Elsewhere in North America: How U.S. Tariffs on China Boosted Mexico's Manufacturing Employment and Output*

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December 30, 2025

Using administrative longitudinal firm- and plant-level data from Mexico that links manufacturing firms to their customs records and covers the period 2014–2023, I examine whether US tariffs targeting China have contributed to a manufacturing revival in the southern part of North America. Leveraging the abrupt shift in US trade policy as a natural experiment, and constructing firm-level trade policy exposure measures based on firms' pre-shock trade portfolios at the product level, I show that higher US tariffs on China significantly increased manufacturing output and employment. Adjustment occurs along both intensive and extensive margins, through expansion of existing plants and the establishment of new manufacturing plants by incumbent firms. Foreign multinationals and their domestic affiliates operating under Mexico's export platform, IMMEX, drive these gains in manufacturing output and jobs, with U.S.-headquartered firms making a particularly notable contribution. The employment response is concentrated among production workers and technicians, particularly in technology-intensive industries embedded in North American supply-chains. These findings provide firm-level evidence that heightened import protection in the United States has stimulated manufacturing activity elsewhere in North America—namely, in Mexico.

Keywords: Trade War, Mexico, US, China, Manufacturing Firms, Employment, Production

JEL classifications: F13; F14; F23; F61; F68

*The analysis in this paper was conducted at the INEGI data lab in Mexico City. I am especially grateful to Dr. Natalia Volkow, head of the data lab, for her exceptional support; Gerardo Durand, Deputy Director General of Economic Administrative Records; Lázaro Trujillo Hernández, Director of Economic Statistics of Administrative Records; and the entire INEGI team responsible for the IMMEX and PEME databases, including José Francisco Cuiriz Moncada and others, for many detailed conversations, their ongoing support, and their patience with my limited Spanish. I thank Justin Pierce for insightful discussion and participants at Roberts Fest and Tariffs and Trade Policy: Past, Present, and Future for helpful comments.

1 Introduction

The imposition of tariffs by the United States on a broad range of Chinese imports under Section 301 of the Trade Act of 1974, in response to alleged unfair trade practices and violations of intellectual property rights, marked a sharp departure from decades of liberal trade policy. By 2019, the tariffs and subsequent retaliation had affected over $450 billion in bilateral trade flows (Fajgelbaum and Khandelwal 2022), creating widespread uncertainty in global markets. The resulting US–China trade war—sudden, far-reaching, and involving the world's largest consumer and producer economies—constituted a major shock to globally integrated production and services.[1]

While the tariffs, estimated to have cost U.S. consumers and businesses billions of dollars per month (Amiti et al. 2019; Grossman et al. 2024), were promoted by the administration as a tool to bring back manufacturing jobs and revitalize U.S. industry (The White House 2025a, 2025b), recent studies suggest that they failed to deliver on their central promise of reviving domestic manufacturing (Flaaen and Pierce 2024; Autor et al. 2024). As a potential catalyst for strategic decoupling, the trade war triggered a broader adjustment of supply chains and led to a sharp rise in multinational-driven export from Mexico and elsewhere (Utar et al. 2025; Fajgelbaum et al. 2024; Beason et al. 2025). Given Mexico's deep integration with the US through North American production networks and its comparative labor cost advantage, the ongoing reorganization of global value chains (GVCs) in response to the protectionist turn in the U.S. trade policy against China has important consequences for the future of manufacturing in North America.

This paper examines whether the 2018–2019 U.S. trade policy actions against China contributed to a manufacturing resurgence in Mexico and, more broadly, to a restructuring of North American production. To this end, I use firm-level data from Mexico's national statistics agency (INEGI) covering internationally active manufacturing firms of all sizes from 2014 to 2023. Developed in

[1] Studies show that the 2018–2019 tariff changes were uncorrelated with prior price or import trends across products, making the event a suitable natural experiment for analyzing trade policy and global value chains (e.g., Cavallo et al. 2021; Fajgelbaum et al. 2020; Amiti et al. 2020). For a comprehensive overview, see Fajgelbaum and Khandelwal (2022). For details on product and sectoral coverage, see Bown (2021).

response to the growing fragmentation of global production, INEGI's Perfil de Empresas Manufactureras de Exportación (PEME) framework links administrative trade records with firm-level information on production and employment. The resulting database covers more than 84% of Mexico's merchandise trade, and offers a unique view of export-oriented manufacturing.

Distinguishing firms that operate under Mexico's export platform, the Maquiladora Manufacturing Industry and Export Services (IMMEX) program, in the firm-level database reveals that IMMEX firms account for 90% of Mexico's manufacturing exports to the United States. As shown in Utar et al. (2025), firms in the IMMEX program, most of which are either subsidiaries of foreign multinationals or domestically owned affiliates closely tied to U.S. manufacturing, are the main drivers of Mexico's export growth in response to the increase in U.S. tariffs on Chinese imports. Throughout the paper, I refer to these firms as "GVC firms," reflecting the program's explicit purpose of fostering participation in global production and service networks.

Using corporate linkages from Dun & Bradstreet, I trace the ultimate owners of GVC firms via their tax identifiers and link this information to the PEME database. Between 2017 and 2023, firms with ultimate owners headquartered outside Mexico created over half a million manufacturing jobs, of which U.S.-owned firms alone expanded employment by 31 percent, adding more than 300,000 jobs (Figure 1).

Between 2018 and 2024, a number of multinational firms—including Bosch, LEGO, Continental, Volkswagen, and Toyota—committed substantial investments to expand their manufacturing footprint in Mexico (News Desk 2018; Webwire 2022; Reuters 2022a; Cohen et al. 2025). In several cases, these expansions coincided with reductions in US operations, as seen with John Deere, Foxconn, and Stellantis (Reuters 2020; Reuters 2022b; Glickman 2024), reflecting a broader reconfiguration of North American production strategies. Did a policy aimed at reviving US manufacturing instead fuel job creation in Mexico? In fact the share of employment accounted for by manufacturing firms in IMMEX relative to US manufacturing employment rose from roughly one-fifth in the pre–trade war period to one-fourth in the post–trade war period (see Figure 2).

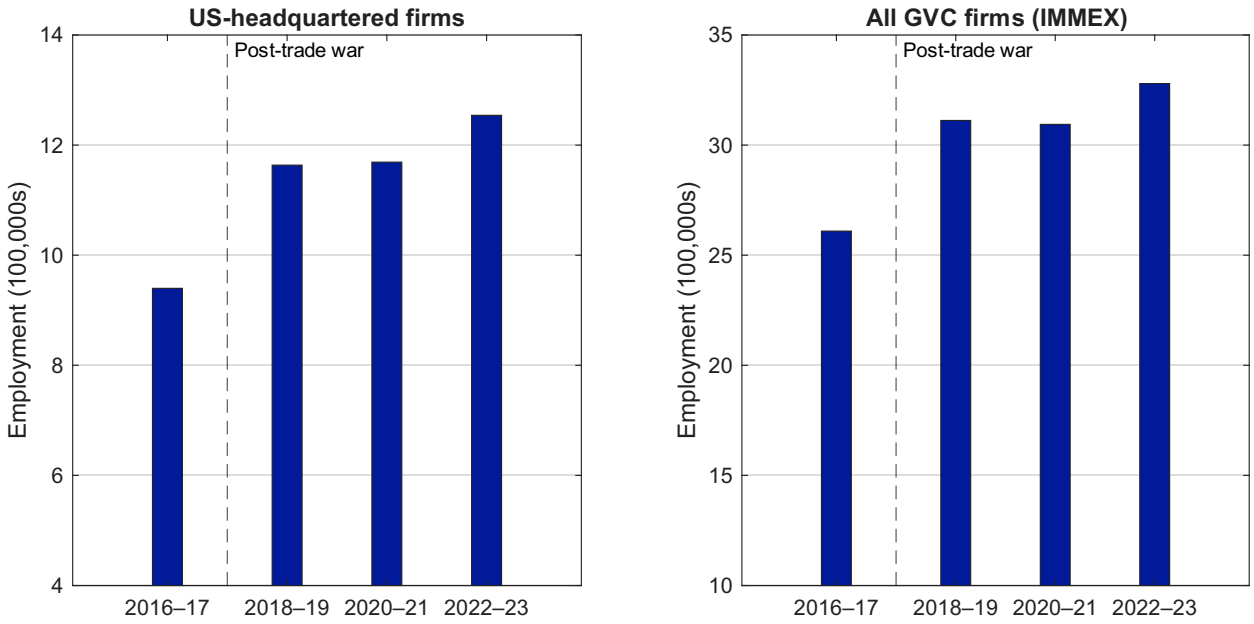


Figure 1: Manufacturing Employment accounted by U.S. Firms in Mexico

PEME database, INEGI. Within PEME, IMMEX firms and US-owned IMMEX firms are identified via their tax identifiers. The figure plots the total employment accounted for by firms whose ultimate owners are headquartered in the US (left) and the total employment accounted for by all IMMEX firms.

I construct firm-level trade policy exposure measures based on pre-shock product-destination portfolios at the six-digit HS level. Exploiting the abrupt and large-scale nature of the US tariff shock, I analyze within-firm outcomes in an event study framework before and after the tariffs, controlling for aggregate, industry, and firm-specific shocks. The results confirm that the tariffs significantly increased Mexican firms' exports to the U.S., consistent with earlier findings (Utar et al. 2025).[2] While the year-by-year analysis shows an impressive and robust export growth, it leaves open the question of whether this expansion reflected a genuine increase in domestic production or was largely driven by imports with limited domestic value added.

Crucially, this paper shows that the U.S. trade policy shift against China not only boosted Mexican firms' exports to the United States but also generated significant increases in domestic production and employment. This manufacturing expansion was driven by subsidiaries and affiliates of firms headquartered in the United States and other major economies, suggesting that North American

[2]Focusing on firms' trade, the positive effect of the US-China trade war on the third-country firms is also shown by Rotunno et al. 2023 and Chen et al. 2025 among others. For the reverse effect, how China's WTO accession negatively affected Mexican firms, see Utar and Ruiz (2013).

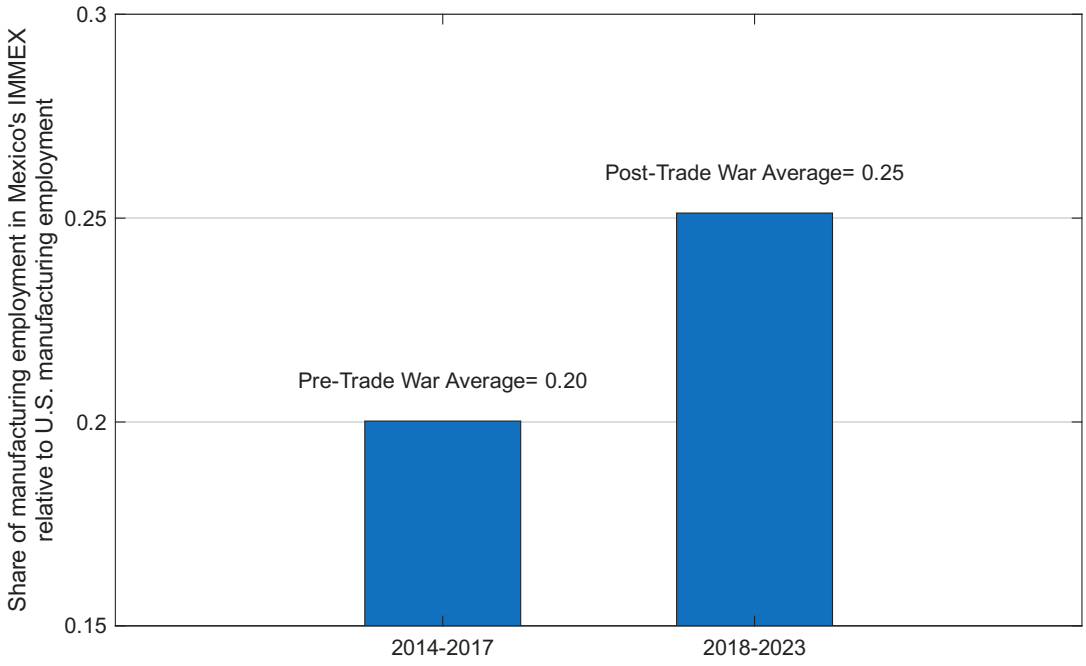


Figure 2: Mexico's Manufacturing GVC Employment Relative to U.S. Manufacturing

PEME database (trade-active manufacturing firms), INEGI. IMMEX firms within PEME are identified via their tax identifiers. Bars show the average share of employment accounted for by IMMEX firms in PEME relative to U.S. manufacturing employment. U.S. manufacturing data are from the Federal Reserve Economic Data (FRED), Federal Reserve Bank of St. Louis. Author's calculations.

manufacturing, as a whole, responded in ways that may have partially offset the intended reshoring of production to the United States.

Recent studies highlight that U.S. dependence on Chinese supply chains often persisted through third-country trade flows, raising questions about whether tariff-induced trade diversion translated into domestic production gains (Alfaro and Chor 2023; Freund et al. 2024; Garred and Yuan 2025; Gopinath et al. 2025). This paper provides direct causal evidence that the 2018–19 U.S. tariffs on China significantly increased manufacturing output in Mexico and, to my knowledge, is the first to show at the firm level that these tariffs boosted production within the North American manufacturing network.

Drawing on plant-level data on GVC firms that provide information on employment types, I show that the resulting employment growth induced by the tariffs is concentrated among production

workers and technicians, while non-production employment was barely affected. Further, the employment gains are generated by technology intensive industries reflecting the pattern of specialization in the North American supply chains, where multinational activity is centered in computers, electronics, machinery, aerospace, and automotive manufacturing. By showing that the U.S. tariffs disproportionately increased factory floor jobs in Mexico, the findings suggest that the U.S. effectively offshored the very types of middle-skill industrial employment that trade protectionism claimed to bring back, thereby extending the empirical evidence on the welfare implications of the 2018–19 U.S. trade policy.

Distinguishing between contract manufacturing for foreign clients and in-house production, I show that the observed production expansion is attributable to the relocation of production within multinational firms' cross-border networks, rather than to growth in arm's-length contract manufacturing. This speaks to literature that highlights the importance of firm-level networks and supplier relationships for trade and supply-chain adjustments (Monarch 2022; Conconi et al. 2025).

My findings show US and non-US foreign firms embedded in North American value chains not only expand production and employment in existing plants but also establish new plants in response to the U.S. tariff hikes targeting China. Although U.S. policymakers aimed to revitalize domestic manufacturing through the trade policy shift against China, recent research finds no measurable impact on U.S. output or employment (Flaaen and Pierce 2024; Autor et al. 2024). Instead, I find that the adjustment occurred primarily outside the United States, as multinational firms reallocated production within their supply chains. This emphasizes how the intended effects of trade policy can diverge from their realized outcomes in an integrated global economy.

A central reason for this divergence is that trade is highly concentrated in the hands of large multinational enterprises. Handley et al. (2025) show that the 2018–19 tariffs disproportionately fell on the largest firms accounting for more than 80% of U.S. exports. Flaaen et al. (2025) emphasize that production in the United States is deeply embedded in global value chains, with extensive cross-border "back-and-forth" linkages with Mexico and Canada. These interdependencies imply that domestic effects of tariffs can differ substantially from conventional predictions: domestic

content of imports and foreign content of exports may limit or even reverse the potential gains for domestic producers. Moreover, such cross-border "back-and-forth" trade often takes place within firms, giving multinational enterprises flexibility to move production across borders in response to policy changes. Consistent with this, Flaaen et al. (2020) highlight tariff-jumping strategies among multinational firms to circumvent import restrictions, and Utar et al. (2025) show that firms in Mexico embedded in global value chains increased their two-way trade with firms in the United States in response to the U.S.–China trade war.[3]

Building on this literature, this paper contributes new evidence by showing that foreign-headquartered firms—especially U.S.-owned firms—were at the center of the U.S. trade-policy-induced manufacturing growth in Mexico and highlights how multinational firms' cross-country production networks shape the way trade policy shocks are transmitted across borders. This also provides an empirical evidence to the recent work focus on optimal trade policy and its welfare implications in the context of global supply chains and multinational production (Antràs et al., 2022; Blanchard et al., 2026; Grossman et al., 2024; Gutiérrez et al., 2025).

The next section introduces the institutional context and describes the firm- and plant-level data that form the empirical foundation for analyzing firms' responses to U.S. trade policy. Section 3 presents the key policy variables and outlines the empirical strategy. Section 4 documents how U.S. tariffs on Chinese products stimulated manufacturing output and employment in Mexico. In addition to providing evidence at both the firm and plant levels, this section also shows that the U.S. tariffs spurred new investment in Mexico by foreign-headquartered firms, including U.S. MNEs. Section 5 concludes. Supplementary results and additional information appear in the online appendix.

[3] See also McCaig et al. (2025) for evidence that tariff reductions reallocate production toward foreign affiliates.

2 Institutional Background and Data

Deep integration with the United States, first under NAFTA and now under the United States–Mexico–Canada Agreement (USMCA), has made Mexico a central platform for U.S.-centered manufacturing production networks. Competitive labor costs, geographic proximity with a long shared border have supported dense cross-border supply chains in which intermediate inputs cross the border multiple times before final assembly. Recent work using confidential U.S. establishment-level data shows that such global value chain linkages are both large and increasingly important and highlight that U.S. manufacturing performance is closely tied to back-and-forth trade with nearby partners, especially Mexico (Flaaen, et al. 2025). Yet much of the empirical literature still identifies GVC firms simply as those that both import and export (Antràs and Chor, 2022), without reference to the institutional arrangements that organize this production sharing. In Mexico, the key institutional framework is the IMMEX program, which allows firms to temporarily import intermediate inputs duty-free for processing and re-export.

In this section, I introduce the institutional context and then describe the PEME firm-level database. I distinguish IMMEX firms and match them with plant-level data to obtain additional detail, creating the data environment that underpins my analysis of firms' responses to U.S. trade policy.

2.1 The Creation of Mexico's Export Platform–IMMEX

In 2007, after the full implementation of the North American Free Trade Agreement which limits duty-free access to non-NAFTA inputs among export-processing establishments, Mexico's Ministry of Economy consolidated all export promotion schemes offering trade-facilitating benefits under a single framework known as the Maquiladora Manufacturing Industry and Export Services Program (IMMEX).

The program is designed to support firms integrated into regional and global value chains by lowering transaction costs on inputs not destined for domestic consumption. IMMEX establishments are predominantly multinational subsidiaries active in North American supply chains, alongside

contract manufacturers serving predominantly U.S. clients. The program has become the principal vehicle through which foreign firms enter and run manufacturing and related operations in Mexico.

