Discussion Paper Series – CRC TR 224

Discussion Paper No. 776
Project B 07

The U.S.–China Trade War and the Geography of Global Production

Harald Fadinger[1]
Lei Li[2]
Sophia Praetorius[3]
Jan Schymik[4]

August 2026

[1]University of Vienna, CEPR and IHS, Email: harald.fadinger@univie.ac.at
[2]University of G¨ottingen, Email: lei.li@unigoettingen.de;
[3]University of Geneva, Email: sophia.praetorius@unige.ch
[4]University of Mannheim, Email: jan.schymik@unimannheim.de.

Support by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) through CRC TR 224 is gratefully acknowledged.

The U.S.–China Trade War and the Geography of Global Production

Harald Fadinger * Lei Li § Sophia Praetorius † Jan Schymik ‡

August 2026

Abstract

We study how the U.S.–China trade war affected manufacturing activity in third countries using a novel plant-level dataset covering millions of establishments in 50 major economies, including affiliates of more than 200,000 multinational enterprises (MNEs). Combining establishment-level data with detailed tariff information, we estimate the effects of U.S. and Chinese punitive bilateral output and input tariffs on sales, employment, and establishments across countries, industries, and stages of production. We find that third-country effects of the trade war are highly heterogeneous and largely offsetting, yielding moderately negative net effects overall. Most of the adjustment is driven by multinational enterprises reallocating activity across affiliate networks, while domestic firms respond much less.

Keywords: Global value chains, firm location choice, multinational enterprise, trade policy, tariffs, tariff elasticity, upstreamness, downstreamness, output tariffs, input tariffs, third-country effects of trade policy
JEL: F13, F14, F23

We are grateful to Meredith Crowley, Aksel Erbahar, Mark Melitz, Andreas Moxnes, Dennis Novy, Ralph Ossa, Frank Pisch, Claudia Steinwender, Daria Taglioni and audiences at at ISoT in Geneva and several other conferences and seminars for helpful conversations and comments. Funding from the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) through CRC TR 224 (project B07) and project 557666971 is gratefully acknowledged. * University of Vienna, CEPR and IHS, harald.fadinger@univie.ac.at; § University of Göttingen, lei.li@uni-goettingen.de; † University of Geneva, sophia.praetorius@unige.ch; ‡ University of Mannheim, jan.schymik@uni-mannheim.de.

1 Introduction

Trade policy is widely used by governments to influence domestic prices, import flows, and firms' decisions regarding location and sales. After decades of sustained trade liberalization, protectionist trade policies have re-emerged. While some countries, most notably the United States and China, have engaged in overt trade conflicts, others have resorted to more subtle forms of protectionism.[1] This renewed turn toward protectionism poses a major challenge to the global economy, which has become increasingly reliant on the international fragmentation of production. Today, around 70% of international trade takes place within global value chains (GVCs), with services, raw materials, parts, and components crossing borders at multiple sequential stages before being embodied in final goods. Multinational enterprises (MNEs) play a central role in these GVCs, with roughly two-thirds of trade involving an MNE on at least one side of the transaction. MNEs are therefore particularly exposed to the recent rise in protectionism, which affects both their global sourcing decisions and their location choices.

We analyze how the U.S.–China trade war reshaped global economic activity and the geography of GVCs, with a particular emphasis on MNEs. Focusing on the first phase of the trade war between 2018 and 2022, we draw on granular establishment-level panel data covering millions of plants worldwide, including affiliates of more than 200,000 MNEs, to offer a comprehensive picture of how the conflict affected the manufacturing activity of firms in third countries.

Using plant-level data from Dun & Bradstreet's WorldBase for 2018 and 2022, we build a novel and comprehensive dataset to assess how establishments in 50 major economies—the United States, China, and 48 other countries—were affected by the U.S.–China trade war. The dataset contains detailed information on the headquarters and affiliates of virtually all MNEs, as well as domestic firms worldwide, including their locations, production activities at the 4-digit Standard Industrial Classification (SIC) industry level, and plant-level employment and sales. We combine these data with detailed product-level information on bilateral U.S.–China tariffs and tariff data for all countries over the same period. We further use a detailed U.S. input-output (IO) table in combination with tariff data to construct measures of the input tariffs that the United States and China impose on one another and on third countries. We also identify each plant's vertical position within the firm's GVC by constructing sectoral upstreamness measures at the 4-digit industry level using a detailed U.S. IO table, following Antràs et al. (2012) and Alfaro et al. (2019).

To study how the trade war reshaped the geography of global economic activity, we focus on two main questions. First, how have U.S.–China trade-war tariffs on outputs and intermediate inputs affected industry-level sales, employment, and entry among MNEs and domestic firms in third

[1] For example, protectionist measures adopted in response to the COVID-19 crisis.

countries? Second, we focus on MNEs and examine how the trade war has reshaped their affiliate networks and the distribution of sales and employment across existing affiliates, depending on the location of their headquarters (for example, in the United States, China, or Europe) and of their affiliates worldwide.

We find that, overall, the trade war had moderately negative average effects on third countries, as the heterogeneous effects of U.S. and Chinese tariffs on outputs and inputs worked in opposite directions and partially offset one another. These effects were driven mainly by MNEs, whereas domestic firms showed a much more muted response. MNEs largely used their existing global affiliate networks to reallocate sales across locations in order to cushion the effects of the trade war. In particular, they shifted economic activity away from China and toward third countries in response to U.S. tariffs on Chinese goods and Chinese tariffs on U.S. inputs, consistent with trade diversion and a reduction in China's competitiveness. Consequently, U.S. output tariffs and Chinese input tariffs had positive effects on third-country sales and employment. By contrast, Chinese tariffs on U.S. goods reduced MNE sales in third countries, possibly due to complementarities with U.S. production. U.S. tariffs on Chinese inputs also depressed MNE sales in third countries within the same industry, also pointing to production complementarities between the United States and third-country locations.

When focusing on heterogeneity in terms of MNE origin country, we find that Chinese MNEs responded particularly sensitively to U.S. and Chinese punitive tariffs and significantly adjusted their sales and affiliate network in third countries. U.S. and European headquartered MNEs also responded in terms of reshuffling their third-country sales but did not adjust their global affiliate network.

Turning to cross-country heterogeneity, we find that the trade war had overall negative effects on manufacturing activity in third countries in Asia and North America, while the net effect was close to zero in Europe and positive in the rest of the world. Across industries, the effects of the trade war also varied systematically with firms' position in the global value chain. Downstream industries in third countries were most sensitive to trade-war tariffs, but trade-war tariffs implied larger tariff hikes for more upstream industries. On net, third-country effects were negative in moderately downstream industries, whereas the most downstream and the most upstream industries were both net beneficiaries.

Related Literature This paper relates to a growing literature on the effects of trade policy on the geography of production, with a particular focus on the U.S.–China trade war. A first body of work documents direct effects within the U.S. and China. Fajgelbaum et al. (2020) establish near-complete pass-through of U.S. tariffs to U.S. importers, and Flaaen and Pierce (2024) show that

rising input costs depressed local U.S. manufacturing employment. Handley et al. (2024, 2025) find that firms reliant on protected intermediates suffered weaker export growth, while Bown et al. (forthcoming) document downstream employment losses from upstream protection and Freund et al. (2024) note that the countries displacing China in U.S. imports remain deeply embedded in Chinese supply networks. On the Chinese side, Jiang et al. (2023) and Sheng et al. (2025) show that exporters rerouted shipments toward non-U.S. destinations. Garred and Yuan (2025) provide complementary firm-level evidence from listed Chinese firms. We move outside this bilateral focus and study the spillovers of the trade war on third countries, specifically differentiating between input and output effects of tariffs.

