption is that, in the absence of the US-China trade war, the relative outcomes of GVC firms compared to non-GVC firms should trend the same way across firms with different exposure levels.

We estimate Equations 5 and 6 on the 2017 exporter sample from 2015 to 2021. Extending the analysis back to 2015 allows us to establish a counterfactual trajectory three years before the trade war. Because the full exporter sample includes very small firms, we weight regressions by firms' pre-shock export value (in logs) to avoid their disproportionate influence.

When focusing on the GVC sample, Equation 5 is augmented with industry-specific time trends from the IMMEX registry. To account for potential confounding effects of local labor market shocks, such as labor shortages and COVID-related closures, we additionally augment Equation 5 with municipality-by-year fixed effects, eliminating all variations at the local labor market level. These results are presented in the Appendix Section D.1.

4 Firm-Level Impact of the US-China Trade War on Mexico and the Role of GVCs

This section examines the impact of the US-China trade war on Mexican firms' exports. First, we first show that US tariff hikes on Chinese goods have a significant positive effect on Mexican firms' exports to the US. Next, we demonstrate that US tariffs imposed during the trade war have a differential effect on exporters depending on their GVC status, with the effect entirely driven by firms in Mexico's IMMEX export platform.

4.1 US Tariffs on China Boosted Mexican Firms' Exports to the US

We begin by estimating Equation 5 on all exporters, without distinguishing between GVC and non-GVC firms. Figure 1 shows the yearly DD coefficient estimates for the continuous firm-level treatment variable, TM_i^{US-CN}, which captures the impact of higher US tariffs on Chinese goods. The dependent variable is the log of firms' US exports.

The figure demonstrates that increased US tariffs on Chinese imports significantly boosts Mexican firms' exports to the US. The DD coefficient estimates are statistically indistinguishable from zero prior to the onset of the trade war, showing no evidence of differential pre-trends among exposed firms. The estimate reaches 0.21 in 2018 and is weakly significant, rising to 0.31 in 2019, where it becomes significant at the 5% level. By 2021, the DD estimate increases to 0.63 and is precisely estimated. For two Mexican exporters, one at the 75th percentile and the other at the 25th percentile of exposure to the new US tariffs on Chinese products, a coefficient of 0.63 indicates a 10% differential growth in more exposed firm's US exports ($e^{0.63\times0.155}-1$).[7]

[7] Firms at the 25th and 75th percentiles of exposure to heightened US tariffs against China have TM_i^{US-CN} values

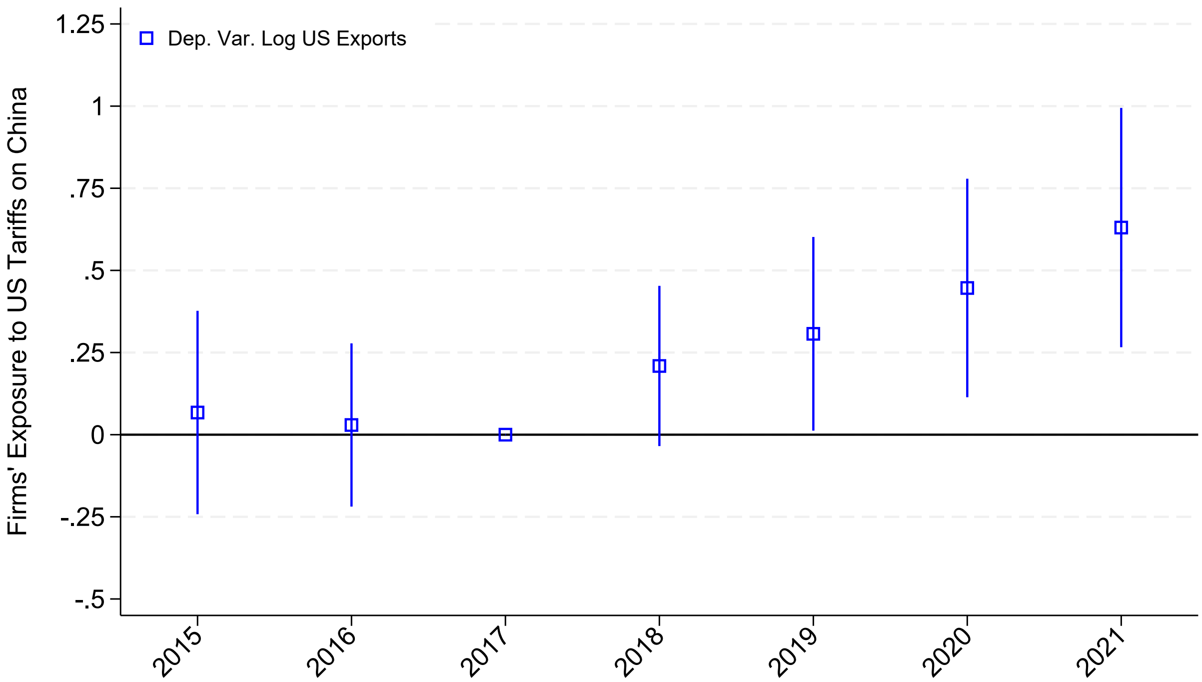


Figure 1: Impact of US Tariffs on Chinese Goods on Mexican Firms' Exports to the US

Notes: Estimation of equation 5. The dependent variable, as indicated in the legend, is the natural logarithm of firms' US exports. The sample includes all exporting firms in Mexico as of 2017, covering the period from 2015 to 2021, with N=128,021. The regression, weighted by the natural logarithm of each firm's total export value in 2017, controls for firm fixed effects, baseline firm size by year, non-manufacturing by year fixed effects, and concurrent trade policy changes—namely TX_i^{CN-US}, TM_i^{US-MEX}, and TX_i^{MEX-US}—each interacted with year fixed effects. The y-axis displays the yearly DD coefficient estimates corresponding to $TM^{US-CN}i$, along with 95% confidence intervals.

The results from estimating Equation 5 using firms' exports to destinations outside the US as the dependent variable are presented in Figure B.1 in the Appendix. They show no significant impact of the recent US trade policy shift on firms' non-US exports. Table B.1 in the Appendix also presents the average effects of the tariff hikes and shows that the weighted and unweighted results are similar, indicating that the findings are not driven by smaller firms.

Table B.1 further shows a significant negative effect of China's retaliatory tariffs on Mexican exporters. The DD coefficient for these tariffs is –0.174 in column (8), significant at the 5% level. We will show in Section 5.2.1 that the negative effect of China's retaliatory tariffs on US exports is largely concentrated among IMMEX companies specializing in export services.

of 0.095 and 0.25, respectively (see Table A.2).

Table B.1 also indicates that the US–Mexico tariff escalation, which lasted for less than a year, did not have a significant long-term effect on firms' exports on average.[8]

4.2 The Role of GVCs in Creating Trade Policy Spillovers

Having established a significant effect of the US–China trade war on Mexican firm-level exports, we now estimate Equation 6 using a triple-difference framework to examine whether the trade war disproportionately affected firms participating in GVCs. If the tariffs triggered a "decoupling" between the U.S. and China, prompting MNEs to adjust their supply networks, and Mexico's IMMEX program served as a hub for MNE activities in the region, we would expect the positive trade effects to be concentrated among GVC firms, reflecting their central role in global production networks.

We estimate Equation 6 with the logarithms of firms' US exports and worldwide exports as the dependent variables. Figure 2 illustrates the evolution of firms' US exports and worldwide exports in response to the shift in US trade policy. Figures 2a and 2b display the DD (TM^{US-CN}) and DDD ($TM^{US-CN} \times IMM$) coefficient estimates, respectively, along with 95 percent confidence intervals. The underlying coefficient estimates are also reported in columns (2) and (4) of Table B.2 in the Appendix.

We begin by examining Figure 2a, which shows the common effect among all firms after the particular effect on GVC firms is accounted for. In the years following the trade war, the treatment effect of US tariffs on Chinese imports (DD) is estimated imprecisely and remains close to zero, except in 2021. This suggests that the US trade policy shift targeting China had little to no impact on Mexican firms' US exports overall. At first glance, this finding is puzzling, as it contrasts with the significant positive impact shown in Figure 1.

The triple difference-in-differences estimates in Figure 2b help resolve this puzzle. Mexican firms' US exports were largely unaffected by the 2018–19 US tariffs on China unless they were part of

[8]See Appendix Section B.8 for an analysis of duty permit utilization among GVC firms in response to Mexico's retaliatory tariffs.

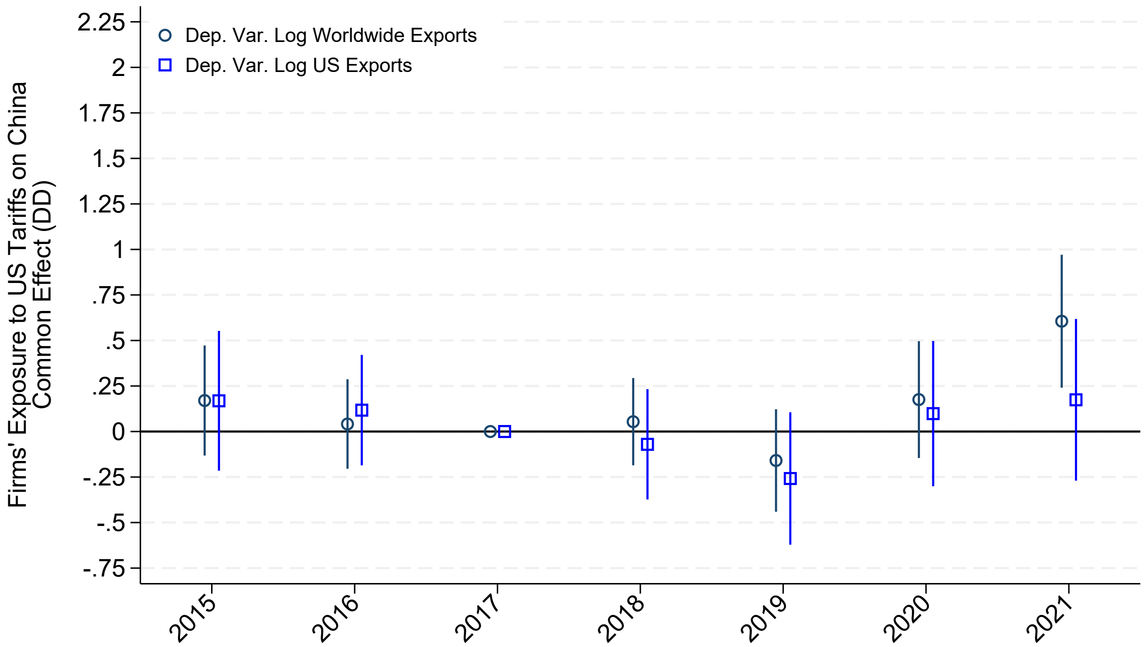
GVCs (as shown in Figure 2a). By contrast, Figure 2b reveals a strong positive impact of rising US tariffs on China on the US exports of GVC firms.

The year-by-year impact shows no significant pre-trends. The positive, significant effect on GVC firms begins in 2018 and intensifies in 2019 (see Figure 2b). In 2020, the DDD coefficient drops from 1.72 to 1.04, coinciding with the COVID-19 shock. However, the overall positive effect of US tariffs on GVC firms rebounds in 2021, reaching 1.56 (1.39+0.17=1.56). This temporal pattern provides further evidence that the significant positive impact on firms' US exports is driven by the US trade policy shift. With a 1.56 coefficient, a GVC firm facing a 0.155 higher exposure, such as one at the 75th percentile (0.25) compared to the 25th (0.095), shows a 27% ($e^{1.56\times0.155}-1$) increase in US exports.

Figures 2a and 2b present the year-by-year impact on firms' worldwide exports (also see column 4 of Table B.2). The results show broadly similar patterns: the DD coefficients for 2018 to 2020 are not statistically significant, except in 2021. In contrast, the DDD estimates are consistently positive and statistically significant throughout the 2018–2021 period. These findings indicate that GVC firms haven't merely rerouted their exports from other destinations to the US. Instead, their overall export volume benefited from US tariffs on Chinese imports, with the positive effect largely driven by increased exports to the US. Importantly, these results show that the positive effect of US tariffs on China on Mexican firms' exports is predominantly attributable to GVC firms.[9]

Figure B.2 in the Appendix presents the yearly DD and DDD coefficient estimates for TX^{CN-US} (firms' exposure to China's retaliatory tariffs) from the same analysis. These results indicate that GVC firms are also the primary drivers of the negative effect of China's tariffs on Mexican firms' exports. The fact that the aggregate effect in Mexican exports is driven by GVC firms is consistent with the idea that the main effect of the US-China trade war was a 'decoupling' of the two economies, led by MNEs, and highlights the importance of GVCs in shaping country-specific trade elasticities (Fajgelbaum et al. 2024).

[9] As GVC firms are generally larger, one might wonder if size alone explains the observed differences with non-GVC firms. However, Appendix Section B.9 shows that firm size does not fully account for these differences.



(a) Impact on Firms' Exports (γ_h)

(b) Disproportionate Impact on GVC Firms' Exports (γ_h^{IMM})

Figure 2: The Role of GVC Firms in the Positive Effect of US Tariffs Targeting China

Notes: Estimation of equation 6. The dependent variables are the natural logarithms of firms' US and worldwide exports, as shown in the legend. The sample consists of all exporting firms in Mexico as of 2017, covering 2015–2021, with N=128,021 for US exports and N=165,284 for worldwide exports. Both regressions control for firm fixed effects, baseline firm size by year, non-manufacturing by year, and IMMEX by year fixed effects, as well as additional trade policy controls (P_i by year and $P_i \times IMM_i$ by year), as specified in equation 6. Regressions are weighted by the natural logarithm of each firm's total export value in 2017. Shown are the yearly DD coefficient estimates for TM_i^{US-CN} in (2a) and the DDD coefficient estimates for $IMM_i \times TM_i^{US-CN}$, with 95% confidence intervals.

5 GVC Adjustments in Response to the US-China Trade War

We show the disproportionate impact of the increased US tariffs targeting China on Mexican exporters is based on firms' participation in GVCs and that this effect is a key driver of Mexico's overall export performance during the trade war. Due to their critical role in Mexico's export response to the US-China trade war, the remainder of our analysis focuses on these firms, leveraging detailed information on their industries, locations, and parent countries.

5.1 Is US Protectionism Against Chinese Imports Leading to Nearshoring?

To better isolate the effect within the GVC sample, we augment the baseline specification (Equation 5) by including sector-specific trends across seven one-digit industries. Diamond markers in Figure 3 show the yearly DD coefficients (α_h) for GVC firms, using the log of firms' exports to the US as the dependent variable. The coefficient estimates are 0.02 and -0.04, respectively, for three years and two years before the start of the trade war, and neither is significantly different from zero. This shows no pre-trends between exposed and non-exposed GVC firms and is consistent with the current literature that finds no major pre-trends across products targeted by the tariff policy (e.g., Amiti et al., 2020; Fajgelbaum et al., 2020; Cavallo et al., 2021).

The estimate rises to 0.80 in the first year of the trade war and nearly doubles to 1.54 in 2019, both statistically and economically significant. Following the COVID-19 pandemic in 2020, it increases slightly to 1.58 in 2021 and remains significant.

The average change in US tariffs over the 2018–19 period for China weighted by GVC firms' 2017 export portfolios is 0.195 (see Table A.2). This figure closely matches the difference in exposure between firms at the 90th and 10th percentiles of the IMMEX sample (0.25 vs. 0.052). Applying this 90/10 exposure difference (0.198) to the 2021 coefficient of 1.58 implies a 37% ($e^{1.58\times0.198}-1$) increase in US exports for more exposed GVC firms relative to less exposed ones, compared to their 2017 levels.[10]

[10] In Figure B.3, we compare results obtained using one- two- and three-digit North American Industry Classification

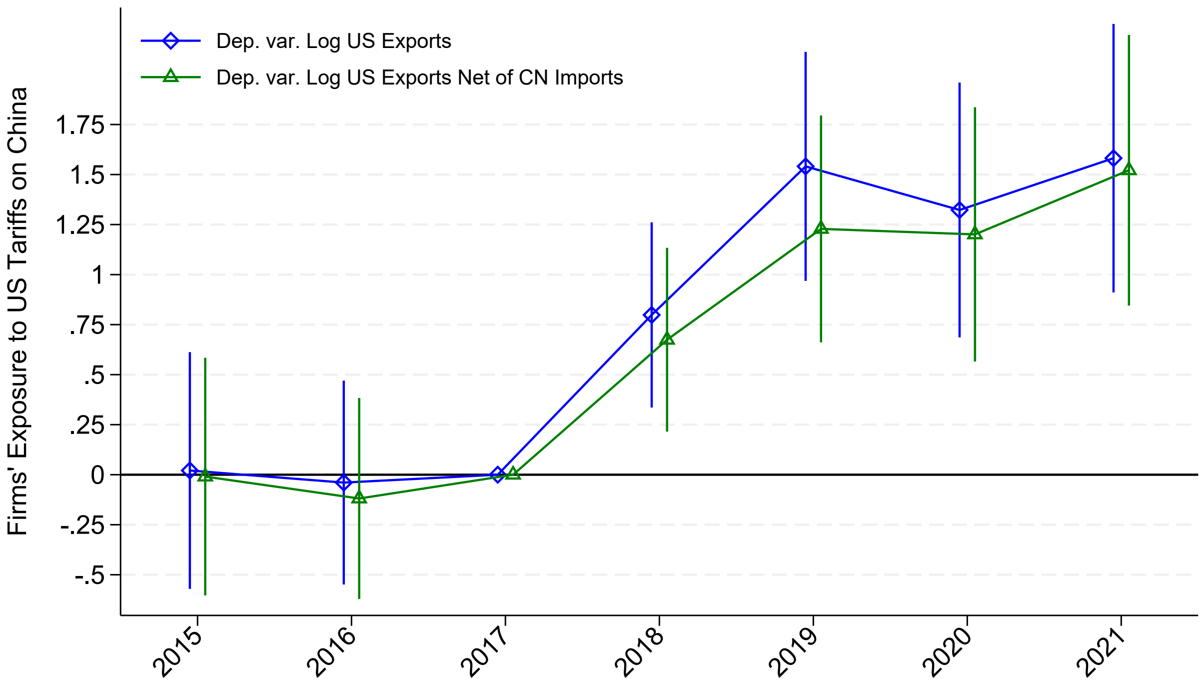


Figure 3: Impact of US Tariffs Targeting China on GVC Firms' Exports to the US

Notes: Estimates from equation 5 with additional industry-by-year fixed effects. The dependent variables (see legend) are log US exports (diamond) and log US exports net of Chinese imports (triangles), with N=36,347 and N=34,558, respectively. Standard errors are clustered at the firm level. The y-axis reports yearly DD estimates for TM_i^{US-CN} with 95% confidence intervals.

Figure B.4 presents the results for GVC firms' total exports and non-US exports. The DD coefficients for total exports are statistically significant throughout 2018–2021, while those for non-US exports are not. In 2021, the coefficient for total exports is 1.43, compared to just 0.16 for non-US exports, indicating that the increase in firms' total exports is due to their rising exports to the US.

Transshipment of Goods from China

One question at the heart of the policy debate is whether there is a potential for transshipment of goods from China through Mexico, and if so, the role of such transshipment in driving the positive effect on exports. To specifically address possible transshipment between US and China,

System (NAICS) industry by year fixed effects; the estimates are similar.

we distinguish US exports net of Chinese imports, as follows:

$$NetUSX_{it}^{MCN} = \sum_{j \in \mathtt{J}_{\mathtt{it}}^{\mathtt{USX}}} [X_{ijt}^{US} - M_{ijt}^{CN}] \tag{7}$$

Here, $\mathtt{J}_{\mathtt{it}}^{\mathtt{USX}}$ denotes the set of six-digit products of firm i exported to the US at period t. $NetUSX_{it}^{MCN}$ is obtained by subtracting any imports in good j from China from firm i's exports of good j to the US at period t in values. While this measure does not capture goods originated from China if firms purchase them domestically, nearly all manufacturing GVC firms in the sample are direct importers as their GVC status grants them importing privileges.

The results for US exports net of Chinese imports in Figure 3 (triangle markers) show a significant positive impact from 2018 to 2021. The temporal pattern and coefficient values closely align with those for total US exports, with the largest difference occurring in 2019: 1.23 for net US exports versus 1.54 for total US exports (Figure 3), a 0.31 gap that is not statistically significant. By 2021, the estimates converge to 1.52 and 1.58, respectively. We do not find evidence that the documented increase in GVC firms' US exports is attributable to the transshipment of Chinese goods. We further explore the effect on firms' total net exports. Results in Appendix B.2.1 show that the US trade policy shift targeting China has a significant positive impact on GVC firms' exports net of their total global imports regardless if these imports used as capital equipment or in domestic sales.

In Figure B.5, we present the year by year effects of China's retaliatory tariffs on GVC firms' exports. The results show no major pre-trends, with the DD coefficient estimates being statistically indistinguishable from zero in 2015 and 2016. A robust, statistically significant negative effect emerges, peaking in 2019. However, this effect weakens after 2019 and becomes statistically indistinguishable from zero once we rely on tariff variations within three-digit industries. These findings indicate a limited, short-run negative impact of the retaliatory tariffs. The estimate for 2019 is -0.60. For two IMMEX exporters—one at the 75th percentile and the other at the 25th percentile of exposure to China's retaliatory tariffs—a coefficient of -0.60 corresponds to a 7%

relative drop in exports ($e^{-0.60\times0.12} - 1$) during the peak of the trade war.[11]

5.2 Heterogeneity in GVC Adjustment to the US-China Trade War

While the majority of IMMEX firms are manufacturing enterprises, the program encompasses a diverse range of industries, including agriculture, warehousing, transportation, and professional services (Table A.3). In this section, we examine how firms' responses to the US-China trade war differ across industries and analyze whether export responses vary by the technology content of exports and their proximity to final consumers.

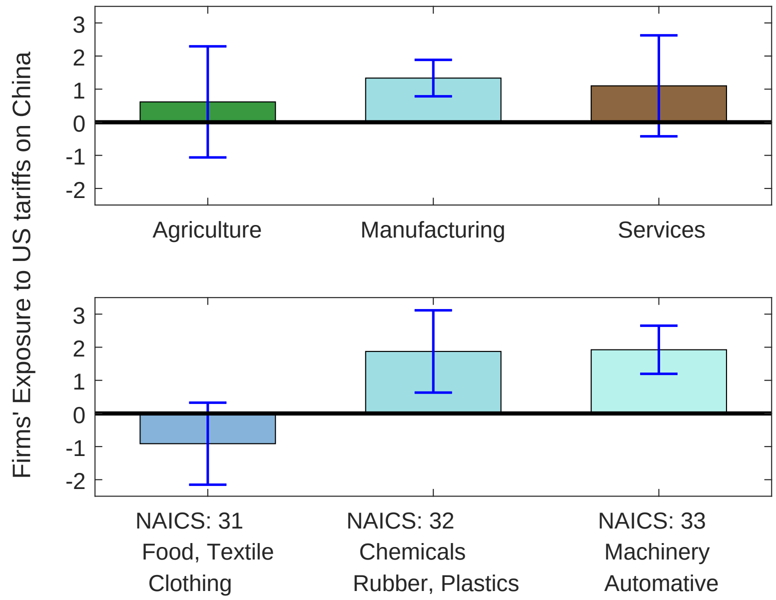
5.2.1 Heterogeneous Effects across Industries

To examine industry-level heterogeneity, we estimate Equation B.1 separately by sector, including three-digit NAICS-by-year fixed effects and focusing on tariff variation across products within each three-digit industry. The top panel of Figure 4a shows the average treatment effect of US tariff hikes on China across Agriculture, Manufacturing, and Services, based on firms' total exports. The effect is positive in all three sectors but precisely estimated only for manufacturing GVC firms, where most IMMEX firms are concentrated.