Firms register under IMMEX to access a set of trade-facilitating benefits, including a waiver of the 16 percent value-added tax typically levied on all purchases, including imported inputs and capital equipment, reduced custom processing fees, and the option to defer tariff payments on inputs not originating in North America until the time of re-export. To qualify, firms must either maintain an annual export value of at least 500,000 USD or derive at least 10 percent of their revenue from exports. In 2017, firms operating under IMMEX accounted for 84 percent of Mexico's total exports and 64 percent of its imports and provided 2.7 million jobs.

2.2 Data

Manufacturing Firms Matched to Customs Transactions

The PEME database links transaction-level customs records detailing firms' export and import activities with firm-level information on manufacturing production and employment. PEME covers the universe of exporting manufacturers observable in INEGI's manufacturing statistical system, with no size threshold. Firms in the database account for more than 84% of Mexico's total merchandise trade. Although firms in PEME are predominantly large—reflecting the typical size distribution of exporting manufacturers—the database also includes small and micro firms.

Production and employment information at the firm level are aggregated from establishment-level data considering only establishments whose primary activity falls within manufacturing. Each firm-level customs record includes product codes, destination or origin countries, and transaction values reported in 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.

Another key advantage of these data is their comprehensive coverage of workers, including both directly hired employees and workers supplied through third-party staffing firms. This is particularly important in the Mexican manufacturing sector, where staffing arrangements are widespread

and lead social security–based employment records to systematically understate employment and labor compensation. Estefan et al. (2024) show that such arrangements account for nearly one-fifth of manufacturing employment and generate substantial gaps in worker coverage and wage reporting in data from the Mexican Social Security Institute (IMSS)[4]. By contrast, INEGI's measures capture both directly hired and third-party-supplied workers.

Firms' customs data are linked with the six-digit products and country pairs subject to newly imposed tariffs as part of the 2018–19 trade war. I employ the datasets of tariff changes on US imports and exports over 2018-2019 as assembled and updated by Fajgelbaum et al. 2020. The tariffs are aggregated at the six-digit HS level, which is the level of detail that can be matched smoothly with TIGIE.[5]

The 2017 PEME dataset includes 6,092 exporting manufacturing firms, which together accounted for approximately 3.5 million jobs. Merging PEME with the Ministry of Economy's IMMEX registry identifies 4,092 firms operating under the IMMEX export program. These GVC firms represent about two-thirds of exporting firms and account for 76% of manufacturing employment in 2017.

Table 1 summarizes the estimation sample, which consists of exporting firms in 2017. Panel B reports firm characteristics separately for GVC (IMMEX) firms and other exporting manufacturing firms. The GVC group corresponds to firms that underlie the spillover effects of the U.S.–China trade war, as documented by Utar et al. (2025). The median firm in the PEME data employs 239 workers, while the median GVC and non-GVC firms employ 245 and 228 workers, respectively. Consistent with this pattern, average log employment is very similar across the two groups—5.5

[4]IMSS records workers based on formal employment relationships for the purpose of social security contributions. Manufacturers frequently hire workers through third-party or shell staffing firms to reduce payroll taxes, profit-sharing obligations, and exposure to severance and unionization costs. These workers are typically registered with IMSS at the statutory minimum wage on the staffing firm's payroll, with the remainder of compensation paid through non-contributory bonuses. As a result, IMSS data understate both employment and labor remuneration (Estefan et al., 2024).

[5]To calculate the tariff changes in HS 6-digit goods, I use the share of each HS 10-digit good per source country 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, I calculate the share of each HS 8-digit good per country in total US HS 6-digit export as a weight to collapse the retaliatory tariff data into the HS6 level. See Appendix B.

among GVC (IMMEX) firms and 5.4 among non-IMMEX exporters. Although employment is slightly higher in GVC firms, non-GVC exporters exhibit larger production volumes, whereas GVC firms export more. This pattern is consistent with GVC firms being more labor-intensive and more export-focused than non-GVC exporters.

Table 1: Summary Statistics—Estimation Sample

	(1)	(2)	(3)	(4)	(5)
Variable	**Mean**	**SD**	**p25**	**p75**	**Obs**
Panel. A					
All 2017 Exporting Firms (PEME)					
Log Employment	5.44	1.46	4.51	6.39	52,198
Log Value of Production	16.65	1.86	15.49	17.92	51,865
Log Value of Exports	15.09	2.82	13.38	17.08	50,616
Log Value of Imports	15.27	2.59	13.69	17.08	49,806
US Export Share	0.75	0.36	0.60	1.00	50,616
Number of Plants	1.55	3.85	1.00	1.00	51,679
Panel. B					
	IMMEX			**Others**	
	Mean	**Obs**		**Mean**	**Obs**
Log Employment	5.47	37,391		5.38	14,807
Log Value of Production	16.62	37,209		16.73	14,656
Log Value of Exports	15.62	36,872		13.67	13,744
Log Value of Imports	15.53	36,465		14.56	13,341
Number of Plants	1.46	36,874		1.77	14,805

Notes: Manufacturing exporters as of 2017 over 2014-2023. Values are expressed in 2019 constant USD. Employment is measured in number of workers; number of plants is reported in levels.

Figure A.1 shows the distribution of firms across two-digit manufacturing industries, separately for GVC firms and for exporting firms outside IMMEX. GVC firms are concentrated in machinery and equipment industry, reflecting the broader pattern of North American supply chain specialization.

Using firms' unique tax identifiers, I link firms operating under IMMEX in the PEME data to D&B's Hierarchy and Connections database to identify each firm's global ultimate parent and its country of headquarters. Slightly more than half of the GVC firms are foreign-owned, and these foreign firms employed roughly 2 million workers in 2017.[6]

Figure A.2 shows that foreign ownership is strongly concentrated in machinery and equipment, particularly among U.S.-owned firms. Table A.2 presents summary statistics for these firms in 2017 by ownership status (U.S., non-U.S. foreign, and domestic).

To complement the firm-level PEME data, I also draw on INEGI's plant-level IMMEX survey of manufacturing establishments. IMMEX plant level data provides comprehensive measures of revenues, input costs, and labor inputs at the establishment level. Merging the firm- and plant-level data using firm–plant identifiers enables an analysis of how firm-level exposure to trade shocks manifests at the plant level.

The IMMEX data report sales of own manufactured goods and revenues from contract manufacturing separately, disaggregated by destination (domestic versus foreign). I construct total foreign revenue by aggregating contract manufacturing revenues for foreign clients, foreign sales of own manufactured goods, and other foreign revenues, such as carry-over trade. Table A.3 reports summary statistics for IMMEX establishments matched to firms in PEME.

The average labor cost share is 21%, while material costs account for 62% of total expenses. A majority of material inputs originate outside Mexico, as reflected in a foreign material cost share of 42%. These patterns highlight the international integration of IMMEX plants.

3 Empirical Strategy

To identify the causal impact of the U.S.–China trade war on manufacturing firms in Mexico, I construct firm-level tariff exposure measures from firms' six-digit product level exports and im-

[6]Note that firms whose ultimate owner is not identified as foreign also include *shelter firms*—firms operating under contractual arrangements with foreign clients—as well as firms affiliated with foreign companies but without a direct ownership link, or those owned by a foreign company holding less than 50 percent of shares.

ports in the pre-shock year 2017. I then estimate how firms' outcomes evolved differentially across years according to their susceptibility to the trade shock.

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

3.1.1 US Import Tariffs on China

The analysis centers on the 2018–19 US import tariffs imposed on China, which covered approximately $350 billion of U.S. imports. Let $USIT^{CN}$ represent the set of HS 6-digit products subject to the 2018–19 US import tariffs on China and let $\Delta\tau_j^{USIT^{CN}}$ denote the change in the US import tariff rate for HS 6-digit good j from China, measured in percentage points and expressed as a decimal.[7] Additionally, let X_{ij}^{2017} be the value of exports of firm i in good j in year 2017. Then, the level of exposure of firm i in Mexico to the increased US import tariffs on Chinese goods can be determined as follows:

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

Here, X_{ij}^{2017} denotes firm i's exports of good j in 2017, and $T_i^{\text{US}\to\text{CN}}$ measures the tariff-weighted share of targeted goods in the firm's overall exports.

While most exports from a typical Mexican firm are destined for the United States (see Table 1), equation 1 does not distinguish export destinations. This is because the increased cost of Chinese goods entering the US market is expected to make the US more attractive to Mexican exporters relative to other markets. As a result, manufacturing firms that previously produced and exported affected goods to non-US markets are potentially treated by the increased appeal of the US market.

Consider two manufacturing exporters with identical export product portfolios and the same level of $T^{\text{US}\to\text{CN}}$, say 0.20. Suppose one sells 50 % of its exports to the US while the other sells 100 %. The firm exporting entirely to the US is treated via its full customer base, whereas the other firm

[7] Since the tariff escalations occurred in multiple phases between 2018 and 2019, I use the increased tariff rates valid as of December 2019.

is treated via only half of its customer base. At the same time, the firm selling 50% of its export capacity to the US may have greater flexibility to expand its US exports without going through costly adjustment of its production capacity. Thus, when focusing on firms' trade outcomes, it is important to adopt a broader definition of treatment.

However, firms with an established customer base in the US are more likely to respond to the costlier entry of Chinese goods to the US in terms of expanding its production capacity. To account for this in the analysis of firms' output and employment outcomes which is the focus of this paper, exposure to US tariffs targeting China is constructed specific for the US market, as follows:

$$T_{i,\text{US}}^{\text{US}\to\text{CN}} = \frac{\sum_{j\in\text{USIT}^{\text{CN}}} X_{ij}^{2017,US} \times \Delta\tau_j^{\text{USIT}^{\text{CN}}}}{\sum_j X_{ij}^{2017}} \tag{2}$$

where $X_{ij}^{2017,US}$ denotes firm i's US exports of good j in 2017.[8]

The exposure measure in Equation 2 is considered *narrow* because it classifies firms with no US exports, but with pre-shock exports of targeted goods, into the control group. However, firms that exported little or nothing to the US before the shock, yet maintained an export portfolio concentrated in targeted goods, may have redirected exports to the US market, leading to downward bias in the estimated effect.

Appendix Table D.1 provides evidence of this potential bias by comparing the average treatment effect on firms' US export shares based on the broad exposure measure, while sequentially excluding firms with low baseline US export shares. Firms with initially low exposure to the US market increase their US exports share more than others. To address this concern, when employing the *narrow* (US-specific) exposure measure on the analysis of production and employment outcomes, I restrict the sample to firms that were exporting to the US in 2017, defined as those for which at least 30% of export revenue came from the US market.[9]

[8] One can also use the measure described in Equation 1 and scale it by the firm's pre-shock U.S. export share, thereby assigning greater weight to U.S.-oriented firms. This alternative approach yields similar results.

[9] The 30% threshold is informed by the results in Table D.1. The estimated tariff exposure effect on U.S. export share becomes statistically insignificant once the sample is restricted to firms with at least 20% of exports destined for the United States. I adopt a 30% cutoff as a conservative criterion that also preserves a sufficiently large sample.

To account for confounding effects of firms' exposure to concurrent trade policy changes, namely the US–Mexico tariff escalation under Section 232, and China's retaliatory tariffs, I construct firm-specific measures that reflect firms' susceptibility to these policies. I further consider the potentially confounding influence of tariffs on firms via the input channel and construct exposure measures based on the relative importance of targeted goods in firms' imports from China and the US. These additional measures are described in Appendix Section B.2

3.2 Empirical Model

Using the firm-level trade policy exposure measures constructed in Section 3.1, I estimate the effects of the U.S. import tariff increases targeting China on manufacturing firms in Mexico. The analysis is conducted on the universe of firms with positive exports in 2017 and at least one employee. I examine firms' trade, production, and employment responses using an event study framework covering the ten year period from 2014 to 2023. The analysis begins in 2014 to establish a counterfactual baseline four years prior to the onset of the trade war and extends through 2023 to capture the long-term effects.

Identifying the Impact of the U.S. Tariffs Hikes Targeting China on Firms in Mexico

Let Y_{ijt} be firm i's outcome variable in industry j at time t, for example, the log value of employment. To examine the effects of the US tariffs targeting China on manufacturing firms in Mexico, the following generalized difference in differences (DD) equation with two sided fixed effects is formed:

$$Y_{ijt} = \beta_0 + \sum_{\substack{h=2014 \\ \neq 2017}}^{2023} \beta_h \mathbb{1}_{h=t} \times T_i^{\text{US}\to\text{CN}} + P_{it} + \eta_{jt} + \phi_i + \varepsilon_{it} \tag{3}$$

In equation 3, the continuous firm-level treatment variable, $T_i^{\text{US}\to\text{CN}}$ is interacted with year indicators to examine the yearly evolution of the impact. Using 2017 as the baseline year, I track exporting manufacturing firms through 2023 to assess the effects of the recent US tariff hikes

targeting China, while also looking backward until 2014 to identify any pre-existing trends.

The vector P_{it} includes controls for the concurrent trade policy changes and tariff exposures via their inputs. In the baseline specification, it includes interactions of the US-Mexico tariff escalation exposures, namely $T_i^{\text{US}\to\text{MEX}}$, and $T_i^{\text{MEX}\to\text{US}}$ with year fixed effects. This allows for differential time trends for those firms susceptible to temporary US tariffs on Mexican goods and firms whose imports are affected by Mexico's retaliatory tariffs on US goods. P_{it} further accounts for differential trends among firms impacted by US tariffs on China through their input use and controls for firms' exposure to China's retaliatory tariffs.

The equation also includes η_{jt} which denotes three-digit industry by time fixed effects to control for potentially confounding time trends that may vary across narrow industries. For example, the key change introduced by the USMCA in 2020 was the tightening of local content requirements in the automotive and textile sectors, and these changes are absorbed by the fixed effects.[10] As a result, the tariff effect is identified from variation across firms within three digit industries as industry-wide variations are contained by η_{jt}.[11]

The time-invariant or relatively persistent firm characteristics such as management skills, production technology, and line of business are controlled with firm fixed effects, ϕ_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 3, 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, exporting manufacturing firms are tracked through 2023 to assess the effects of

[10] As a robustness check, Appendix Figure D.1 shows that production and employment effects remain strong—and if anything, marginally stronger—when excluding firms prone to USMCA provisions.

[11] In Appendix Section D, Figures D.2–D.4 illustrate how the estimates change as control variables are added sequentially.

the US tariffs, while also looking backward until 2014 to identify any pre-existing trends.

Plant-level Analysis

Complementing the firm-level analysis, I estimate the following plant-level event-study specification using data on IMMEX establishments over the period 2015–2022:

$$Y_{pijt} = \alpha_0 + \sum_{\substack{h=2015 \\ \neq 2017}}^{2022} \alpha_h \mathbb{1}_{h=t} \times \mathbf{T}_{\mathbf{i}}^{\text{US}\to\text{CN}} + P_{it} + \eta_{jt} + L_{pt} + \phi_p + \varepsilon_{pt} \tag{4}$$

In equation 4, ϕ_p denotes plant fixed effects and as before η_{jt} denotes three-digit industry-by-year fixed effects, where the industry classification reflects each plant's reported primary activity (as opposed to firm i's primary industry used above). The plant-level database also provides information on plant location. Leveraging this additional information, L_{pt} includes municipality by year fixed effects to address possible confounding effects of the minimum wage legislation enacted in 2019, raising the minimum wage in the border municipalities by 100 percent.[12] Since municipalities in Mexico are typically contained within local labor markets (Utar, 2025), controlling for L_{pt} also absorbs local labor market shocks associated with labor shortages and COVID-related closures.

The treatment variable remains defined at the firm level, and the vector P_{it} continues to include controls for concurrent trade policy changes and tariff exposures through firms' input sourcing, as described in Equation 3. The error term ε_{pt} is assumed to have zero mean, and standard errors are clustered at the firm level, which corresponds to the level of exposure.

To estimate average treatment effects rather than year-by-year dynamic responses, I modify Equation 3 and Equation 4 by interacting firm-specific trade exposure measures with a post-shock indicator, PostTW_t, which equals 1 for years 2018 and onward and 0 otherwise.

[12] In 2019, Mexico revised its minimum wage legislation to improve workers' living conditions. The reform was implemented unevenly, dividing the country into two regions: the northern border region—which includes 45 municipalities located within approximately 25 kilometers of the U.S. border—and the rest of the country. In the northern border region, the minimum wage doubled in 2019, while in the rest of the country it rose gradually, with annual increases of 16%, 20%, and 15%, respectively, between 2019 and 2021.

4 Production and Employment Consequences of the US Trade Policy Shift Against China

Extending Utar et al. (2025), which documents trade reallocations through 2021, this section uses firm-level production and employment data linked to customs records through 2023 to first confirm the persistent positive effect on exports, then addresses the key question of whether this trade response translated into real effects on firm-level manufacturing output and employment. Finally, I examine the nature of this expansion: which workers benefited, whether firms adjusted along the extensive margin through new plant openings, and the role of U.S.-headquartered multinationals in driving these gains.

4.1 The Effect of U.S. Tariffs on China on Mexican Manufacturing Firms' Exports

I begin by estimating Equation 3, with the logarithm of firms' exports to the U.S. as the dependent variable. Figure 3 presents the year-by-year DD coefficient estimates for the continuous firm-level treatment variable $\mathbf{T_i^{US \to CN}}$.

The results show that higher U.S. tariffs on Chinese imports significantly increase manufacturing firms' exports to the United States. The DD estimates are statistically indistinguishable from zero prior to the onset of the trade war, indicating no meaningful differential pre-trends across firms with differing exposure levels. The estimates then rise gradually relative to the 2017 baseline through 2023, with a temporary decline during the COVID shock in 2020. By 2023, the DD estimate reaches 1.71 and is highly statistically significant.

A manufacturing firm at the 90th percentile of tariff exposure faced a 25% increase in U.S. tariffs on Chinese imports, compared with 7.7% for a firm at the 10th percentile (see Table A.1). This difference in exposure implies a 34% increase in exports to the United States ($e^{1.71 \times 0.17}$).

Figure C.1 in the Appendix presents the year-by-year impact on firms' total exports and imports.