Most closely related, a growing literature studies the third-country effects of the U.S.–China trade war. Fajgelbaum et al. (2024) provide evidence of global reallocation in trade data, identifying clear winners and losers. Cavalcanti et al. (2026) find that Brazilian regions more exposed to Chinese retaliatory tariffs on U.S. exports experienced increases in formal employment and wage bills, while U.S. tariffs on Chinese exports had no significant effect. Utar et al. (2025) show that Mexico's response is driven primarily by multinational enterprises. Graziano et al. (2024) study the effect of U.S. tariffs on Chinese MNE activity in third countries and Conteduca et al. (2026) use firm-level data for Italy to document that multinationals adjust mainly along the intensive margin, scaling existing foreign affiliates rather than opening new ones. This highlights intra-firm reallocation as a central adjustment mechanism. We build on these insights by studying the global response of local economic activity to the trade war using granular data at the establishment level. This allows us to measure the global third-country effects of the trade war and to track how much of the worldwide reorganization of economic activity is driven by MNEs in contrast to local firms.

A third literature studies the interaction between trade policy and global value chains more broadly. Blanchard et al. (2026) and Antràs et al. (2022) characterize optimal tariffs when firms rely on imported intermediates, and Antràs and De Gortari (2020) formalize location-choice elasticities along value chains. Empirically, Flaaen et al. (2020) document sourcing reallocation following the washing-machine safeguards, and Conconi et al. (2018) show that NAFTA's rules of origin shifted Mexican sourcing away from third countries toward the U.S. and Canada. Barattieri and Cacciatore (2023) identify downstream losses of upstream protectionism due to increased input costs; Bown et al. (forthcoming) document this mechanism in the context of the trade war. Shen (2026) studies the impact of the U.S.–China trade war on global value chain reorganization within a general equilibrium framework. GVC routes used by major exporters to serve the U.S. market have increasingly shifted away from China, with China–Mexico–U.S. and China–Vietnam–U.S. links becoming more prominent. Our empirical design allows us to trace such reallocation responses to a single, large policy shock simultaneously across many economies and industries.

Finally, our paper builds on work showing the importance of firms for the propagation of local shocks through production networks. Giroud and Mueller (2019) show that shocks at one establishment affect the rest of the firm; Barrot and Sauvagnat (2016) establish cross-firm propagation through buyer–supplier linkages; and Boehm et al. (2019) demonstrate that multinationals transmit local shocks across borders. We apply this logic to a major trade-policy event and document spillovers across many third countries simultaneously, driven primarily by MNEs that reorganize their production activities.

We describe the institutional context and our data sources in Section 2. Section 3 discusses our results. Finally, Section 4 concludes.

2 The U.S.–China Trade War: Data and Measurement

This section provides background information on the U.S.–China trade war and describes the data and measurement approach that we use in the empirical analyses.

2.1 Background

The U.S.–China trade war emerged from a series of escalating trade-policy actions beginning in early 2018, marking an abrupt departure from the United States' historical leadership in integrating global markets. The U.S. government first imposed safeguard tariffs under Section 201, targeting solar panels and washing machines to protect domestic producers from import competition. This was followed by Section 232 tariffs on steel and aluminum, justified on national security grounds. These initial actions were global in scope, affecting many trading partners and triggering broad retaliation, including from China (Fajgelbaum et al., 2020). In parallel, the U.S. Trade Representative had launched a Section 301 investigation into China's technology transfer and intellectual property practices in August 2017, laying the groundwork for a more targeted bilateral confrontation. Starting in mid-2018, the U.S. imposed several waves of China-specific punitive tariffs based on the Section 301 findings. The initial tariff lists were concentrated on advanced manufacturing and high-tech products central to China's industrial upgrading agenda "Made in China 2025" (Ju et al., 2024; Feng et al., 2025), consistent with both technology-competition and supply-chain-relocation motives.

China responded with retaliatory tariffs targeting politically sensitive and highly substitutable U.S. exports, particularly soybeans, pork, and automobiles, while sparing critical imports such as aircraft and aerospace components that were hard to substitute. As tariff rates and product coverage expanded throughout 2018-2019, the vast majority of bilateral trade became subject

to elevated duties. The resulting tariff escalations vary substantially across sectors and set the stage for our empirical examination of how import sourcing and local production across industries responded during the trade war.

2.2 Measuring Trade Protection During the Trade War

Our sample covers the top 50 countries in terms of purchasing-power-parity (PPP)-adjusted real 2018 GDP (including the U.S. and China) and we study the first phase of the trade war, from 2018 to 2022, focusing on trade in manufacturing goods. To study the third-country effects of the trade war, we construct a coherent panel of tariff data.

Since standard databases such as the World Integrated Trade Solution (WITS) track tariffs under normal trade relations, these do not cover additional duties imposed bilaterally on top of most favored nation (MFN) rates, such as Section 301 duties. Therefore, we start from hand-collected product-level tariff information, obtained from primary legal sources, to track all U.S. and Chinese policy changes during the trade war.

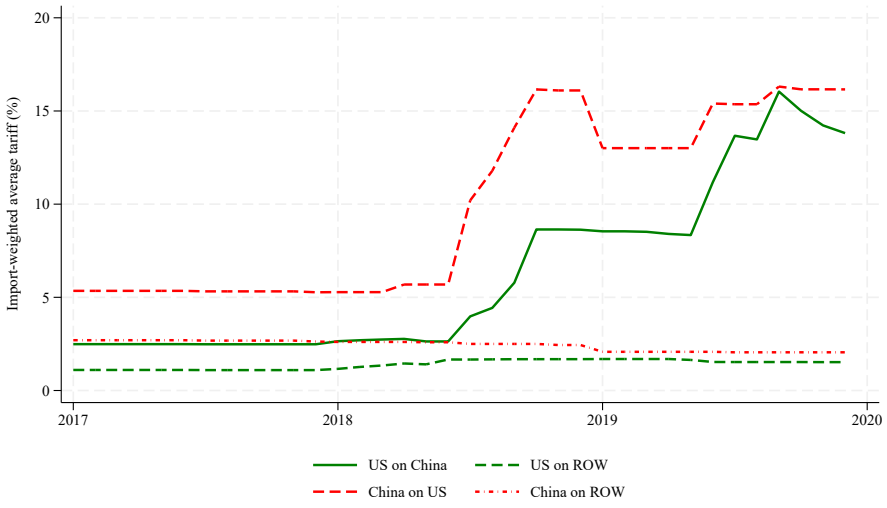
For the U.S. import tariffs, we obtain punitive tariffs imposed on goods imported from China and other countries based on announcements by the United States Trade Representative (USTR), and enrich these punitive tariffs by taking into account tariff exemptions. These data are available at the country-product level, where products are measured at the 10-digit Harmonized System (HS) level. Chinese retaliatory tariffs imposed on U.S. goods and their exemptions are collected based on official documents released by the Ministry of Finance of China. These are available at the 8-digit HS product level. For China, we additionally hand-collect MFN rates and preferential tariffs under Free Trade Agreements (FTAs) from the General Administration of Customs of China, both available at the country-HS-8-digit-product level (Feng et al., 2025). Finally, we add tariffs imposed by third countries from WITS and use them as controls.