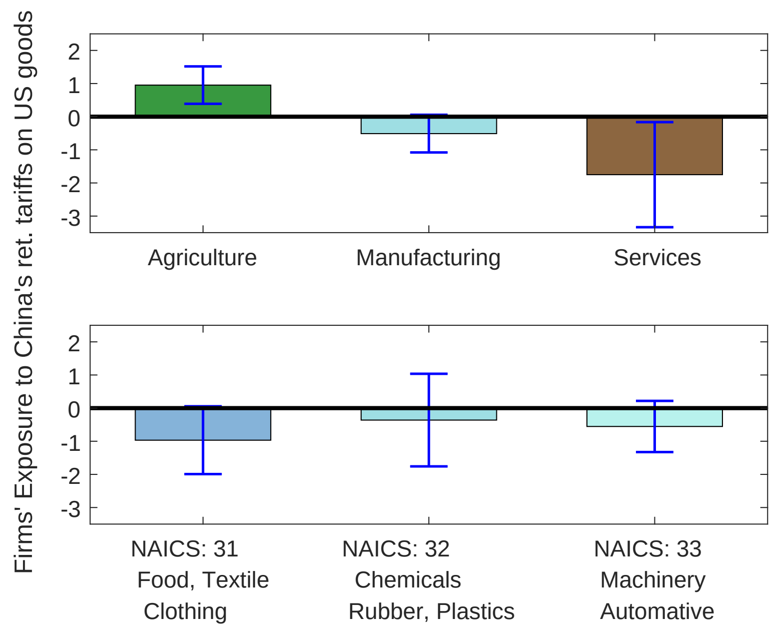
The bottom panel of Figure 4a examines the heterogeneous effects within manufacturing industries. The results reveal that not all manufacturing industries benefited from the US tariffs. Traditionally labor-intensive industries such as textile, apparel, and footwear saw no expansion (NAICS: 31), while skill-intensive industries such as chemicals, computers, machinery, and automotive (NAICS: 32 & 33) experienced significant export growth. This cross-industry pattern aligns with Mexico's long-term shift toward tech-intensive GVCs that has been happening since the 2000s, driven in part by heightened competition with China in the US market (Utar and Ruiz (2013)).

Figure B.7 in the Appendix shows a similar sectoral pattern for firms' US exports. A key difference is that the 2018–19 US tariffs on China significantly boosted agricultural firms' US exports, while

[11] GVC firms at the 25th and 75th percentiles of exposure to China's tariffs have TX_i^{CN-US} values of 0.11 and 0.23, respectively (see Table A.2).



(a) Average Effects of US Tariff Hikes on China



(b) Average Effects of China's Retaliatory Tariffs

Figure 4: Effects of the US-China Trade War on GVC Firms' Total Exports across Industries

Notes: Separate estimations across IMMEX companies operated in: NAICS=1, 2; NAICS=31,32,33; NAICS≥4; NAICS=31; NAICS=32; and NAICS=33. The dependent variable is the logarithm of firms' total exports. Each regression includes firm fixed effects, baseline firm size by year, three-digit NAICS-by-year fixed effects, and controls for concurrent trade policy changes. Bar heights represent the average treatment effect of US tariff hikes on China (Figure 4a) and China's retaliatory tariffs on the US (Figure 4a) over 2018–2021. Robust standard errors are clustered at the firm level, and error bars indicate 95% confidence intervals. The number of observations is 2,823 (Agr), 30,185 (Man), 4,255 (Service), 5,819 (NAICS=31), 4,612 (NAICS=32), and 19,691 (NAICS=33).

their total exports (Figure 4a) were unaffected. This suggests agricultural GVC firms may have redirected exports to the US rather than expanded overall capacity–plausible given the short-term rigidity of agricultural production and uncertainty over the tariffs' duration (Handley, 2014).

Heterogeneous Impact of China's Retaliatory Tariffs

Figure 4b presents the effect of China's retaliatory tariffs, revealing sharp sectoral differences. Specifically, China's tariffs have a substantial adverse effect on firms in export services including warehousing, distribution, waste management, and other post-production services and no significant effect within manufacturing. The DD coefficient estimate is -1.75 for services and significant at the 5% level. At the same time, China's tariffs on US goods have a markedly different impact on agricultural GVC firms, boosting their exports. The DD estimate for this group is 0.95 and statistically significant at the 1% level.[12] This finding suggests that the US and Mexico's agricultural products are primarily substitutes while export services conduct complementary activities to US manufacturing.

The bottom panel of Figure 4b shows no major effect of China's retaliatory tariffs on skill- and technology-intensive manufacturing sectors—the same sectors that benefited from the US tariffs on China.[13] Overall, the findings support our conjecture that the negative effects of China's retaliatory tariffs stem largely from GVC firms providing export services to US businesses now facing reduced demand due to China's tariffs.

5.2.2 Heterogeneous Effects across Product Types

The positive impact of US tariffs on Mexico's GVCs is largely concentrated in technology-rich industries. Exploring this further, we examine how the effect varies across firms' exports of consumer goods, intermediate and capital goods, and raw materials. The results, presented in Figure

[12] Although firms under NAICS 1 and 2 are grouped together, the positive effect is driven primarily by agricultural GVC firms, which make up the majority of this group.

[13] China's retaliatory tariffs have a somewhat more pronounced negative effect in less skill intensive manufacturing such as denims. While a significant portion of US denim production has moved offshore due to lower labor costs, some premium denim brands and manufacturers still produce in the US, particularly in California. Co-production activities between these US manufacturers and IMMEX firms may have contributed to the observed negative impact.

5 show that most of the observed export growth falls within intermediate and capital goods. This finding aligns with the prominence of intermediate and capital goods among targeted items and GVCs' significant involvement in the trade of such goods.

Figure B.10a in the Appendix examines how firm-level exports in high- and mid-tech categories versus low-tech categories respond to US tariff hikes and show that the positive effect is concentrated in mid- and high-tech exports, rather than in low-tech exports.

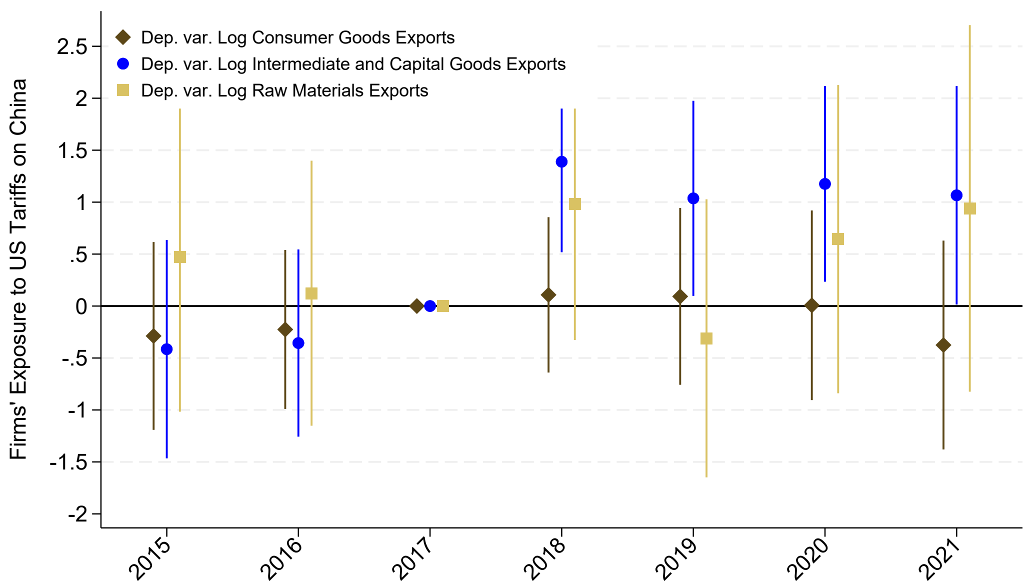


Figure 5: Impact of US Tariff Hikes on Firms' Exports by Product Type

Notes: Dependent variables are logarithmic values of firm's exports in consumer goods (N=31,755), in intermediate and capital goods (N=31,462), and in raw materials (N=10,860). Estimation of equation 5 with firm FE, baseline firm-size by year, industry by year fixed effects, the yearly controls for China's retaliatory tariffs, US tariffs on Mexico, Mexico's tariffs on US goods. Robust standard errors are clustered at the firm level. Shown are the DD coefficient estimates for TM_i^{US-CN} and confidence interval at the 95% level.

To assess whether the increase in technology-rich exports reflects product expansion, we examine changes in the number of goods exported across product types. Figure B.9 shows that the rise in intermediate and capital goods exports is not accompanied by an increase in the number of such products, suggesting growth comes mainly from existing product lines. Similarly, the increase in mid- and high-tech exports does not reflect a broadening of the product range (Figure B.10b). Instead, firms appear to expand the number of low-tech, consumer goods they export.

We also examine new product introductions by manufacturing firms and find that the shift in US trade policy prompted manufacturing GVC firms to introduce new products targeted by tariffs in the US market. Our analysis shows that the effect is stronger for products subject to higher tariffs (see Appendix Section B.4). However, the increased number of low-tech consumer products together with export growth in tech-intensive intermediate goods suggests that new product introductions, occurring mostly in consumer goods, did not contribute significantly to the overall Mexican export growth. These findings indicate that firms participating in technology-intensive supply chains benefit more from the US trade policy shift against China, primarily through the expansion of their existing product lines.

The IMMEX program is typically utilized by US companies and other foreign MNEs to achieve more cost-efficient production and services as an export platform for the US market. We next examine the role of foreign MNEs in driving the trade policy spillover.

5.3 The Role of Foreign MNEs in Shaping Mexico's Trade Expansion with the US

The concept of nearshoring centers on MNEs as a driver of Mexico's export response to the US trade policy shift. Firms participating in Mexico's IMMEX program–many of which are linked to foreign MNEs–are the primary force behind Mexico's export expansion. To shed more light on the role that foreign MNEs play in Mexico's export response to the US-China trade war, we employ global ultimate parent country information for IMMEX firms from Dun & Bradstreet.[14] By merging global parent company headquarters data with customs data, we identify 3,329 foreign-owned firms. These firms represent 56% of IMMEX firms, account for 86% of IMMEX exports, and contribute 72% of total nationwide exports in 2017. This illustrates the importance of foreign-owned MNEs in the Mexican economy. US-based MNEs dominate the group (1,590 firms), followed by European MNEs (1,021 firms) and 481 firms headquartered in other Asia, including Japan, Korea,

[14] We use firms' unique tax IDs to extract parent country information from the corporate hierarchies and connections database of D&B. To enhance coverage, we also incorporate data from the S&P Global database to identify additional 43 IMMEX firms with foreign parent companies. See Section E for further details.

Taiwan, Vietnam, Thailand, and India. Table A.4 presents summary statistics for domestic and foreign IMMEX firms separately, revealing that foreign GVC firms rely more on imported varieties and export at higher volumes.

Table A.5 summarizes firms' export and import shares across destinations depending on their parent country. While the primary export destination for all GVC firms is the US market, firms tend to exhibit home bias in both exports and imports. For instance, IMMEX firms identified as subsidiaries of MNEs headquartered in other Asia source 46% of their imports from the same region, while a typical IMMEX firm's import share from this region is 12% (Table A.1). These descriptive statistics align with the notion that MNEs often co-locate sourcing activities with other affiliates or headquarters to facilitate easier monitoring, quality control, and risk management and to strengthen business relationships within the company's network (Antràs, et al. 2022b).

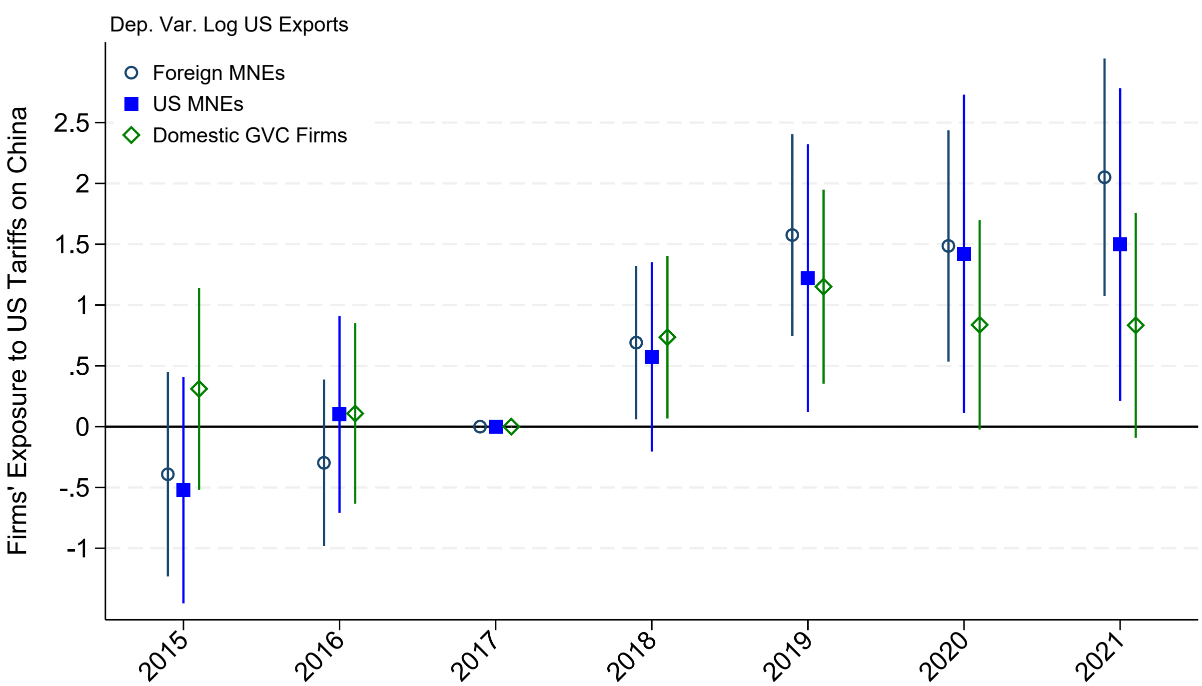


Figure 6: Foreign versus Domestic GVC Firms' Response to the US Trade Policy Shift

Notes: N=20,767 (all foreign MNEs), N=10,236 (US MNEs), N=15,519 (domestic). Dependent variable is firms' exports to the US in logarithmic form. Estimation of equation 5 with firm, baseline firm-size by year, sector by year fixed effects and the yearly firm-specific controls for China's retaliatory tariffs, US tariffs on Mexico, Mexico's tariffs on US goods. Robust standard errors are clustered at the firm level. Shown are the DD coefficient estimates for TM_i^{US-CN} and confidence interval at the 95% level.

Next, we estimate the year-by-year effect of the US trade policy shift on firms' US exports separately for foreign-owned MNEs and domestic GVC firms. Figure 6 presents these results. The circle markers depict how foreign MNEs' exports from Mexico to the US change in response to the rise in US tariffs on Chinese goods. In 2018, the coefficient estimate starts at just over 0.5 and rises significantly to 1.6 in 2019. After a slight drop in 2020, it increases further to just above 2 in 2021. These findings show a sustained and strong response from foreign MNEs.

Domestic GVC firms also show a marked response to the increased US tariffs on China. In 2019, the coefficient estimate is 1.15 and statistically significance at the 1% level. However, after a drop in 2020, the estimate remains lower in 2021, at 0.83, and is only weakly significant. These results show that, in response to increased US tariffs on China, foreign MNEs' exports to the US grew 2.5 times more than those of domestic GVC firms (2.05/0.83).

Figure 6 also reports results for subsidiaries of US MNEs separately (square markers), to isolate the effect of US ownership on the foreign MNE export response. Exports from US MNEs to the US increase significantly in response to the shift in US trade policy against China. In 2021, the coefficient estimate for US MNE subsidiaries is 1.50, which is similar in magnitude to the overall effect for GVC firms (1.58 in 2021, as shown in Figure 3). Thus, the response of US MNEs to the US trade policy shift closely mirrors the broader response of GVC firms in Mexico, which, in turn, shapes Mexico's aggregate export response.

The US trade policy shift benefits not only the Mexican operations of US MNEs but also those of European and Asian MNEs. Figure B.11 in the Appendix shows the average treatment effect on GVC firms, broken down by the parent company's region. While the impact on total exports is comparable for US- and Europe-based firms, the effect on other Asian MNEs—predominantly headquartered in Japan and Korea—is over three times greater (Figure B.11b). Though few in number with limited aggregate impact, IMMEX firms linked to Chinese parent companies also respond strongly to the US trade policy shift (Figure B.12).

These results suggest that Asian MNEs may underlie the downward-sloping supply curve patterns observed in product-level analyses (Fajgelbaum et al. 2024). Their strong export response likely reflects higher trade elasticities and greater flexibility in adjusting supply chains in response to US trade costs.

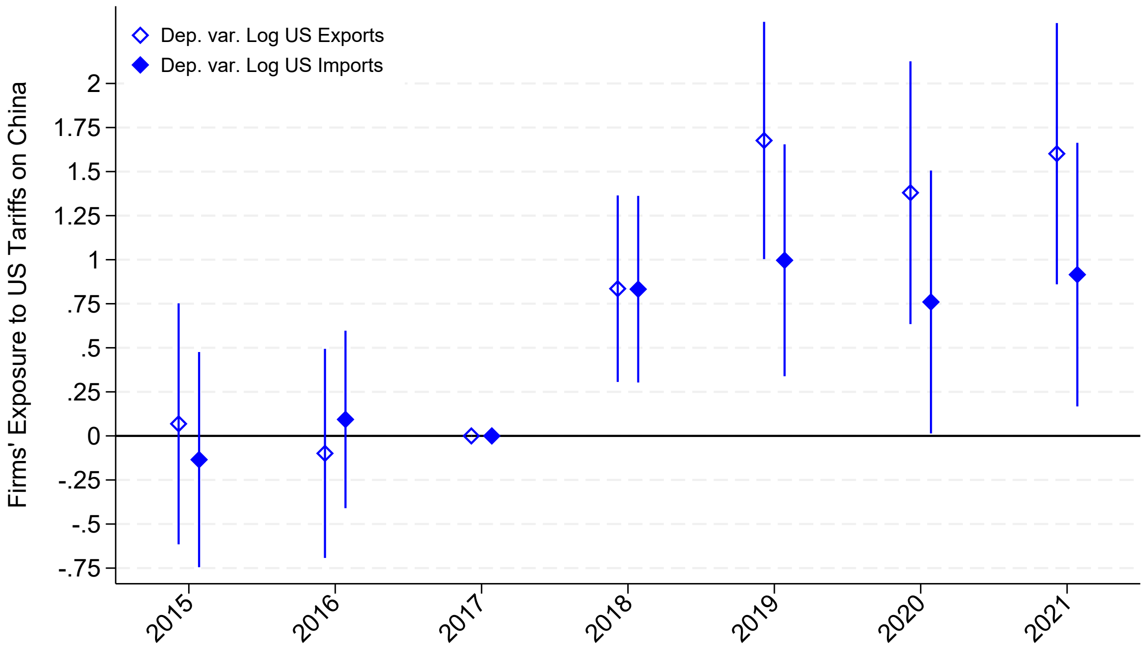
A comparison between the effects on domestic and foreign GVC firms underscores the critical role of foreign MNEs in driving the overall impact of the US-China conflict on Mexico's exports to the US. That the aggregate effect on Mexico's exports is primarily driven by GVC firms—and in particular by foreign MNEs—is consistent with the narrative of 'decoupling' between the US and China. This decoupling involves MNEs reorganizing and reallocating their activities away from China to other countries, with Mexico emerging as a key beneficiary through its well-established export platform.[15]

6 Adjustment in Sourcing among Manufacturing GVC Firms

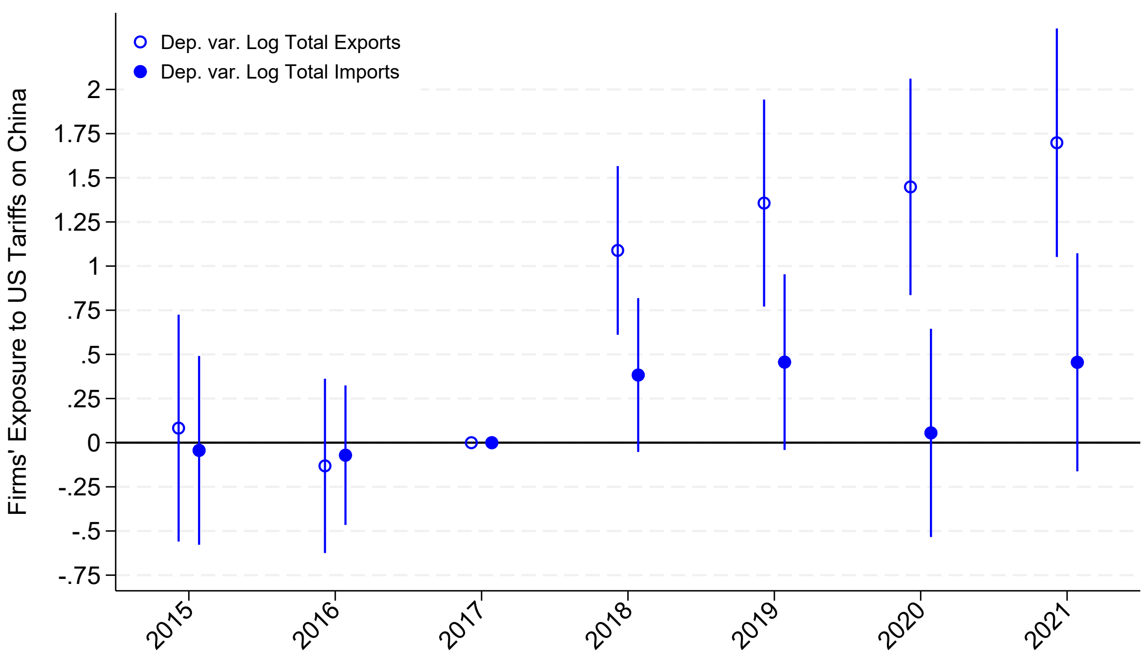
We now focus on manufacturing GVC firms to examine how they adjusted their sourcing while expanding exports in response to the US trade policy shift. Imports and exports both play a crucial role in manufacturing GVC activities, as these firms specialize in specific stages of production within integrated processes spanning borders. We begin by comparing year-by-year impacts on their total and US exports and imports, then turn to sourcing changes by origin and parent country.

Figure 7 illustrates the year-by-year effects on manufacturing GVC firms' US exports, US imports, worldwide exports, and worldwide imports (in logs). As part of value chains tightly integrated with the US, the majority of these firms both import from and export to the US. Figure 7a shows a strong positive effect on both throughout 2018–2021. The coefficient estimate for the logarithm of firms' US exports in 2019 is 1.68. As discussed earlier, the average change in US tariffs (0.195) closely aligns with the 90/10 exposure difference across IMMEX firms. Applying this to the 2019 coefficient implies a 39% ($e^{1.68\times0.195}-1$) differential increase in manufacturing GVC exports to the US. Similarly, the results for US imports show a robust positive effect of the US tariffs on China. The coefficient estimate in 2019 is 1, indicating a 21% ($e^{1\times0.195}-1$) increase in US imports

[15] Between 2017 and 2023, as China's share of US imports declined by 8.2 percentage points (pp), Mexico recorded the largest gain, increasing by 2.2 pp, followed by Vietnam with 1.5 pp (Banco de Mexico, 2023).



(a) Manufacturing GVC Firms' U.S. Exports and Imports



(b) Manufacturing GVC Firms' Total Exports and Imports

Figure 7: Impact of Increased US Tariffs on China for Manufacturing GVC Firms in Mexico

Notes: Estimation of 5. The dependent variables are indicated in the figure legends. Sample: The 2017 cohort of manufacturing IMMEX firms, observed from 2015 to 2021. Observations: N=28,977 (US exports), N=28,387 (US imports), N=30,185 (total exports), and N=29,617 (total imports). Robust standard errors are clustered at the firm level. Year-by-year DD coefficient estimates for TM^{US-CN} are shown with 95% confidence intervals.

over the same exposure difference.

For total exports, the DD estimate rises from 1.36 in 2019 to 1.7 in 2021 (Figure 7b). In contrast, the positive effect on firms' total imports is weaker, with estimates of 0.38 and 0.46 in 2018 and 2019, respectively, both weakly significant at the 10 percent level. By 2020, the effect approaches zero, and although there is a rebound in 2021, it is no longer statistically significant. These findings–consistent with the increased net exports shown in Figure B.6–highlight the expansionary impact of the new US tariffs on Mexico's manufacturing GVCs.[16]

To examine how firms adjusted their sourcing strategies, Table 2 presents the results from estimating equation 6, where the dependent variables are the log values of firms' total imports from different regions and countries. For completeness, columns (1) and (2) present the effects on firms' total imports and imports from the US, as illustrated in Figure 7. Columns (3) through (6) report the effects on imports from Europe, Latin America, China, and other Asia, respectively.