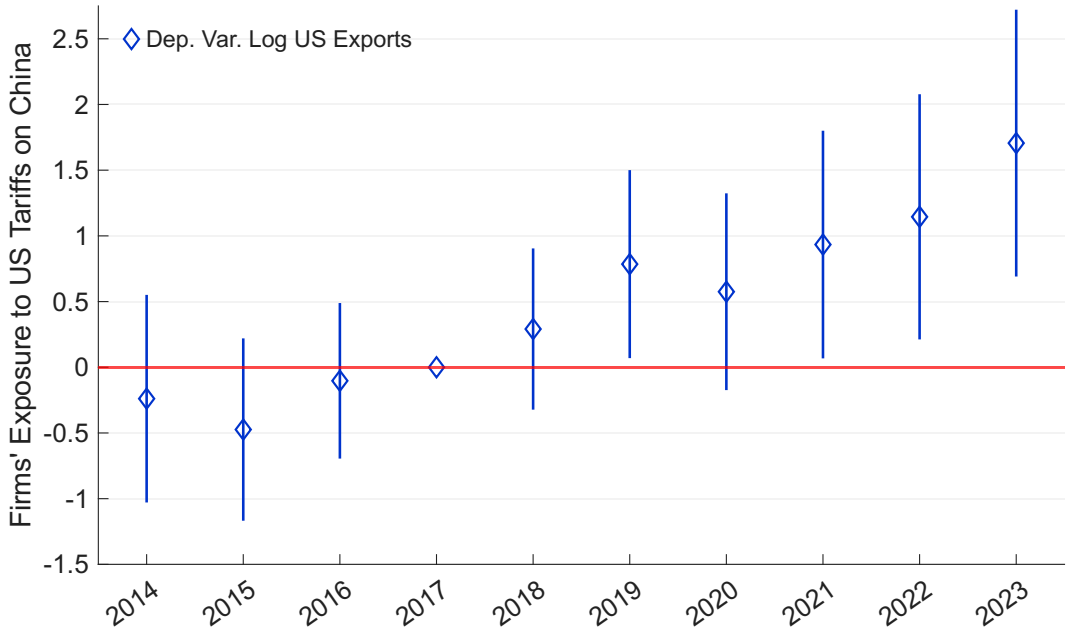


Figure 3: Impact of US Tariffs Targeting China on Manufacturing Firms' Exports

Notes: Estimation of equation 3. The dependent variable, as indicated in the legend, is the natural logarithm of firms' value of exports. PEME firms exporting as of 2017, covering the period from 2014 to 2023, with N=46,453. The regression controls for firm fixed effects, three-digit-industry-by-year fixed effects and concurrent trade policy changes. The y-axis displays the yearly DD coefficient estimates corresponding to $\mathbf{T_i^{US \to CN}}$, along with 95% confidence intervals.

It shows that US tariffs targeting China had a significant positive effect on both total exports and total imports. In 2023, the estimated effect on total exports is 1.67, which is similar in magnitude to the effect on US exports. Similarly, firms' total imports also responded positively in response to the increase in US tariffs on China, with the estimated coefficient reaching 1.08 by 2023. The stronger response in total exports in comparison to imports suggests higher Mexican value-added which I will directly address below.

These results indicate that the significant positive impact of U.S. tariffs on Chinese goods—previously documented by Utar et al. (2025) using customs data through 2021—is also evident in INEGI's PEME database for the export manufacturing sector, and persists through 2023.

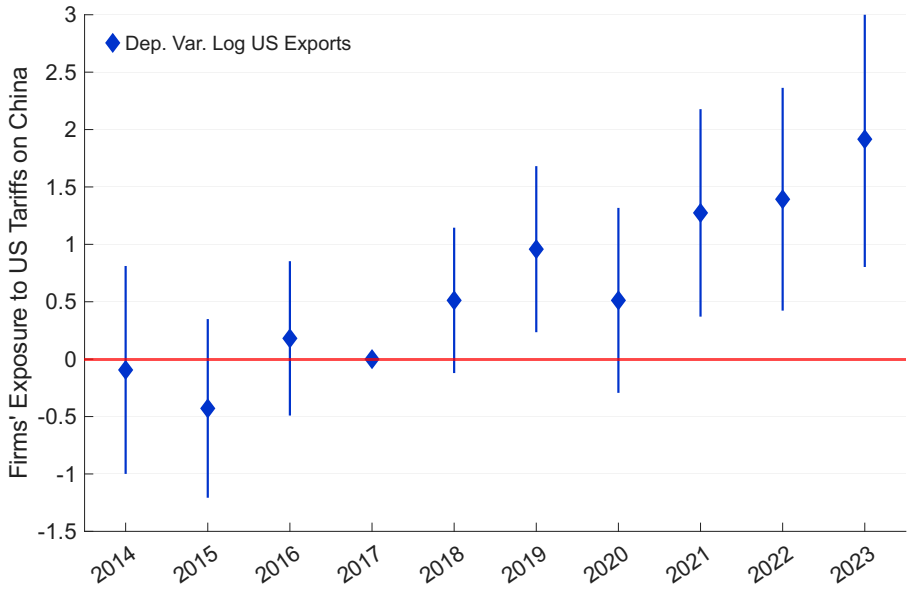
Utar et al. (2025) show that the positive effect of the U.S. trade policy shift was primarily attributable to GVC firms operating under Mexico's export-platform program (IMMEX). Building

on this evidence, I estimate Equation 3 separately for GVC firms and non-IMMEX manufacturing firms.

Figure 4 reports the effects on U.S. exports for these two groups. The US trade policy shift has a significant positive effect on GVC firms with the estimated effect reaching 1.92 by 2023, whereas the impact on non-IMMEX manufacturing firms remains statistically insignificant throughout 2018–2023. The coefficient estimate of 1.92, combined with the 17% exposure difference between the 90th and 10th percentiles, indicates a 39% increase in firms' US exports relative to their 2017 level.

To account for potential transshipment of Chinese goods, I construct firms' US exports net of Chinese imports, defined as, $NetUSX_{it}^{MCN} = \sum_{j \in \mathtt{J}_{it}^{\mathtt{USX}}} [X_{ijt}^{US} - M_{ijt}^{CN}]$. Here, $\mathtt{J}_{it}^{\mathtt{USX}}$ denotes the set of six-digit HS products that firm i exports to the U.S. in period t. Thus, $NetUSX_{it}^{MCN}$ measures the value of firm i's U.S. exports net of its imports from China of the same products. Figure C.2 shows that the estimated effect on U.S. exports net of Chinese imports closely follows the effect on U.S. exports, indicating that transshipment does not explain the observed export growth.

These findings indicate that the export response to the U.S. trade policy shift is primarily driven by firms operating under Mexico's IMMEX program, which encompasses firms integrated into North American production networks. Importantly, the effect reflects who operates within IMMEX, rather than the program's specific policy features. Because IMMEX hosts a large share of foreign-owned multinationals serving the North American market, I further distinguish firms by ownership using Dun & Bradstreet's corporate hierarchy data and re-estimate the effects separately among foreign-owned IMMEX firms. The results shown in Figure C.3 suggest that the export expansion following the U.S. trade policy shift is driven predominantly by foreign multinationals embedded in Mexico's export-oriented production.



(a) GVC Firms



(b) Other Manufacturing Firms

Figure 4: Impact of US Tariffs Targeting China on Manufacturing Firms' Exports

Notes: Estimation of equation 3. PEME database. N=35,787 (IMMEX firms in PEME) N=10,666 (Others). The dependent variable in both figures is the natural logarithm of firms' value of US exports. All regressions control for firm fixed effects, three-digit-industry-by-year fixed effects and concurrent trade policy changes. The y-axis displays the yearly DD coefficient estimates corresponding to $\mathbf{T_i^{US \to CN}}$, along with 95% confidence intervals.

Table C.1 in the Appendix reports the average treatment effects on firms' trade outcomes, separately for GVC firms and domestic exporters (firms outside the IMMEX program). The results show that U.S. tariffs on China increased both U.S. imports of GVC firms and their exports. This pattern is consistent with greater fragmentation and back-and-forth trade within U.S.–Mexico production networks.

Tariffs on China also have a significant positive effect on GVC firms' imports from non-U.S. countries. To assess whether China accounts for a disproportionate share of this tariff-induced growth in imports, column (7) reports the effect on the Chinese import share. China's share of firms' imports does not increase in response to the tariff hikes, particularly among GVC firms. These findings are consistent with GVC expansion substituting for activities previously undertaken in China.

Taken together, these results suggest that Mexico's export gains from the U.S.–China trade war were driven primarily by global value chain reallocations led by foreign multinationals rather than by domestic firms. But how much of the increased exports and imports translated into higher manufacturing output? I now turn to the effects on production.

4.2 How US Tariffs on Chinese Products Stimulated Manufacturing Output in Mexico

To address whether changes in trade flows also stimulated domestic manufacturing activity, I start with examining how firms' output, measured as the value of production at factory prices, responds to the U.S. trade policy shift.

Because expansion is more likely among firms with established U.S. networks, I estimate the effects using both the narrow U.S.-specific measure, estimated for firms exporting to the United States in 2017, and the broad measure, estimated for all firms that exported in 2017. Figure 5 presents these results, with Panel (a) showing estimates for all exporters (whether GVC firms or not) and Panel (b) isolating the effects among GVC firms, which Section 4.1 showed were the

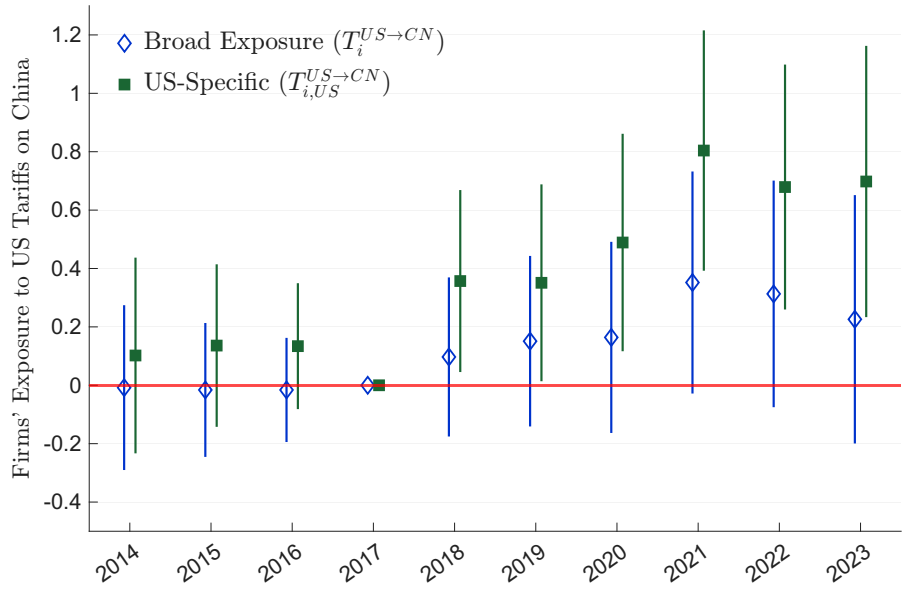
primary drivers of export growth.

The estimates show no major differential pre-trends in manufacturing output before the trade war in either group. With the protectionist shift in U.S. trade policy against China, manufacturing output increases, with a stronger effect among U.S. exporters. The production effects strengthen notably after the onset of COVID-19. In the full sample results (Figure 5a), the DD coefficient for U.S. exporters reaches 0.8 in 2021 and is significant at the 1% level. The response peaks in 2021, followed by a modest slowdown in 2022–23, but by 2023 the effect based on the narrow exposure measure (among U.S. exporters) remains at 0.7 and is precisely estimated.

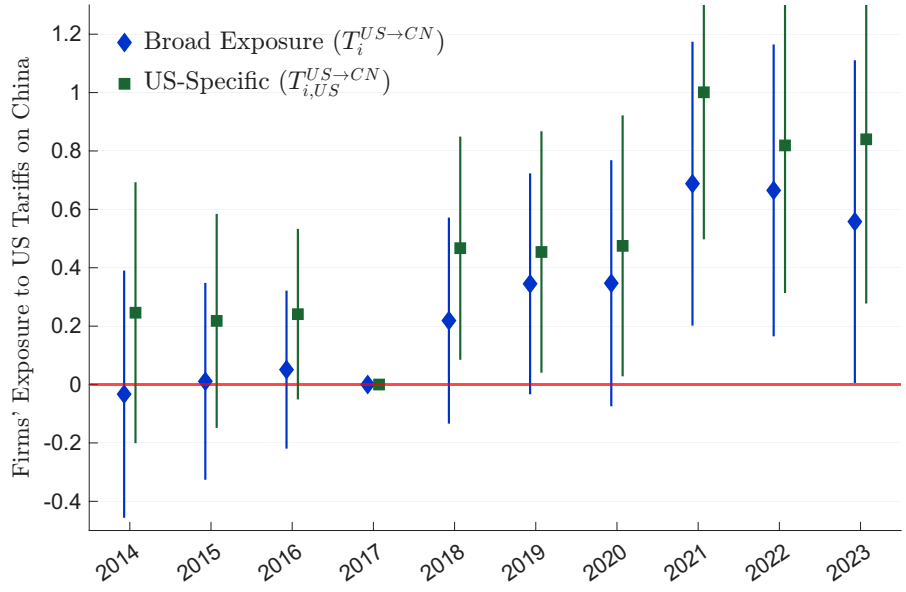
Among GVC firms (Figure 5b), the magnitude of the effects indicates that these firms are the key drivers behind the full-sample results. The narrower gap between broad and US-specific exposure estimates (compared with Figure 5a) is consistent with the notion that GVC firms, through their extensive MNE networks, incur lower costs of connecting to U.S. customers. At the 2021 peak, the DD coefficients are 0.7 for all exporters and 1.0 for U.S. exporters (both significant at 1%). Given the 0.17 exposure gap, these imply increases in manufacturing production of 13% and 19%, respectively.

Contract Manufacturing versus In-House Production Establishments operating under IMMEX include both maquiladoras—export-processing plants performing labor-intensive tasks for foreign clients under contract manufacturing arrangements—and full-fledged manufacturing operations that produce goods for the North American market, often within multinational firms. Since the legal maquiladora regime was integrated into IMMEX in 2007, it is important to distinguish whether observed production growth reflects assembly-like contract manufacturing for U.S. firms or expansion of product-owning manufacturing activity within Mexico.

This distinction matters for understanding the U.S. implications: maquiladora-type contract manufacturing typically moves in tandem with U.S. manufacturing activity, whereas product-owning manufacturing by multinationals in Mexico can expand independently, reflecting production relocation or capacity substitution.



(a) Manufacturing Output–Full sample



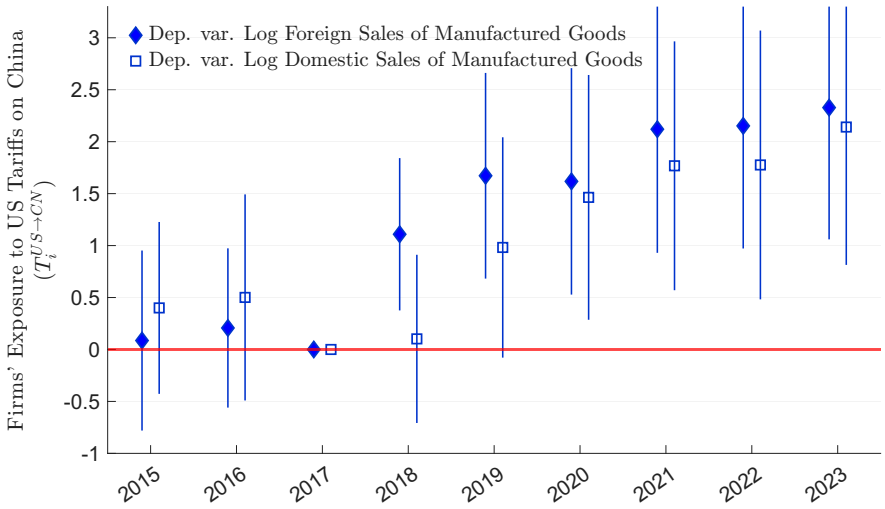
(b) Manufacturing Output–GVC Firms

Figure 5: Impact of US Tariffs on Chinese Goods on Firms' Production

Notes: The dependent variable is the natural logarithm of firms' value of production. Equation 3 is estimated using the treatment variable $T_i^{\text{US}\to\text{CN}}$ among 2017 exporters (Figure (a): $N = 51{,}838$ Figure (b): $N = 37{,}202$), and using the treatment variable $T_{i,\text{US}}^{\text{US}\to\text{CN}}$ among 2017 U.S. exporters (Figure (a): $N = 41{,}914$ Figure (b): $N = 33{,}418$). All regressions include firm fixed effects, three-digit industry-by-year fixed effects, and controls for concurrent trade policy changes. The y-axis displays yearly difference-in-differences coefficient estimates with 95% confidence intervals based on robust standard errors clustered at the firm level.



(a) Sales of Manufactured Goods at the Plant-level



(b) Foreign versus Domestic Sales of Manufactured Goods at the Plant-level

Figure 6: Impact of US Tariffs targeting China on Sales of Manufactured Goods

Notes: Estimation of equation 4 using IMMEX plant-level data, N=19,410 (total sales), 15,967 (foreign), 17,804 (domestic). All regressions control for plant fixed effects, three-digit industry-by-year, municipality-by-year fixed effects and firm-level controls for concurrent trade policy changes. The y-axis displays the yearly DD coefficient estimates corresponding to $\mathbf{T_i^{US \to CN}}$, along with 95% confidence intervals. Robust standard errors are clustered at the firm level.

To disentangle these mechanisms, I match IMMEX firms in PEME to their establishments using the IMMEX plant-level survey (2015–2023), which reports both plant-level sales of own-manufactured goods and total plant revenues. The latter encompass sales of own production as well as revenues from contract manufacturing services (i.e., manufacturing services provided to other firms).

Figure 6 reports the results from estimating Equation 4 using plant-level sales of own manufactured goods (total, foreign, and domestic) as the dependent variables. The estimates show a clear positive impact on plants' sales of own production, with no evidence of differential pre-trends. The DD estimate of 1.92 in 2023, combined with the 0.17 difference between the 90th and 10th percentiles of tariff exposure, implies a 39% increase in total sales of own manufactured goods at the plant level.

Figure 6b shows the effects separately for foreign and domestic sales (of own production). The estimate for foreign sales is 2.33 in 2023, indicating a 49% increase based on the same exposure difference. While beginning with a one-year lag relative to the effect on foreign sales, the effect on domestic sales is also substantial and highly significant. This increase, consistent with the supply-chain orientation of IMMEX plants and their specialization in parts and components, further supports the view that Mexico's export gains reflect production expansion rather than trade re-routing.

Sales of own-manufactured goods exclude revenues from contract manufacturing services. As a result, plants that operate exclusively as contract manufacturers report zero sales of own production and only *maquila* revenues. When total plant revenues, including *maquila* revenues, are used as the outcome in Figure C.4a, the sample size increases from 19,410 to 36,378 plants.

As expected, U.S. tariff exposure has a positive and statistically significant effect on total plant revenues, with a stronger response for foreign revenues, which capture both foreign sales and export-processing income. However, these effects are considerably smaller than those estimated for sales of own-manufactured goods. In 2023, the DD coefficient for foreign revenues is 0.87,

compared with 2.33 for foreign sales of own production; similarly, the coefficient for total revenues (0.67) is well below that for total sales of own-manufactured goods (1.92). This pattern indicates that incorporating contract manufacturing revenues dampens the estimated response, suggesting that the expansion induced by tariff exposure is driven primarily by in-house manufacturing rather than contract processing services.

To examine this mechanism more directly, Figure C.4b shows the effect of U.S. tariff exposure on the share of revenues derived from foreign contract manufacturing (export processing). The share declines with higher tariff exposure, indicating that increased U.S. import protection is associated with a reduced reliance on export-processing services.