To map the tariff datasets to a harmonized reporter-partner-industry-level panel, the tariffs are merged and aggregated first to an annual 6-digit HS product-level panel. Finally, to aggregate tariff data from the 6-digit HS product-level to the 4-digit SIC industry-level, we construct a dynamic crosswalk, taking into account the changing product definitions across nomenclatures based on Pierce and Schott (2012).[2]

Figure 1 plots the dynamics of the U.S. and Chinese tariffs imposed on each other and on third countries. The U.S. import-weighted tariffs on Chinese goods rose rapidly from 2.7% in January 2018 to 13.8% by December 2019 (solid green line). Over the same period, China's tariffs on U.S. goods increased from 5.3% to 16.2% (dashed red line). While both countries sharply increased

[2]See Appendix A for details.

Figure 1: Chinese and U.S. Tariffs During the Trade War



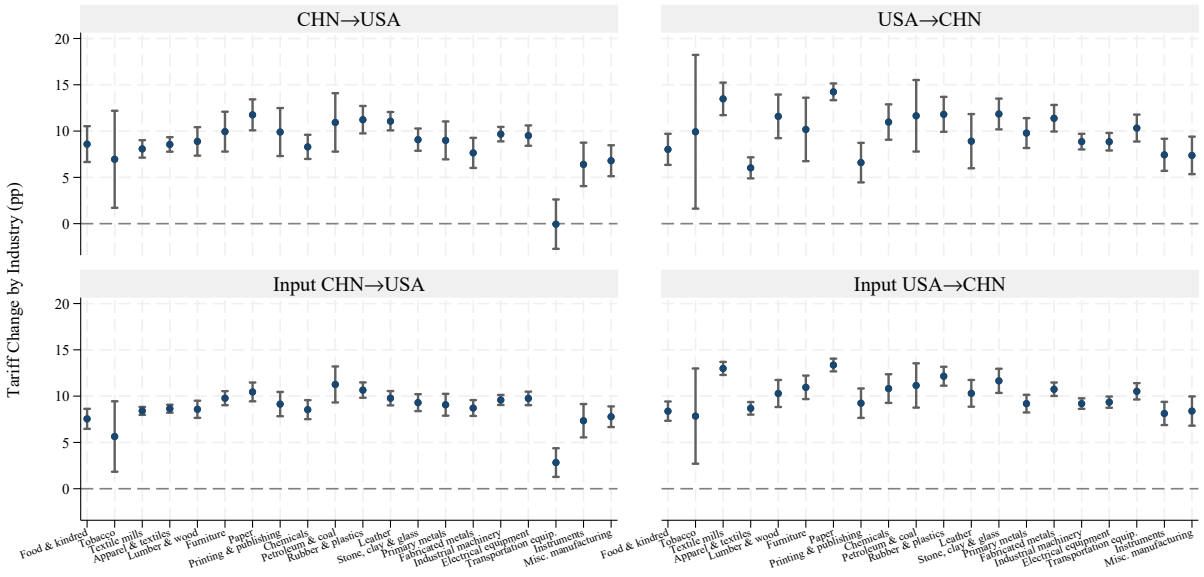
Notes: The figure presents the import-weighted average Chinese tariff rates on U.S. products (dashed red line) and the rest of the world (dash-dotted red line), as well as U.S. tariffs on Chinese products (solid green line) and the rest of the world (dashed green line). Chinese tariffs are weighted by China's country-HS-8-product-level imports in 2017. U.S. tariffs are weighted by the U.S. country-HS-10-product-level imports in 2017.

tariffs on each other, they adopted opposing strategies toward imports from third countries. The U.S. slightly increased tariffs on other countries. U.S. import-weighted tariffs on third countries edged up from 1.2% to 1.5% over 2018–2019, largely reflecting the implementation of Section 201 tariffs on solar panels and washing machines and Section 232 measures on steel and aluminum (dotted green line). China reduced MFN and preferential tariffs beginning in July 2018, in particular for consumer goods, automobiles, and information-technology products, and expanded tariff cuts under various free trade agreements. Consequently, China's tariffs on third countries decreased from 2.6% to 2.1% over that period (dash-dotted red line). This variation forms the basis of our empirical identification of the tariff effects on production location choices.

Throughout our analysis, we distinguish between trade protection targeting an industry's own output and trade protection targeting the inputs used by that industry. Specifically, we define as *output tariffs* the tariffs imposed on direct imports of goods produced within the same industry i. By contrast, we define as *input tariffs* the tariffs imposed on imported inputs used in the production of output in industry i.

Output tariffs are measured as $\ln(1+\tau_{rpit})$, where τ_{rpit} denotes the ad valorem tariff rate, expressed in percent, that importer (reporter) country r levies on exports from partner country p in industry i at time t. Analogously, we construct input tariffs for industry i imposed by reporter country r

Figure 2: Chinese and U.S. Tariff Changes During the Trade War



Notes: The figure presents box plots of the percentage-point tariff increases imposed by the U.S. and China on each other during the trade war. Tariff changes are grouped by broad SIC manufacturing industries. *CHN→USA*: China's tariffs on the U.S., *USA→CHN*: U.S. tariffs on China, *Input CHN→USA*: China's tariffs on U.S. inputs, *Input USA→CHN*: U.S. tariffs on Chinese inputs.

on exports from country p as $\ln\left(1+\sum_j t_{ji}\tau_{rpjt}\right)$. Here, t_{ji} denotes the total-requirement share of inputs from industry j used in industry i. We compute these total requirements using the 1992 Supply-Use Table from the U.S. Bureau of Economic Analysis.

The key identifying variation we exploit to study the effects of the trade war on third countries arises from differential changes in the tariffs that the U.S. and China impose on one another. Figure 2 plots the growth in input and output tariffs across SIC manufacturing groups and highlights the main sources of variation used in our empirical analysis. First, tariff increases vary substantially across industries, both across broad SIC groups and across 4-digit SIC industries within those groups. Second, there is meaningful variation between the tariffs imposed by China on the U.S. and those imposed by the U.S. on China. Third, although changes in output and input tariffs are correlated, they are not identical. Because input tariffs are constructed as weighted averages of tariff rates across supplying industries, heterogeneity in input tariffs across output industries is less pronounced than heterogeneity in output tariffs.

2.3 Granular Establishment-Level Data

Our source for measuring local economic activity at the establishment level is Dun & Bradstreet's WorldBase database. This dataset contains information on millions of public and private firms across all industries in more than 200 countries. We restrict the sample to 4-digit SIC manufacturing industries in the 50 largest economies by real GDP in 2018. For each plant, WorldBase reports information on location, industry affiliation, employment, and sales.