The results show no significant impact on manufacturing firms' imports from European countries (column 3). Although the DD estimates turn positive at the start of the trade war, except in 2020, they are not statistically significant. In column (4), there is evidence of a temporary increase in imports from Latin American countries, but this effect is not sustained over the longer term. The results on Chinese imports in column (5) reveal no significant effect. In contrast, column (6) shows a significant increase in imports from six Asian countries with significant GVC presence: Japan, Korea, Taiwan, Thailand, Vietnam, and India.

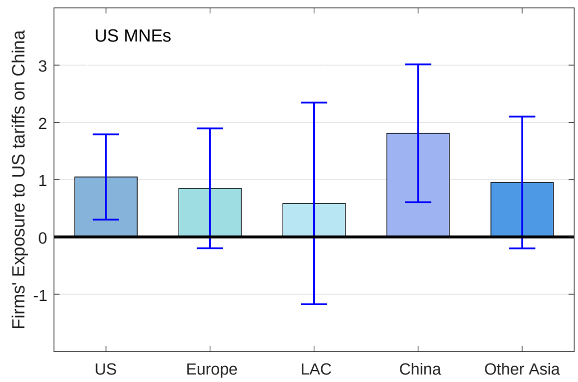
In summary, manufacturing GVC firms more exposed to US tariff hikes on China increased imports from both the US and other major Asian economies integrated into GVCs. These findings provide firm-level evidence of supply chain adjustments in response to the US trade policy shift, highlighting Mexico's role as a hub connecting US and Asian production networks.

[16] Results are robust to controlling for three-digit industry specific shocks, see Figure B.13.

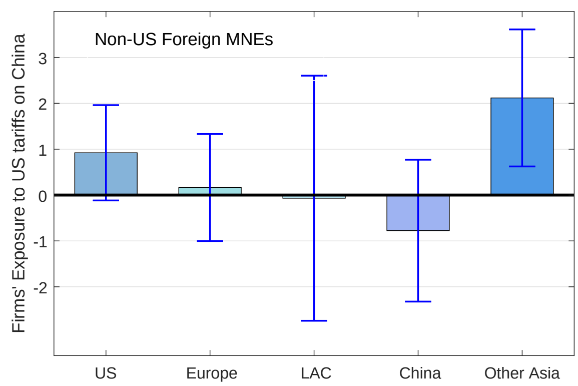
Table 2: Sourcing Adjustments by Manufacturing GVC Firms in Response to the Increased US Tariffs on China

	(1)	(2)	(3)	(4)	(5)	(6)
Sample:		Manufacturing GVCs (IMMEX)				
Dep Var. Log of Firms' Imports from	Worldwide	US	Europe	LAC	China	Other Asia
$TM_i^{US-CN} \times 2015$	-0.044	-0.135	-0.317	0.946	-0.724	-0.318
	(0.273)	(0.311)	(0.426)	(0.863)	(0.462)	(0.535)
$TM_i^{US-CN} \times 2016$	-0.071	0.093	-0.104	1.091	-0.551	-0.783^c
	(0.201)	(0.257)	(0.424)	(0.687)	(0.385)	(0.443)
$TM_i^{US-CN} \times 2018$	0.383^c	0.833^a	0.051	0.740	-0.172	0.817^c
	(0.222)	(0.270)	(0.393)	(0.732)	(0.422)	(0.442)
$TM_i^{US-CN} \times 2019$	0.456^c	0.997^a	0.272	1.924^b	0.271	1.125^b
	(0.254)	(0.336)	(0.436)	(0.847)	(0.492)	(0.494)
$TM_i^{US-CN} \times 2020$	0.055	0.760^b	-0.330	0.450	0.063	1.082^b
	(0.301)	(0.380)	(0.459)	(0.909)	(0.538)	(0.549)
$TM_i^{US-CN} \times 2021$	0.455	0.915^b	0.441	0.751	0.931	1.183^b
	(0.315)	(0.381)	(0.493)	(0.914)	(0.599)	(0.603)
China's Retaliatory Tariff Exposure × Year FEs	✓	✓	✓	✓	✓	✓
Section 232 Tariff Exposure × Year FEs	✓	✓	✓	✓	✓	✓
Mexico's Retaliatory Tariff Exposure × Year FEs	✓	✓	✓	✓	✓	✓
Baseline Firm Size × Year FEs	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Observations	29,617	28,387	24,075	14,787	25,834	24,734
R-squared	0.914	0.898	0.859	0.802	0.855	0.865

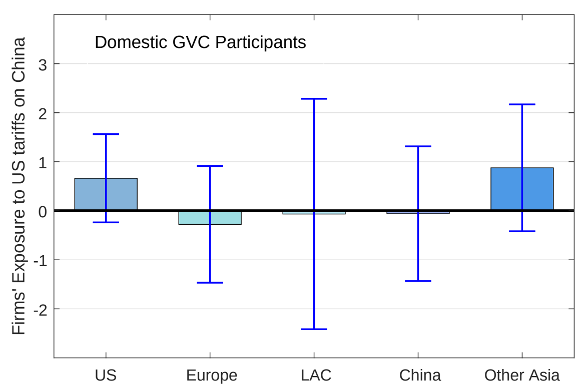
Notes: The 2017 cohort of manufacturing IMMEX firms, observed from 2015 to 2021. Estimation of equation 5. The dependent variables are the natural logarithmic transformation of firm's import from countries/regions as given in column headings. Europe refers to the EU-28 countries, including the UK. Other Asia refers to the following set of countries: Taiwan, Thailand, Vietnam, Japan, Korea, and India. LAC refers to the Latin American Countries excluding Mexico. Robust standard errors are clustered at the firm level. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% levels respectively.



(a) Changing Import Patterns of US MNEs



(b) Changing Import Patterns of Non-US Foreign MNEs



(c) Changing Import Patterns of Domestic GVCs

Figure 8: US-China Trade War and Manufacturing GVC Firms' Imports across Regions

Notes: Estimation of equation B.1 separately across samples and dependent variables. The dependent variables are logarithm of imports from the US, Europe (EU-28), Latin American countries, China, and other Asia (Taiwan, Thailand, Vietnam, Japan, Korea, and India), respectively from left to right. The sample of GVC firms operating in NAICS=31, 32, 33, are partitioned to three groups in figures (a), (b), and (c), respectively: subsidiaries of US MNEs, non-US foreign MNEs, domestic GVC participants. See Table B.4 for additional details. Shown are the DD coefficient estimates corresponding to TM^{US-CN} with 95% confidence intervals.

To examine heterogeneity in sourcing behavior by parent country, we analyze manufacturing firms separately by ownership: US MNEs, other foreign MNEs, and domestic firms. Figure 8a highlights a notable difference between subsidiaries of US MNEs and those of other foreign MNEs (8b) and domestic firms (8c). GVC firms generally increase their imports from the US and other Asia, highlighting Mexico's role as a substitute for China within supply chains involving the US and Asia. However, subsidiaries of US MNEs exhibit a distinct response: they increase their imports from China in reaction to the US tariffs on China. This pattern suggests nearshoring, where US MNEs expand operations in Mexico as a substitute for—or at the expense of—their US-based production to mitigate tariff costs. Meanwhile, the significant rise in imports from the US and other Asian countries by non-US MNEs in Mexico points to a re-optimization of supply chains away from China and toward Mexico.

6.1 Using Mexico's Trade Facilitation Tool *Regla Octava* to Understand Supply Chain Shifts

When an MNE establishes a new plant in Mexico or expands an existing one to introduce a new production line, it may need to source additional inputs from outside North America. In such cases, the company registers under PROSEC (if not already registered) to obtain a *Regla Octava* permit for the specific input, allowing it to import essential intermediate or capital goods at zero or significantly reduced MFN tariffs. In 2017, a typical manufacturing GVC firm sourced about 4% of its imports under *Regla Octava*.

To better understand how supply chains are shifting to Mexico, we analyze firm- and good-specific preferential tariff treatments under *Regla Octava*. Specifically, we evaluate whether the US trade policy shift has affected firms' likelihood of obtaining these permits and whether inputs sourced under *Regla Octava* are concentrated in particular regions.

Figure 9a presents the results from estimating equation 5, where the dependent variable equals one if a firm has imports under *Regla Octava* permits in a given year. The estimation is conducted for all manufacturing GVC firms and separately for foreign and domestic ones. The findings show that the US trade policy shift against China significantly increased firms' likelihood of utilizing a *Regla Octava* permit, with the effect driven largely by foreign MNEs.

The coefficient estimate for the sample of all manufacturing firms in 2021 is 0.27. Applying the 90th–10th percentile exposure difference of 0.198 implies a 5.3 percentage point increase in the likelihood of using a *Regla Octava* permit. Permit usage among manufacturing GVC firms rose from 29% in 2017 to 34% in 2021. Given that the average increase in US tariffs in IMMEX firms' exposure to US tariffs over this period was 0.195, the estimated effect can plausibly account for the entire observed rise in permit utilization.

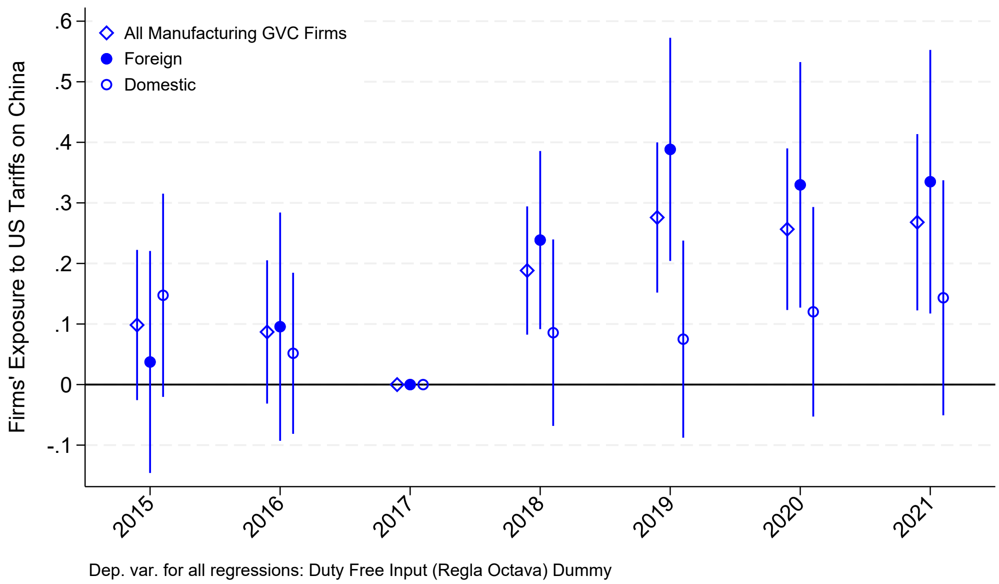
Figure 9b examines how the value of firm imports under preferential duty permits varies by source region. The dependent variables are the value of imports under these permits, transformed using the inverse hyperbolic sine to retain zero-valued observations. The results show a significant positive effect of the US trade policy shift on total preferentially treated imports.

Where do firms source these inputs? The figure shows no effect on imports from the US, consistent with the fact that most US goods already enter duty-free unless they are targeted by the Mexican government in retaliation for the steel and aluminum tariffs. Because firms typically do not require permits to import US goods, the US tariffs hikes on China had no measurable impact on their preferential treatment.[17]

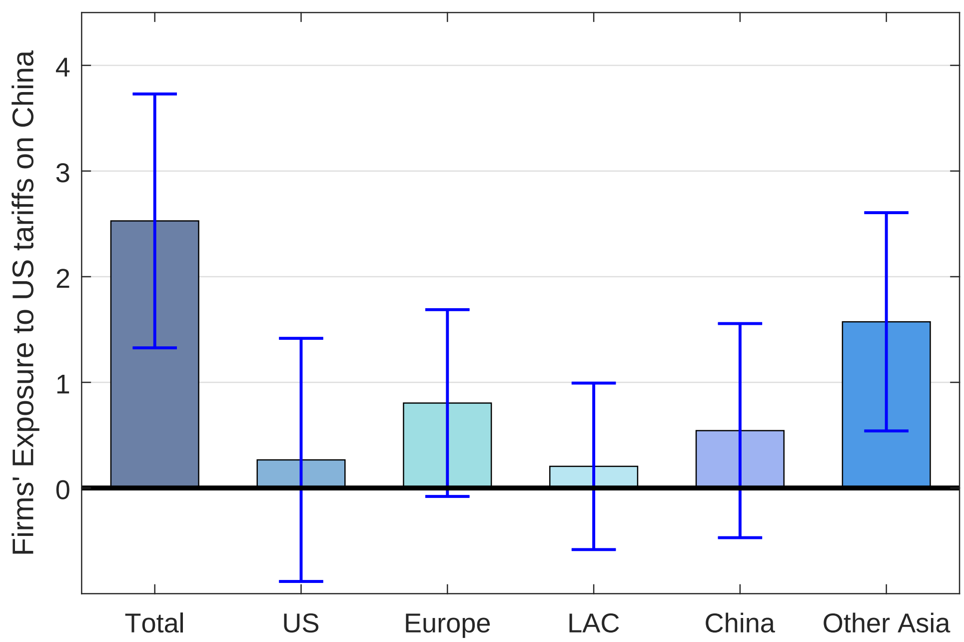
Figure 9b shows some evidence for increased European imports under *Regla Octava*, this is consistent with the increased activity of EU-based multinationals operating in Mexico to serve the US market. The DD coefficient value is 0.80 and statistically significant at the 10% level.

The US trade policy shift had no discernible effect on preferentially treated imports from Latin America or China. By contrast, we observe a clear and significant positive impact on preferentially treated imports from other key Asian countries with substantial GVC activity, suggesting that the policy shift not only increased imports from these countries but also encouraged greater use of

[17]Notice that the impact of Mexican retaliatory tariffs on firms' importing US goods with permits is separately accounted for in these regressions (see Section B.8). We return to this point below.



(a) GVC Firms with government permits for low tariff rates



(b) The Value of Imports Under Preferential Duty Rates

Figure 9: Effect of US Tariffs on Manufacturing GVC Firms' Use of Preferential Duties

Notes: The sample includes GVC firms operating in NAICS=31, 32, 33 (as of 2017) over 2015–2021, with N=30,840 in both figures. Top figure: Estimation of equation 5 with the dependent variable as a 0–1 indicator for whether a firm imports with a Regla Octava/PROSEC license at preferential rates. Bottom figure: Estimation of equation B.1 with the dependent variables being the value of imports treated with preferential duties across regions, as indicated in the bar legends, transformed using the inverse hyperbolic sine. Europe refers to the EU-28, Other Asia includes Taiwan, Thailand, Vietnam, Japan, Korea, and India, and LAC refers to Central and South America. Shown are the DD coefficient estimates corresponding to TM^{US-CN} with 95% confidence intervals.

firm-specific duty exemptions.

To explore potential heterogeneity, we conduct a triple DD estimation distinguishing between domestic firms, US MNEs, and non-US foreign MNEs. Results presented in Table B.5 reveal that the increase in EU and other Asian inputs through *Regla Octava* is largely driven by non-US foreign MNEs, most of which are headquartered in Europe and Asia and whose primary motivation is to use Mexico as an export platform to serve the US market.

It is worth emphasizing that these results are obtained while controlling for additional trade war factors, such as retaliatory tariffs. The full results show no significant effect of China's retaliatory tariffs; however, we find a significant positive impact of Mexico's retaliatory tariffs on GVC firms' preferential imports from the US, particularly during 2018 and 2019.[18] Figure B.14 shows these findings. Notably, the retaliatory tariffs imposed by Mexico on US imports led GVC firms to increase their preferential imports of targeted US goods. This suggests that while penalizing US imports, the Mexican government simultaneously sought to mitigate negative effects on GVC firms by maintaining preferential rates for key inputs.

Together, these results show an important role for trade facilitation instruments, especially in a trade war environment, to mitigate the negative effect of tariffs on domestic participation in GVCs and, at the same time, to benefit from the positive spillover effects of the third-country tariffs.

These findings also provide further evidence for relocation of supply chain activities in response to the US trade policy shift and the role of foreign MNEs driving it.

7 Concluding Remarks

After promoting global tariff reductions for decades, US trade policy took a decisive turn in 2018 with the aim of reducing reliance on China, which had emerged as the world's foremost manufacturing hub. This shift, marked by the US-China trade war, sparked discussions on 'nearshoring,'

[18] In May 2019, the United States, Mexico, and Canada agreed to remove Section 232 tariffs on Mexican and Canadian goods in exchange for the removal of retaliatory tariffs by Mexico and Canada. While Mexico's retaliatory tariffs were lifted on May 20, 2019, some anti-dumping fees on US products, such as seamed carbon steel pipes, remained.

‘friendshoring,’ and Mexico’s potential as an alternative to China.

To examine the impact of the US-China trade war on Mexican firms, we use longitudinal firm-level data covering all firms engaged in international trade in Mexico and construct firm-level measures of tariff exposure based on pre-shock export portfolios at the product level. Controlling for firm- and industry-specific trends, we leverage the abrupt shift toward protectionist policies as a natural experiment to show that the US-China trade war significantly affected Mexican firms. By distinguishing firms operating in GVCs and identifying their parent countries, we demonstrate that GVC firms were the primary channel through which the trade dispute impacted Mexico. Notably, US tariff hikes targeting China particularly boosted exports from manufacturing subsidiaries of foreign MNEs compared to domestic GVC firms, with gains concentrated in technology-intensive industries. Analyzing firms’ imports and use of duty-free permits in response to the US-China trade war, we also document shifting sourcing patterns consistent with nearshoring by US MNEs and GVC re-adjustments toward Mexico by foreign MNEs. While Mexico is a ‘third country’ with respect to the US-China trade war, we show that foreign MNEs, as the direct subject of the US-China trade war, played a pivotal role in driving the positive effect on Mexico.

The findings have important policy implications, particularly for trade and industrial strategies in North America. The significant role of GVC firms and foreign MNEs in channeling the benefits of the US-China trade war emphasizes the importance of maintaining and enhancing programs that facilitate GVC participation, such as Mexico’s IMMEX program. Policymakers should prioritize measures that strengthen Mexico’s integration into North American production networks, particularly in technology-intensive sectors, to capitalize on nearshoring opportunities.

For the US, the findings suggest that protectionist trade policies aimed at reshoring manufacturing may strengthen regional production sharing instead and give rise to the question of suitability and sufficiency of tariff policies in achieving domestic manufacturing goals.

Taken together, these findings underscore the transformative role of trade policy in reshaping global production and service networks and provide firm-level evidence of the nuanced occurrence of nearshoring in response to the trade war, highlighting the complex and multifaceted nature of these adjustments.

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Online Appendix:

"The US-China Trade War and Relocation of Global Value Chains to Mexico"

July 27, 2025

Contents (Appendix)

A Descriptive Statistics

Table A.1: Firms' Trade Across Destinations

	Mean	P25	P75	Mean	P25	P75
	(1)	(2)	(3)	(4)	(5)	(6)
	Non-IMMEX Exporters			IMMEX Firms		
Panel A. Share in Firm's Exports						
USA	0.606	0.000	1.000	0.801	0.762	1.000
Canada	0.020	0.000	0.000	0.023	0.000	0.000
Latin America	0.232	0.000	0.251	0.075	0.000	0.004
Europe	0.067	0.000	0.000	0.037	0.000	0.002
China	0.014	0.000	0.000	0.016	0.000	0.000
Other Asia	0.018	0.000	0.000	0.026	0.000	0.000
Panel B. Share in Firm's Imports						
USA	0.394	0.003	0.799	0.525	0.182	0.854
Canada	0.023	0.000	0.000	0.024	0.000	0.007
Latin America	0.047	0.000	0.000	0.032	0.000	0.002
Europe	0.209	0.000	0.301	0.121	0.000	0.120
China	0.191	0.000	0.237	0.137	0.002	0.172
Other Asia	0.082	0.000	0.050	0.119	0.001	0.115

Notes: Exporters as of 2017. The numbers of observations are 30,524, and 5,943, respectively in columns (1)-(3) and (4)-(6) in Panel A. The numbers of observations are 12,659, and 5,554, respectively in columns (1)-(3), and (4)-(6) in Panel B. Latin America refers to countries located in Central and Southern America. Europe refers to the EU28, namely the following countries: Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the UK. Other Asia refers to the following set of countries: Japan, Korea, India, Taiwan, Thailand, and Vietnam.

Table A.2: Firm-Level Measures of Exposures to the Trade War

	(1) Mean	(2) SD	(3) P25	(4) P75	(5) N
Panel A. All Exporters					
TM_i^{US-CN}	0.168	0.095	0.095	0.250	190,830
TX_i^{CN-US}	0.165	0.098	0.100	0.233	190,830
TM_i^{US-MEX}	0.001	0.015	0.000	0.000	190,830
TX_i^{MEX-US}	0.002	0.015	0.000	0.000	190,830
Panel B. IMMEX Firms					
TM_i^{US-CN}	0.195	0.078	0.151	0.250	39,422
TX_i^{CN-US}	0.171	0.082	0.110	0.229	39,422
TM_i^{US-MEX}	0.003	0.022	0.000	0.000	39,422
TX_i^{MEX-US}	0.005	0.020	0.000	0.000	39,422

Notes: See Section 3.1 for the definitions of these variables.

Table A.3: Distribution of IMMEX firms in 2017 across sectors

Agricultural and Animal Production	6.3%
Mining and Utilities	1.2%
Manufacturing	80.2%
Warehousing and Storage Services	5.7%
Business Services	3.9%
Repair, Maintenance, Personal and Laundry Services	1.4%
Other Services	1.4%

Notes: Data source are the IMMEX registry and customs data (COMEXT).

Table A.4: Summary Statistics of Foreign versus Domestic IMMEX Firms in 2017

Variable	(1) Mean	(2) Median	(3) SD	(4) Min	(5) Max	(6) Obs
Panel A. Foreign MNEs						
Firms w/ Preferential Duty License	0.313	0	0.464	0	1	3,329
Export	1	1	0	1	1	3,329
Import	0.974	1	0.158	0	1	3,329
Number of Goods (HS6) Exported	38.525	17	53.426	1	500	3,329
Number of Goods (HS6) Imported	141.642	101	137.801	0	1,069	3,329
Number of Countries Exported	6.118	2	9.108	1	96	3,329
Number of Countries Imported	19.817	16	15.754	0	131	3,329
Log Value of Exports	15.460	15.923	2.994	2.502	23.523	3,329
Log Value of Imports	15.954	16.284	2.460	2.483	23.130	3,244
Panel B. Domestic IMMEX						
Firms w/ Preferential Duty License	0.154	0	0.361	0	1	2,614
Export	1	1	0	1	1	2,614
Import	0.884	1	0.321	0	1	2,614
Number of Goods (HS6) Exported	15.351	6	31.424	1	617	2,614
Number of Goods (HS6) Imported	50.289	20	80.924	0	1,126	2,614
Number of Countries Exported	3.731	1	6.666	1	122	2,614
Number of Countries Imported	8.818	5	10.061	0	100	2,614
Log Value of Exports	14.097	14.381	2.597	0.020	22.407	2,614
Log Value of Imports	13.665	13.830	2.612	0.010	21.426	2,310

Notes: Variables, “IMMEX”, “Firms w/ Preferential Duty License”, “Export”, “Import” are dummies. Values are expressed in USD.

Table A.5: **Firms' Trade Across Destinations based on Parent Country**

	Domestic	Foreign Parent	US Parent	EU28 Parent	Other Asia Parent	China Parent
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Share in Firm's Exports						
USA	0.815	0.789	0.863	0.736	0.722	0.795
Canada	0.021	0.024	0.015	0.028	0.016	0.032
LAC	0.077	0.074	0.066	0.090	0.063	0.045
Europe (EU28)	0.031	0.042	0.019	0.078	0.038	0.057
China	0.014	0.017	0.009	0.024	0.026	0.013
Other Asia	0.018	0.031	0.013	0.016	0.125	0.029
Panel B. Share in Firm's Imports						
USA	0.561	0.500	0.619	0.432	0.282	0.358
Canada	0.024	0.024	0.021	0.025	0.010	0.016
LAC	0.044	0.023	0.018	0.024	0.013	0.006
Europe (EU28)	0.101	0.135	0.075	0.263	0.058	0.174
China	0.141	0.135	0.133	0.136	0.137	0.303
Other Asia	0.085	0.143	0.099	0.075	0.464	0.116

Notes: IMMEX firms in 2017. The numbers of observations are 2614, 3329, 1590, 1021, 481, 71 respectively in columns (1)-(6) in Panel A. The numbers of observations are 2310, 3244, 1555, 988, 478, and 71 respectively in columns (1)-(6) in Panel B. LAC refers to the countries located in the Central and Southern America. Europe refers to the EU28, namely the following countries: Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the UK. Other Asia refers to the following set of countries: Japan, Korea, India, Taiwan, Thailand, and Vietnam.