Taken together, these findings indicate that the manufacturing response to the U.S.–China trade war reflects multinationals expanding in-house production capacity in Mexico, rather than an increase in contract manufacturing for U.S.-based clients. More broadly, the export growth observed during this period represents genuine expansion in Mexican manufacturing activity, not simply the re-routing of trade flows emphasized in parts of the policy and media debate.

4.3 Effects of U.S. Tariffs Targeting China on Manufacturing Jobs in Mexico

The U.S.–China trade war tariffs, estimated to impose large costs on U.S. consumers and producers, were framed as an effort to "bring back jobs to America." This section examines how this shift in U.S. trade policy toward China affected manufacturing employment in neighboring Mexico, a key production location within North American value chains.

While the expansion in manufacturing output documented in the previous section suggests increased labor demand, the relationship between output and employment is not mechanical, as firms may adjust through productivity improvements or the adoption of automation-intensive technologies with limited labor absorption (Diao et al. 2025; Firooz et al. 2025). To examine the employment response at the firm-level, I estimate Equation 3 using the logarithm of the firm's total

employment across its manufacturing establishments as the dependent variable.

Figure 7 presents the results using both the broad exposure measure for 2017 exporters and the narrow exposure measure for 2017 U.S. exporters. The year-by-year DD estimates show no evidence of differential pre-trends and reveal a significant positive effect of U.S. tariff hikes on manufacturing employment for both exposure measures. Employment effects emerge starting in 2019 and grow steadily through 2023. The timing of the employment response—lagging slightly behind the output effects shown earlier—is consistent with firms first expanding production before scaling up their workforce, and aligns with the time needed to establish new production capacity and hire workers.

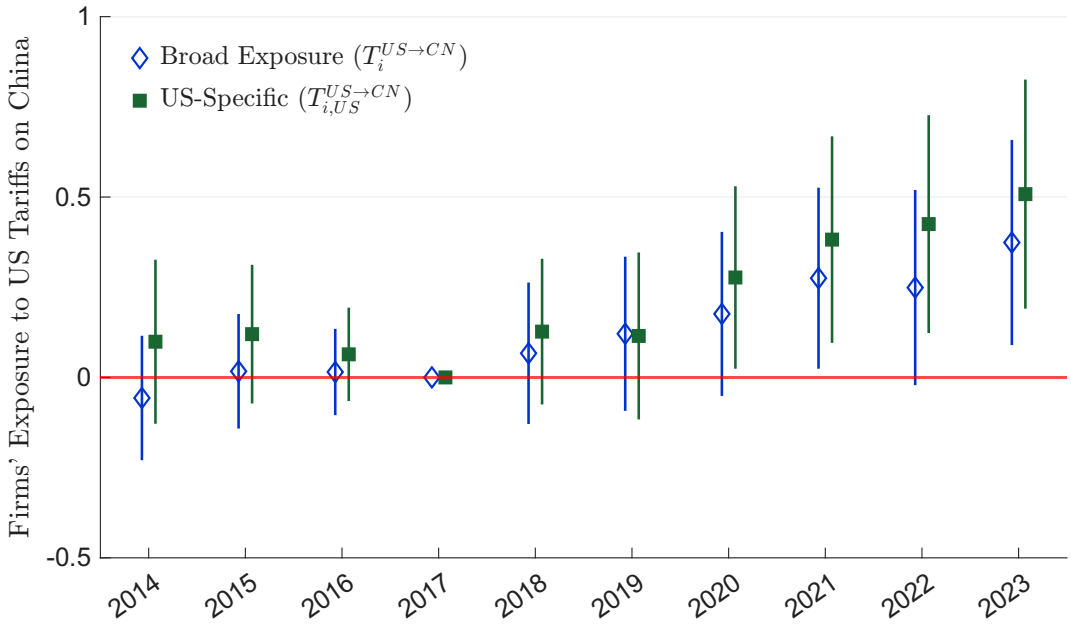


Figure 7: Impact of US Tariffs on Chinese Goods on Manufacturing Employment

Notes: Estimation of equation 3. The dependent variable is the natural logarithm of firms' employment. 2017 Exporters, with N=52,174 and 2017 US Exporters, with N=42,171. All regressions control for firm fixed effects, three-digit industry-by-year fixed effects and concurrent trade policy changes. Robust standard errors are clustered at the firm level. The y-axis displays the yearly DD coefficient estimates corresponding to $\mathbf{T_i^{US\to CN}}$ and $\mathbf{T_{i,US}^{US\to CN}}$, along with 95% confidence intervals.

Table C.2 reports the coefficient estimates separately for GVC and non-GVC firms and shows that employment gains from U.S. tariffs were concentrated among GVC firms. By 2023, the DD coefficient for GVC firms reaches 0.52 under broad exposure and 0.57 under US-specific

exposure—both highly significant. The coefficient estimate of 0.57 in 2023, combined with the 90–10 percentile exposure difference of 0.17, implies a 10% increase in manufacturing employment among GVC firms.

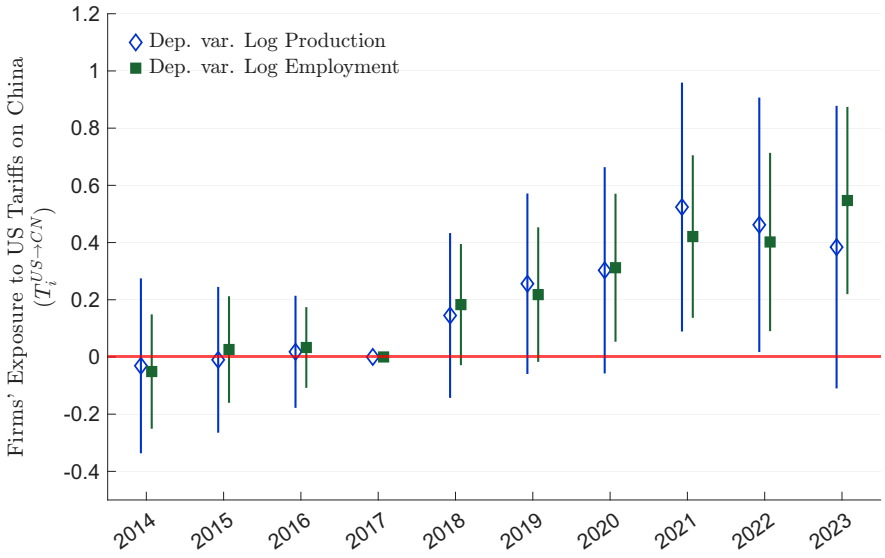
Figure C.5 plots the estimates by two-digit industry, revealing that employment gains are concentrated in technology-intensive industries, particularly materials and chemicals (NAICS 32) and machinery and equipment manufacturing (NAICS 33). In contrast, employment effects in food and textile manufacturing (NAICS 31) remain near zero throughout the period. This pattern reflects the sectoral concentration of foreign multinationals in North American supply chains.

As described in Section 2.2, INEGI constructs firm-level measures of production and employment by aggregating data from establishments whose primary activity is classified as manufacturing. This aggregation creates measurement challenges for multi-establishment firms, particularly when manufacturing activities span multiple sites—including technology centers, distribution facilities, or other manufacturing establishments potentially outside INEGI's database. If trade exposure induces firms to reallocate activities across establishments, the estimated effects on employment and production may be attenuated when these activities shift to sites classified outside manufacturing or to newer establishments that are not yet included in INEGI's database. To isolate responses that operate within a single production unit and avoid this source of aggregation bias, Figure 8 reports estimates separately for firms that operated a single establishment in 2017.

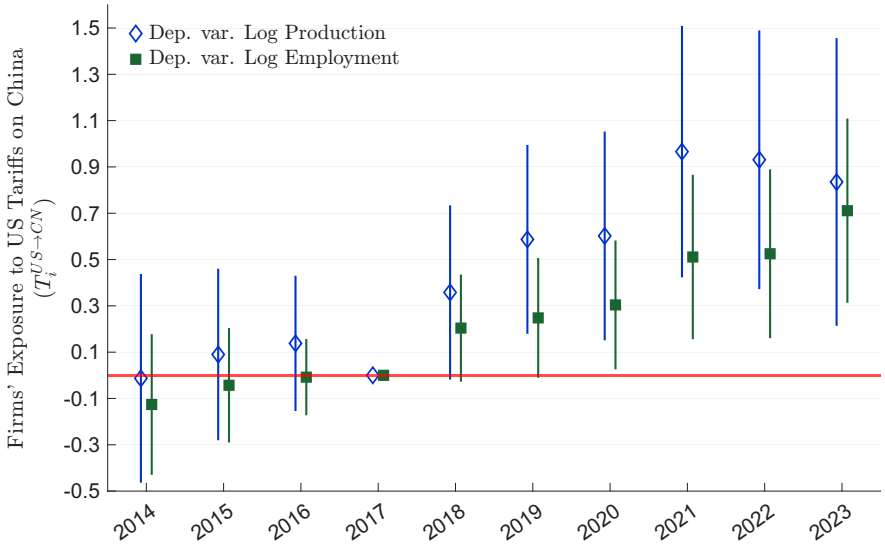
Figure 8a presents employment and production estimates for the 2017 single-plant cohort of all exporters, while Figure 8b reports corresponding results for single-plant GVC firms. The estimates show a significant positive effect of U.S. tariffs on both production and employment. The employment effect increases gradually throughout the sample period, reaching 0.55 for the full sample of export-oriented manufacturing firms and 0.71 for GVC firms by 2023. Production effects peak in 2021, with DD estimates of 0.52 and 0.97, respectively.

Among GVC firms, the divergence between production and employment widens initially, as output expands more rapidly than labor input. Because the analysis restricts attention to single-plant firms,

this pattern reflects within-plant adjustment rather than reallocation across establishments. After 2021, employment growth accelerates and the gap narrows, suggesting that early output expansion was partially sustained through increases in labor productivity (see Appendix Figure C.6).



(a) Single-plant Exporters



(b) Single-plant GVC firms

Figure 8: Employment and Production Effect among Single Plant Firms

Notes: Estimation of equation 3 among single plant firms as of 2017. In figure (a) N=42,596/42,297, in figure (b) N=30,853/30,694. All regressions control for firm fixed effects, three-digit industry-by-year fixed effects and concurrent trade policy changes. The y-axis displays the yearly DD coefficient estimates corresponding to $\mathbf{T_i^{US\to CN}}$, along with 95% confidence intervals based on robust standard errors clustered at the firm level.

4.4 Within Plant Adjustment: Workforce Composition

To understand the nature of within-plant adjustment in greater depth, I turn to plant-level data. Linking firms to their IMMEX plants, I use the occupation breakdown to assess whether employment gains reflect expansion in core manufacturing activity.

Figure 9 plots estimates from Equation 4 for production workers and technicians and for non-production workers. The figure shows that exposure to the 2018–2019 U.S. tariff increases on China leads to a significant and sustained increase in employment of production workers and technicians, beginning in 2018 and growing through 2023. In contrast, non-production employment exhibits much smaller and less precisely estimated responses, with coefficients generally closer to zero and wider confidence intervals.

The growing effects on production-floor workers through 2023 point to a persistent expansion in production capacity rather than a transitory adjustment. Quantitatively, the 2023 coefficient of 0.7, combined with a 17% increase in tariff exposure—corresponding to the difference between the 90th and 10th percentiles of the exposure distribution—implies approximately a 13% increase in blue-collar employment at the plant level.

The employment measures in Figure 9 include both payroll and non-payroll workers. Because the plant-level data separately report payroll employment and workers supplied by third-parties, I test whether tariff-induced expansion initially relied on non-payroll arrangements, which were a low-cost and flexible hiring margin prior to the 2021 reform.

Figure C.7 in the Appendix shows that in the early years of the trade war, tariff-induced employment gains were concentrated among non-payroll workers. This pattern is consistent with firms facing trade policy uncertainty (Handley and Limão, 2022) adjusting initially along more flexible and lower-cost labor margins.

From 2021 onward, the composition shifts dramatically: payroll employment effects grow large and statistically significant, while non-payroll employment effects diminish—with the latter beginning to decline even before the 2021 prohibition on using shell companies to supply labor for

core business activities. The pattern suggests that as tariffs became clearly permanent and shell companies became less advantageous, firms converted temporary arrangements into formal employment relationships, indicating a transition from cautious, reversible expansion to committed capacity growth.

Chen et al. (2025) document a decline in average wages at more exposed firms using IMSS data through 2019. Since early expansion relied disproportionately on shell-company labor—which falls outside IMSS payroll reporting—tariff-driven labor demand was partially invisible in IMSS data, especially in the initial years. This helps reconcile the apparent wage declines documented with IMSS records.

To examine wage effects, I turn to my plant-level data, which capture payments to both payroll and non-payroll workers. Table C.3 in the Appendix reports the treatment effects on additional plant-level outcomes including wages. The dependent variable in column (1) is the logarithm of the average plant wage, constructed from total labor costs inclusive of payments to staffing agencies. While this measure is affected by compositional changes in the workforce (e.g., production versus non-production workers), it has the advantage of capturing all labor payments made by the establishment. The DD estimate is positive but not statistically significant.

Columns (2) and (3) report effects on average wages for white-collar and blue-collar payroll workers, respectively. Both estimates are again positive but statistically insignificant, consistent with increased labor demand being absorbed without meaningful upward wage pressure relative to other plants in the same local labor market and year.

In contrast, column (4) shows a significant increase in total labor costs, reflecting tariff-induced employment growth rather than higher wages per worker. This employment expansion is accompanied by parallel adjustments on the input side. Plant-level foreign material costs capture whether establishments scale up imported components as production expands. Column (5) of Table C.3 reports a large and precisely estimated increase in foreign material expenditures. Column (6) shows that the foreign material cost share rises as well, implying that the additional production induced

by tariff exposure is intensive in imported intermediates. Finally, column (7) reports a decline in labor's share of total costs, despite higher total labor spending. Taken together, the results point to scale expansion accompanied by a shift in the cost structure toward imported inputs, consistent with production in Mexico scaling up within existing supply-chain linkages.

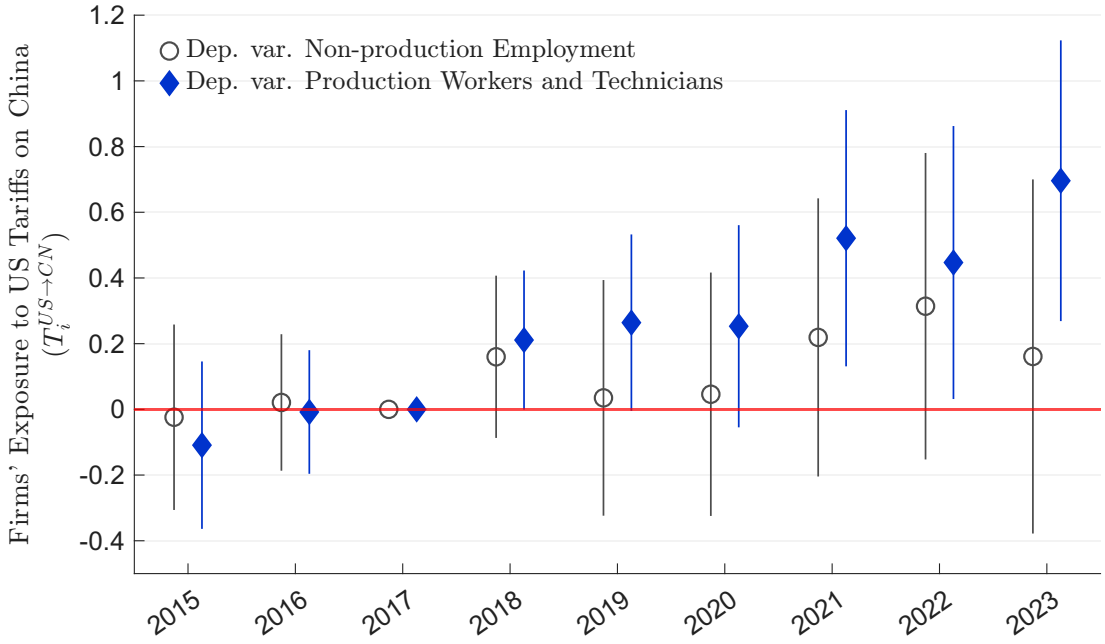


Figure 9: Tariff-Induced Employment Growth Concentrated in Production Occupations

Notes: Estimation of equation 4 using IMMEX plant-level data, N=35,870 (non-production employment), N=36,336 (production workers and technicians). All regressions control for plant fixed effects, three-digit industry-by-year, municipality-by-year fixed effects and firm-level controls for concurrent trade policy changes. The y-axis displays the yearly DD coefficient estimates corresponding to $\mathbf{T_i^{US \to CN}}$, along with 95% confidence intervals. Robust standard errors are clustered at the firm level.

4.5 Firm-Level Evidence on New Plant Openings

Since 2018, major multinational companies—including Bosch, LEGO, Continental, Volkswagen, and Toyota, all operating under Mexico's IMMEX program—have announced plans to expand their production capacity in Mexico through a wave of new investments, as reported in business media (News Desk 2018; Webwire 2022; Reuters 2022a; Cohen et al. 2025). A large share of these projects involves the construction of new manufacturing plants.

Figure 10 reports the estimated effect of the U.S. trade policy shift on the number of manufacturing plants operated by firms. The results show a clear shift after 2018, consistent with a reallocation of production capacity toward Mexico in response to the U.S.–China trade conflict.