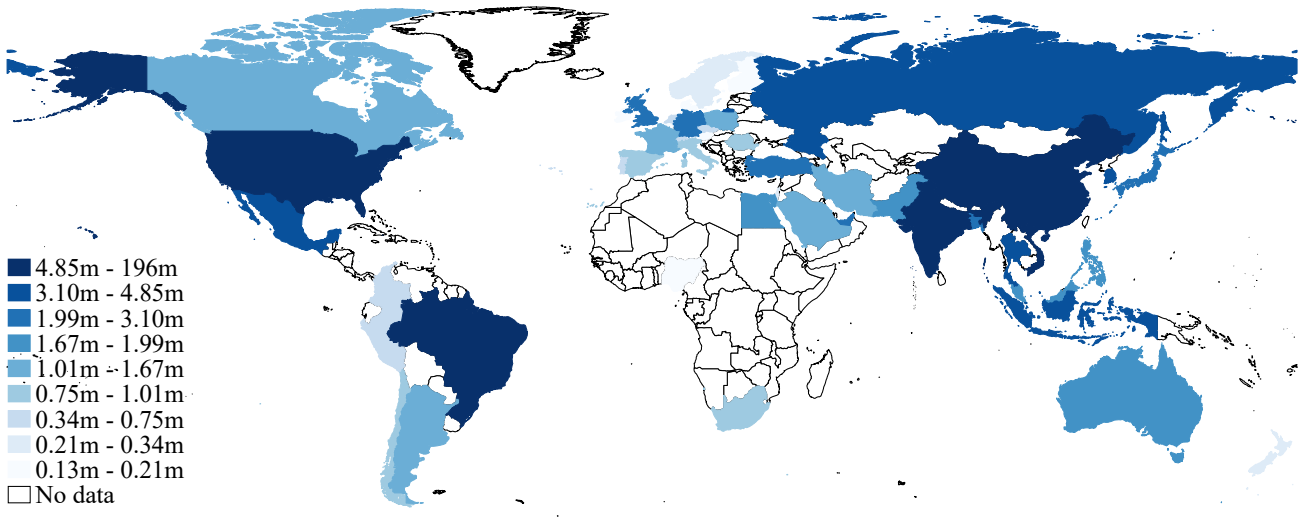
Using two vintages of WorldBase, one for 2018 and one for 2022, allows us to assess the global impact of the U.S.–China trade war on firms. Relative to other firm-level datasets, WorldBase offers three main advantages for our analysis. First, because it draws on official firm registries supplemented by additional sources, its coverage is exceptionally broad and, for many countries, close to the universe of firms. Second, WorldBase provides detailed information on firms' ownership structure. In particular, information on both the domestic headquarters and the firm's ultimate global headquarters allows us to identify plants belonging to multinational enterprises (MNEs). Third, the detailed information in WorldBase on each plant's production activities allows us to identify its vertical position within MNEs' global value chains.

While we do not have an additional WorldBase vintage for the pre-trade-war sample period, we can use our 2018 vintage together with information on the age of each plant to backdate the establishment-level data to 2014. We can then construct artificial 2014 sales of each country-industry-firm-type-cell (e.g., sales of all MNE plants in an industry and country) by adding the 2018 sales of all plants established up to 2014 in a given cell. Since these data suffer from measurement error because we use 2018 sales and employment to compute 2014 sales for a given cell and attrition because we do not observe plants that exited before 2018, we use the 2014 data only for robustness checks.

Figure 3 maps total employment in the 2018 WorldBase vintage for the countries in our sample. The aggregated figures are highly comparable to official statistics. Brazil, China, India, and the United States are the countries with the highest level of employment and the largest number of establishments.

Table 1 reports selected summary statistics for country-industry-level aggregates (upper panel) and individual establishments (lower panel) in our regression data based on WorldBase. After balancing, the 2018 vintage contains about 7.7 million establishments, while the 2022 vintage includes around 10.8 million. In 2018, the average country-industry-cell contains 338 establishments, employs around 14,000 workers and has sales of 1.3 billion USD. The size distribution of establishments is highly skewed. For example, mean sales exceed sales at the 90th percentile of the establishment-size distribution. The distribution is less skewed in terms of employment. Roughly

Figure 3: Local Employment Across Economies



Notes: The figure maps country-level employment levels using the 2018 vintage of WorldBase.

6% of establishments belong to multinational enterprises (MNEs). This share rises to 11% when the data are aggregated to the country-industry level.

For each MNE, we observe where and when affiliate establishments are created. Table 2 reports the ownership composition of linkages between MNEs and their affiliates. We distinguish here between affiliates located in the U.S., affiliates located in China, or affiliates located in third countries and report how the number of those affiliates changed for Chinese, U.S., European or other MNEs. Within each column, the entries give the share of all MNE linkages to affiliates in that location, such that a column describes how ownership of affiliate networks in a given host market is distributed in 2018 or in 2022. In both directly affected economies, the composition of affiliates shifted toward domestic ownership. This is particularly the case for Chinese MNEs that expanded activities in China as the share of linkages in China held by Chinese MNEs rose from 50.6% to 66.8%, while the shares held by U.S., European and other foreign MNEs all declined. The same pattern appeared in the U.S. but to a smaller extent. The U.S. share of linkages held by U.S. MNEs rose from 77.7% to 79.5%. Chinese MNEs also gained in third countries, where their share rose from 0.9% to 1.5%. This increase is large in relative terms but remains small in levels. MNE affiliate networks in third-country markets continue to be dominated by U.S., European and other MNEs. Relative to MNEs from all other regions, we observe that European MNEs lost share in every host region.

Table 1: Summary Statistics on Establishment Data from WorldBase

Panel A. Country-industry statistics						
Variable	Observations	Mean	Std. dev.	10th pct.	Median	90th pct.
2018						
# establishments	22,950	338	2,114	0	14	441
employment	22,950	13,897	123,920	0	519	12,694
sales (million USD)	22,950	1,338	7,108	0	66	2,423
share of MNEs	22,950	0.11	0.19	0	0.01	0.38
2022						
# establishments	22,950	469	3,777	0	7	379
employment	22,950	18,278	151,444	0	347	16,545
sales (million USD)	22,950	1,789	11,295	0	34	2,804
share of MNEs	22,950	0.11	0.20	0.00	0.00	0.40
Panel B. Establishment statistics						
Variable	Observations	Mean	Std. dev.	10th pct.	Median	90th pct.
2018						
employment	7,748,016	50	2,911	0	14	71
sales (million USD)	7,748,016	8.7	431.2	0.0	0.7	5.4
MNE establishment	7,748,016	0.06				
2022						
employment	10,758,714	43	676	0	17	50
sales (million USD)	10,758,714	14.3	11,894	0.0	1.3	5.2
MNE establishment	10,758,714	0.04				

Notes: Statistics refer to the estimation sample of manufacturing establishments across the 50 largest countries.

2.4 Measuring the Position of Industries in Global Value Chains

We position each 4-digit SIC industry in GVCs based on its average distance from final demand (upstreamness), following Antràs et al. (2012) and using the 1992 U.S. IO table.[3]

Antràs et al. (2012) show that the upstreamness of an industry j is the unique solution to the following recurrence relation:

$$U_j = 1 + \sum_i b_{ji} U_i, \tag{1}$$

where b_{ji} is the allocation coefficient of industry i's use by industry j. Intuitively, each industry can be considered to be one stage more upstream than the weighted mean of upstreamness across all industries that purchase inputs from it, with allocation coefficients b_{ji} being the weights. Figure 4 shows the distribution of the upstreamness index across all manufacturing SIC industries.