Table A.6: Firm-Level Measures of Input Exposures to the Trade War

	(1) Mean	(2) SD	(3) P25	(4) P75	(5) N
Panel A. All Exporters					
$IMCN_i^{USIT}$	0.030	0.058	0.000	0.030	190,830
IC_i^{USIT}	0.066	0.085	0.000	0.126	190,830
IC_i^{USRT}	0.052	0.071	0.000	0.094	190,830
Panel B. IMMEX Firms					
$IMCN_i^{USIT}$	0.036	0.051	0.002	0.047	39,422
IC_i^{USIT}	0.114	0.082	0.039	0.184	39,422
IC_i^{USRT}	0.092	0.071	0.029	0.144	39,422

Notes: See Section C.2 for the definitions of these variables.

B Additional Results

B.1 Supplemental Results for Section 5

We estimate a simplified, difference-in-differences version of Equation 5 where we interact the firm-level trade policy exposures with a post-shock indicator, $Post2008_t$, that takes one in the year 2018 and onwards, as follows:

$$\begin{aligned} Y_{it} = \beta_0 + \beta_1\, Post2008_t \times TM_i^{US-CN} + \beta_2\, Post2008_t \times TX_i^{CN-US} + \beta_3\, Post2008_t \times TM_i^{US-MEX} \\ + \beta_4\, Post2008_t \times TX_i^{MEX-US} + Z_{it} + \eta_i + \varepsilon_{it} \end{aligned} \tag{B.1}$$

In equation B.1 we explicitly write the elements of P_{it}, which include the controls for China's retaliatory tariffs, and the US-Mexico tariff escalations. As before, Z_{it} includes baseline firm-size-by-year and nonmanufacturing-by-year fixed effects.

Table B.1 present the results from estimating equation B.1.

Table B.1: The Average Impact of the US-China Trade War on Mexican Firms' Exports

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Log US Exports				Log Worldwide Exports			
$TM_i^{US-CN} \times Post2018_t$	0.411^a	0.411^a	0.406^a	0.405^a	0.467^a	0.472^a	0.452^a	0.455^a
	(0.125)	(0.125)	(0.122)	(0.122)	(0.108)	(0.108)	(0.101)	(0.101)
$TX_i^{CN-US} \times Post2018_t$	-0.198^b	-0.198^b	-0.179^b	-0.178^b	-0.203^b	-0.201^b	-0.177^b	-0.174^b
	(0.091)	(0.091)	(0.088)	(0.088)	(0.085)	(0.085)	(0.079)	(0.079)
$TM_i^{US-MEX} \times Post2018_t$		-0.020		0.107		-0.268		-0.102
		(0.600)		(0.568)		(0.500)		(0.480)
$TX_i^{MEX-US} \times Post2018_t$		-0.051		-0.122		-0.460		-0.616
		(0.571)		(0.485)		(0.553)		(0.463)
Observations	128,021	128,021	128,021	128,021	165,284	165,284	165,284	165,284
R-squared	0.883	0.883	0.894	0.894	0.878	0.878	0.893	0.893
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓
Baseline Firm Size × Year FEs	✓	✓	✓	✓	✓	✓	✓	✓
Nonmanufacturing × Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Weighted	-	-	✓	✓	-	-	✓	✓

Notes: The sample consists of all Mexico's exporting firms as of 2017, covering the period from 2015 to 2021. The dependent variables are given in column headings. Regressions in columns (2)-(4) and (7)-(8) are weighted by the natural logarithm of each firm's total export value in 2017. Robust standard errors are clustered at the firm level. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% levels, respectively.

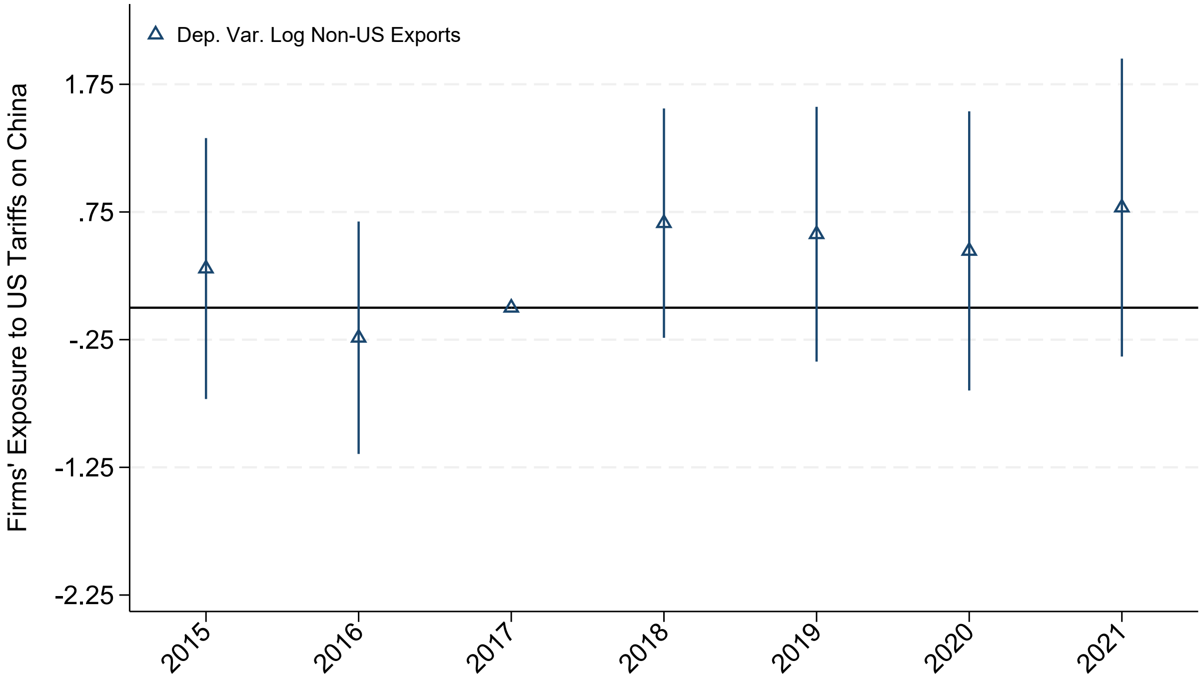
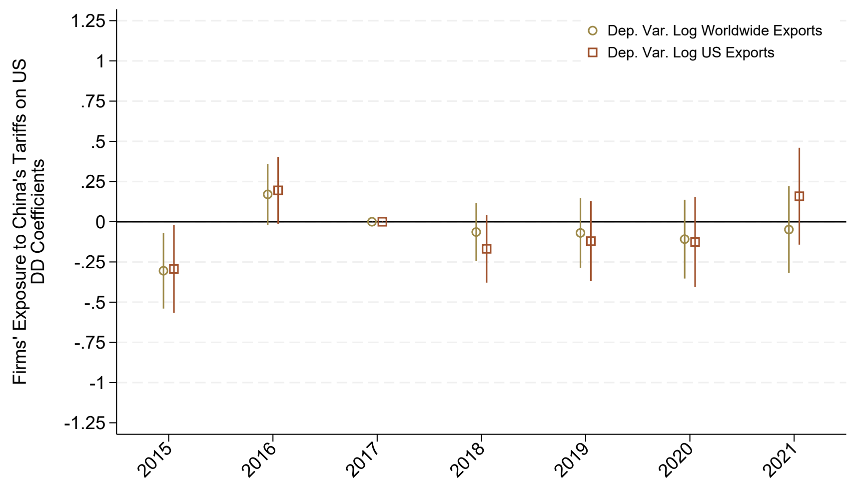
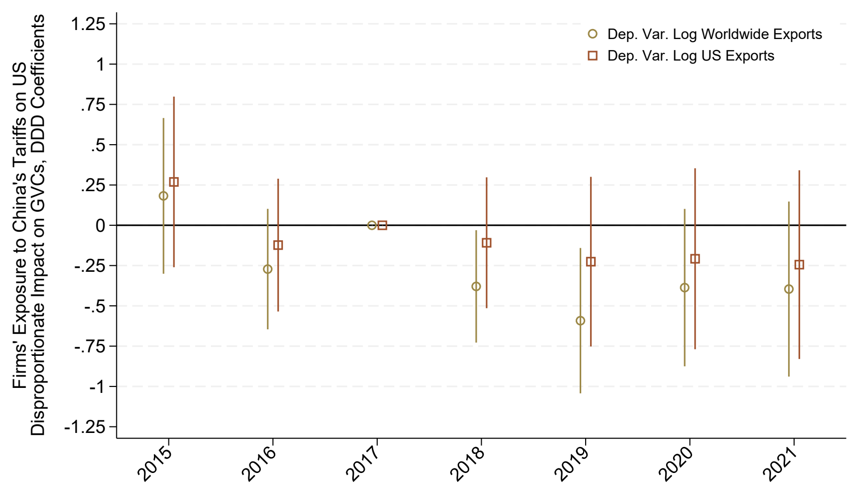


Figure B.1: Mexican Firms' Exports to Non-US Destinations in Response to US Tariff Hikes on China

Notes: Estimation of equation 5. The dependent variable, as indicated in the legend, is the natural logarithms of non-U.S. exports. The sample includes all exporting firms in Mexico as of 2017, covering 2015–2021, with N=121,555. The regression includes firm fixed effects, baseline firm size by year, non-manufacturing by year fixed effects, and concurrent trade policy changes—namely TX_i^{CN-US}, TM_i^{US-MEX}, and TX_i^{MEX-US}—each interacted with year fixed effects. Both regressions are weighted by the natural logarithm of each firm's total export value in 2017. Robust standard errors are clustered at the firm level. The y-axis displays the yearly DD coefficient estimates for TM_i^{US-CN}, along with 95% confidence intervals.



(a) Impact of China's retaliatory tariffs on Mexican firms, common effect



(b) Impact of China's retaliatory tariffs on Mexican firms, disproportionate effect on GVCs

Figure B.2: Impact of China's Retaliatory Tariffs on US Goods on Mexican Firms' Exports

Notes: Estimation of equation 6. The sample includes all exporting firms as of 2017, covering 2015–2021. The dependent variables, shown in the legend, are the natural logarithms of U.S. exports (N=128,021) and worldwide exports (N=165,284). Regressions are weighted by the natural logarithm of firms' total export value in 2017, and robust standard errors are clustered at the firm level. Figure B.2a shows the yearly DD coefficient estimates for TX_i^{CN-US}, and figure B.2b shows the yearly DDD coefficient estimates for $IMM_i \times TX_i^{CN-US}$, both with 95% confidence intervals.

Table B.2: The Role of GVC Firms in the Positive Effect of US Tariffs Targeting China

	(1)	(2)	(3)	(4)
	Log US Exports		Log Worldwide Exports	
$TM_i^{US-CN} \times 2015$	0.320	0.169	0.300^c	0.170
	(0.204)	(0.196)	(0.174)	(0.154)
$TM_i^{US-CN} \times 2016$	0.234	0.117	0.225	0.041
	(0.166)	(0.155)	(0.144)	(0.125)
$TM_i^{US-CN} \times 2018$	0.080	-0.070	0.181	0.054
	(0.165)	(0.155)	(0.142)	(0.122)
$TM_i^{US-CN} \times 2019$	-0.115	-0.258	-0.007	-0.159
	(0.194)	(0.185)	(0.162)	(0.144)
$TM_i^{US-CN} \times 2020$	0.193	0.098	0.296	0.175
	(0.214)	(0.203)	(0.185)	(0.164)
$TM_i^{US-CN} \times 2021$	0.285	0.174	0.736^a	0.606^a
	(0.238)	(0.226)	(0.207)	(0.186)
$IMM \times TM_i^{US-CN} \times 2015$	-0.147	-0.121	-0.305	-0.289
	(0.324)	(0.300)	(0.306)	(0.264)
$IMM \times TM_i^{US-CN} \times 2016$	-0.282	-0.230	-0.429^c	-0.346^c
	(0.272)	(0.241)	(0.244)	(0.198)
$IMM \times TM_i^{US-CN} \times 2018$	0.857^a	0.908^a	0.946^a	0.879^a
	(0.264)	(0.241)	(0.255)	(0.204)
$IMM \times TM_i^{US-CN} \times 2019$	1.773^a	1.715^a	1.311^a	1.230^a
	(0.310)	(0.287)	(0.285)	(0.233)
$IMM \times TM_i^{US-CN} \times 2020$	1.165^a	1.043^a	1.055^a	0.860^a
	(0.342)	(0.320)	(0.312)	(0.262)
$IMM \times TM_i^{US-CN} \times 2021$	1.478^a	1.385^a	0.995^a	0.830^b
	(0.372)	(0.351)	(0.367)	(0.324)
China's Retaliatory Tariff Exposure × Year FEs	✓	✓	✓	✓
Section 232 Tariff Exposure × Year FEs	✓	✓	✓	✓
Mexico's Retaliatory Tariff Exposure × Year FEs	✓	✓	✓	✓
IMM × China's Retaliatory Tariff Exp. × Year FEs	✓	✓	✓	✓
IMM × Section 232 Tariff Exp. × Year FEs	✓	✓	✓	✓
IMM × Mexico's Retaliatory Tariff Exp. × Year FEs	✓	✓	✓	✓
IMM × YEAR FEs	✓	✓	✓	✓
NonManufacturing × Year FEs	✓	✓	✓	✓
Baseline Firm Size × Year FEs	✓	✓	✓	✓
Firm FEs	✓	✓	✓	✓
Weighted	No	✓	No	✓
Observations	128,021	128,021	165,284	165,284
R-squared	0.883	0.894	0.878	0.894

Notes: The sample includes all exporting firms as of 2017, covering 2015–2021. Estimation of equation 6. Regressions in columns (2) and (4) are weighted by the natural logarithm of each firm's total export value in 2017. The dependent variables are listed in the column headings. Baseline Firm Size is measured as of 2017 by the number of goods exported. NonManufacturing is a binary indicator for firms exporting at least one non-manufactured good in 2017. Robust standard errors are clustered at the firm level. [a], [b], and [c] denote significance at the 1%, 5%, and 10% levels, respectively.

B.2 Additional Results for Section 5 GVC Adjustments

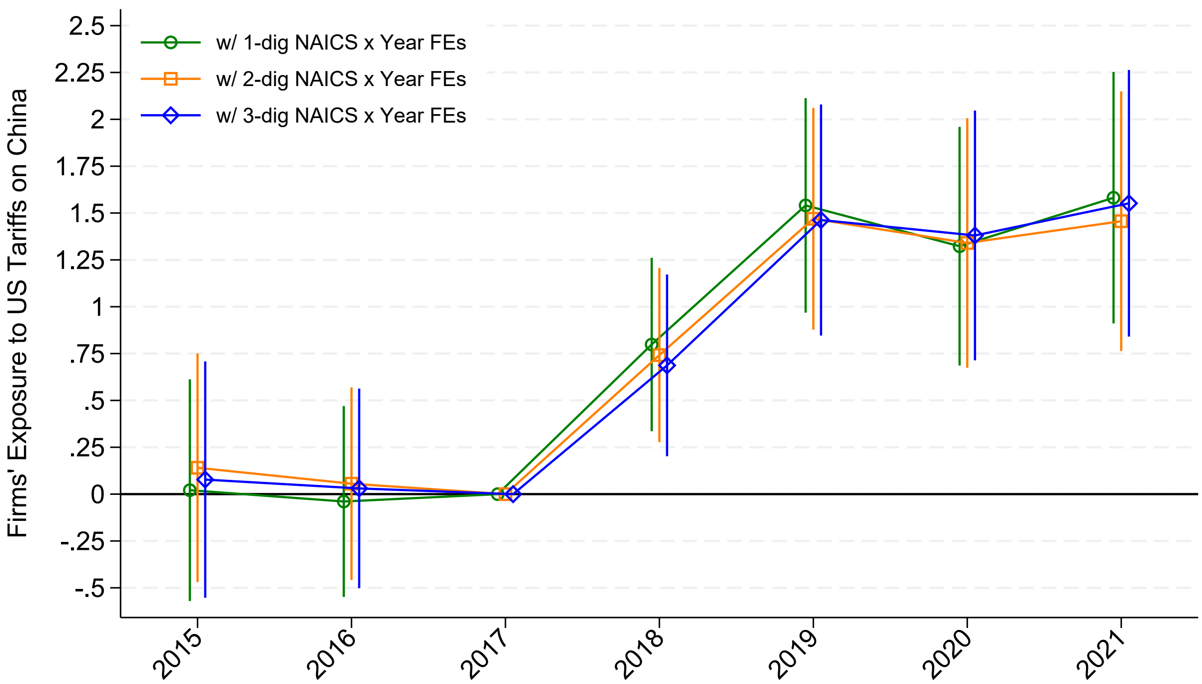
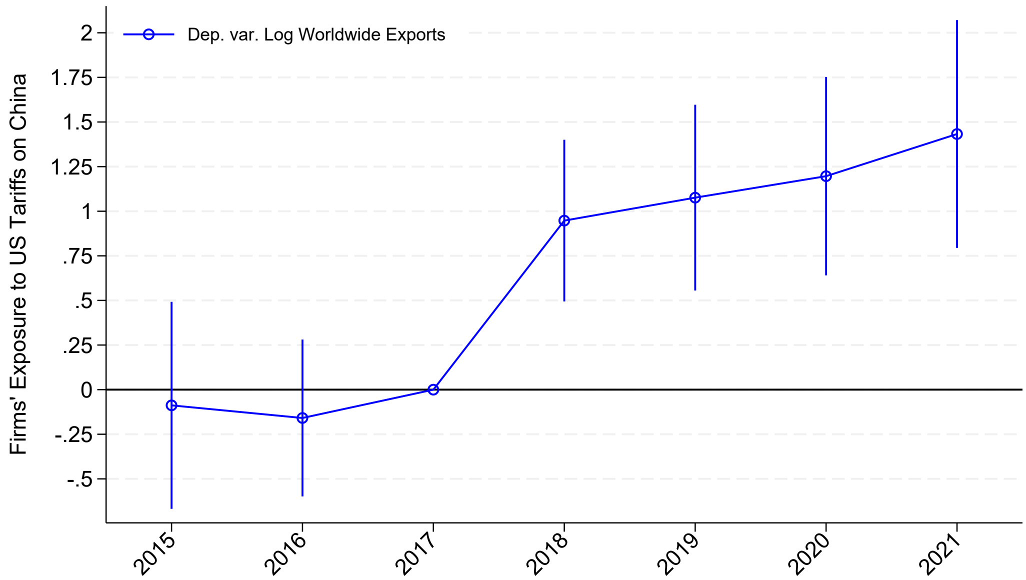
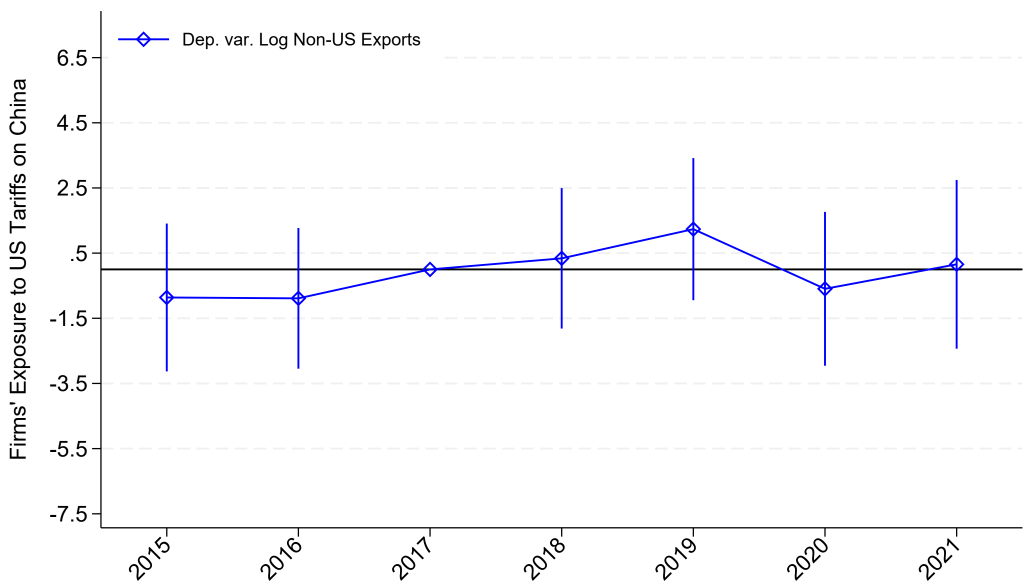


Figure B.3: Robustness–Impact of US Tariffs Targeting China on GVC Firms' US Exports

Notes: Estimation of equation 5. The dependent variable, as indicated in the legend, is the natural logarithms of US exports. The sample consists of IMMEX firms as of 2017, with N=36,347. All regressions control for firm fixed effects, baseline firm size by year, industry by year fixed effects (as indicated in legend) and additional trade policy controls, as specified in equation 5. Robust standard errors are clustered at the firm level. Shown are the yearly DD coefficient estimates for TM_i^{US-CN}, along with 95% confidence intervals.



(a) Impact on Firms' Worldwide Exports



(b) Impact on Firms' Non-US Exports

Figure B.4: Impact of US Tariffs Targeting China on GVC Firms' Worldwide Exports

Notes: Estimation of equation 5. The dependent variables are the natural logarithms of firms' worldwide exports (inclusive of the US), and their exports excluding the US as indicated in the legend. The sample is IMMEX firms as of 2017 from 2015 until 2021, with N=38,292 for worldwide exports and N=30,453 for non-US exports. All regressions include firm fixed effects, baseline firm size by year, and industry by year FEs, as well as additional trade policy controls (P_i by year fixed effects), as specified in equation 5. Robust standard errors are clustered at the firm level. Shown are the yearly DD coefficient estimates for TM_i^{US-CN}, along with 95% confidence intervals.

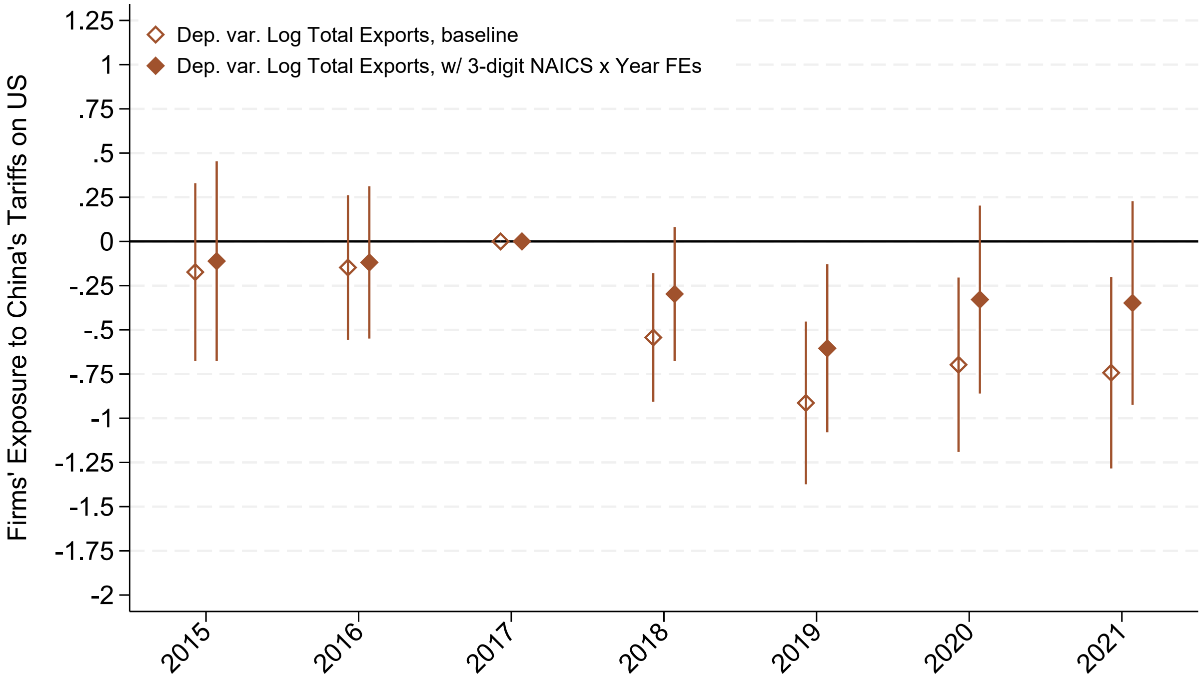


Figure B.5: Effect of China's Retaliatory Tariffs on GVC Firms' Exports

Notes: Estimation of equation 5. The dependent variable is the natural logarithm of firms' total exports. The sample consists of IMMEX firms as of 2017, with $N = 38,292$. All regressions include controls for firm fixed effects, baseline firm size by year fixed effects, industry-by-year fixed effects (as indicated in the figure legend, baseline: one-digit industry by year), and TM_i^{US-CN} by year fixed effects, as well as controls for US tariffs on Mexico and Mexico's tariffs on the US (Pi by year fixed effects), as specified in equation 5. Robust standard errors are clustered at the firm level. Shown are the yearly DD coefficient estimates corresponding to TX_i^{CN-US}, along with 95% confidence intervals.