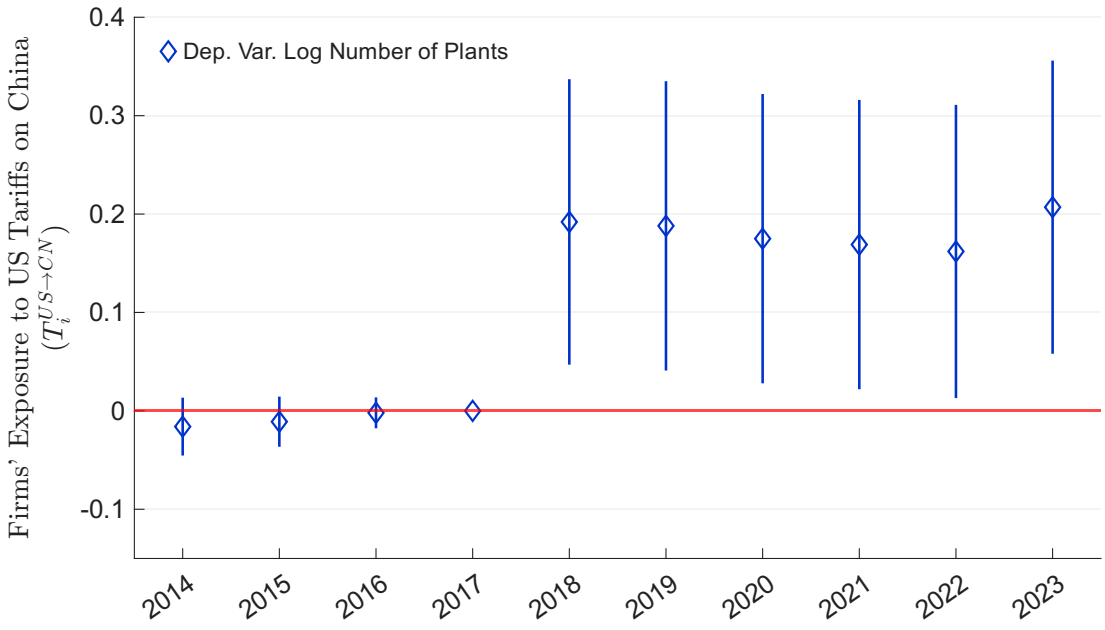


Figure 10: Rising US import tariffs on China spur plant openings in Mexico

Notes: Estimation of equation 3 with the dependent variable being the natural logarithm of number of plants a firm has. PEME sample firms exporting as of 2017, covering the period from 2014 to 2023, N=51,651. All regressions control for firm fixed effects, industry-by-year fixed effects and concurrent trade policy changes. The y-axis displays the yearly DD coefficient estimates corresponding to $\mathbf{T_i^{US \to CN}}$, along with 95% confidence intervals.

The estimates imply that more exposed firms experience a persistent net expansion in the number of operating plants after 2018. Using the 90–10 exposure difference of 0.17, the 2023 coefficient of 0.21 implies a 3.6 percent increase, corresponding to an increase of about $0.036 \times 1.55 \approx 0.05$ additional plants per firm. As a back-of-the-envelope measure of aggregate expansion, aggregating this effect across the roughly 6,000 exporting manufacturing firms in the sample implies an increase of approximately 360 additional plants associated with differential exposure to U.S. tariffs on China. Because the outcome in Figure 10 is the log number of plants, the effect captures the net entry margin, plant openings minus closures, rather than openings alone. To isolate the effect on plant entry, I identify newly established plants between 2016 and 2024 using the IMMEX registry. A

plant is classified as new if it appears for the first time in the monthly registry under firm i with an address not previously listed for that firm. I then aggregate the data across the pre- and post–trade war periods for manufacturing IMMEX firms operating as of 2017 and estimate a firm-level specification in which exposure to U.S. tariffs is measured at the firm's three-digit industry level.[13] The specification additionally controls for firm, period, and state-by-period fixed effects, as well as concurrent trade policy exposures, as described in equations B.1–B.6. The industry-level tariff exposure measures are constructed analogously to the firm-level exposures.

Table 2: Rising US import tariffs on China spur plant openings in Mexico

	(1)	(2)	(3)	(4)
Sample:	All	All	Foreign-owned	US-owned
Dep . Var. Number of New Plants (IHS)				
$\text{PostTW}_t \times \mathbf{T}_\mathbf{j}^{\text{US}\to\text{CN}}$	0.860***	0.873***	0.894*	0.814*
	(0.229)	(0.226)	(0.473)	(0.462)
Observations	9,202	9,200	4,506	2,800
R-squared	0.611	0.612	0.617	0.620
Additional Trade Policy Controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Time FE	✓	✓	✓	✓
State × Time FE	No	✓	✓	✓
Average Dep. Var.	0.172	0.172	0.229	0.241

Notes: Sample includes manufacturing IMMEX firms operating as of 2017. The annualized 2016–2024 registry data are aggregated into pre– and post–trade war periods. Dependent variable is the inverse hyperbolic sine transformation of the number of new plants. Additional Trade Policy Controls include exposures to the U.S.–Mexico tariff escalation, China's retaliatory tariffs, and the input channel measures $IMUS_j^{\text{CN}\to\text{US}}$, $IMUS_j^{\text{US}\to\text{CN}}$, and $IMCN_j^{\text{US}\to\text{CN}}$, all constructed using firm data at the industry level and interacted with the post–trade war indicator. Robust standard errors are clustered at the three-digit industry level. ***, **, and * indicate significance at the levels, respectively.

The results are presented in Table 2. They show that U.S. tariffs on China spurred the establish-

[13]Because the IMMEX registry is maintained by the Ministry of Economy and is not part of INEGI's confidential microdata, this analysis is conducted outside INEGI's secure servers; hence the use of industry-level exposure.

ment of new manufacturing plants in Mexico. Columns (3) presents the effect separately for firms whose ultimate owners are headquartered outside Mexico. The estimate indicates that U.S. tariffs on China induced significant plant entry by foreign multinationals into Mexico, providing causal evidence of production reallocation in response to the trade policy shock at the extensive margin. Column (4) reports the corresponding results for U.S.-headquartered multinationals. Although the sample size is smaller, the estimated effect for U.S. firms is similar in magnitude and remains significant at the ten percent level, highlighting the important role of U.S. firms in expanding production capacity in Mexico in response to higher U.S. protection against Chinese imports.

4.6 The Role of US-headquartered Firms in Creating Jobs in Mexico

The increase in newly established manufacturing plants by U.S.-headquartered firms in Mexico in response to greater U.S. import protection is particularly notable, in light of the lack of evidence of corresponding gains in U.S. manufacturing output or employment (Flaaen and Pierce, 2024; Autor et al., 2024). U.S.-headquartered firms in the IMMEX program accounted for 38% of Mexico's exports to the United States and nearly one million manufacturing jobs in 2017.[14] Given the central role of U.S. multinationals in North American production networks (Flaaen et al. 2025), and prior evidence that Mexico's export surge between 2018 and 2021 was driven by firms embedded in GVCs, especially foreign multinationals (Utar et al., 2025), a focused analysis of U.S.-headquartered firms is crucial for assessing the effectiveness of domestic trade policy in the context of global value chains.

The expansion of U.S. multinationals in Mexico may reflect both substitution away from production in China and a reallocation of activity that might otherwise have occurred within the United States following higher tariffs on Chinese goods. Consistent with this interpretation, Table C.4 in the Appendix shows that while both U.S.- and non-U.S. foreign firms increase their exports to the United States, only U.S.-headquartered firms operating in Mexico significantly increase their imports from both the United States and China, mirroring the evidence documented by Utar et al.

[14] Author's calculation based on customs data, the IMMEX registry, and PEME.

(2025).

Figure 11 further shows that imports from the United States respond sharply beginning in 2018, whereas imports from China increase starting around 2020, with no evidence of differential pre-trends and effects that persist through 2023. The lagged response of Chinese imports suggests that the expansion of U.S. firms in Mexico initially relied on existing North American supply chains, with greater reliance on Chinese inputs emerging as production scaled up. This pattern is consistent with the possibility that tariff-induced expansion by U.S. firms in Mexico occurred partly at the expense of domestic production, as higher input costs constrained expansion within the United States (Flaaen and Pierce, 2024). The later increase in imports from China coincides with the period of COVID-related disruptions, which may have reinforced these forces.

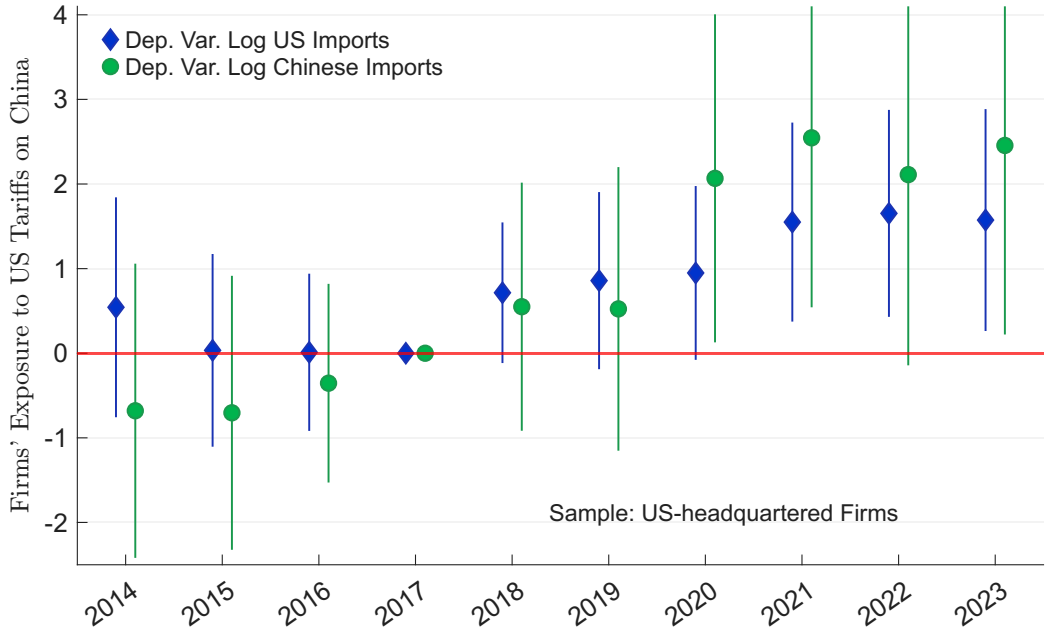


Figure 11: Import Sourcing Responses of U.S.-Headquartered Firms to U.S. Tariffs on China
Notes: Estimation of equation 3 among US-headquartered firms. US imports: N=10,955. Chinese imports: N=10,459. All regressions control for firm fixed effects, three-digit-industry-by-year fixed effects and concurrent trade policy changes. The y-axis displays the yearly DD coefficient estimates corresponding to $\mathbf{T_i^{US \to CN}}$, along with 95% confidence intervals.

Table 3 reports estimates of Equation 3 for manufacturing firms whose ultimate headquarters are located in the United States. Increased U.S. import protection against China leads to higher produc-

tion and employment among U.S.-headquartered manufacturing firms operating in Mexico, alongside positive effects on firm-level labor productivity. The joint increases in output, employment, and labor productivity indicate that U.S.-headquartered firms scaled up manufacturing capacity in Mexico through expanded and more efficient production, while continuing to rely on imported intermediate inputs.

Taken together, the evidence in this paper indicates that the 2018–2019 U.S. trade policy shift caused a significant expansion of manufacturing activity among U.S.-headquartered firms in Mexico, manifested in higher output, increased employment, and the establishment of new plants.

Table 3: Protectionist U.S. Trade Policy Shift and Expansion of U.S.-Headquartered Firms in Mexico

	(1) Log Production	(2) Log Employment	(3) Log Labor Productivity
$T_{i,US}^{US \to CN} \times 2014$	0.049	0.348	0.001
	(0.332)	(0.310)	(0.245)
$T_{i,US}^{US \to CN} \times 2015$	-0.156	0.194	-0.103
	(0.278)	(0.257)	(0.202)
$T_{i,US}^{US \to CN} \times 2016$	-0.078	0.084	-0.080
	(0.182)	(0.134)	(0.151)
$T_{i,US}^{US \to CN} \times 2018$	0.714**	0.296	0.466*
	(0.338)	(0.237)	(0.269)
$T_{i,US}^{US \to CN} \times 2019$	0.419	0.127	0.370
	(0.364)	(0.249)	(0.291)
$T_{i,US}^{US \to CN} \times 2020$	0.517	0.267	0.323
	(0.382)	(0.264)	(0.302)
$T_{i,US}^{US \to CN} \times 2021$	1.302***	0.551*	0.945**
	(0.449)	(0.293)	(0.395)
$T_{i,US}^{US \to CN} \times 2022$	1.134***	0.510*	0.725**
	(0.411)	(0.306)	(0.307)
$T_{i,US}^{US \to CN} \times 2023$	0.772	0.602*	0.293
	(0.473)	(0.349)	(0.414)
N	10,522	10,553	10,521
Firm FE	✓	✓	✓
3-digit Industry × Year FE	✓	✓	✓
Concurrent Trade Policy Controls	✓	✓	✓

Notes: Sample: U.S.-headquartered firms (with global ultimate headquarters in the United States) that exported to the United States as of 2017. Concurrent Trade Policy Controls include firms' exposures to the US-Mexico tariff escalation, retaliatory tariffs of China and the input channels as described in equations B.1-B.6. Robust standard errors are clustered at the firm level. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

5 Concluding Remarks

The 2018–2019 U.S.–China trade war marked one of the most dramatic shifts in U.S. trade policy in decades. While the tariffs were justified as a means of revitalizing domestic manufacturing, estimates suggest they cost U.S. consumers and firms several billion dollars per month. This paper shows that instead of bringing production back home, the protectionist shock ultimately caused manufacturing revival in Mexico—the United States' key partner within North American supply chains.

Using administrative microdata that link firms' customs transactions to firm-level information on employment and output from 2014 to 2023, I construct firm-level measures of exposure to U.S. tariffs on Chinese goods based on firms' pre-shock trade patterns at the HS 6-digit product–destination level. A cohort approach focusing on the 2017 cohort of exporting manufacturing firms enables identification of the causal effects of the U.S. trade policy change while accounting for firm heterogeneity and industry-specific shocks.

The results indicate that the trade war significantly increased manufacturing output, employment, labor productivity, and the number of plants in Mexico. The positive effects are concentrated among firms operating under IMMEX, Mexico's special export-oriented manufacturing program that facilitates the participation of multinational enterprises in regional production networks. These findings highlight the central role of existing GVC structures in mediating trade policy shocks: much of the observed expansion stems from firms that were already integrated into North American production networks prior to the trade war.

Further analysis reveals a notable role for U.S.-headquartered firms, whose subsidiaries in Mexico expanded production and employment in response to the tariffs. This pattern suggests that part of the adjustment to U.S. protectionism occurred not within U.S. borders, but through the reallocation of activity within the same multinational networks—raising important questions about the spatial distribution of manufacturing gains and losses in an era of tightly integrated global value chains.

Overall, the findings suggest that tariff policy may be ill-suited to achieving domestic manufacturing objectives when production is organized through global value chains. Rather than reshoring, protectionist trade policy measures may reinforce cross-border production linkages, shifting manufacturing activity to proximate economies while leaving domestic manufacturing outcomes largely unchanged.

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Appendix to:

“Elsewhere in North America”

Hâle Utar

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A Descriptive Statistics

Table A.1: Firm-Level Measures of Exposures to the Trade War

	(1) Mean	(2) SD	(3) P10	(4) P25	(5) P75	(6) P90	(7) N
All Exporters							
$T_i^{\text{US}\to\text{CN}}$	0.201	0.074	0.077	0.152	0.250	0.250	52,260
$T_{i,\text{US}}^{\text{US}\to\text{CN}}$	0.150	0.095	0.000	0.056	0.242	0.250	52,260
$T_i^{\text{US}\to\text{MEX}}$	0.003	0.022	0.000	0.000	0.000	0.000	52,260
$T_i^{\text{MEX}\to\text{US}}$	0.004	0.019	0.000	0.000	0.000	0.004	52,260
$T_i^{\text{CN}\to\text{US}}$	0.167	0.072	0.058	0.110	0.225	0.250	52,260
$IMUS_i^{\text{US}\to\text{CN}}$	0.103	0.084	0.000	0.019	0.175	0.224	52,260
$IMCN_i^{\text{US}\to\text{CN}}$	0.026	0.046	0.000	0.000	0.030	0.081	52,260
$IMUS_i^{\text{CN}\to\text{US}}$	0.081	0.071	0.000	0.015	0.132	0.183	52,260
GVC Firms							
$T_i^{\text{US}\to\text{CN}}$	0.203	0.072	0.087	0.157	0.250	0.250	37,440
$T_{i,\text{US}}^{\text{US}\to\text{CN}}$	0.169	0.086	0.014	0.117	0.245	0.250	37,440
$T_i^{\text{US}\to\text{MEX}}$	0.003	0.025	0.000	0.000	0.000	0.000	37,440
$T_i^{\text{MEX}\to\text{US}}$	0.005	0.021	0.000	0.000	0.000	0.006	37,440
$T_i^{\text{CN}\to\text{US}}$	0.166	0.072	0.059	0.108	0.225	0.249	37,440
$IMUS_i^{\text{US}\to\text{CN}}$	0.113	0.082	0.002	0.036	0.182	0.226	37,440
$IMCN_i^{\text{US}\to\text{CN}}$	0.026	0.043	0.000	0.000	0.032	0.078	37,440
$IMUS_i^{\text{CN}\to\text{US}}$	0.089	0.070	0.002	0.027	0.140	0.188	37,440

Notes: See Section 3.1 and Appendix Section B.2 for the definitions of these variables.