Figure 5 summarizes the changes in U.S.–China tariffs during the trade-war period across industries grouped into quartiles of upstreamness. For both input and output tariffs, increases were larger in

[3]There are additional indices, such as downstreamness (Fally, 2012) or measures related to value-added accounting. For simplicity, we focus on upstreamness measures.

Table 2: Share of Linkages by MNE Headquarters 2018-2022

	Affiliates in the U.S.			Affiliates in China			Affiliates in ROW		
	2018	2022	% Δ	2018	2022	% Δ	2018	2022	% Δ
Chinese MNEs	0.73	0.81	11.16	50.59	66.79	32.03	0.88	1.51	72.22
U.S. MNEs	77.65	79.46	2.33	9.71	8.44	-13.10	16.68	17.53	5.11
European MNEs	8.91	8.67	-2.65	7.18	5.09	-29.04	25.70	23.16	-9.90
Other MNEs	12.71	11.05	-13.03	32.52	19.67	-39.50	56.75	57.80	1.87

Notes: The table reports the composition of MNE linkages in the 2018 and 2022 WorldBase vintages, measured at the country-pair–industry level and expressed in %. Columns are grouped by the country of the affiliate: the U.S., China, and all other host countries. Within each block, entries give the share of all linkages accounted for by each headquarters group, where a group is defined by the location of the global ultimate owner: Chinese, U.S., European, and Other.

more upstream industries and more limited in more downstream sectors. Our empirical analysis accounts explicitly for this important source of heterogeneity along the supply chain.

2.5 Trade Data

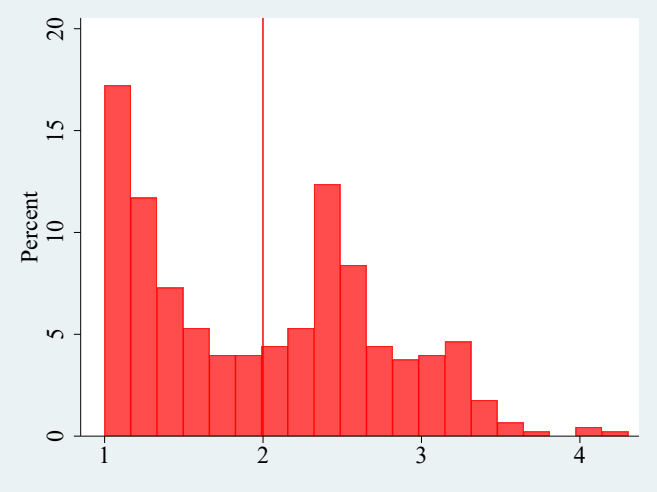
To assess the impact of the trade war not only on third-country establishment outcomes but also on third-country exports, we complement our granular establishment-level data with product-level trade data sourced from UN Comtrade. For comparability, we use bilateral manufacturing export values for the 50 countries in the WorldBase sample at the 4-digit SIC industry level.

3 Third-Country Effects of the U.S.–China Trade War and GVCs

3.1 Third-Country Effects on Industry Economic Activity

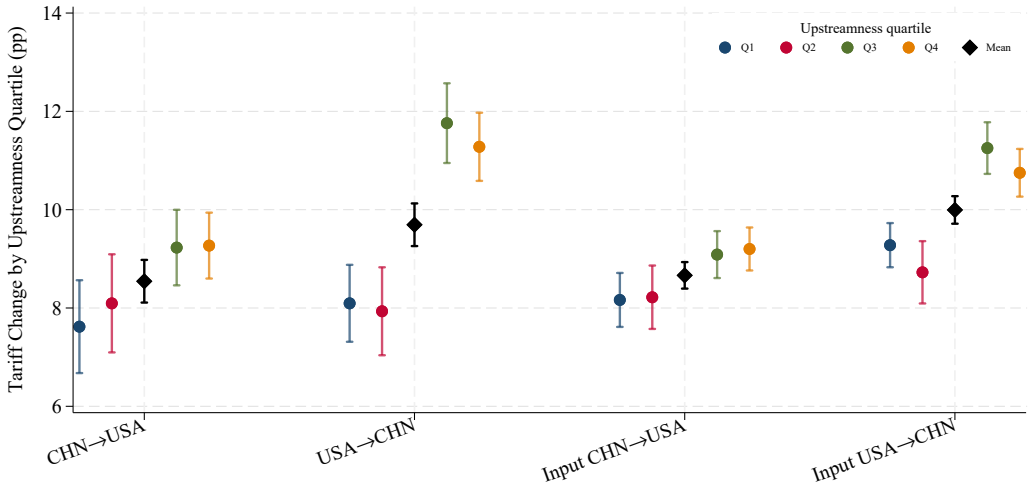
In this section, we assess the third-country effects of the U.S.–China trade war by examining its impact on industry-level economic activity in third countries. We estimate the effects of U.S. and Chinese output and input tariffs on manufacturing sales, employment, and establishment counts at the 4-digit industry level. To do so, we leverage our establishment-level data to distinguish between the activity of multinational affiliates and that of domestically owned plants.

Figure 4: Upstreamness Across Industries



Notes: The figures presents the distribution of the upstreamness index from equation (1) across SIC industries.

Figure 5: Chinese and U.S. Tariffs During the Trade War by Upstreamness Quartiles



Notes: The figure presents the average trade-war changes in input and output tariffs between China and the U.S. across SIC industries grouped into quartiles of upstreamness.

Theoretical Channels Our empirical analysis is guided by a set of theoretical hypotheses regarding the effects of discriminatory U.S. and Chinese tariffs—on both outputs and inputs—on production activity in third countries. The direction of these effects depends on whether third-country production is a substitute for, or a complement to production in the U.S. and China. Substitutability arises when third-country producers supply goods that compete with U.S. or Chinese output, such that contractions in U.S. or Chinese production create opportunities for

third-country producers to expand. Complementarity arises when third-country producers supply goods that are linked to production in China or the U.S.—for example through production linkages, demand linkages, or co-location—so that contractions in Chinese or U.S. activity spill over to producers in third countries. By symmetry, the same mechanisms apply in both directions of the trade war. For brevity, however, we discuss each channel from the perspective of U.S. tariffs on China.

We begin by discussing the potential effects of a U.S. *output* tariff on Chinese goods on economic activity in third countries. First, because third countries face lower U.S. tariffs than China, producers in third countries may expand their exports to the U.S. by replacing Chinese supply when their goods are substitutes for Chinese goods (*trade diversion*). This may occur in part through Chinese MNEs relocating activity to third countries and using them as export platforms.

Second, U.S. tariffs may depress economic activity in third countries by deflecting Chinese exports away from the U.S. market and toward third-country markets (*trade deflection*), where they compete more harshly with local production.

Third, when production in third countries complements Chinese production, a trade-war-induced contraction in Chinese economic activity also reduces economic activity in third countries (*output complementarity*).

We now discuss the possible effects of a U.S. *input* tariff on Chinese goods on economic activity in third countries. First, a U.S. tariff on inputs imported from China raises production costs for U.S. firms (*competitiveness loss*). When third-country production is a substitute for U.S. production, this shifts economic activity toward producers in third countries. By contrast, when third-country production is complementary to U.S. production, the resulting contraction in U.S. activity also reduces economic activity in third countries.