B.2.1 Impact of the US trade policy shift on GVC firms' net exports

The increased US tariffs on Chinese goods may have caused a comparable rise in firms' worldwide imports alongside their exports, driving the positive export response with minimal impact on domestic value-added. To investigate this, we construct a total net exports variable at the product level as follows:

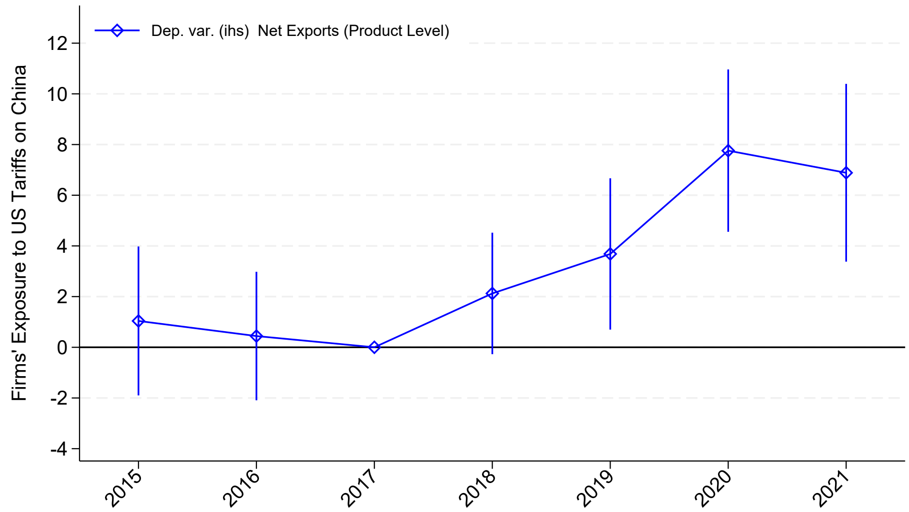
$$NetXPL_{it} = \sum_{j \in \mathtt{J}^{\mathtt{x}}_{\mathtt{it}}} (X_{ijt} - M_{ijt}) \tag{B.2}$$

where $\mathtt{J}^{\mathtt{x}}_{\mathtt{it}}$ represents the set of six-digit products of firm i exported at period t. Here, we calculate net exports for each product j of firm i, and sum over all exported products of firm i in year t.

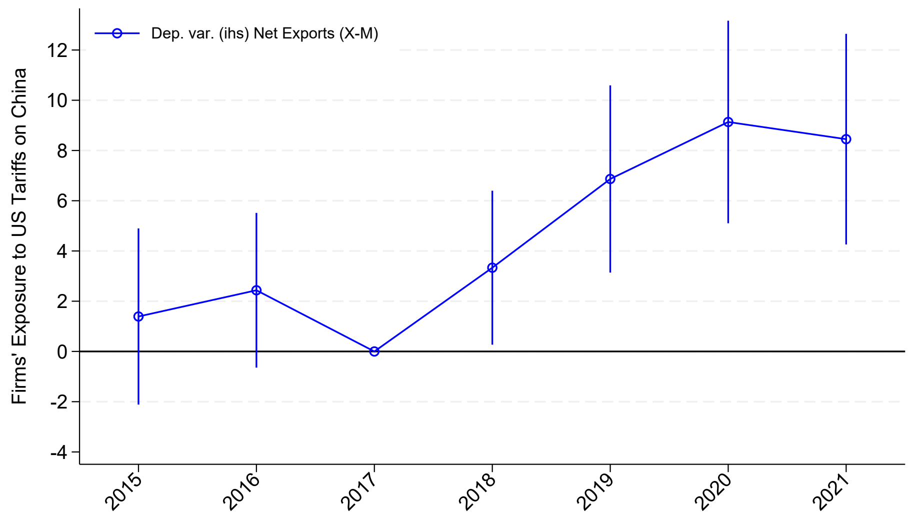
To approximate domestic value-added at the firm level, we also examine the effect on firms' exports net of total imports including those used as capital or material inputs for their domestically sold products. For this purpose, we define $NetX_{it}$ as the difference between a firm's total exports and total imports: $NetX_{it} = X_{it} - M_{it}$.

Unlike $NetXPL_{it}$, which considers only imports of goods that are also exported by the firm, $NetX_{it}$ accounts for total imports, regardless of whether the same product is exported. Hence, assuming no significant change in profitability or productivity, a positive effect on $NetX_{it}$ suggests increased domestic value added.

To account for zero and negative values, we apply the inverse hyperbolic sine transformation. The results in Figure B.6 show a significant positive effect of the US trade policy shift against China on GVC firms' total net exports.



(a) Firms' Product Level Net Exports



(b) Firms' Total Net Exports

Figure B.6: Impact of the Increased US Tariffs on China on GVC Firms' Net Exports

Notes: Dependent variables are the inverse hyperbolic transformation (IHS) of product-level net exports, NetX_{it}^{FP}, (top) and total net exports, $NetExports_{it} = X_{it} - M_{it}$ (bottom). Sample is IMMEX firms as of 2017 with N=39,375 for both regressions. Estimations of equation 5 with firm, baseline firm-size by year, industry by year fixed effects and the controls for China's retaliatory tariffs, US tariffs on Mexico, Mexico's tariffs on US goods. Robust standard errors are clustered at the firm level. Shown are the DD coefficient estimates and confidence interval at the 95% level.

B.3 Heterogeneity

In this section, we present additional analyses on heterogeneous GVC adjustments. Figure B.7, which complements Figure 4a in the main paper, shows the average treatment effect on firms' US exports over the period 2018-2021, estimated separately by sector and two-digit manufacturing industry. Figure B.8 presents results from the same regressions but focuses on the treatment effect of China's retaliatory tariffs.

Figures B.9 and B.10 complement the heterogeneity analysis across product types. Figure B.9, along with Figure 5 in the paper, illustrates that although the primary increase in firm-level exports due to the US trade policy shift is in intermediate and capital goods, the positive effect on the number of exported products is disproportionately seen in consumer goods, suggesting the positive effect on exports are primarily due to an expansion of firms' existing business lines.

Similarly, Figure B.9 examines how firm-level exports in high- and mid-tech categories versus low-tech categories among Mexico's GVC participants respond to US tariff hikes on China.[19] The results show that the positive effect is concentrated in mid- and high-tech exports, rather than low-tech exports, while the effect on the number of exported goods displays the opposite pattern.

Together, these findings suggest that firms participate in relatively technology-intensive global value chains benefit more from the US trade policy shift against China, primarily through expansion of their existing product lines.

[19] We classify exports as high-, mid-, and low-tech based on 3-digit SITC Rev 3 technology classifications provided by UNCTAD and originally constructed by Lall (2000).

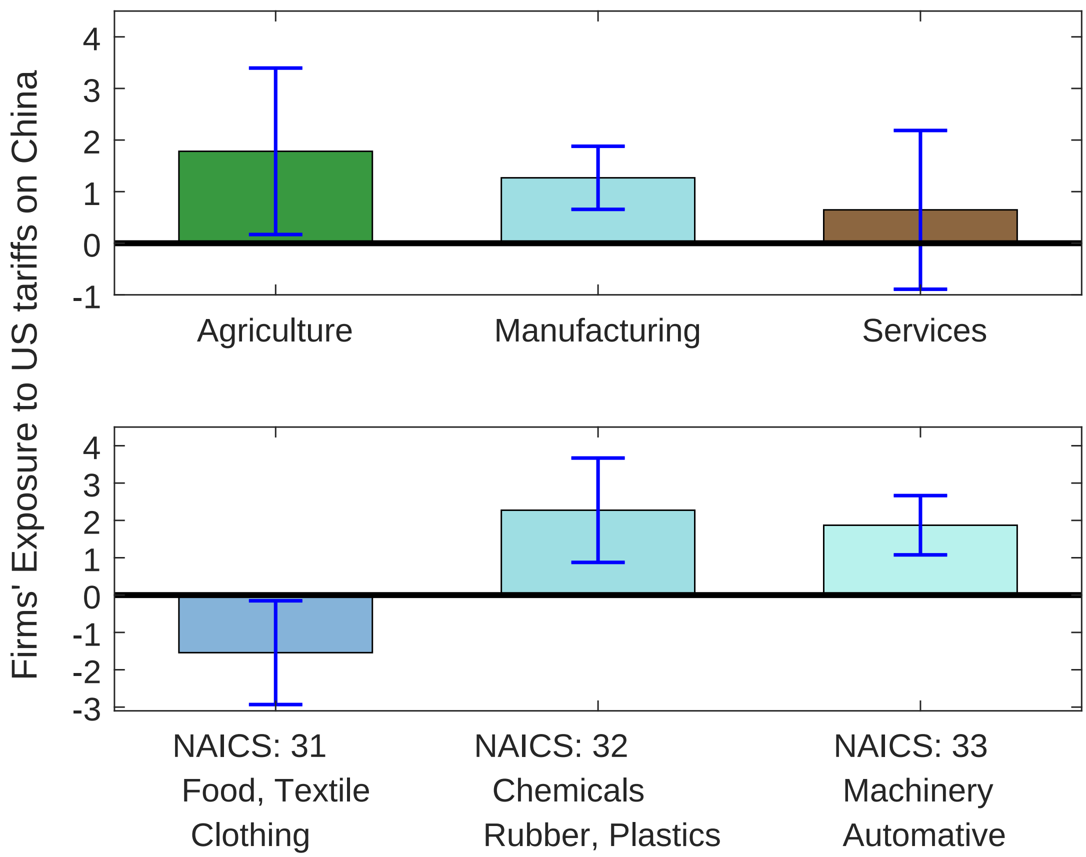


Figure B.7: Average Effects of US Tariffs on GVC Firms' US Exports across Industries

Notes: Separate estimations across IMMEX companies operated in: NAICS=1, 2; NAICS=31,32,33; NAICS>=4; NAICS=31; NAICS=32; and NAICS=33. The dependent variable is the logarithm of firms' US exports. All regressions include firm, baseline-firm-size by year, three-digit NAICS by year fixed effects, and the firm-specific controls for China's retaliatory tariffs, US tariffs on Mexico, Mexico's tariffs on US goods. Bar heights indicate the average treatment effect over 2018-2021 of the heightened trade protection in the US (TM^{US-CN}). Robust standard errors are clustered by firms, and error bars indicate 95% confidence intervals. The numbers of observations are 2,709 (Agr), 28,977 (Man), 3,690 (Service), 5,562 (NAICS=31), 4,361 (NAICS=32), and 18,991 (NAICS=33).

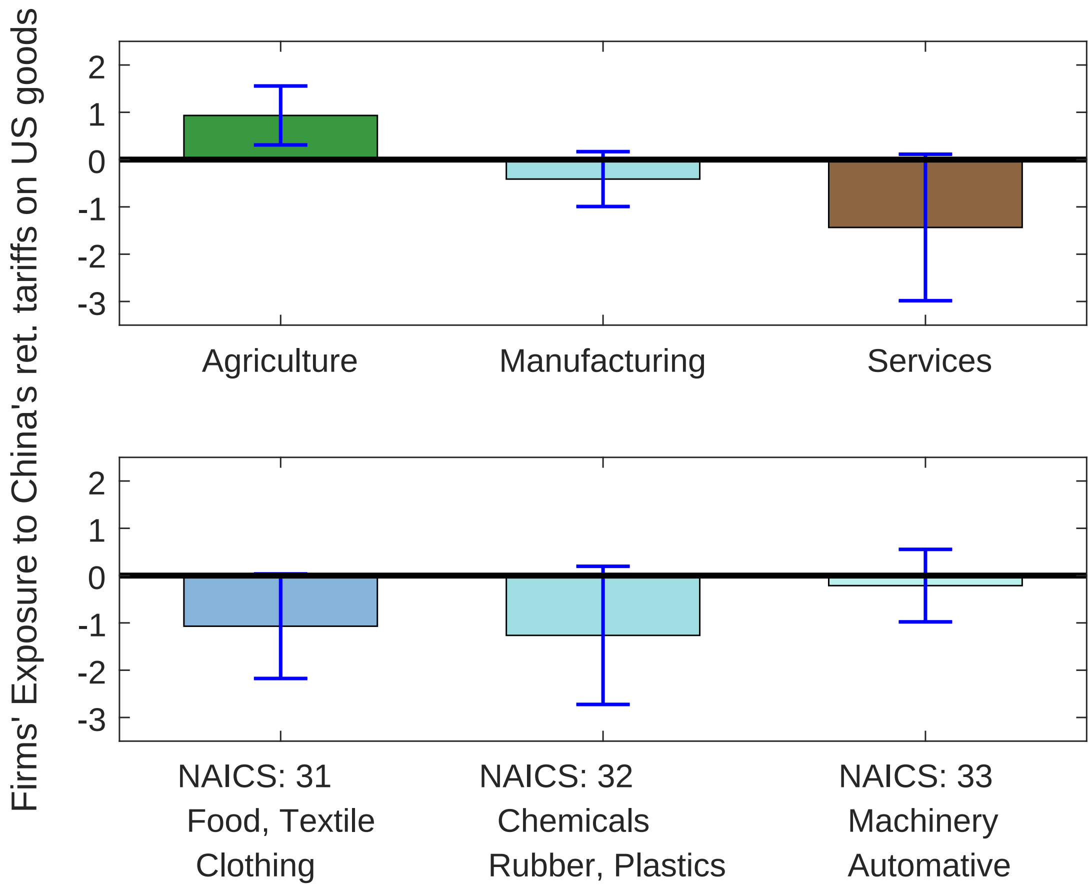
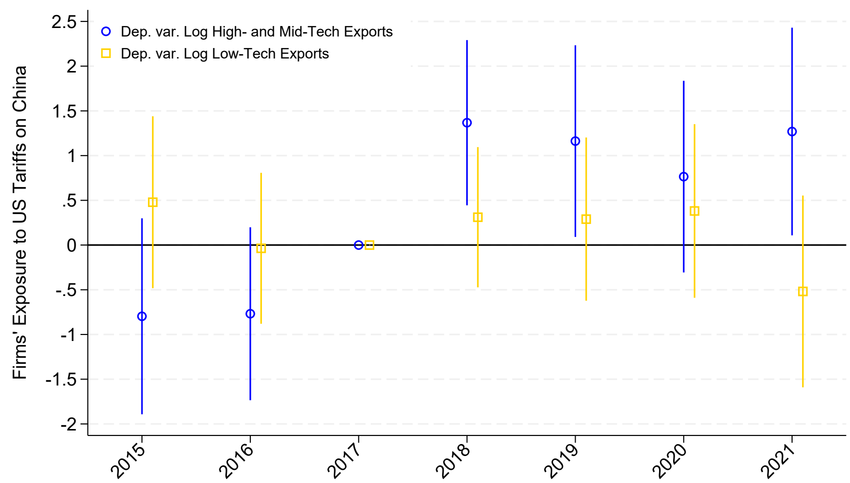


Figure B.8: Average Effects of China's Retaliatory Tariffs on GVC Firms' US Exports across Industries

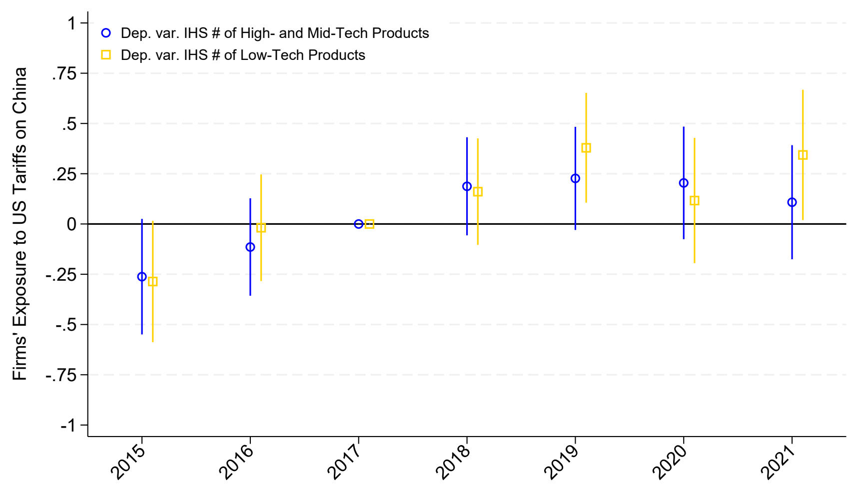
Notes: Separate estimations across IMMEX companies operated in: NAICS=1, 2; NAICS=31,32,33; NAICS>=4; NAICS=31; NAICS=32; and NAICS=33. The dependent variable is the logarithm of firms' US exports. All regressions include firm, baseline-firm-size by year, three-digit NAICS by year fixed effects, and the firm-specific controls for the increased US tariffs on China, US tariffs on Mexico, Mexico's tariffs on US goods. Bar heights indicate the average treatment effect over 2018-2021 of the heightened trade protection in the US (TX^{US-CN}). Robust standard errors are clustered by firms, and error bars indicate 95% confidence intervals. The numbers of observations are 2,709 (Agr), 28,977 (Man), 3,690 (Service), 5,562 (NAICS=31), 4,361 (NAICS=32), and 18,991 (NAICS=33).

Figure B.9: Impact of US Tariff Hikes on the Number of Exported Products by Types

Notes: The dependent variables, shown in the legend, are the inverse hyperbolic sine transformation of the number of exported six-digit products by type. The sample includes IMMEX firms as of 2017 (N=39,375). Estimation follows Equation 5, with firm fixed effects, baseline firm size by year, sector-by-year fixed effects, and yearly, firm-specific trade policy controls for China's retaliatory tariffs, U.S. tariffs on Mexico, and Mexico's tariffs on U.S. goods. Robust standard errors are clustered at the firm level. Shown are the yearly DD coefficient estimates for TM_i^{US-CN} along with confidence intervals at the 95% level.



(a) Firms' Exports in High- and Mid-Tech Exports versus Low-Tech Exports



(b) The Number of Exported Products by Technology Content

Figure B.10: Impact of the Increased US Tariffs on China on GVC Firms' Exports by Technology Content

Notes: Log value of firms' exports in high- and mid-tech goods (N=28,067), log value of firms' exports in low-tech goods (N=30,694), the number of exported six-digit high- or mid-tech goods in inverse hyperbolic sine transformation (N=39,375), the number of exported six-digit low-tech goods in inverse hyperbolic sine transformation (N=39,375). Estimations of equation 5 with firm, baseline firm-size by year, industry by year fixed effects and the yearly, firm-specific controls for China's retaliatory tariffs, US tariffs on Mexico, Mexico's tariffs on US goods. Robust standard errors are clustered at the firm level. Shown are the DD coefficient estimates for TM^{US-CN} and confidence interval at the 95% level.

B.4 Firm-Level Adjustment to the US Trade Policy Shift in Mexico: New Product Introductions

While the analysis in Section 5.2.2 suggests that much of the increased exports by Mexico's GVC firms stems from existing product lines, we also examine whether the shift in US trade policy prompted manufacturing GVC firms to begin exporting new products to the US. We define 'new products' based on each firm's US export portfolio in the baseline year of 2017. This implies that no firm has any new products in 2017. We then estimate equation B.1 for manufacturing GVC firms over the period 2017-2021 on the number and value of newly exported products to the US. Table B.3 presents these results.

In Panel A, column (1), the dependent variable is the number of newly exported products, while columns (2) through (4) break down new products by their exposure to US tariffs on Chinese goods. The results in column (1) show a significant positive effect on the number of new products. Columns (2) and (3) indicate that manufacturing firms are significantly less likely to begin exporting new products with at most a 5% tariff increase but are more likely to export products subject to at least a 5% tariff increase. In column (4) the dependent variable is the number of new products that are subject to at least a 15% increase, and the coefficient estimate rises from 1.35 to 1.73, showing a stronger response.

In Panel B, we focus on the export value of new products. The results show that firms' export revenues increase from newly introduced products, driven by those that are exposed to higher US tariffs on China. These findings suggest that manufacturing GVC firms are expanding their product portfolios to substitute for Chinese goods now facing higher tariffs in the US market.

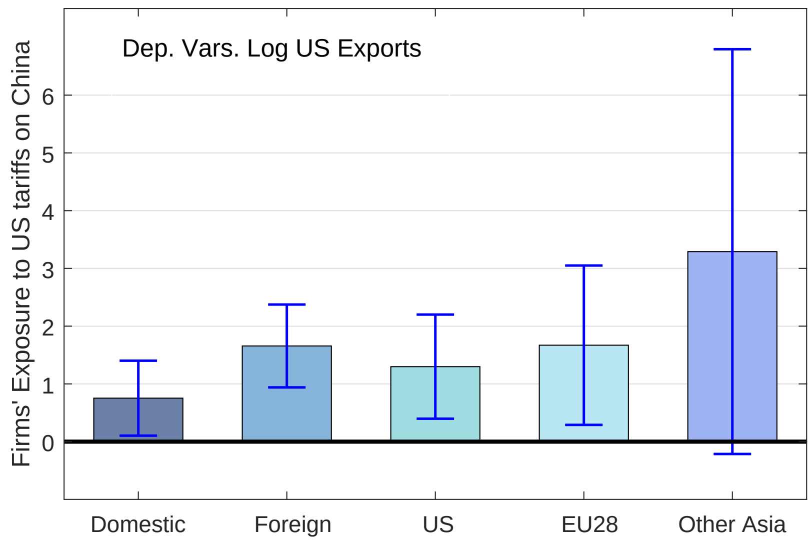
Table B.3: Exports of New Products in Response to US Tariff Hikes

	(1) All New Goods	(2) w/ US tariffs $< 5\%$	(3) w/ US tariffs $>= 5\%$	(4) w/ US tariffs $>= 15\%$
Panel A.				
Dep Var.	Number of New Exported Goods (ihs)			
Firms' Exposure to US Tariffs on China	0.953^{a}	-0.778^{a}	1.347^{a}	1.730^{a}
	(0.193)	(0.112)	(0.194)	(0.192)
Panel B.				
Dep. Var.	Export Value of New Goods (ihs)			
Firms' Exposure to US Tariffs on China	3.977^{a}	-7.257^{a}	6.846^{a}	9.221^{a}
	(0.861)	(0.844)	(0.838)	(0.833)

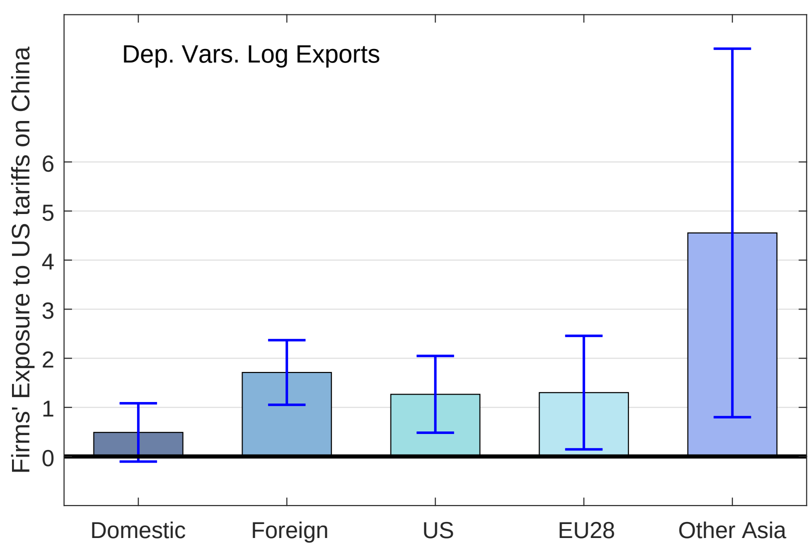
Notes: N=20,656 (Manufacturing IMMEX firms, 2017-2021). Estimation of equation 5. "New goods" are defined as six-digit products exported by firm i between 2018 and 2021 but were not part of its 2017 export portfolio. In Panel A, the dependent variables are the number of new goods, broken down in columns (1) to (4), as: all new goods, new goods exposed to a US tariff increase on China of at most 4.99% (or zero), new goods exposed to a US tariff increase of at least 5%, and new goods exposed to a US tariff increase of at least 15%. In Panel B, the dependent variables are the value of these newly exported goods, broken down by US tariff exposure levels (less than 5%, 5% or more, and 15% or more). All dependent variables are transformed using the inverse hyperbolic sine. Robust standard errors are clustered at the firm level. ^{a}, ^{b}, and ^{c} indicate significance at the 1%, 5% and 10% levels respectively.