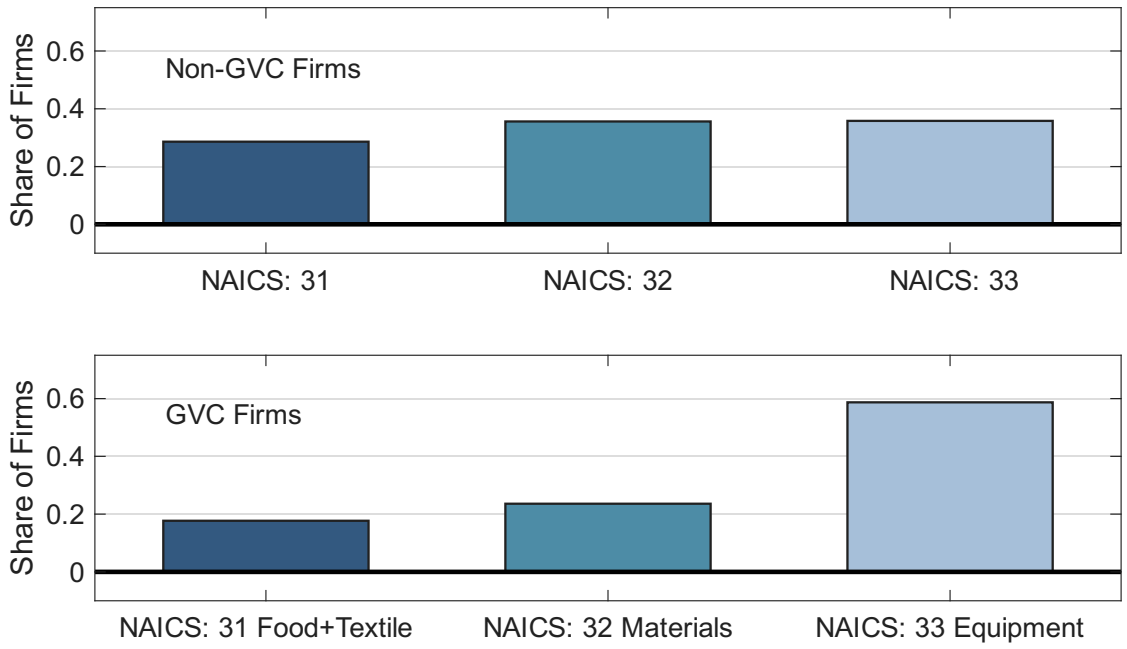


Figure A.1: Distribution of firms across industries

Notes: Top figure: Non GVC firms across two-digit industries (N=14,820). Bottom figure: GVC firms across two-digit industries (N=37,440)

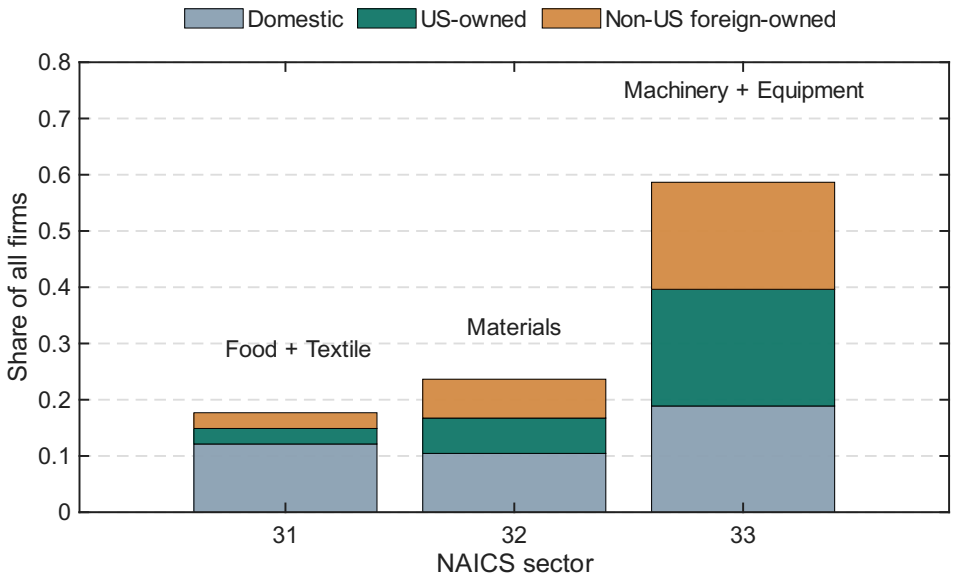


Figure A.2: Distribution of GVC firms across industries by ownership type

Notes: GVC firms by ownership type across two-digit industries (N=37,440)

Table A.2: Summary Statistics—GVC Firms by Country of Ownership

	(1)	(2)	(3)	(4)	(5)
Variable	**Mean**	**SD**	**p25**	**p75**	**Obs**
Panel. A U.S. Firms					
Log Employment	5.74	1.46	4.79	6.71	1183
Log Value of Production	16.91	1.68	15.91	18.02	1177
Log Value of Exports	16.24	2.42	15.03	17.96	1183
Log Value of Import	16.27	2.22	15.05	17.79	1170
US Export Share	0.89	0.23	0.92	1.00	1183
US Import Share	0.64	0.28	0.46	0.88	1170
Chinese Import Share	0.12	0.18	0.01	0.17	1170
Panel. B Non U.S. Foreign Firms					
Log Employment	5.69	1.51	4.69	6.72	1164
Log Value of Production	17.12	1.93	16.02	18.41	1157
Log Value of Exports	15.79	2.97	13.94	17.85	1164
Log Value of Import	16.38	2.27	15.19	17.84	1152
US Export Share	0.76	0.33	0.64	1.00	1164
US Import Share	0.39	0.32	0.10	0.67	1152
Chinese Import Share	0.14	0.20	0.01	0.19	1152
Panel. C Domestic Firms					
Log Employment	4.80	1.48	3.76	5.79	1745
Log Value of Production	15.72	1.92	14.48	16.93	1729
Log Value of Exports	14.34	2.44	12.94	15.95	1745
Log Value of Import	14.05	2.44	12.52	15.74	1647
US Export Share	0.83	0.31	0.82	1.00	1745
US Import Share	0.55	0.36	0.19	0.89	1647
Chinese Import Share	0.14	0.23	0.00	0.17	1647

Notes: GVC (IMMEX) firms in 2017 by country of wonership. Values are expressed in 2019 constant USD. Employment is measured in number of workers. Domestic firms are defined as those whose parent company is identified as domestic in the D&B database, or as firms that do not have a listed parent company.

Table A.3: Summary Statistics—IMMEX establishment-level data (2015-2023)

Variable	(1) Mean	(2) SD	(3) p25	(4) p75	(5) Obs
Log Total Revenue	12.24	1.88	11.03	13.50	37,822
Log Total Foreign Revenue	11.71	1.91	10.53	13.00	35,762
Log Sales of Own Manufactured Goods	12.27	2.73	11.22	14.04	20,766
Log Domestic Sales of Own Manufactured Goods	11.41	2.83	10.02	13.37	19,139
Log Foreign Sales of Own Manufactured Goods	11.78	2.31	10.56	13.31	17,234
Labor Cost Share	0.21	0.16	0.10	0.27	37,904
Material Cost Share	0.62	0.22	0.50	0.79	37,904
Foreign Material Cost Share	0.42	0.31	0.10	0.70	37,904
Log Non Production Employees	3.60	1.50	2.56	4.66	37,330
Log Production Employees	5.39	1.45	4.43	6.40	37,793
Log Employment on Firm's Payroll	5.48	1.55	4.53	6.55	33,342
Log Employment not on Firm's Payroll	4.71	1.82	3.58	6.00	10,465

Notes: IMMEX plants matched with PEME. Values are expressed in thousands of 2019 Mexican pesos. Total revenue includes sales of own manufactured goods and revenues from contract manufacturing. The labor cost share is defined as total labor payments—including wages, benefits, and payments to staffing companies—divided by total expenses. The material cost share is total material costs divided by total expenses, and the foreign material cost share is total foreign material costs divided by total expenses. Non-production employees include administrative, managerial, and other non-production workers, whether directly hired or supplied through staffing companies. Production employees include production workers and technicians involved in manufacturing, whether on the firm's payroll or supplied through staffing companies.

B Data and Variable Construction

Firm-level data The Profile of Export-Oriented Manufacturing Firms (PEME) is a statistical product developed by Mexico's National Institute of Statistics and Geography (INEGI) that provides detailed firm-level information on the foreign trade activities of manufacturing firms. PEME is constructed by linking multiple data sources, including administrative foreign trade records, manufacturing surveys, and statistics from the IMMEX program. These datasets are integrated through Mexico's Statistical Business Register (RENEM), which provides a unified framework for identi-

fying and tracking firms across sources. INEGI has undertaken this data-linking effort since 2013, combining foreign trade records with information from the Economic Censuses, the Annual and Monthly Manufacturing Industry Surveys, and IMMEX Program Statistics.

The unit of observation in PEME is the firm, defined as an organization owned by a single legal entity that engages in one or more economic activities. Firms are autonomous in decisions related to marketing, finance, and investment, and allocate resources according to a defined production strategy. A firm may operate in one or multiple establishments under the same legal name.PEME includes manufacturing firms for which at least one establishment reports information in the Manufacturing Surveys or the IMMEX Program Statistics.

Plant-level data The IMMEX plant-level dataset covers all establishments belonging to firms participating in the IMMEX Program, making it a census of activity conducted under the program. Since the analysis focuses on manufacturing, I restrict attention to manufacturing plants. The data, originally reported at the monthly frequency, are aggregated to the annual level.

Registry data In addition to the IMMEX plant-level data, I use the monthly IMMEX firm registry maintained by Mexico's Ministry of Economy (Secretaría de Economía) for the period 2016–2024. The registry includes firm names, descriptions of primary activities (which roughly correspond to three-digit NAICS industries), addresses, and tax identifiers (Registro Federal de Contribuyentes, RFC). The registry is updated monthly to reflect plant openings and closures, which I use to identify new plant establishments. Firm tax identifiers are used to link firms to their global ultimate owners using D&B's Corporate Hierarchies and Linkages database.

B.1 Overview of Categories, Variables, and Classifications

In the PEME, firms' economic activity is classified using the North American Industry Classification System (NAICS, 2018), based on establishments' outputs and production processes. Each firm is assigned a primary activity at the three-digit NAICS level, yielding 21 manufacturing industries. Importantly, the PEME includes microenterprises (1–10 employees), providing more

complete coverage of firms' contributions to employment and Mexico's international trade.

INEGI provides a crosswalk between establishment and firm identifiers for the period 2013–2023. This key makes it possible to track the number of establishments belonging to a firm over time. It also enables the merge of firm-level PEME data with the plant-level IMMEX database.

B.2 Firm-Level Controls for Concurrent Trade Policy Changes

Section 232 and Mexico's retaliation Before the US government targeted China specifically, Section 232 tariffs led to retaliation from Mexico, among other countries. To control for the potentially confounding effects of the brief US-Mexico tariff escalation, we separately construct firm-specific exposures to the US tariffs on Mexican products ($T_i^{\text{US}\to\text{MEX}}$) and Mexico's retaliatory tariffs on US products ($T_i^{\text{MEX}\to\text{US}}$).

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 be subject to Section 232 tariffs:

$$T_i^{\text{US}\to\text{MEX}} = \frac{\sum_{j\in\text{USIT}^{\text{MEX}}} X_{ij}^{2017,US} \times \Delta\tau_j^{\text{USIT}^{\text{MEX}}}}{\sum_j X_{ij}^{2017}} \tag{B.1}$$

Since the Section 232 tariffs included other third countries, $T_i^{\text{US}\to\text{MEX}}$ does not cleanly identify the specific effects of US tariffs on Mexico but essentially functions as a robust control for the possible 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 $USRT^{MEX}$ be 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 and let M_{ij}^{2017} be the value of firm i's imports of good j in 2017, and let $M_{ij}^{2017,US}$ denote firm i's imports of good j from the US. The firm-level exposure to the Mexican government's retaliatory tariffs is then given by the following:

$$T_i^{\text{MEX}\to\text{US}} = \frac{\sum_{j\in\text{USRT}^{\text{MEX}}} M_{ij}^{2017,US} \times \Delta\tau_j^{\text{USRT}^{\text{MEX}}}}{\sum_j M_{ij}^{2017}} \tag{B.2}$$

As the empirical analysis focuses on exporters as of 2017, not all firms are importing in the sample. For non-importing firms, $T_i^{\text{MEX}\to\text{US}}$ is defined as zero.

Tariff Exposures via Input Channels I additionally construct firm-level exposure measures for firms that import inputs from the US exposed to the US tariffs on China, as well as for firms whose inputs concentrate on Chinese imports that would have been subject to US tariffs if imported into the US as follows:

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

$$IMCN_i^{\text{US}\to\text{CN}} = \frac{\sum_{j\in\text{USIT}^{\text{CN}}} M_{ij}^{2017,\text{CN}} \times \Delta\tau_j^{\text{USIT}^{\text{CN}}}}{\sum_j M_{ij}^{2017}} \tag{B.4}$$

China's retaliatory tariffs By offering manufacturing and export services like polishing, packaging, and warehousing to US businesses, some exporting firms likely complement US operations without altering the nature of the goods traded, and hence their exports may be dampened due to costlier entry of US goods to China. However, particularly in the agricultural sector, Mexico's exports may also compete with US products in global markets.

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.

$$T_i^{\text{CN}\to\text{US}} = \frac{\sum_{j\in\text{USRT}^{\text{CN}}} X_{ij}^{2017} \times \Delta\tau_j^{\text{USRT}^{\text{CN}}}}{\sum_i X_{ij}^{2017}} \tag{B.5}$$

$T_i^{\text{CN}\to\text{US}}$ 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.

I additionally account for firms whose imports from the US concentrated in goods that will be subject to retaliatory tariffs from China.

$$IMUS_i^{\text{CN}\to\text{US}} = \frac{\sum_{j\in\text{USRT}^{\text{CN}}} M_{ij}^{2017,US} \times \Delta\tau_j^{\text{USRT}^{\text{CN}}}}{\sum_j M_{ij}^{2017}} \tag{B.6}$$

Table A.1 presents summary statistics for these measures.

C Additional Analysis

C.1 Firms' Trade Outcomes

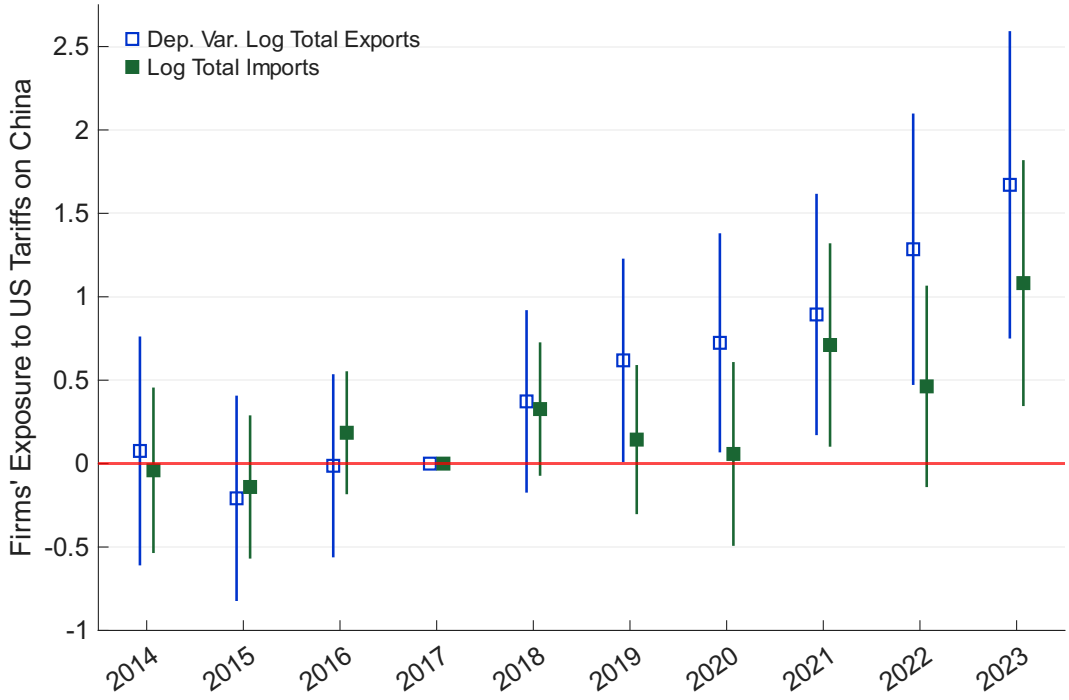
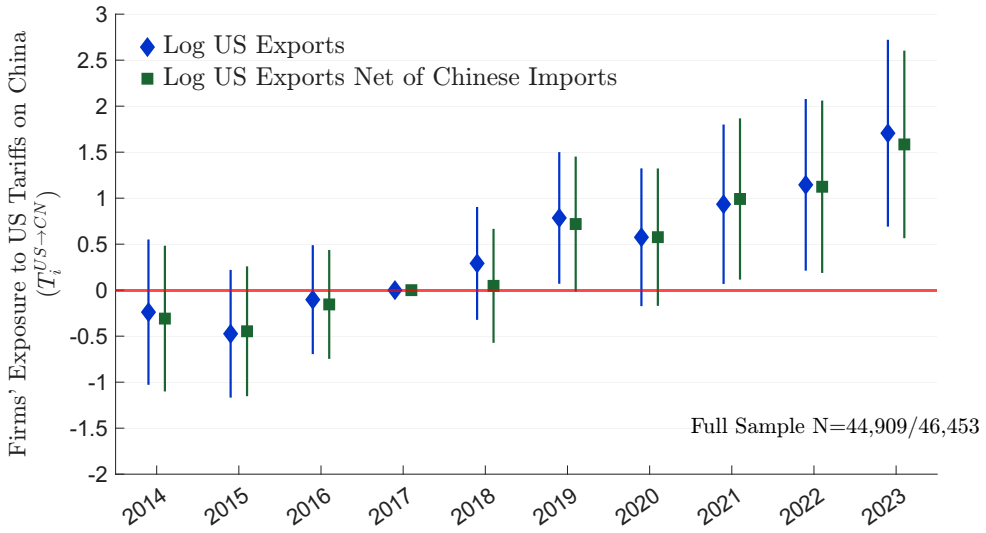
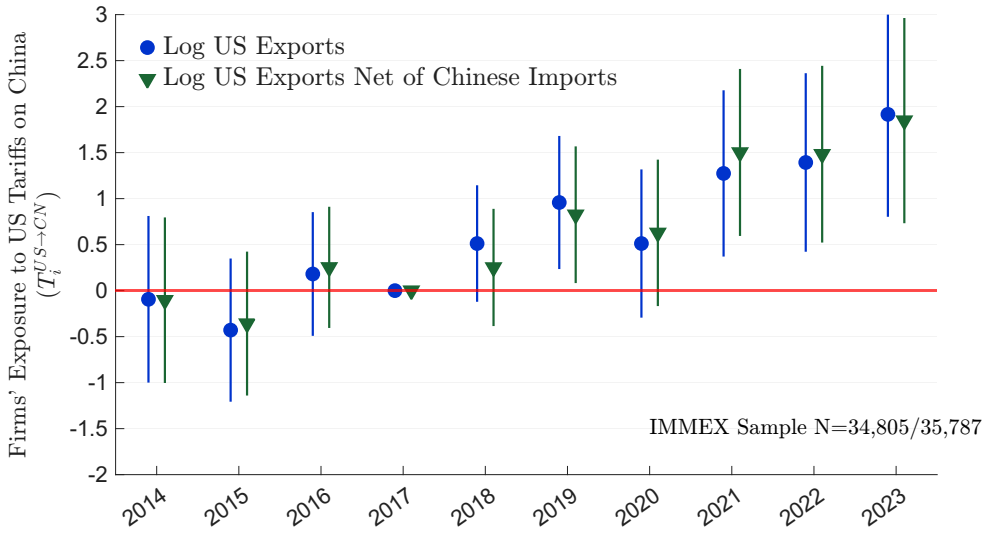


Figure C.1: Impact of US Tariffs Targeting China on Manufacturing Firms' Total Exports and Imports

Notes: Estimation of equation 3. The dependent variables are the natural logarithm of firms' value of exports (N=50,550) and imports (49,706). All regressions control for firm fixed effects, three-digit-industry-by-year fixed effects and concurrent trade policy changes. The y-axis displays the yearly DD coefficient estimates corresponding to $\mathbf{T_i^{US \to CN}}$, along with 95% confidence intervals based on robust standard errors clustered at the firm level.



(a) Full Sample



(b) GVC Firms

Figure C.2: Impact of US Tariffs Targeting China on US Exports Net of Chinese Imports

Notes: Estimation of equation 3. The dependent variables are the natural logarithm of US exports and US exports net of Chinese imports, $\sum_{j\in J_{it}^{USX}}[X_{ijt}^{US} - M_{ijt}^{CN}]$. All regressions control for firm fixed effects, three-digit-industry-by-year fixed effects and concurrent trade policy changes. The y-axis displays the yearly DD coefficient estimates corresponding to $\mathbf{T_i^{US\to CN}}$, along with 95% confidence intervals based on robust standard errors clustered at the firm level.