Second, increasing returns to scale may weaken or even offset the loss in U.S. competitiveness caused by an input tariff (*domestic scale effect*). If the tariff raises the scale and productivity of U.S. suppliers, it can reduce input costs for U.S. downstream producers. Under substitutability, this lowers economic activity in third countries; under complementarity, it increases output in third countries.

Third, increasing returns to scale among Chinese input suppliers may also shape the effects of a U.S. tariff on inputs from China (*foreign scale effect*). If the tariff-induced contraction in Chinese input production raises the price of Chinese inputs, production costs for third-country firms will also increase, thereby reducing economic activity in third countries. Table 3 summarizes the theoretical channels.

Table 3: Theoretical Channels of Input and Output Tariffs on Third Countries

Channel	Description of the mechanism	Effect on third countries	
		Substitutes	Complements
Panel A. Output tariff			
Trade diversion	Third countries (Vietnam) replace trade-war partner (China)	↑	
Trade deflection	Trade-war partner (U.S.) redirects to third markets (EU)	↓	
Output complementarity	Third countries contract with trade-war partner		↓
Panel B. Input tariff			
Competitiveness loss	Higher trade-war reporter input costs lower its output	↑	↓
Domestic scale effect	IRS gains of trade-war reporter suppliers lowers costs	↓	↑
Foreign scale effect	IRS loss of trade-war opponent suppliers raises third-country input costs	↓	↓

Notes: The table summarizes possible implications of input and output tariffs on economic activity in third countries.

Empirical Specification To identify third-country effects of the U.S.–China trade war, we exclude the U.S. and China from the sample used in our industry-level regressions and focus on the remaining 48 countries. Our analysis is conducted at the 4-digit manufacturing-industry level. As outcomes, we consider log sales, log employment, and the log number of establishments in country r and period t, where $t \in \{2018, 2022\}$. We estimate the model separately for three samples: affiliates of multinational enterprises (MNEs), plants that are not affiliated with an MNE (domestic firms), and all plants. Accordingly, for each sample, we aggregate sales and employment to the country-industry level and also use the total number of establishments at that level as an outcome.

Our regressors of interest are changes in tariffs in industry s between 2018 and 2022 (denoted by Δ). These include China's output tariff on imports from the U.S. ($\Delta\tau_{\text{CHN,USA},s}$); changes in the U.S. output tariff on imports from China ($\Delta\tau_{\text{USA,CHN},s}$); changes in China's input tariff on inputs imported from the U.S. ($\Delta\tau^{I}_{\text{CHN,USA},s}$); and changes in the U.S. input tariff on inputs sourced from China ($\Delta\tau^{I}_{\text{USA,CHN},s}$). We additionally control for changes in Chinese and U.S. output and input tariffs vis-à-vis the rest of the world ($\Delta\tau_{\text{CHN,ROW},s}$, $\Delta\tau_{\text{USA,ROW},s}$, $\Delta\tau^{I}_{\text{CHN,ROW},s}$, $\Delta\tau^{I}_{\text{USA,ROW},s}$), and also include China's and the U.S.'s bilateral output and input tariffs vis-à-vis the considered reporter country r ($\Delta\tau_{\text{CHN},r,s}$, $\Delta\tau_{\text{USA},r,s}$, $\Delta\tau^{I}_{\text{CHN},r,s}$, $\Delta\tau^{I}_{\text{USA},r,s}$). All tariffs enter in log form as $\Delta \ln(1+\text{tariff})$, where tariff levels are measured in percent, so that the coefficients can be interpreted as elasticities.

We estimate specifications in long differences between 2018 and 2022, so that any unobserved variation at the country-by-industry level is implicitly eliminated. Standard errors are clustered at the industry level. Accordingly, we estimate the following baseline specification:

$$\Delta Y_{rs} = \alpha + \beta_1 \Delta \tau_{\text{CHN,USA},s} + \beta_2 \Delta \tau_{\text{USA,CHN},s} + \beta_3 \Delta \tau^I_{\text{CHN,USA},s} + \beta_4 \Delta \tau^I_{\text{USA,CHN},s} + X'_{rs}\gamma + \Delta \epsilon_{rs}, \quad (2)$$

where ΔY_{rs} is the 2018-2022 change in outcome Y for industry s located in reporter country r. The vector X_{rs} denotes our tariff controls, covering changes in Chinese and U.S. output and input tariffs vis-à-vis the rest of the world and U.S. and Chinese tariff changes vis-à-vis the considered reporter country r.

Results The results are reported in Table 4. Columns (1)-(3) report sales as the outcome, columns (4)-(6) employment, and columns (7)-(9) the number of establishments. In terms of the sample, columns (1), (4) and (7) focus on affiliates of MNEs, columns (2), (5) and (8) on domestic plants only, and columns (3), (6) and (9) include all plants in the industry.

We begin with the effects on third-country sales. For MNEs, the effects of the trade war are economically sizable and statistically significant. Multinationals reduced their sales in third countries in response to China's tariffs on the U.S. By contrast, they strongly increased third-country sales in response to U.S. tariffs on China. In addition, China's tariffs on inputs sourced from the U.S. had a positive effect on MNE sales in third countries. Conversely, U.S. tariffs on inputs from China reduced the third-country sales of MNEs.

When we restrict the sample to domestic plants only (column (2)), we find no significant effects of the trade war on sales. The results for all plants in the industry (column (3)) mostly preserve the signs of the coefficients estimated for MNEs, but the magnitudes are much smaller, and the estimates are not statistically significant. Taken together, these findings suggest that MNEs were the firms most responsive to the trade war and that aggregate industry-level data mask substantial heterogeneity in firms' responses.

We next consider the effects of the trade war on third-country industry employment. For MNEs (column (4)), the effects are less pronounced than for sales and not statistically significant. China's tariffs on the U.S. reduced employment in third countries. By contrast, although U.S. tariffs on China increased third-country sales of MNEs, they did not have any effect on employment. China's tariffs on U.S. inputs also raised third-country employment among MNEs, whereas U.S. tariffs on Chinese inputs had no significant effect.

For domestic plants (column (5)), the estimated effects are close to zero and not statistically significant. Finally, when all plants in the industry are included in column (6), we again find a positive but statistically insignificant effect of U.S. tariffs on third-country employment and negative effects of U.S. input tariffs on China. Overall, the employment effects of the trade war

on third countries resemble those for sales, although they are smaller in magnitude and estimated less precisely.

Finally, we turn to the effects of the trade war on the number of establishments in third countries. Once again, the estimated effects are qualitatively similar to those for sales and employment, but they are smaller in magnitude and statistically insignificant. In this case, neither MNEs nor domestic firms showed a significant response. This suggests that multinationals primarily used their existing affiliate networks to reallocate production across locations in order to mitigate the negative effects of the trade war, rather than adjusting extensively along the entry margin. Domestic firms, by contrast, appear to have been much less responsive.