B.5 The Role of Foreign MNEs in Shaping Mexico's Response to the US-China Trade War

Figure B.11a presents the effect of the US tariff hikes on GVC firms' exports to the US by ultimate parent country. Figure B.11b presents the same for firms' total exports. Even though the group of China-linked firms includes only a small number of firms, we also conducted separate estimates for this group, with the results presented in Figure B.12. Taken together, these results show that the reorganization of GVCs in response to the US trade policy shift against China has been led by MNEs.



(a) Impact on Firms' US Exports by Parent Country of Origin



(b) Impact on Firms' Total Exports by Parent Country of Origin

Figure B.11: Heterogeneous Responses to the US Trade Policy Shift by Parent Country of Origin

Notes: Estimation of equation B.1 separately for domestic firms (N=16,450/15,519), foreign MNEs (N=20,767/21,780), US MNEs (N=10,236/10,485), EU28 MNEs (N=6,309/6,658), Other Asian MNEs (N=2,833/3,124). The dependent variables are indicated in the legends. All regressions control for firm fixed effects, baseline firm size by year, industry by year fixed effects, and the controls for firm-specific exposures to China's retaliatory tariffs, US tariffs on Mexico and Mexico's tariffs on US. Bar heights represent the DD coefficient estimates for $TM_i^{US-CN} \times Post2018_t$, with 95% confidence intervals derived from robust standard errors clustered at the firm level.

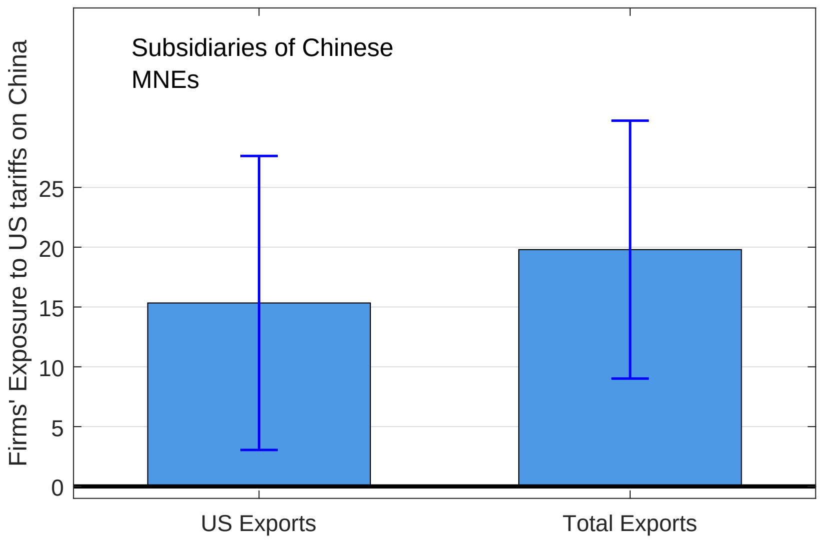
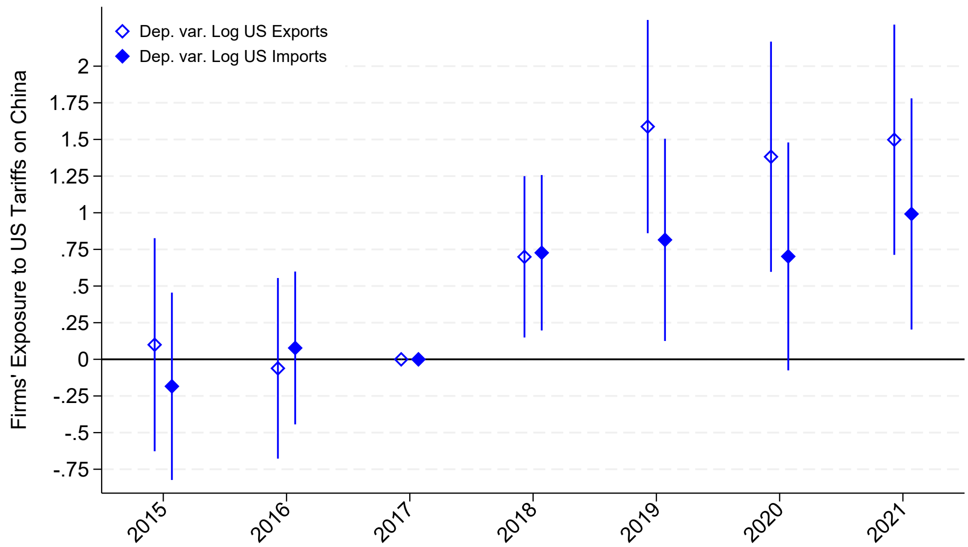


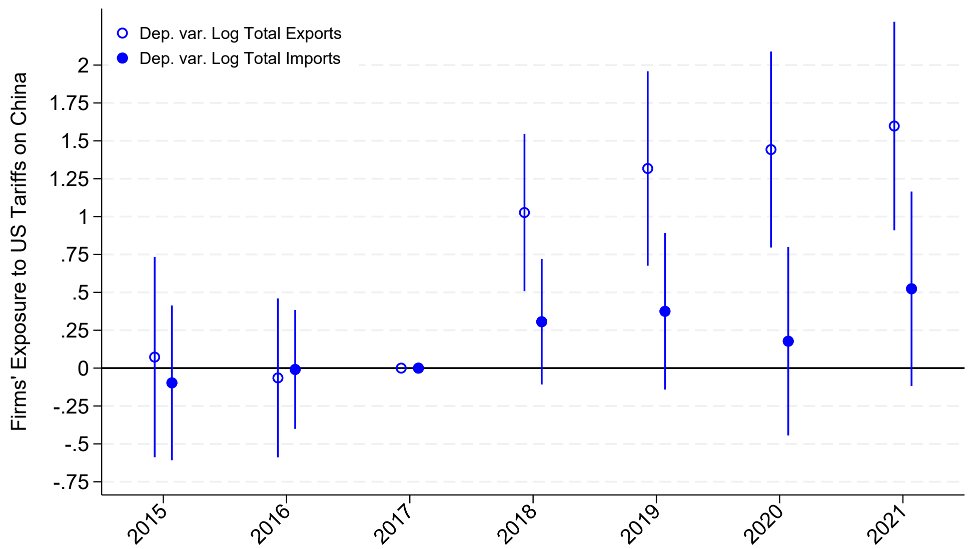
Figure B.12: Impact of US Trade Policy Shift on Subsidiary of Chinese MNEs in Mexico

Notes: Estimation of equation B.1 on the sample of the 2017 cohort of IMMEX firms under Chinese MNEs, 2015-2021. N=357 (Log US Exports), N=382 (Log Total Exports). Both regressions control for firm fixed effects, baseline firm size by year, industry by year fixed effects, and the controls for firm-specific exposures to China's retaliatory tariffs, US tariffs on Mexico and Mexico's tariffs on US. Bar heights represent the DD coefficient estimates for $TM_i^{US-CN} \times Post2018_t$. The 95% confidence intervals are derived from robust standard errors clustered at the firm level.

B.6 Additional Analysis: Manufacturing GVC Firms



(a) Manufacturing GVC Firms' U.S. Exports and Imports



(b) Manufacturing GVC Firms' Total Exports and Imports

Figure B.13: Impact of Increased US Tariffs on China for Manufacturing GVC Firms in Mexico—Robustness with 3-digit NAICS by Year FEs

Notes: The dependent variables are indicated in the figure legends. The sample includes all manufacturing IMMEX firms in Mexico as of 2017, covering 2015-2021. N=28,977 (U.S. exports), N=28,387 (U.S. imports), N=30,185 (total exports), N=29,617 (total imports). Estimations are based on equation 5 and include firm, baseline-firm-size-by-year, 3-digit industry-by-year fixed effects and firm-specific controls for China's retaliatory tariffs, US tariffs on Mexico, and Mexico's tariffs on U.S. goods. Robust standard errors are clustered at the firm level. Shown are the DD coefficient estimates corresponding to TM^{US-CN} with 95% confidence intervals.

Table B.4: Heterogeneous Impact of the New US Tariffs Targeting China on Subsidiaries of US MNEs and Others

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample: Manufacturing GVCs	Exports		Imports					
Dep Var. Log of Firms' Imports from	Worldwide	US	Worldwide	US	Europe	Latin America	China	Other Asia
Panel A. Subsidiaries of US MNEs								
$TM_i^{US-CN} \times \text{Post}_t$	1.429^a	1.488^a	1.005^a	1.047^a	0.849	0.586	1.810^a	0.951
	(0.424)	(0.490)	(0.341)	(0.380)	(0.534)	(0.898)	(0.614)	(0.587)
N	8,824	8,693	8,813	8,724	7,885	5,590	8,318	8,209
Panel B. Subsidiaries of Non-US Foreign MNEs								
$TM_i^{US-CN} \times \text{Post}_t$	2.074^a	1.896^a	0.101	0.921^c	0.164	-0.069	-0.776	2.117^a
	(0.609)	(0.701)	(0.423)	(0.530)	(0.595)	(1.363)	(0.789)	(0.762)
N	9,407	8,903	9,469	9,081	8,290	4,853	8,658	8,491
Panel C. Domestic GVC Firms								
$TM_i^{US-CN} \times \text{Post}_t$	0.626^c	0.737^c	-0.152	0.663	-0.277	-0.066	-0.060	0.876
	(0.363)	(0.401)	(0.358)	(0.459)	(0.607)	(1.199)	(0.701)	(0.660)
N	11,899	11,327	11,279	10,529	7,846	4,283	8,809	7,984
For all panels								
Controls for China's Retaliatory Tariff Exposure	✓	✓	✓	✓	✓	✓	✓	✓
Controls for Section 232 Tariff Exposure	✓	✓	✓	✓	✓	✓	✓	✓
Controls for Mexico's Retaliatory Tariff Exposure	✓	✓	✓	✓	✓	✓	✓	✓
Baseline Firm Size × Year FEs	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓

Notes: The 2017 cohort of manufacturing IMMEX firms, observed from 2015 to 2021, partitioned based on parent country. Robust standard errors are clustered at the firm level. ^{a}, ^{b}, and ^{c} denote significance at the 1%, 5%, and 10% levels, respectively.

B.7 Understanding Supply Chain Shifts Through Mexico's Trade Facilitation Program

Table B.5: Impacts of the US Trade Policy Shift on Inputs through Special Import Regime

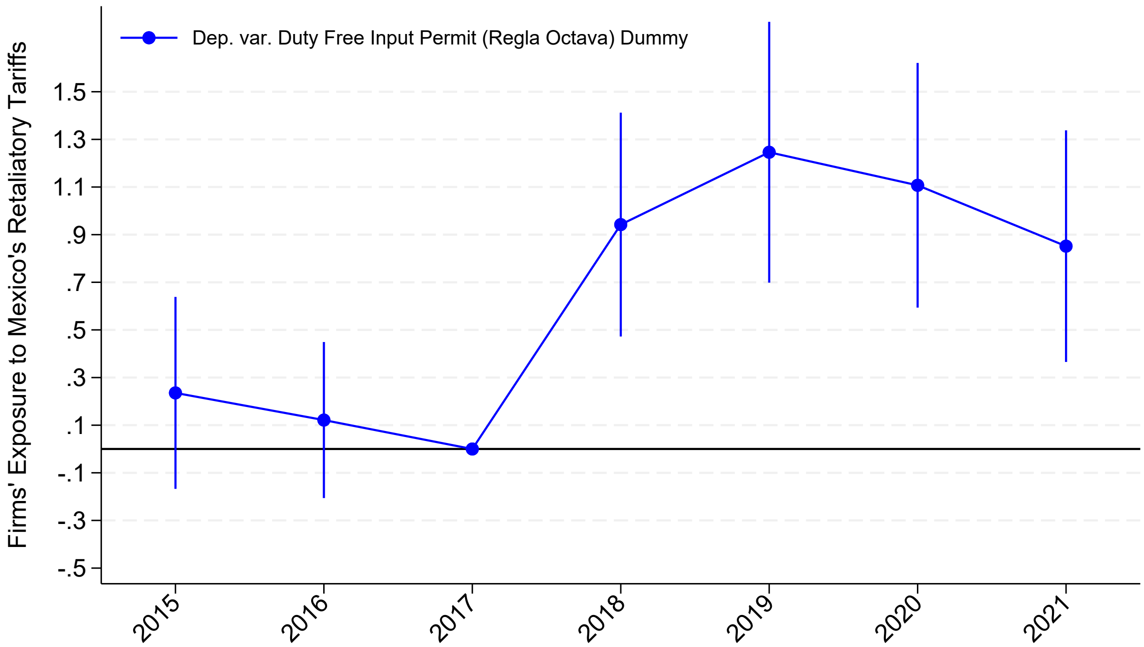
Sample: Manufacturing GVCs	(1)	(2)	(5)	(6)	(7)	(8)
	Imports via *Regla Octava*					
	Worldwide	US	Europe	Latin America	China	Other Asia
$TM_i^{US-CN} \times Post_t$	-0.174	-0.429	-0.012	0.267	0.528	-0.508
	(0.807)	(0.597)	(0.553)	(0.383)	(0.594)	(0.634)
$TM_i^{US-CN} \times Post_t \times$ US MNE$_i$	1.715	-1.05	-0.126	0.328	-0.986	0.296
	(1.454)	(1.533)	(1.189)	(0.971)	(1.292)	(1.256)
$TM_i^{US-CN} \times Post_t \times$ non-US Foreign MNE$_i$	3.461^b	0.528	1.842^c	-0.454	0.405	4.217^a
	(1.616)	(1.409)	(1.032)	(0.979)	(1.295)	(1.397)
N	30,840	30,840	30,840	30,840	30,840	30,840
US MNE Indicator × Post$_t$	✓	✓	✓	✓	✓	✓
Non-US Foreign MNE × Post$_t$	✓	✓	✓	✓	✓	✓
Controls for China's Retaliatory Tariff Exposure	✓	✓	✓	✓	✓	✓
Controls for Section 232 Tariff Exposure	✓	✓	✓	✓	✓	✓
Controls for Mexico's Retaliatory Tariff Exposure	✓	✓	✓	✓	✓	✓
Baseline Firm Size × Year FEs	✓	✓	✓	✓	✓	✓
Industry × Year FEs	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓

Notes: The dependent variables are the value of imports under special heading across different regions, as given in column headings, and are transformed using the inverse hyperbolic sine. Europe refers to the EU-28, and Other Asia includes Taiwan, Thailand, Vietnam, Japan, Korea, and India. Robust standard errors are clustered at the firm level. ^{a}, ^{b}, and ^{c} denote significance at the 1%, 5%, and 10% levels, respectively.

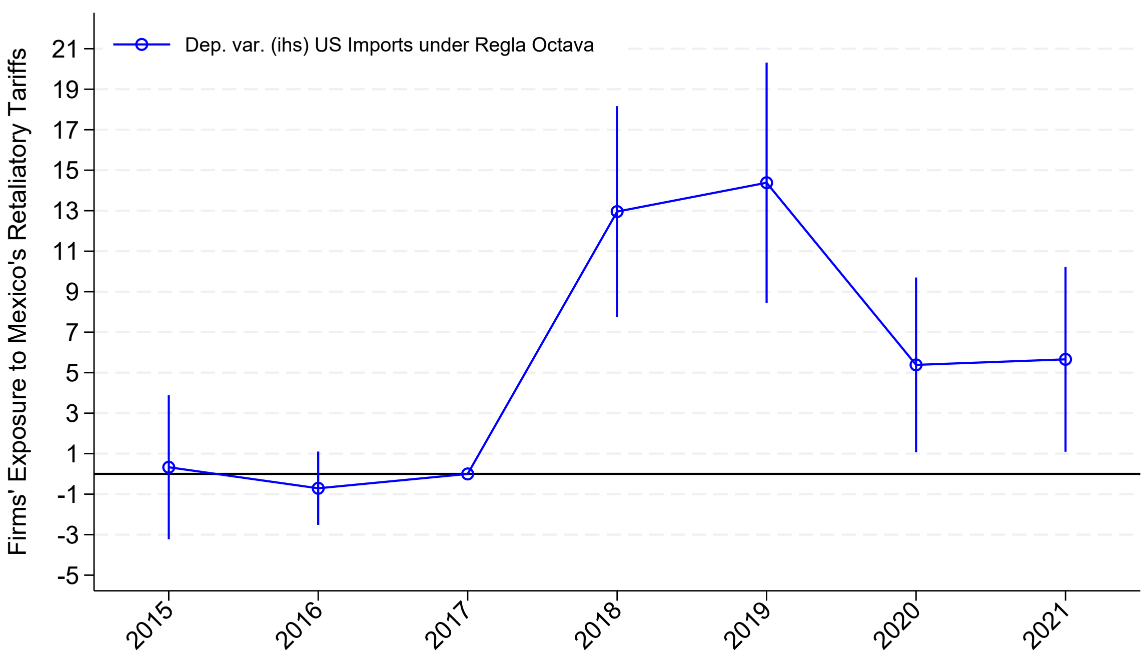
B.8 Increased Preferential Imports from the US in Response to Mexico's Retaliatory Tariffs

Table B.1 shows that the Mexican government's retaliatory tariffs on US goods did not have a significant long-term effect on firms' exports. Although these tariffs covered only about $3 billion in goods, meaning most firms were not directly impacted (see Table A.2), those firms affected by the tariffs may have mitigated the impact through firm-specific preferential duty permits.

Figure B.14 displays yearly coefficient estimates measuring the impact of exposure to Mexico's retaliatory tariffs implemented in response to Section 232 tariffs on manufacturing GVC firms' use of duty-free permits. Specifically, Figure B.14a illustrates how these tariffs influenced the probability of manufacturing GVC firms securing duty-free permits, while Figure B.14b shows the effect on firms' imports from the US under these permits. The results indicate that affected GVC firms adapted by applying for duty-free permits when importing inputs subject to Mexican tariffs. This response likely helped mitigate the negative impact of the retaliatory tariffs on their operations, which may explain the limited effect of these tariffs on firms' export performance overall.



(a) Firms' Preferential Duty Permits Utilization in Response to Mexico's Retaliatory Tariffs



(b) US Imports under Preferential Duty Permits in Response to Mexico's Retaliatory Tariffs

Figure B.14: Exposure to Mexico's Retaliatory Tariffs Increases Firms' Preferential Imports from the US

Notes: The sample includes manufacturing IMMEX firms as of 2017, with N=30,840 in all regressions. The dependent variables are indicated in the figure legends. Estimation of 5. Robust standard errors are clustered at the firm level. Shown are the DD coefficient estimates corresponding to TX^{MEX-US} with 95% confidence intervals.

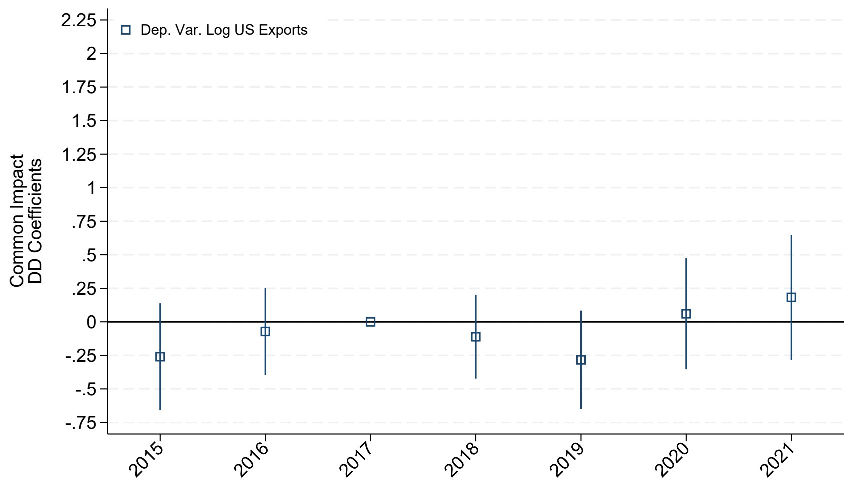
B.9 The Role of Firm Size in Explaining GVC Firms' Response

Approximately 16% of exporting firms in 2017 were IMMEX firms, yet they accounted for 84% of nationwide exports, or 89% when excluding petroleum.[20] Given this concentration, we assess the role of firm size, measured by export volume, in explaining the differences between GVC and non-GVC firms in their response to trade policy changes. To do this, we rank firms by their export value in 2017 and assign the top 16% a 'fake' IMMEX identity.

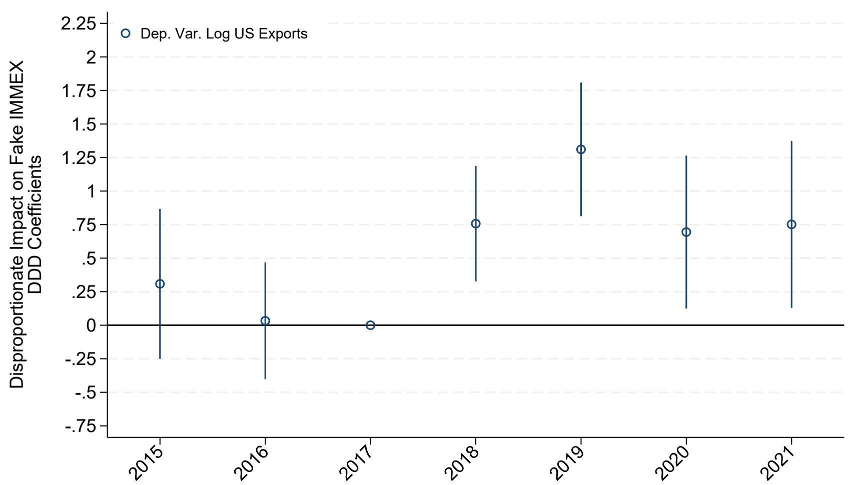
This approach results in 5,922 firms with the highest export values (log exports ≥ 14.401). We then estimate equation 6, replacing the IMMEX indicator with this size-based fake IMMEX indicator to observe whether the largest 16% of firms respond disproportionately to US tariffs. Since many of these top exporters are indeed IMMEX firms, we expect that the largest 16% may respond disproportionately to US tariffs. However, if firm size alone explains the difference in response between GVC and non-GVC firms, we might observe an even stronger disproportionate effect among these top exporters.

The results, presented in Figure B.15, show a significant difference in how smaller firms and top exporters respond to US tariffs. However, the disproportionate impact on the largest exporters is not as pronounced as what we observe for IMMEX firms. To confirm, we estimate equation 6 separately for fake IMMEX firms and for actual IMMEX firms. The results, shown in Figure B.16, indicate that the response of IMMEX firms to the US trade policy shift is stronger than that of larger firms in general, suggesting that while firm size plays a role, it does not fully explain the difference between GVC and non-GVC firms.

[20] Authors' calculations based on COMEXT and IMMEX 2017 data.