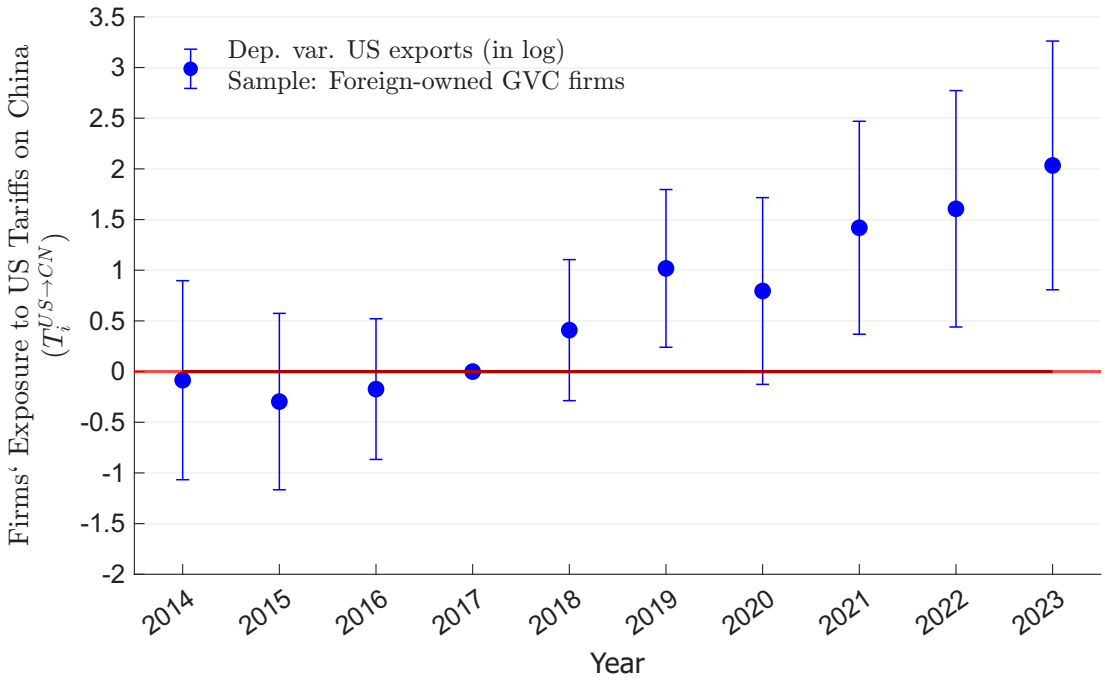
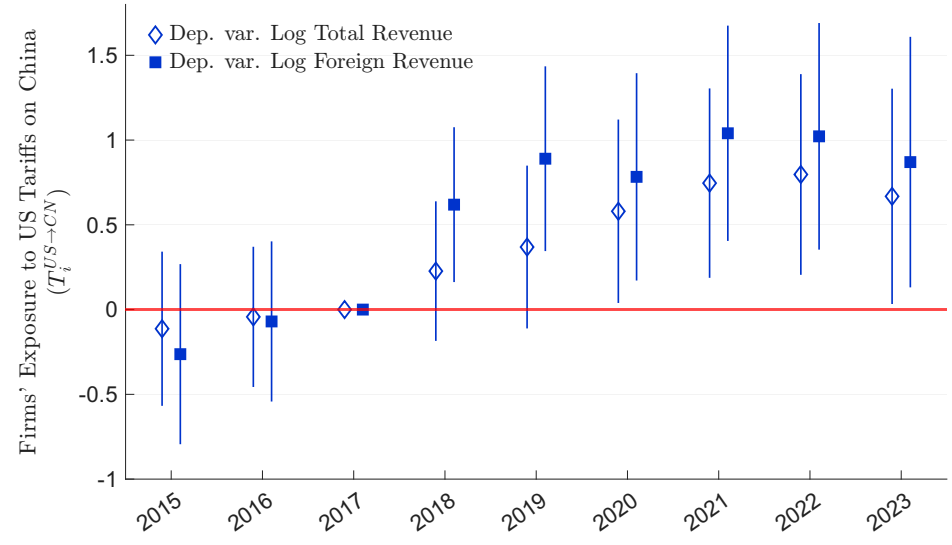


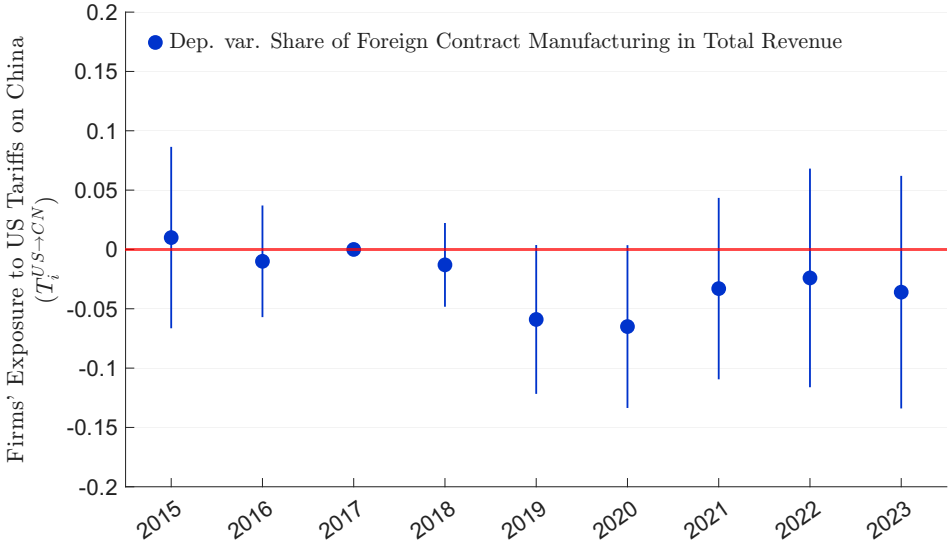
Figure C.3: How US Exports of Foreign GVC Firms Respond to the US Tariffs

Notes: The dependent variables are the natural logarithm of US exports, N=21,177 (among foreign IMMEX). All regressions control for firm fixed effects, industry-by-year fixed effects and concurrent trade policy changes. The y-axis displays the yearly DD coefficient estimates corresponding to $\mathbf{T_i^{US \to CN}}$, along with 95% confidence intervals based on robust standard errors clustered at the firm level.

C.2 Supplemental Analysis–Manufacturing Output



(a) Impact on Plant Revenue



(b) Impact on Contract Manufacturing for Foreign Clients

Figure C.4: Impact of the U.S. Tariff Hikes Targeting China on Plants' Revenue

Notes: Estimation of equation 4. The dependent variables are the natural logarithms of total plant revenue (N=36,378), total foreign revenue (N=34,325), in (a) and the share of revenue from contract manufacturing for foreign clients in total revenue (N=36,378) in (b). All regressions control for plant fixed effects, three-digit-industry-by-year, municipality-by-year fixed effects and concurrent trade policy changes. The y-axis displays the yearly DD coefficient estimates corresponding to $\mathbf{T_i^{US\to CN}}$, along with 95% confidence intervals based on robust standard errors clustered at the firm level.

Table C.1: The US-China Trade War and Manufacturing Firms' Trade Outcomes

	(1) Log US Exports	(2) Log Total Exports	(3) Log Non-US Exports	(4) Log Total Imports	(5) Log US Imports	(6) Log Non-US Imports	(7) Share of Imports from China
Panel A. IMMEX-GVC Firms							
US Tariffs on China	1.157***	1.088***	-0.615	0.585**	0.604*	0.736**	0.019
$(T_i^{US \to CN} \times PostTW_t)$	(0.331)	(0.302)	(0.503)	(0.256)	(0.317)	(0.300)	(0.037)
N	35,787	36,859	22,381	36,430	35,217	35,219	36,430
Panel B. Other firms							
US Tariffs on China	0.730	0.556	1.012	0.407	0.521	0.038	0.052
$(T_i^{US \to CN} \times PostTW_t)$	(0.757)	(0.547)	(0.633)	(0.411)	(0.526)	(0.493)	(0.050)
N	10,666	13,691	10,779	13,276	11,716	12,729	13,276
For both panels:							
Firm FEs	✓	✓	✓	✓	✓	✓	✓
3-digit Industry × Year FEs	✓	✓	✓	✓	✓	✓	✓
Additional Trade Policy Controls	✓	✓	✓	✓	✓	✓	✓

Notes: $PostTW_t$ is a dummy variable equal to 1 for years 2018 and later, and 0 otherwise. Additional Trade Policy Controls include firms' exposures to the US-Mexico tariff escalation, retaliatory tariffs of China and the input channels as described in equations B.1-B.6. Robust standard errros are clustered at the firm level.

C.3 Supplemental Analysis–Manufacturing Employment

Table C.2: The US-China Trade War and Manufacturing Employment

	Broad Exposure			US market specific		
	ALL	GVCs	Others	ALL	GVCs	Others
Dep var. Log Employment						
2014	-0.057	-0.117	-0.007	0.099	0.069	0.195
	(0.088)	(0.134)	(0.099)	(0.116)	(0.156)	(0.145)
2015	0.017	-0.051	0.095	0.120	0.084	0.231*
	(0.081)	(0.110)	(0.122)	(0.098)	(0.131)	(0.120)
2016	0.015	-0.030	0.080	0.064	0.057	0.110
	(0.061)	(0.073)	(0.107)	(0.066)	(0.088)	(0.078)
2018	0.067	0.084	-0.022	0.127	0.163	-0.018
	(0.100)	(0.116)	(0.190)	(0.103)	(0.126)	(0.163)
2019	0.121	0.132	0.060	0.115	0.125	0.039
	(0.109)	(0.129)	(0.205)	(0.118)	(0.141)	(0.202)
2020	0.176	0.167	0.171	0.277**	0.197	0.490*
	(0.116)	(0.132)	(0.231)	(0.129)	(0.147)	(0.261)
2021	0.275**	0.359**	0.157	0.382***	0.452***	0.157
	(0.128)	(0.164)	(0.192)	(0.146)	(0.175)	(0.243)
2022	0.249*	0.351**	0.081	0.425***	0.445**	0.377
	(0.138)	(0.169)	(0.227)	(0.154)	(0.182)	(0.276)
2023	0.374**	0.518***	0.118	0.508***	0.570***	0.269
	(0.145)	(0.183)	(0.224)	(0.162)	(0.194)	(0.276)
N	52,174	37,385	14,789	42,171	33,573	8,598
Firm FEs	✓	✓	✓	✓	✓	✓
Industry × Year FEs	✓	✓	✓	✓	✓	✓
Concurrent Trade Policy Controls	✓	✓	✓	✓	✓	✓

Notes: Concurrent Trade Policy Controls include firms' exposures to the US-Mexico tariff escalation, retaliatory tariffs of China and the input channels as described in equations B.1-B.6. Robust standard errros are clustered at the firm level.

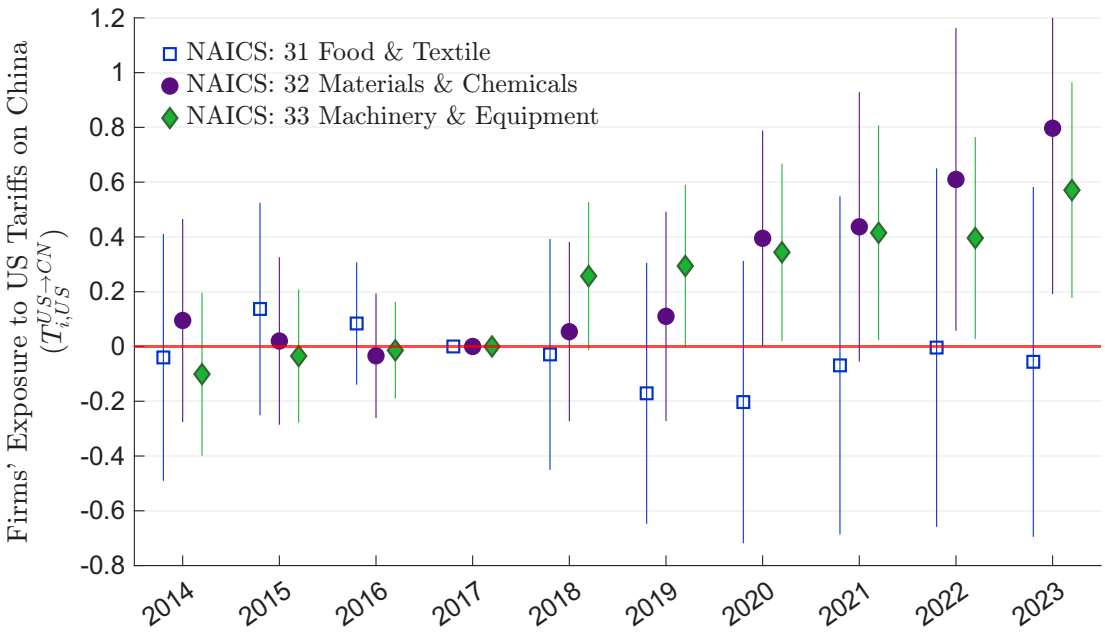


Figure C.5: Employment gains are concentrated in tech-intensive industries

Notes: Estimation of equation 3 among 2017 US exporters operating in NAICS 31 (N=8,197), NAICS 32 (N=10,243), and NAICS 33 (N=23,720) industries. All regressions include for firm fixed effects, three-digit industry-by-year fixed effects and controls for concurrent trade policy changes. The y-axis displays the yearly DD coefficient estimates corresponding to $\mathbf{T}_{\mathbf{i,US}}^{\mathbf{US\to CN}}$, along with 95% confidence intervals based on robust standard errors clustered at the firm level.

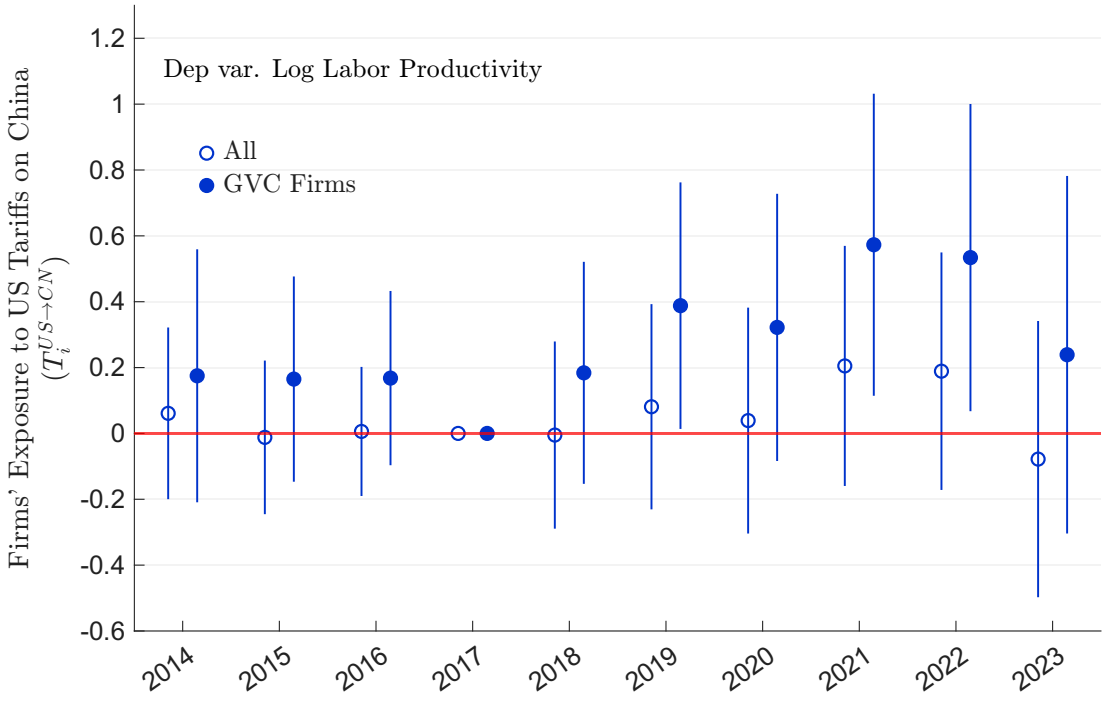


Figure C.6: The Effect of Rising U.S. Import Tariffs on China on Labor Productivity

Notes: Estimation of equation 3 among single-plant firms with the dependent variable being the natural logarithm of the labor productivity. N=42,278/30,681. All regressions control for firm fixed effects, three-digit industry-by-year fixed effects and concurrent trade policy changes. The y-axis displays the yearly DD coefficient estimates corresponding to $\mathbf{T_i^{US \to CN}}$, along with 95% confidence intervals.



Figure C.7: Rising U.S. Tariffs on China and Labor Adjustment Margins

Notes: Estimation of equation 4 among IMMEX plants. The dependent variables are payroll employment (N = 31,938) and non-payroll employment (N = 9,426). All specifications include plant FE, three-digit-industry-by-year FE, municipality-by-year FE and concurrent trade policy changes. The y-axis displays the yearly DD coefficient estimates corresponding to $\mathbf{T_i^{US \to CN}}$, along with 95% confidence intervals. Robust SEs clustered at the firm level.

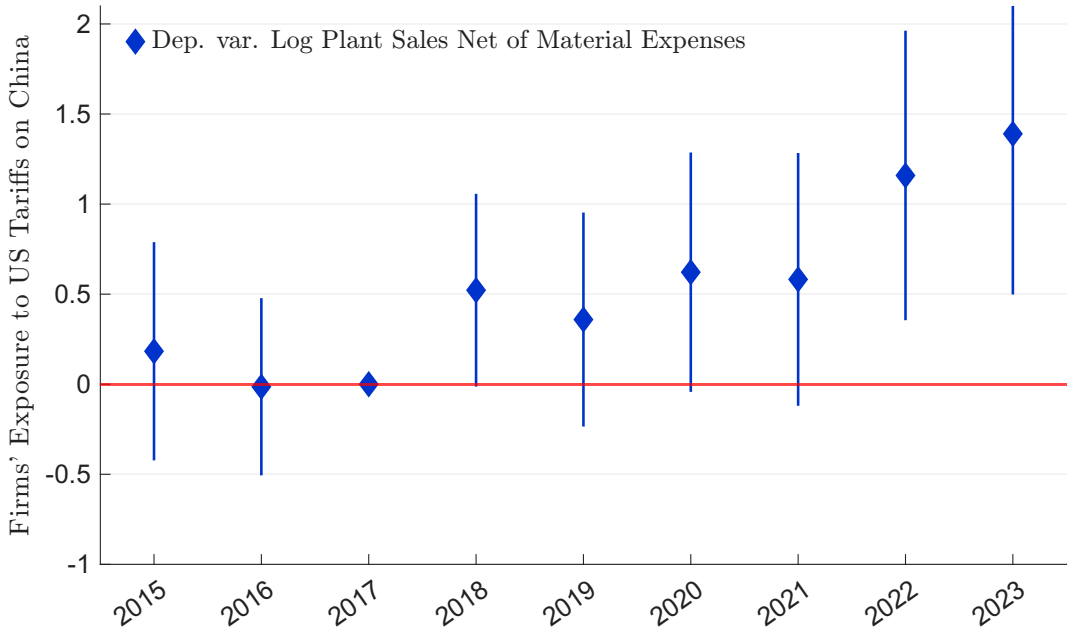


Figure C.8: Plant Value Added and Exposure to U.S. Tariffs on China

Notes: Estimation of equation 4 using IMMEX plant-level data, N=17,318. The dependent variable is the logarithm of plant sales of own manufactured goods net of total expenditures on domestic and foreign materials and packaging. All regressions control for plant fixed effects, three-digit industry-by-year, municipality-by-year fixed effects and firm-level controls for concurrent trade policy changes. The y-axis displays the yearly DD coefficient estimates corresponding to $\mathbf{T_i}^{\text{US}\rightarrow\text{CN}}$, along with 95% confidence intervals. Robust standard errors are clustered at the firm level.