As a robustness check, we include the artificial data for 2014 as an additional sample year in Appendix Table B.2. In this way, we estimate specification (2) using two stacked long differences (one for the pre-trade-war period 2014-2018 and one for the trade-war period 2018-2022). We employ a diff-in-diff style specification with continuous treatment intensity that controls for industry-specific trends. Specifically, starting from specification (2), we interact trade-war-period (2018-2022) tariff changes with a trade-war dummy and include 4-digit SIC and period fixed effects, so that bilateral China-U.S. tariff coefficients are measured as deviations from their pre-trade-war (2014-2018) baseline, which is absorbed by the fixed effects. The upper panel reports results for sales, the middle panel for employment and the lower panel for the number of plants. Results remain in line with the baseline results: sales effects are significant only for MNEs, Chinese output tariffs reduced their sales in third countries, while U.S. output tariffs increased them. For input tariffs, the effects are the opposite. While U.S. trade-war tariff changes are highly statistically significant, Chinese trade-war tariff changes are estimated less precisely.[4]

Discussion The positive effect of U.S. tariffs on China on third-country economic activity within the same industry is consistent with trade diversion and aligns with evidence in the literature showing that firms relocated production from China to third countries in order to avoid trade-war tariffs (Utar et al., 2025).

[4]In Appendix Table B.1, we examine the effects of the trade war on industry-level outcomes in China and the U.S. The regression specifications are again based on (2), and we estimate the model separately for China and for the U.S. using the 2018-2022 sample. Because trade-war tariffs are less plausibly exogenous for these two countries, we do not interpret these regressions causally. Nevertheless, they provide useful descriptive evidence on how the trade war affected economic activity in the two directly exposed economies. We find that China's tariffs on the U.S. had positive effects on local sales, employment, and establishment growth in China, with the effects on entry being most significant for MNEs and the effects on sales being most significant for domestic establishments. By contrast, China's tariffs on inputs sourced from the U.S. had strongly negative effects on local economic activity in China, particularly on the sales of domestic establishments. U.S. tariffs on imports from China had positive effects on MNEs' sales and establishment growth in the U.S., but no significant effect on employment growth. By contrast, U.S. tariffs on inputs sourced from China tended to have negative effects on local economic activity in the U.S.

By contrast, the negative effect of China's tariffs on the U.S. on third-country economic activity within the same industry is consistent either with trade deflection of U.S. exports toward third markets or with demand complementarity between U.S. products and third-country products within the same industry.

Turning to input tariffs, the strongly positive effect of China's tariffs on U.S. inputs on third-country economic activity is consistent with the view that discriminatory input tariffs reduced the competitiveness of Chinese producers, thereby increasing demand for substitutes from third countries and stimulating local economic activity. This effect was particularly pronounced for multinational affiliates, suggesting that multinationals reliant on U.S. inputs shifted economic activity away from China and toward third countries.[5]

Finally, the strongly negative effect of U.S. tariffs on Chinese inputs is consistent with the idea that these tariffs reduced the competitiveness of U.S. producers, while at the same time lowering demand for third-country products because of demand complementarities. Alternatively, the result is also consistent with a mechanism in which Chinese upstream industries operate under increasing returns and became less competitive in response to U.S. tariffs. If third-country industries also depend on Chinese inputs, their production costs rose, reducing their economic activity.[6]

Quantification Figure 6 presents the predicted third-country effects of the trade war on sales, employment, and establishment growth, evaluated at the mean changes in Chinese and U.S. output and input tariffs across industries, and shown with 90% confidence intervals.

The estimated total effect of the trade war on third-country sales growth is negative for multinationals, domestic firms, and the full sample of firms—around -0.1—but not statistically significant (see Figure 6). This imprecisely estimated negative effect reflects the opposing forces of Chinese and U.S. output and input tariffs. For the average industry, third-country output-tariff increases and input-tariff increases were both substantial, but their effects tended to offset one another. The combined effect is similar for multinational and domestic plants, even though MNE affiliates are much more responsive to the individual components of third-country tariff changes than domestic plants. Finally, the estimated effects of the trade war on third-country employment and establishment growth are close to zero. This result also holds when multinational and domestic plants are considered separately. Overall, for the average third-country industry, the trade war had at most a mildly negative net effect, as the heterogeneous effects of Chinese and U.S. output and input tariffs largely offset one another.

[5]This interpretation is also consistent with the large negative estimated effects of Chinese input tariffs on MNE entry and sales in China.

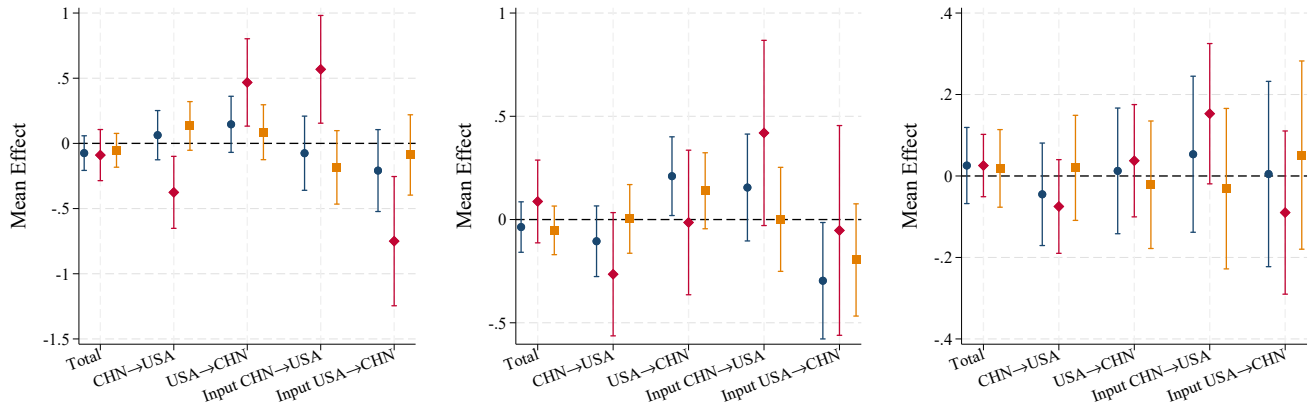
[6]Both channels are consistent with the negative coefficients on U.S. tariffs on Chinese inputs for both U.S. and Chinese industries.

Table 4: Effects of the Trade War on Third-Country Industries

	Sales			Employment			Establishments		
	MNEs	Domestic	All	MNEs	Domestic	All	MNEs	Domestic	All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Δ China's tariff on U.S.	-5.11*	1.81	0.85	-3.60	0.04	-1.42	-1.02	0.27	-0.61
	(2.96)	(1.73)	(1.67)	(2.52)	(1.76)	(1.81)	(0.91)	(1.25)	(1.17)
Δ U.S. tariff on China	5.39**	0.99	1.69	-0.16	1.61	2.43	0.43	-0.25	0.14
	(2.46)	(1.56)	(1.48)	(2.20)	(1.40)	(1.50)	(0.87)	(1.08)	(1.05)
Δ China's input tariff on U.S.	7.55*	-2.44	-1.00	5.56	0.01	2.06	2.03	-0.41	0.71
	(4.20)	(2.54)	(2.41)	(3.57)	(2.55)	(2.64)	(1.36)	(1.83)	(1.72)
Δ U.S. input tariff on China	-8.48**	-1.00	-2.35	-0.60	-2.21	-3.34	-1.01	0.58	0.05
	(3.50)	(2.27)	(2.15)	(3.16)	(2.00)	(2.15)	(1.27)	(1.53)	(1.51)
Observations	6,540	11,964	12,201	6625	11,973	12,201	7,956	12,304	12,572
Clusters	410	411	411	408	411	411	410	411	411
Long difference	×	×	×	×	×	×	×	×	×
Tariff controls	×	×	×	×	×	×	×	×	×