(a) Impact on Firms' Exports (γ_h)



(b) Disproportionate Impact on Fake IMMEX Firms' Exports ($\gamma_h^{FAKEIMM}$)

Figure B.15: The Role of Firm Size in the Positive Effect of US Tariffs Targeting China

Notes: Estimation of equation 6. The dependent variables are the natural logarithm of firms' US as indicated in the legend. The sample consists of all exporting firms in Mexico as of 2017 over 2015-2021, with N=128,021. All regressions control for firm fixed effects, baseline firm size by year, non-manufacturing by year, Fake IMMEX by year fixed effects, as well as additional trade policy controls (P_i by year, $P_i \times IMM_i$ by year fixed effects), as specified in equation 5. Both regressions are weighted by the natural logarithm of each firm's total export value in 2017. Figure B.15a shows the yearly DD coefficient estimates for TM_i^{US-CN}, and figure B.15b shows the yearly DDD coefficient estimates for $FAKEIMM_i \times TM_i^{US-CN}$, both with 95% confidence intervals.

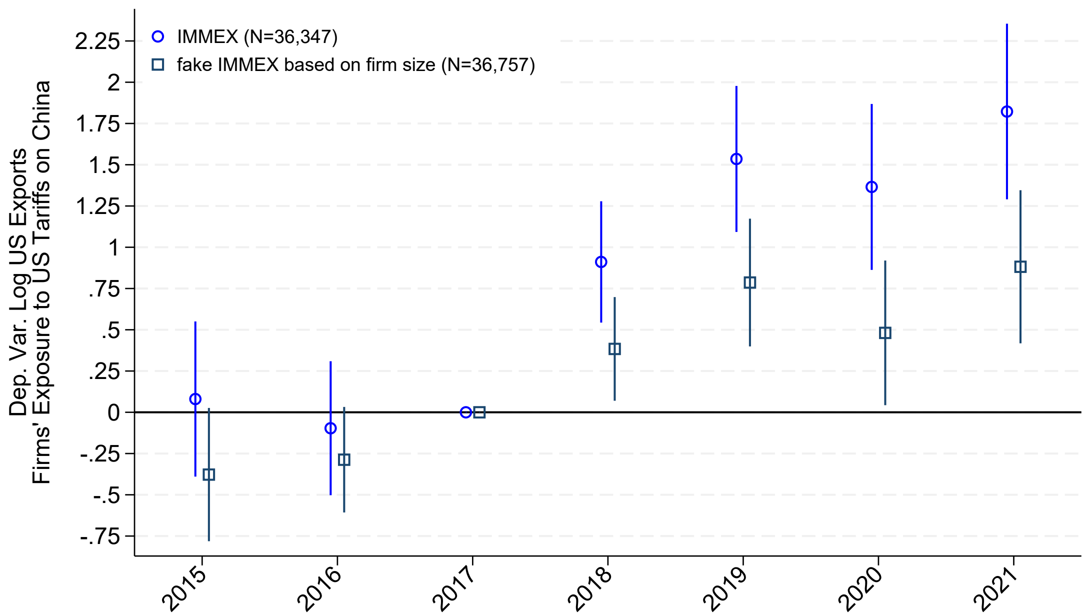


Figure B.16: The Role of Firm Size—GVC Firms Sample

Notes: Estimation of equation 5. IMMEX firms sample N=36,347; Fake IMMEX sample N=36,757. Dependent variable in both regressions is the logarithm of firms' US exports. Robust standard errors are clustered at the firm level. The y-axis displays the coefficient values of the respective DD estimates corresponding to TM_i^{US-CN}, along with 90% confidence intervals.

C Alternative Specifications

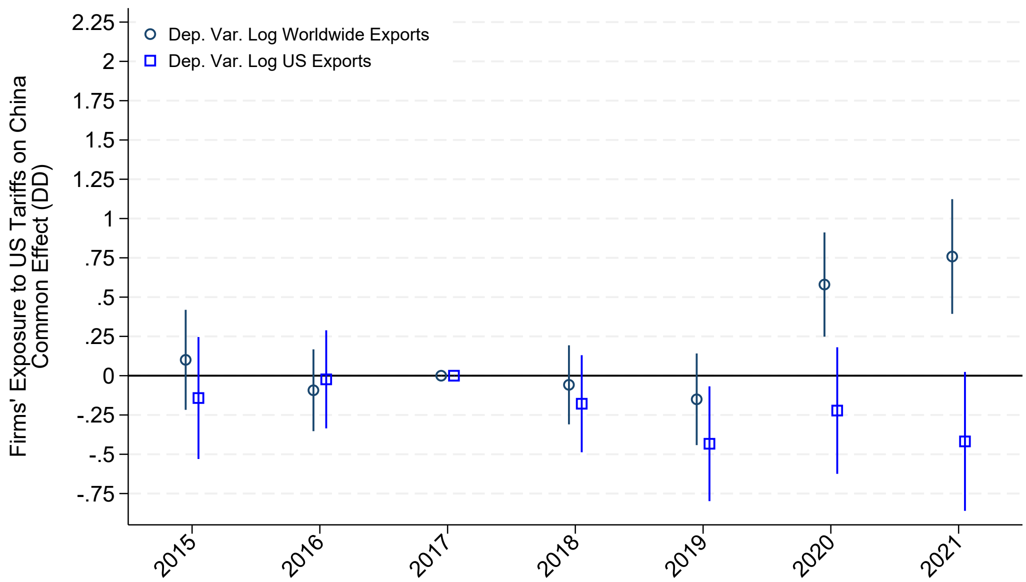
In this section, we explore various alternative specifications to validate the robustness of our main findings.

C.1 Results based on the US-market specific trade policy exposures

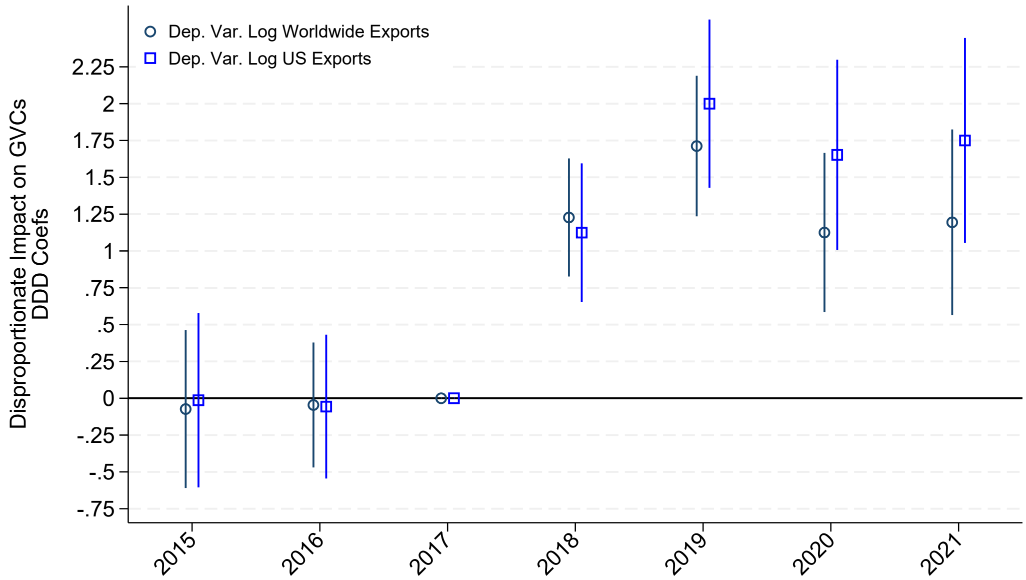
The majority of a typical exporting firm's exports in Mexico are destined for the United States (see Panel A in Table A.1). Equation 1 does not distinguish export destinations because the costlier entry of Chinese goods to the US market is expected to increase the overall attractiveness of the US market for Mexican exporters compared to other markets. In other words, even if Mexican exporters were selling their affected goods in non-US markets before the shock, they are expected to be 'treated' by the heightened attractiveness of the US market. Moreover, firms involved in global value chains may export to a third country while indirectly catering to the US market. Nonetheless, we also introduce an alternative measure of exposure where we explicitly define the export destination of the exposed firm as "the US". This alternative measure is defined as follows:

$$TMA_i^{US-CN} = \frac{\sum_{j \in USIT^{CN}} X_{ij}^{2017,US} \times \Delta\tau_j^{USIT^{CN}}}{\sum_j X_{ij}^{2017}} \tag{C.1}$$

In this case, $X_{ij}^{2017,US}$ denotes firm i's exports of good j to the US and TMA_i^{US-CN} measures the tariff equivalent value of US exports in firm i's total exports as of 2017. We similarly construct firms' exposure to China's retaliatory tariffs based on their US exports, which we denote by TXA_i^{CN-US}. We estimate equation 6 using the logarithms of firms' US exports and their worldwide exports as the dependent variables. Figure C.1 shows how firms' US exports and total worldwide exports evolved in response to the shift in US trade policy toward China based on the alternative exposures. Figures 2a and 2b present the DD (TMA^{US-CN}) and DDD ($TMA^{US-CN} \times IMM$) coefficient estimates, respectively, along with 95 percent confidence intervals.



(a) Impact on Firms' Exports (γ_h)



(b) Disproportionate Impact on GVC Firms' Exports (γ_h^{IMM})

Figure C.1: Robustness with Alternative Trade Exposures: Role of GVC Firms in the Positive Effect of US Tariffs Targeting China

Notes: Estimation of equation 6 when TM_i^{US-CN} and TX_i^{CN-US} are replaced with US market specific exposures (see equation C.1). The dependent variables are the natural logarithms of firms' US and worldwide exports, as indicated in the legends. The sample consists of all exporting firms in Mexico as of 2017 over 2015-2021, with N=128,021 for US exports and N=165,284 for worldwide exports. All regressions control for firm fixed effects, baseline firm size by year, non-manufacturing by year, IMMEX by year fixed effects, and additional trade policy controls (P_i by year, $P_i \times IMM_i$ by year fixed effects), as specified in equation 6. Both regressions are weighted by the natural logarithm of each firm's total export value in 2017. Figure C.1a shows the yearly DD coefficient estimates for TMA_i^{US-CN}, and figure C.1b shows the yearly DDD coefficient estimates for $IMM_i \times TMA_i^{US-CN}$, both with 95% confidence intervals which are derived from robust standard errors clustered at the firm level.

C.2 Input Channels

Our analysis of US-China tariffs primarily focuses on firms' output markets; however, firms whose imports include products targeted by either the US or Chinese government may also be affected by changing market conditions. In this section, we construct three additional trade exposure variables to show that our main results remain robust when controlling for differential trends among firms with varying levels of reliance on targeted imports.

Imports from China

We identify firms that, as of 2017, imported goods from China subject to higher US tariffs and construct a firm-level measure as follows:

$$IMCN_i^{USIT} = \frac{\sum_{j \in USIT^{CN}} M_{ij}^{2017,CN} \times \Delta\tau_j^{USIT^{CN}}}{\sum_j M_{ij}^{2017}} \tag{C.2}$$

Here, M_{ij}^{2017} represents the total value of firm i's imports in good j in 2017, while $M_{ij}^{2017,CN}$ indicates firm i's imports from China for good j in 2017. For firms without imports in 2017, $IMCN_i^{USIT}$ is set to zero. We classify firms by the hypothetical tariff incidence on their import basket if imported by a US company. By interacting this measure with time-fixed effects, we capture differential trends for firms importing affected goods from China before the shock.

Imports from the US

Under typical conditions, US imports enter Mexico duty-free. However, new US tariffs on Chinese products can impact prices of all goods in the market, irrespective of origin, due to reduced competition or higher input costs. To address this, we consider the potential effect of US tariffs on Mexican exporters through input cost changes:

$$IC_i^{USIT} = \frac{\sum_{j \in USIT^{CN}} M_{ij}^{2017,US} \times \Delta\tau_j^{USIT^{CN}}}{\sum_j M_{ij}^{2017}} \tag{C.3}$$

Equation C.3 identifies Mexican exporters whose imports depend on US goods affected by increased import protection targeting China.

Additionally, we consider the potential effects of China's retaliatory tariffs via input costs and examine differential trends among firms whose imports focus on affected US goods. Retaliatory export tariffs may lower prices of these goods, potentially benefiting Mexican exporters that use them as inputs. We define this firm-level measure as:

$$IC_i^{USRT} = \frac{\sum_{j \in USRT^{CN}} M_{ij}^{2017,US} \times \Delta\tau_j^{USRT^{CN}}}{\sum_j M_{ij}^{2017}} \tag{C.4}$$

Equation C.4 allows us to distinguish Mexican exporters whose imports depend on US goods that will become subject to retaliatory export tariffs imposed by China.

Table A.6 presents the summary statistics for these three additional exposure measures. To incorporate these measures, we augment equation 5 by extending the vector of policy controls, P_{it}, to include $\xi_t \times IMCN_i^{USIT}$, $\xi_t \times IC_i^{USIT}$, and IC_i^{USRT}, where ξ_t denotes year fixed effects. Figure C.2 presents the results, alongside the baseline results for comparison. The findings confirm that our baseline results are robust to allowing differential trends for firms with varying levels of reliance on targeted goods in their imports.

We also augment equation 6 with the input channel controls, by incorporating the three channels to both P_{it} and $P_{it} \times IMM_i$, to account for differential responses to targeted import exposures based on firms' IMMEX status. Figure C.3 confirms that input channels do not confound the effect of US tariffs on Mexican firms' exports to the US.

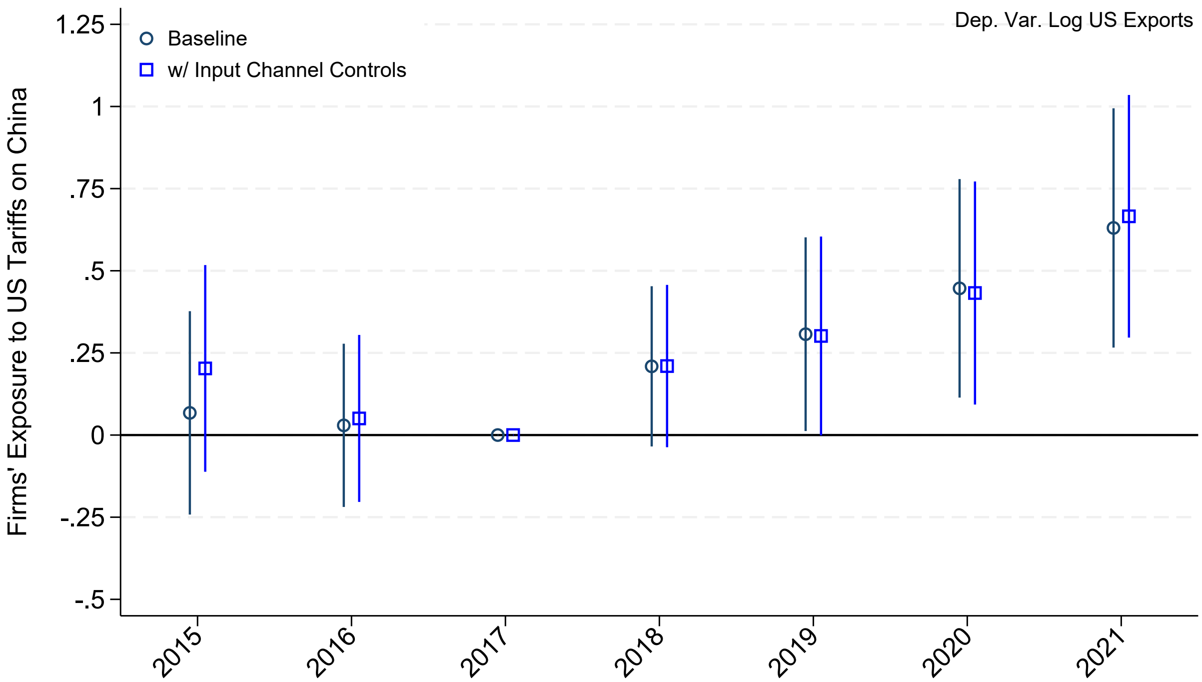
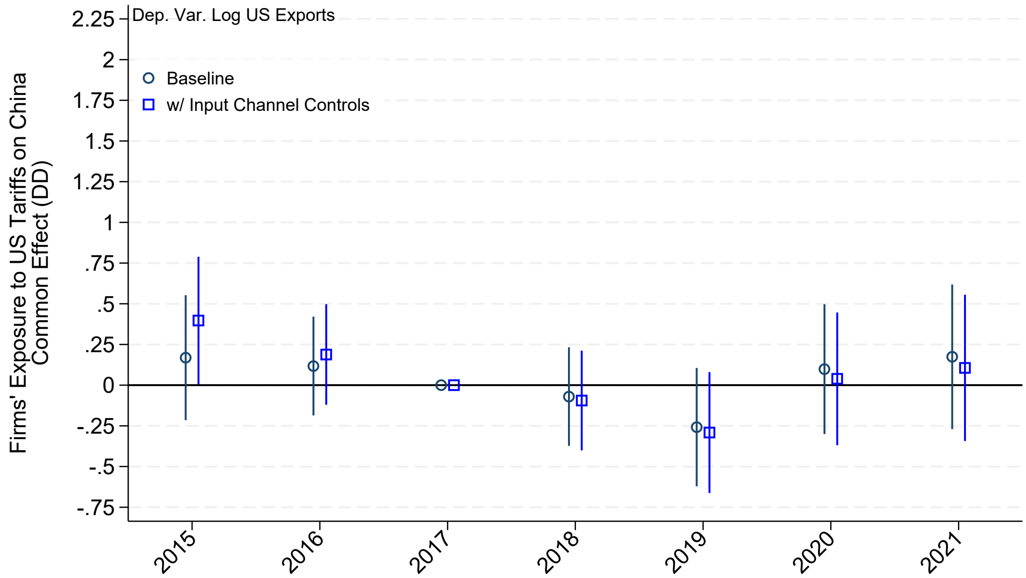
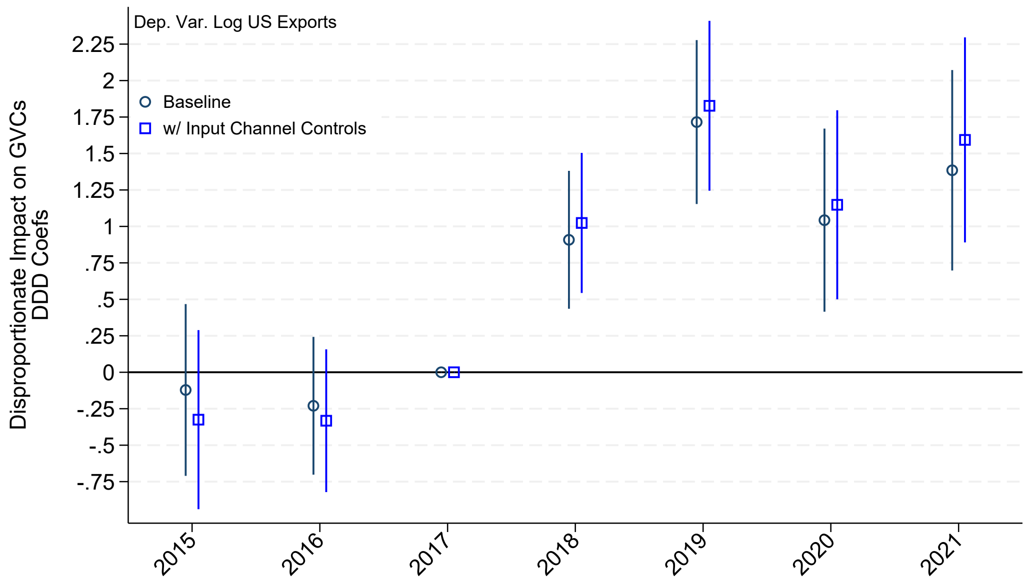


Figure C.2: Robustness with additional input channels: Impact on Mexican Firms' Exports to the US

Notes: The sample consists of all exporting firms in Mexico as of 2017 covering 2015-2021, with N=128,021. Estimation of equation 5 (baseline) and augmented equation 5 with three input channel controls allowing for differential trends on firms whose imports rely on targeted goods. The dependent variable is the natural logarithms of firms' US exports. Both regressions are weighted by the natural logarithm of each firm's total export value in 2017. Shown are the yearly DD coefficient estimates corresponding to TM_i^{US-CN}, along with 95% confidence intervals derived from robust standard errors clustered at the firm level.



(a) Impact on Firms' Exports (DD coefficients)



(b) Disproportionate Impact on GVC Firms' Exports (DDD coefficients)

Figure C.3: Robustness with additional input channels: Role of GVC Firms in the Positive Effect of US Tariffs Targeting China

Notes: N=128,021. Estimation of equation 6 (baseline) and augmented equation 6 with input channel controls. The dependent variable is the natural logarithms of firms' US exports. All regressions control for firm fixed effects, baseline firm size by year, non-manufacturing by year, IMMEX by year fixed effects, and additional trade policy controls (P_i by year, $P_i \times IMM_i$ by year fixed effects), as outlined in equation 6 and in figure legends. Both regressions are weighted by the natural logarithm of each firm's total export value in 2017. Figure C.3a shows the yearly DD coefficient estimates for TM_i^{US-CN}, and figure C.3b shows the yearly DDD coefficient estimates for $IMM_i \times TM_i^{US-CN}$, both with 95% confidence intervals which are derived from robust standard errors clustered at the firm level.

C.3 Analysis with the Quarterly Data

Although analyzing firm-level data at high frequency is more challenging due to seasonality and other econometric issues, we also conduct the analysis at the quarterly level for robustness. Figure C.4 presents the quarter-by-quarter impact of increased US tariffs on China on Mexico's GVC firms' exports to the US. To examine quarterly pre-trends in 2017, we use 2015 data as the reference point. The results confirm a lack of major pre-trends over 2016-2017.

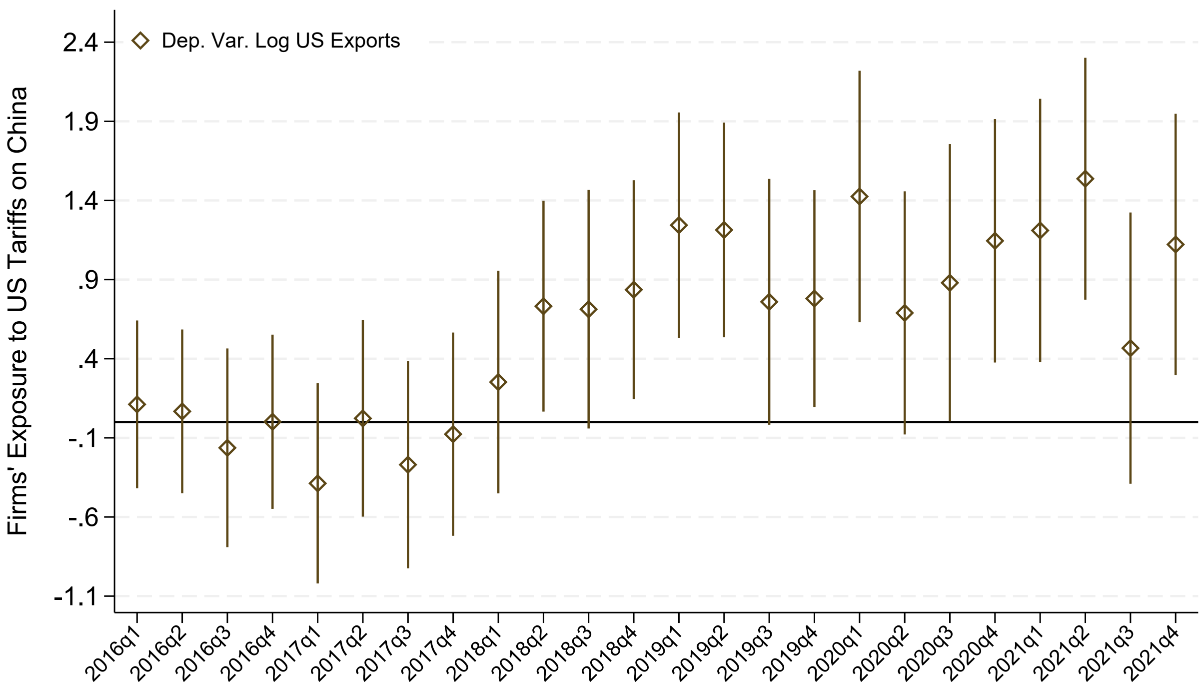


Figure C.4: Robustness Analysis with Quarterly Data

Notes: The dependent variable is the natural logarithms of firms' US exports. The sample consists of all IMMEX firms in Mexico as of 2017 covering the period from 2015 to 2021, with N=132,796. The regression includes firm by quarter fixed effects, quarterly time fixed effects, baseline firm size by quarterly time fixed effects, three-digit industry by year fixed effects, and controls for firm-specific exposures to China's retaliatory tariffs, Mexico's retaliatory tariffs and the US tariffs on Mexico. Shown are the quarterly DD coefficient estimates corresponding to TM_i^{US-CN}, along with 95% confidence intervals.