Table C.3: Plant-Level Responses to Rising U.S. Import Tariffs on China

	(1) Avg. Wage (log)	(2) White Collar Wage (log)	(3) Blue Collar Wage (log)	(4) Total Labor Cost (log)	(5) Foreign Material Cost (log)	(6) Foreign Material Cost Share	(7) Labor Cost Share
$T_i^{\text{US}\to\text{CN}} \times PostTW_t$	0.096	0.294	0.028	0.356**	1.476***	0.096**	-0.051*
	(0.101)	(0.180)	(0.099)	(0.171)	(0.392)	(0.044)	(0.030)
R-squared	0.805	0.778	0.788	0.933	0.897	0.889	0.789
Observations	36,430	30,453	30,650	36,433	36,269	36,454	36,454
Concurrent Trade Policy Controls	✓	✓	✓	✓	✓	✓	✓
Plant FE	✓	✓	✓	✓	✓	✓	✓
Industry (3-dig) × Year FE	✓	✓	✓	✓	✓	✓	✓
Municipality × Year FE	✓	✓	✓	✓	✓	✓	✓

Notes: IMMEX Plant Survey 2015–2023 merged with PEME firms. Average wage is constructed by dividing total labor costs, inclusive of payments to non-payroll workers, by total employment. White-collar wage is the average hourly wage among non-production workers on the payroll. Blue-collar wage is the average hourly wage among production workers and technicians on the payroll. Concurrent trade policy controls include firms' exposures to the U.S.–Mexico tariff escalation, China's retaliatory tariffs, and the input channel measures $IMUS_j^{\text{CN}\to\text{US}}$, $IMUS_j^{\text{US}\to\text{CN}}$, and $IMCN_j^{\text{US}\to\text{CN}}$, all interacted with the post–trade war indicator. Robust standard errors are clustered at the firm level. ***, **, and * indicate significance at the levels, respectively.

Table C.4: Export and Import Responses of U.S.- and Non-U.S. Foreign Firms Operating in Mexico

	(1) Log US Exports	(2) Log US Exports Net of Chinese Imports	(3) Log US Imports	(4) Log Chinese Imports
Panel A. US MNEs in Mexico				
Firm Exposure to US Tariffs on China	1.000**	0.902*	1.074***	2.073***
$(T_i^{US \to CN} \times PostTW_t)$	(0.498)	(0.488)	(0.380)	(0.783)
N	10,940	10,706	10,955	10,459
Panel B. Non-US Foreign MNEs in Mexico				
Firm Exposure to US Tariffs on China	1.548*	1.539*	0.715	0.398
$(T_i^{US \to CN} \times PostTW_t)$	(0.850)	(0.875)	(0.686)	(0.822)
N	10,231	9,809	10,369	9,954
For both panels				
Firm FE	✓	✓	✓	✓
Industry × Year FE	✓	✓	✓	✓
Additional Trade Policy Controls	✓	✓	✓	✓

Notes: $PostTW_t$ is a dummy variable equal to 1 for years 2018 and later, and 0 otherwise. Additional Trade Policy Controls include firms' exposures to the US-Mexico tariff escalation, retaliatory tariffs of China and the input channels as described in equations B.1-B.6. Robust standard errros are clustered at the firm level.

D Robustness Analysis

Table D.1: U.S. Export Share Gains by Baseline U.S. Export Share

	(1)	(2)	(3)	(4)	(5)	(6)
Sample based on 2017 share of US exports	All ($>=0$)	>0	$>=0.1$	$>=0.2$	$>=0.3$	$>=0.4$
Dep var. for all columns			US Export Share			
Firm Exposure to US Tariffs on China	0.120***	0.085**	0.071*	0.062	0.053	0.027
$(T_i^{\text{US}\to\text{CN}} \times PostTW_t)$	(0.039)	(0.039)	(0.041)	(0.041)	(0.040)	(0.039)
N	50,550	46,596	43,614	42,335	41,265	40,054
Firm FE	✓	✓	✓	✓	✓	✓
3-digit Industry × Year FEs	✓	✓	✓	✓	✓	✓
Additional Trade Policy Controls	✓	✓	✓	✓	✓	✓

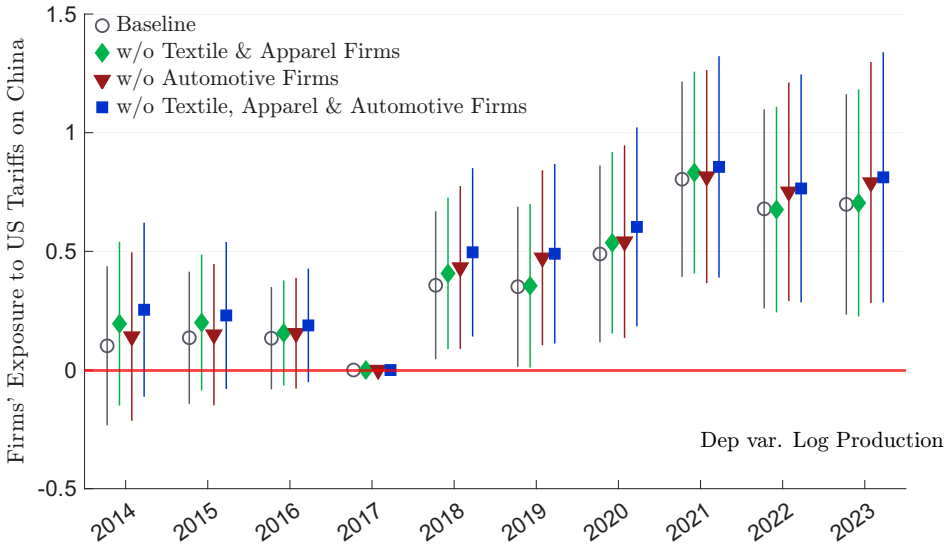
Notes: $PostTW_t$ is a dummy variable equal to 1 for years 2018 and later, and 0 otherwise. Additional Trade Policy Controls include firms' exposures to the US-Mexico tariff escalation, retaliatory tariffs of China and the input channels as described in equations B.1-B.6. Robust standard errros are clustered at the firm level.

D.1 Robustness to USMCA-Affected Industries

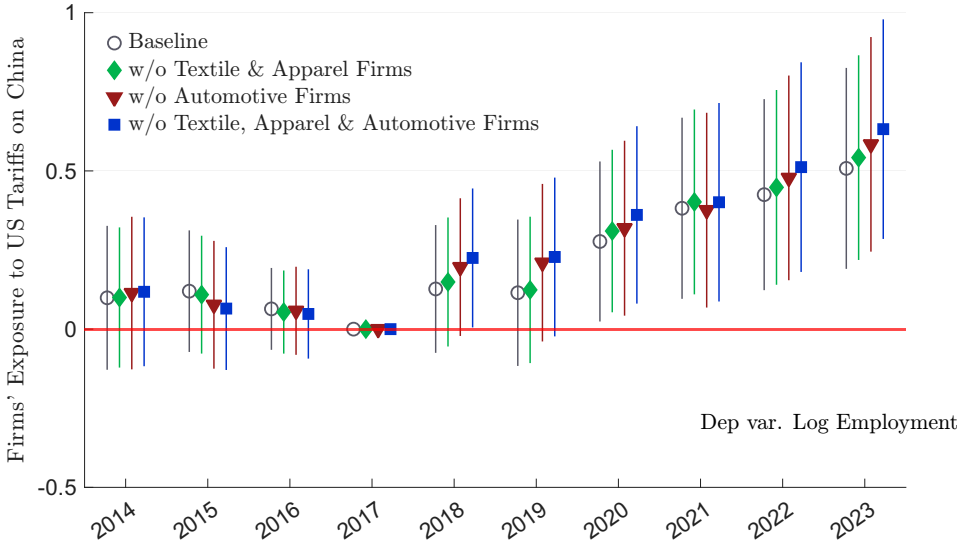
The USMCA entered into force in July 2020 and introduced new rules that disproportionately affected a narrow set of manufacturing industries, most notably automotive and textile and apparel production. These provisions—including higher regional value content requirements and new labor value content thresholds in transportation equipment, as well as revised rules of origin in textiles and apparel—could, in principle, affect employment and production outcomes.

The baseline specification includes three-digit industry by year fixed effects, which absorb industry-wide shocks and time-varying trends common to narrowly defined sectors. As a result, broad adjustments associated with the implementation of the USMCA are already accounted for in the main estimates. Nevertheless, firms within the same three-digit industry may have been differentially affected by USMCA provisions due to heterogeneity in product composition, sourcing patterns, or integration into North American supply chains.

To assess whether such within-industry exposure to USMCA changes influences the results, I conduct a set of robustness exercises that re-estimate the employment and production effects after excluding industries most directly targeted by the agreement. Specifically, I sequentially exclude firms operating in textiles and apparel manufacturing (NAICS 313–315), transportation equipment manufacturing (NAICS 336), and the combined set of these industries. Across all specifications, production (Figure D.1a) and employment (Figure D.1b) effects remain positive and statistically significant, with no important differences, suggesting that the results reflect responses to the tariff shock rather than USMCA-related adjustments.



(a) Production



(b) Employment

Figure D.1: Robustness to Excluding Firms Affected by USMCA Provisions

Notes: Estimation of Equation 3 using the treatment variable $T_{i,\text{US}}^{\text{US}\to\text{CN}}$ among 2017 U.S. exporters, as firms in textiles and apparel manufacturing (NAICS 313–315) and transportation equipment manufacturing (NAICS 336) are sequentially removed. The dependent variables are the natural logarithm of firms' value of production in (a) with N=41,914/31,798 and employment in (b). N=42,171/31,970. All regressions include firm fixed effects, three-digit industry-by-year fixed effects, and controls for concurrent trade policy changes. The y-axis displays yearly difference-in-differences coefficient estimates with 95% confidence intervals based on robust standard errors clustered at the firm level.

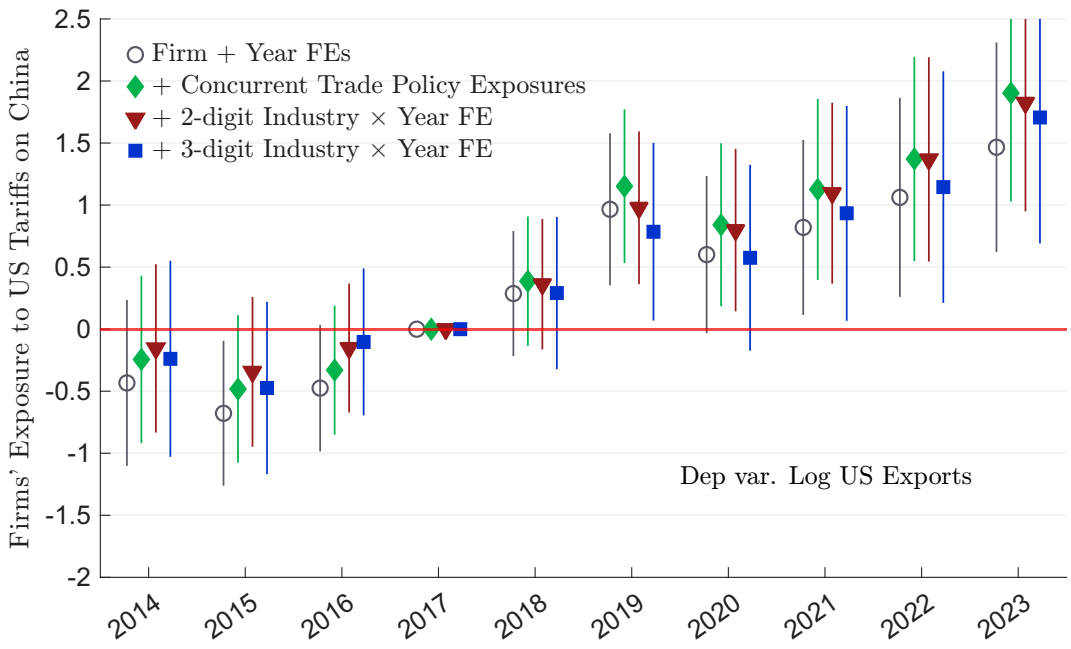


Figure D.2: U.S. tariffs on China and firms' exports to the United States, with sequentially added controls

Notes: Estimation of equation 3 with the dependent variable being the natural logarithm of firm's exports to the U.S.. N=46,453. The y-axis displays the yearly DD coefficient estimates corresponding to $\mathbf{T_i^{US \to CN}}$, along with 95% confidence intervals.

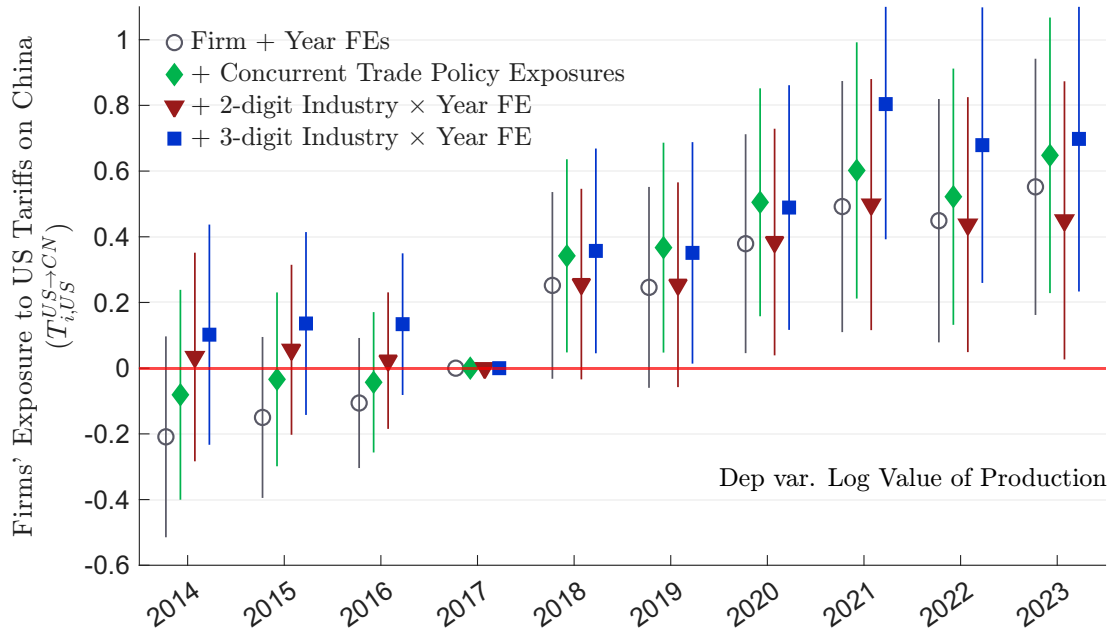


Figure D.3: U.S. tariffs on China and firms' production, with sequentially added controls

Notes: Estimation of equation 3 with the dependent variable being the natural logarithm of firm's value of production at factory prices. Estimation is conducted among U.S. exporters with N=41,914. The y-axis displays the yearly DD coefficient estimates corresponding to $T_{i,\text{US}}^{\text{US}\to\text{CN}}$, along with 95% confidence intervals.

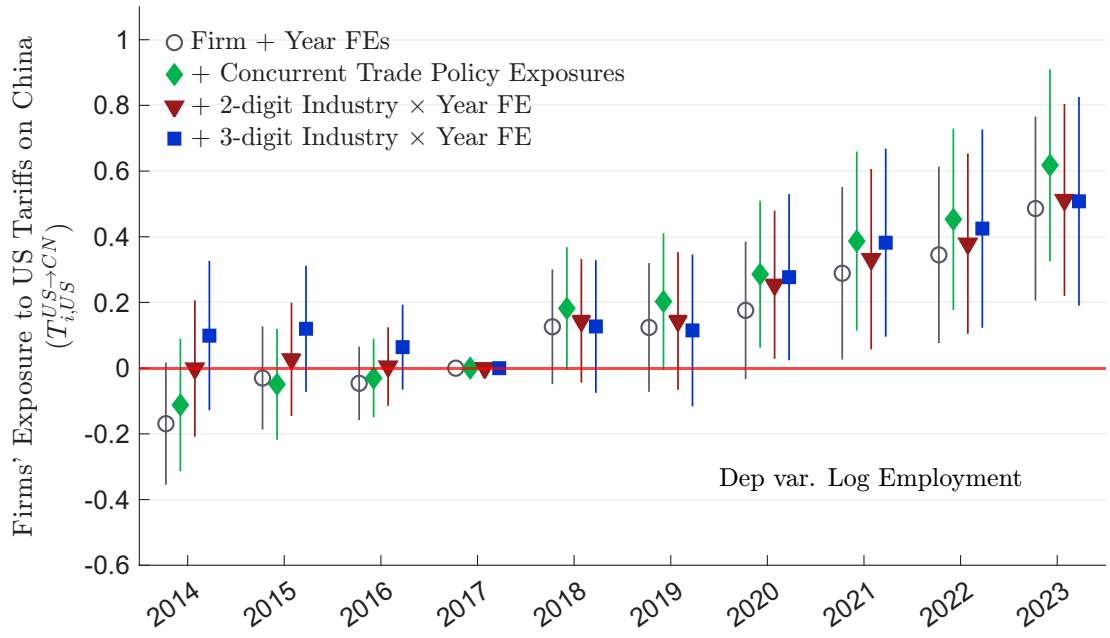


Figure D.4: U.S. tariffs on China and firms' employment, with sequentially added controls

Notes: Estimation of equation 3 with the dependent variable being the natural logarithm of firm's employment. Estimation is conducted among U.S. exporters with N=42,171. The y-axis displays the yearly DD coefficient estimates corresponding to $T_{i,\text{US}}^{\text{US}\to\text{CN}}$, along with 95% confidence intervals.