D Robustness Analyses

In this section, we consider various additional factors that can potentially affect our results.

D.1 Local Labor Market Shocks

In 2019, Mexico revised its minimum wage legislation to improve workers' living conditions. The legislation was applied unevenly, dividing the country into two regions: the northern border region, which includes 45 municipalities within approximately 25 kilometers of the US border, and the rest of the country. In the northern border region, the minimum wage doubled in 2019 and increased by 5% in 2020. Between 2019 and 2021, the national minimum wage increased annually by 16%, 20%, and 15%, respectively, for the rest of the country.

The US Border versus Other Regions

To assess whether the minimum wage increase has impacted firms' response to the US trade policy shift, we conducted the analysis separately among firms located in the border region affected by the higher minimum wage increase and among firms located in the other regions. Figure D.1 shows how GVC firms' US exports respond to the US tariff exposure on China depending on firms' location. While the results show positive effect regardless of whether firms operate in the area which was the target of the faster minimum wage legislation, Figure D.1 also reveals somewhat sluggish response in that area which may reflect the higher labor costs resulting from the legislative change.

Municipality-Specific Trends

To control for any other local labor market shocks, such as labor shortages and COVID-19 closures that may confound our results, we also include municipality-specific trends based on firms' primary locations as registered with the Ministry of Economy. Firms are spread across 380 municipalities, allowing us to control for differential time trends in each. The results in Figure D.2 confirm the robustness of our findings to such local labor market shocks. To additionally address potential

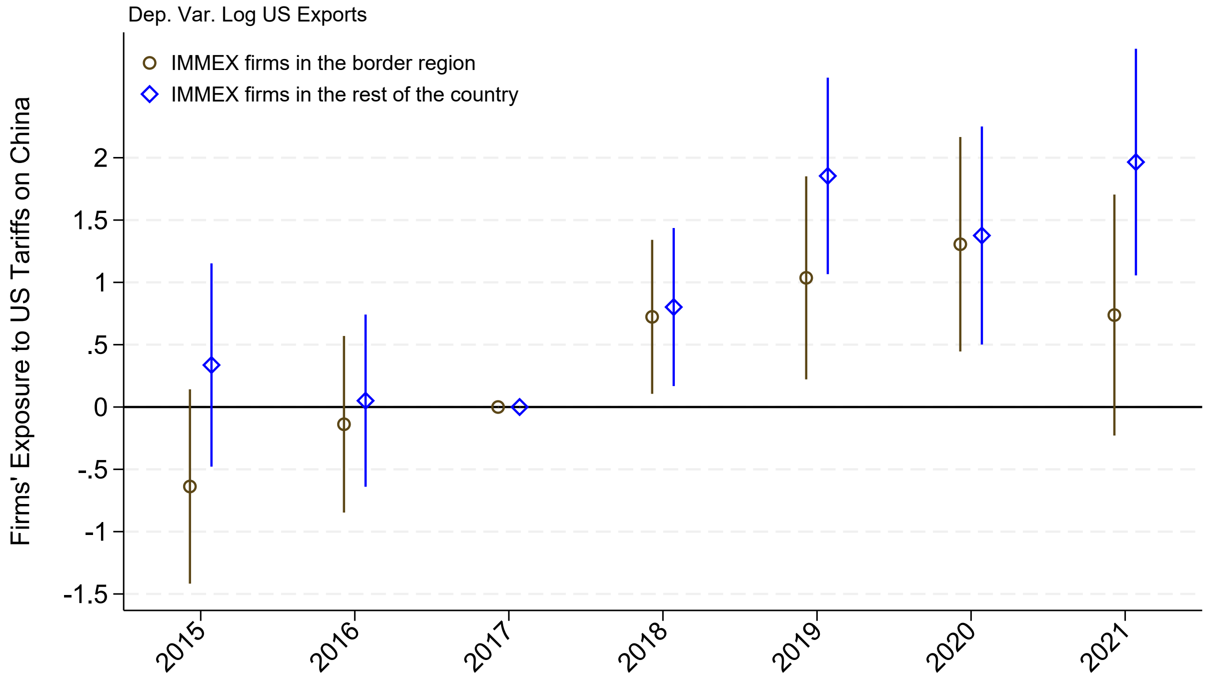
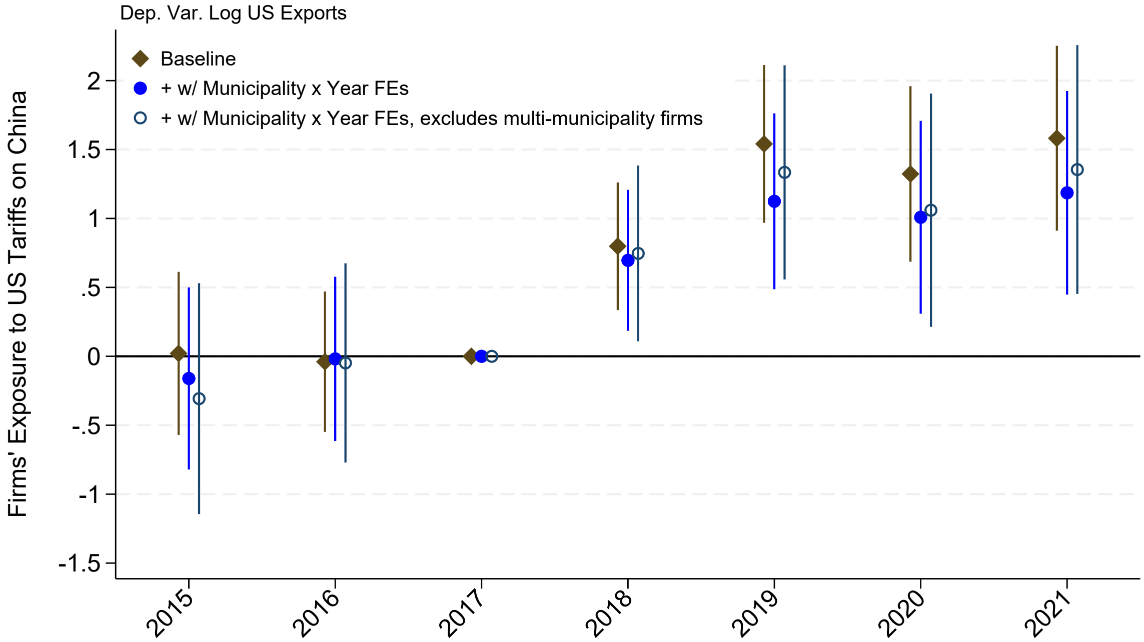


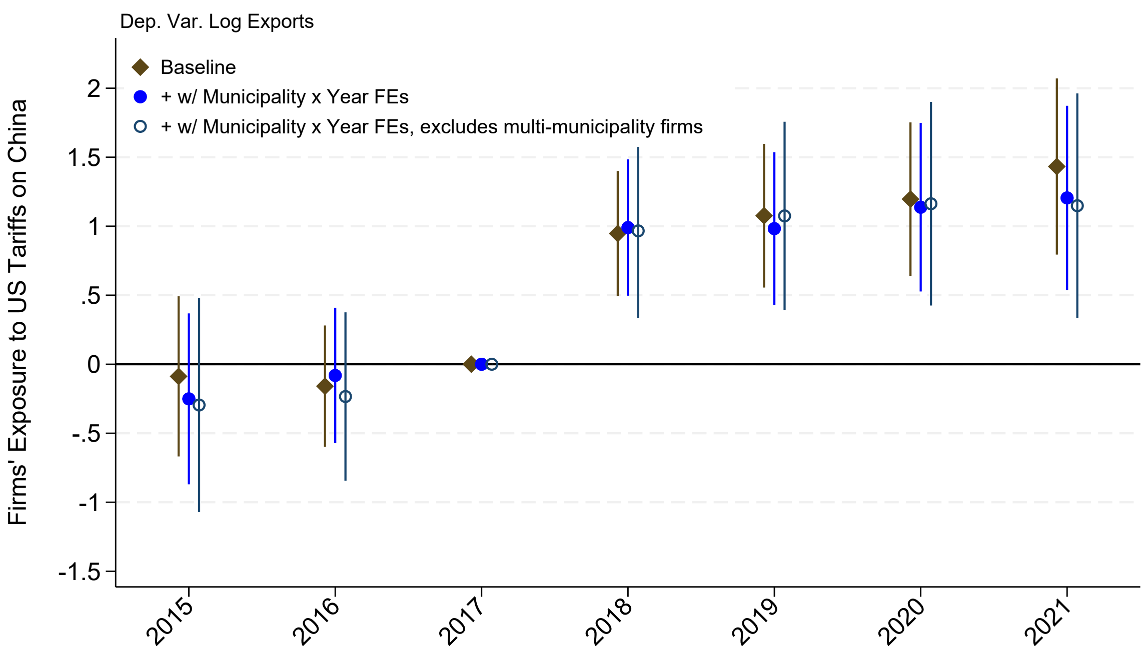
Figure D.1: Robustness Analysis: Northern Border versus Other Regions

N=12,502 (US Border), N=23,810 (Other regions). The sample includes all manufacturing IMMEX firms in Mexico as of 2017, covering 2015-2021. Estimations based on equation 5 and include firm, baseline firm size-by-year, industry-by-year fixed effects, and the yearly, firm-specific controls for China's retaliatory tariffs, US tariffs on Mexico, and Mexico's tariffs on US goods. Shown are DD coefficient estimates for TM^{US-CN} with 95% confidence intervals.

bias due to firms with multiple municipality operations, we also conduct our analysis by excluding firms whose operations span multiple municipalities. These results are also presented in Figure D.2 and confirm that our results are not impacted by these potential confounding factors.



(a) GVC Firms' U.S. Exports



(b) GVC Firms' Total Exports

Figure D.2: Robustness Analysis with Municipality-Specific Trends

The dependent variables are the logarithms of firms' US exports and total exports in Figures D.2a and D.2b, respectively. The sample includes all manufacturing IMMEX firms in Mexico as of 2017, covering 2015-2021. The number of observations for baseline, municipality $\times$ yesr FE, and single municipality samples are N=36,347, N=35,425, N=23,806, respectively in Figure D.2a (US exports).They are, N=38,292, N=35,820, and N=25,178 in Figure D.2b (total exports). Estimations use equation 5 and include firm, baseline firm size-by-year, industry-by-year fixed effects, and controls for China's retaliatory tariffs, US tariffs on Mexico, and Mexico's tariffs on US goods. Blue markers indicate regressions that also include municipality-by-year fixed effects. Shown are DD coefficient estimates for TM^{US-CN} with 95% confidence intervals.

D.2 The Changes with the USMCA

The United States-Mexico-Canada Agreement (USMCA) took effect in July 2020, introducing key provisions impacting the automotive and, to some extent, textile sectors. The agreement significantly raised the regional content requirements for duty-free treatment of automotive products. For instance, the regional value content (RVC) threshold for passenger cars increased from 66% to 75%, to be fully phased in by 2023, and for heavy trucks, from 60% to 70% by 2027. Additionally, labor value content requirements mandated minimum wage thresholds, starting at 30% on July 1, 2020, and rising to 40% by 2023.

The USMCA also revised NAFTA's textile and apparel rules of origin (ROOs), easing requirements for some products while tightening them for others (United States International Trade Commission, Publication No. 4889). Although most USMCA provisions began incremental implementation in 2020, anticipated higher regional value content may have influenced long-term relocation decisions. To test USMCA's potential influence on our findings, we re-conduct our analysis, excluding firms in industries targeted by the new provisions. The results showed statistically indistinguishable effects when firms in USMCA-affected industries were omitted. Figure D.3 displays the impact of new US tariffs on firm exports to the US in the baseline analysis and when firms in the automotive and both automotive and textile sectors are excluded.

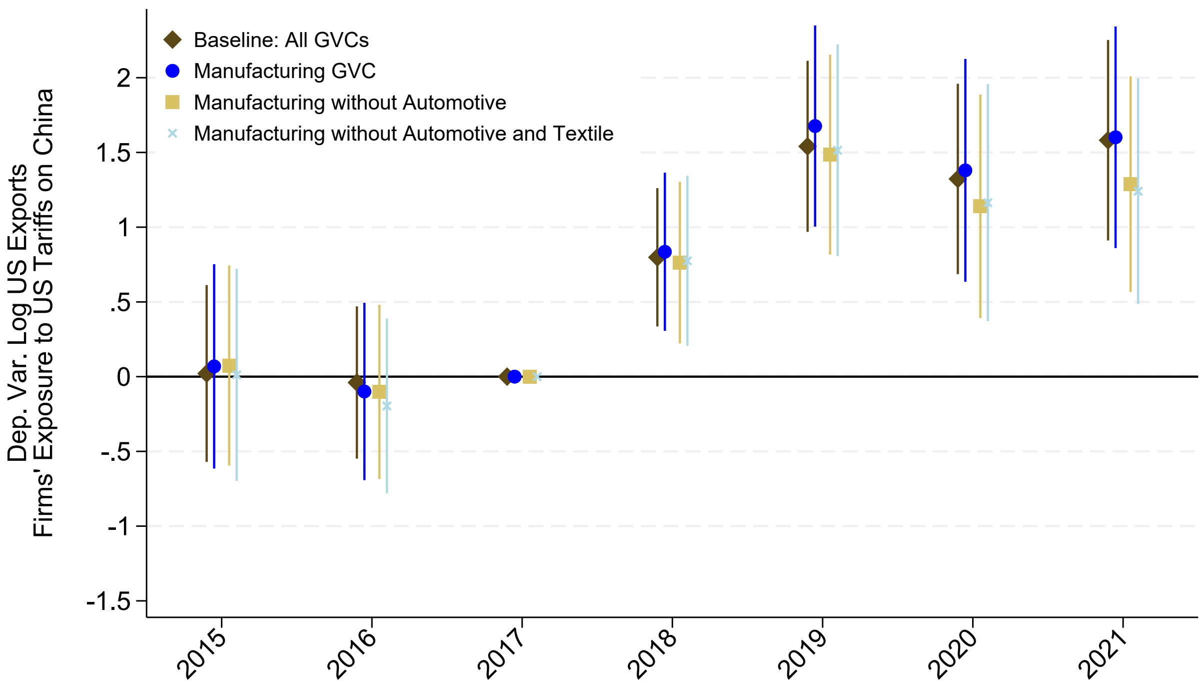


Figure D.3: Robustness Analysis Excluding Automotive and Textile Sectors

The dependent variables are the logarithms of firms' US exports. The sample includes all manufacturing IMMEX firms in Mexico as of 2017, covering the 2015-2021 period. N=36,347, 28,977, 24,840, and 21,650 respectively in the baseline, manufacturing, manufacturing without auto and manufacturing without auto and textile samples. Estimations use equation 5 and include firm, baseline firm size-by-year, and industry-by-year fixed effects, with yearly controls for China's retaliatory tariffs, US tariffs on Mexico, and Mexico's tariffs on US goods. Shown are DD coefficient estimates for TM^{US-CN} with 95% confidence intervals.

E Data Construction

We employ confidential transaction-level customs data, called COMEXT, that covers all export and import transactions of Mexican firms. The database is hosted by the secure data servers in the Econlab of Banco de Mexico and accessed in compliance with the data access agreement signed by the corresponding author.[21]

The values in the customs data are reported in free on board (FOB). The products are reported at the TIGIE classification which closely matches with the HS classification at the six-digit. We use the correspondence tables provided by Banco de Mexico to map TIGIE to HS.

We link the confidential transaction-level customs data with the six-digit products and country pairs subject to newly imposed import and export tariffs as part of the 2018/19 trade war. We use the datasets of tariff changes on US imports and exports in 2018 and 2019 as constructed by Fajgelbaum et al. 2020 and Fajgelbaum et al. 2021. Import tariff changes are reported at the Country-Month-HS-10 digit. We use the share of each HS-10 digit good in total US HS-6 digit import in the pre-trade war year, 2017, to collapse the data into the HS-6 digit level. Similarly, we collapsed retaliatory tariff changes imposed on the US which are reported at the HS-8 digit level based on the US exports in the pre-trade war year. Based on the firms' HS-6 digit level import and export across different destinations as of 2016, we then identify affected firms and construct our firm-level measures of the trade war as described in Section 3.

To identify the global ultimate parent companies of IMMEX firms, we use D&B Direct+ APIs with the Hierarchy and Connections datablocks. First, we utilize the unique tax identification numbers of IMMEX firms to retrieve their D-U-N-S Numbers, a unique firm identifier in the D&B database. Approximately 83% of IMMEX firms were matched in the D&B database. Using these D-U-N-S Numbers and the Hierarchy and Connections datablocks, we obtained information on their global ultimate parent companies. In some cases, the global ultimate parent company is the IMMEX

[21] Inquiries regarding the terms and conditions for accessing this data should be directed to econlab@banxico.org.mx.

firm itself or another Mexican firm. Out of 5,943 IMMEX firms, the D&B Corporate Hierarchy database identified 3,286 firms with foreign parent companies. To supplement this, we used the S&P Global Database (via Capital IQ) to search for parent company information, resulting in an additional 43 firms with foreign parent information. Finally, we merged the country of the ultimate parent company with firm-level trade data using firms' tax identification numbers, with the support of personnel from Banco de México's microdata laboratory. We classify IMMEX firms as domestic if neither the D&B database nor the S&P Global database identifies a foreign parent company.

We classify exports as high-, mid-, and low-tech exports based on 3-digit SITC Rev 3 technology classifications provided by UNCTAD and originally constructed by Lall (2000). To classify goods as raw materials, intermediate, consumer, and capital, we rely on SoP1, SoP2, SoP3, and SoP4 classifications by UNCTAD.

F Legislative Environment for GVC participant firms: IMMEX

This section provides an overview of the legislative framework for firms participating in Global Value Chains (GVCs) under Mexico's IMMEX program, which is designed to promote exports through various fiscal benefits and regulatory requirements.

F.1 IMMEX Registry

The Ministry of Economy (Secretaría de Economía) publishes monthly directories of firms registered under the IMMEX program. To retain IMMEX status, firms must submit annual activity reports and maintain minimum annual exports of $500,000. Failure to submit the report or meet the export threshold may lead to suspension and eventual cancellation of IMMEX registration.

We obtain these directories—which include firm names, addresses, and tax identifiers (Registro Federal de Contribuyentes, RFC)[22]—from the Ministry of Economy. Between 2012 and 2015, the registry was updated five to eight times per year; since 2016, updates have been monthly.

We use firms' RFCs, names, and addresses to identify IMMEX firms in COMEXT. Due to confidentiality restrictions, researchers may only work with customs data after tax IDs are anonymized. The merge was therefore performed by Banco de México's Econlab personnel, who have access to the raw data. Between 2012 and 2021, 14,519 firms were registered in the IMMEX directories, of which 13,965 (96%) were identified in COMEXT.

F.2 Background Information: The Creation of IMMEX

Participation in global value chains has been a longstanding and crucial economic development strategy pursued by Mexico. In line with this objective, the Maquiladora Industry was established in the US-Mexico border region as one of the world's first export processing zones under the Border Industrialization program in 1965. Over time, the maquiladora industry has transitioned from consisting of predominantly labor-intensive assembly plants owned by foreign MNEs

[22] RFC is a unique registration number issued by Mexico's tax authority, SAT.

to encompass more advanced manufacturing processes. China's accession to the World Trade Organization (WTO) and the subsequent rise in Chinese imports had a profound impact on the maquiladora industry, particularly in traditionally labor-intensive sectors such as apparel and toys. This increased competition, however, spurred a shift within the maquiladora sector towards more advanced industries, like chemical manufacturing, machinery, and automotive products (Utar and Ruiz, 2013).The majority of establishments operating under the maquiladora program were owned by US-based multinationals (MNEs) and enjoyed the privilege of importing inputs, machinery, and equipment used in production without tariffs long before NAFTA took place. In 2005, 91% of capital equipment investment in maquiladoras originated from the US, with Canada, Switzerland, the Netherlands, and Japan each holding a 1% share (Utar and Ruiz, 2013).

Mexico had another export promotion program called the Program for Temporary Imports to Promote Exports (PITEX), which was established in 1990. This program aimed to provide domestic producers, who met certain criteria, with similar trade facilitating benefits as those enjoyed by maquiladoras. PITEX plants were typically located in the older industrial belt in central and southern Mexico, while maquiladoras were more prevalent in states along the US-Mexico border.

The full implementation of NAFTA decreased the difference between the Maquiladora and the PITEX programs by removing domestic sales limitation on Maquiladoras and allowing for 100% foreign ownership. In 2005, maquiladora and PITEX firms accounted for 85% of nationwide exports and 65% of nationwide intermediate goods imports. Recognizing the shared goal of facilitating Mexico's integration into global value chains, the Ministry of Economy merged the Maquiladora and PITEX programs in 2007, resulting in the creation of a new program called the Maquiladora Manufacturing Industry and Export Services, or simply, IMMEX.

In Mexico companies are subject to both a 28 percent corporate income taxes net of expenses and a 16 percent value-added taxes on domestic purchases of inputs and imports. If maquiladoras certify that they function purely as a maquiladora for a foreign company with all the inventories owned by a foreign company then instead of paying 28 percent corporate income tax, they pay 3 percent income or asset tax, whichever is greater. Maquiladoras are also altogether exempt from the value-added tax on purchases (domestic or imports). Since the establishment of IMMEX, PITEX firms were also granted value-added tax exemption, yet the corporate tax differences still persists between foreign maquiladoras and PITEX firms.

With NAFTA, duty-free input was extended to other companies as long as the goods qualify the minimum North American content. But IMMEX firms are still granted additional benefits with respect to importing inputs, machinery and equipment to be used in the production. If importing from non-NAFTA/USMCA countries, IMMEX firms can delay duties until they re-export the final product that contains the import. They pay lower customs processing fees. They are exempt from duties altogether on imports as long as the final products go to outside the North American destination. If the final products go to the US, which is likely the case, or Canada, then IMMEX firms can benefit from some additional trade facilitation instruments, such as Regla Octava and can pay lower (preferential) duties on the non-North American content of their export.

PROSEC Firms and the Eighth Rule (Regla Octava) PROSEC is the Spanish acronym for *Programa de Promoción Sectorial* /Sectorial Promotion Program. The program establishes that authorized companies that manufacture goods for a particular sector can import certain, pre-specified goods to be used in their production using preferential tariff rates, regardless of whether the goods to be produced are for export or the domestic market. Unlike the IMMEX Program, which permits companies to carry out temporary imports with specific benefits in paying duties and value-added tax, the PROSEC Program's benefits only concern duties (not value-added taxes) regardless of the type of imports, whether temporary or not. PROSEC encompasses 23 sectors with pre-specified list of inputs within each sector.

What is the Eighth Rule (Regla Octava)?

The "eighth rule" consists of a license issued by the Ministry of Economy that allows a company that has an authorized PROSEC program to use tariff items from Mexico's HS (TIGIE) heading 98 "special operations." The authorized companies may import machinery, equipment, materials, inputs, parts, and components at preferential tariff rates per the Ministry of Economy authorization. Companies that seek to benefit from the Eighth Rule must have their " manufacturing company certificate” that consists of its PROSEC registration. In other words, the company must have its PROSEC registration in order to access the preferential tariffs of the Eighth Rule.

This permit allows for the import of all types of goods to be used in a specific production project via a single tariff code that is exempted from the payment of import duties. We identify firms that import under the Eighth Rule based on the customs data as we see if firms import any goods under the heading of “special operations”. As any firm with the Eighth Rule permit has to have a PROSEC registration, this way we also identify PROSEC firms. We should note that our PROSEC identification does not capture a PROSEC firm if that firm does not utilize the Eighth Rule. IMMEX firms benefit from the Eighth Rule for their non-NAFTA/USMCA import contents when they are exporting to NAFTA countries.

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