Notes: The table reports estimates of the effects of the U.S.–China trade war on outcomes in 4-digit manufacturing industries in third countries. Panel A reports results for log sales, panel B for log employment, and panel C for the log number of establishments. The dependent variables are constructed by aggregating plant-level outcomes to the industry level. The aggregation is carried out separately for MNE affiliates, domestic plants, and all plants. All specifications are estimated in long differences between 2018 and 2022. The controls include China's and the U.S. output and input tariffs vis-à-vis third countries, as well as their bilateral output and input tariffs with the country under consideration (all in long differences). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure 6: Third-Country Predicted Effect of the Trade War



(a) Sales (b) Employment (c) Establishments

Notes: The figure presents predicted third-country effects of the U.S.–China trade war on industry log sales (a), log employment (b), and log establishments (c), evaluated at the mean of trade-war tariff changes. *CHN→USA*: mean impact of China's tariffs on the U.S. *USA→CHN*: mean impact of U.S. tariffs on China. *Input CHN→USA*: mean impact of China's tariffs on U.S. inputs. *Input USA→CHN*: mean impact of U.S. tariffs on Chinese inputs. *Total*: total effect of all trade-war tariff changes. Dependent variables are constructed by aggregating plant-level outcomes to the industry level. The aggregation is carried out separately for all plants (circle markers), MNE affiliates (diamond markers), and domestic plants (square markers). Specifications are estimated in long differences (2018-2022). Controls include China's and the U.S. output and input tariffs vis-à-vis third countries, and bilateral output and input tariffs with the country under consideration. 90% confidence intervals with clustering at the industry level reported.

3.2 Trade Effects

In Table 5, we investigate the impact of the trade war on third-country exports to complement the results on local economic activity. We continue to use specification (2). The outcomes are now either long differences (2018-2022) of 4-digit SIC industry total log exports of third countries to destinations other than China and the U.S. or long differences of log exports to the U.S. or China.

The coefficients on Chinese and U.S. output and input tariffs on export outcomes are consistent with the effects of tariffs on MNE sales, albeit somewhat weaker. This is expected since we observe only aggregate industry exports, not exports by establishment type and we know that only MNE establishments respond significantly to the trade war.

Chinese tariffs on the U.S. reduced third-country exports to China and (weakly) to the U.S. and other countries. This finding is not consistent with substitutability with U.S. exports and trade diversion. Trade diversion would imply increased exports of third countries to China, while trade deflection would imply reduced exports to other destinations. Instead the outcome is more consistent with demand complementarities between U.S. and third-country goods.

U.S. tariffs on China increased third-country exports to the U.S. and to other markets. This is

consistent with trade diversion but not with trade deflection of Chinese exports or complementarity between Chinese and third country goods. Instead, consistent with the impact on MNE sales, it is in line with MNEs reshuffling exports away from China and using third countries as export platforms to export to the U.S. and to other markets.

The positive effect of Chinese tariffs on U.S. inputs on third-country exports, and, in particular, on exports to China is consistent with Chinese input tariffs weakening competitiveness of Chinese producers, substitutability between third-country and Chinese producers and relocation of production destined for the Chinese market to third countries.

By contrast, the negative impact of U.S. input tariffs on Chinese inputs on third-country total exports and exports to the U.S. points to a weakening of U.S. competitiveness and demand complementarity between the U.S. and third-country producers. Moreover, there is no evidence that exports to China were affected, which would be expected if Chinese industries became less competitive due to production losses in local upstream industries.

Table 5: Effects of the Trade War on Third-Country Exports

	(1) Total exports	(2) Exports to U.S.	(3) Exports to China
Δ China's tariff on U.S.	-3.34	-6.41	-9.95**
	(4.08)	(4.57)	(4.54)
Δ U.S. tariff on China	5.59*	7.29**	0.58
	(2.95)	(3.48)	(4.28)
Δ China's input tariff on U.S.	9.06	13.08	17.73**
	(8.00)	(8.58)	(8.11)
Δ U.S. input tariff on China	-7.81*	-8.33	-2.17
	(4.64)	(5.37)	(6.72)
Observations	19,424	19,424	19,424
Clusters	411	411	411
Long difference	×	×	×
Tariff controls	×	×	×

Notes: The table reports estimates of the effects of the U.S.–China trade war on export values in 4-digit manufacturing industries of third countries. Total exports in column (1) excludes exports to China or to the U.S. Column (2) reports exports to the U.S. and column (3) exports to China. All specifications are estimated in long differences between 2018 and 2022. The controls include China's and the U.S. output and input tariffs vis-à-vis third countries, as well as their bilateral output and input tariffs with the country under consideration (in long differences). Standard errors are clustered at the industry level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

3.3 Third-Country Effects of the Trade War on MNEs

Empirical Specification Building on our industry-level result for third-country effects of the trade war, we now zoom in on the local activity of MNEs. Exploiting the granularity of our data, we aggregate affiliate-level sales, employment, and the number of affiliates of each multinational firm to the headquarters-country–affiliate-country–industry level. Our dependent variable is therefore ΔY_{has}, where h denotes the headquarters country, a the affiliate country, and s the industry of the affiliate.

For example, we examine whether affiliate sales in the automobile industry by U.S.-headquartered multinationals change in a given third country in response to a U.S. tariff on China in the automobile industry. Our regression specification follows (2) but differences out a much richer set of unobserved heterogeneity than the industry-level regressions, allowing for cleaner identification. Specifically, we estimate the following regression in long differences between 2018 and 2022:

$$\Delta Y_{has} = \alpha + \beta_1 \Delta\tau_{\text{CHN,USA},s} + \beta_2 \Delta\tau_{\text{USA,CHN},s} + \beta_3 \Delta\tau^{I}_{\text{CHN,USA},s} + \beta_4 \Delta\tau^{I}_{\text{USA,CHN},s} + X'_{as}\boldsymbol{\gamma} + \Delta\epsilon_{has}, \tag{3}$$

where ΔY_{has} is the 2018–2022 change in outcome Y for headquarter country h, affiliate country a, and affiliate industry s. The vector X_{as} contains our tariff controls, covering changes in Chinese and U.S. output and input tariffs vis-à-vis the rest of the world, as well as Chinese and U.S. output and input tariff changes vis-à-vis affiliate country a.

For sales and employment, we use the transformation $\Delta \ln(1+x)$, while for the number of affiliates, we estimate the regression in level changes. We adopt these transformations rather than logs because the extensive margin is important at the granular bilateral level, and we want to retain observations with zero outcomes. Note that by taking long differences, our specification eliminates headquarters-country-by-affiliate-country-by-industry fixed effects ν_{has}, which take care of both unobserved bilateral and affiliate-country-industry-specific variation. We report standard errors clustered at the industry level. We also examine how the effects of the U.S.–China trade war on MNE affiliates in third countries vary with the location of the headquarters. Specifically, we consider four alternative samples: all MNEs, U.S. MNEs, Chinese MNEs, and European MNEs.

Results Table 6 reports the results for these specifications. Panel A presents the results for sales, panel B for employment, and panel C for the number of linkages between an MNE headquarter and its affiliates. Columns (1)–(2) consider all affiliates of MNEs in third countries, column (3) reports results for the subsample of affiliates of Chinese MNEs, column (4) for affiliates of U.S.-headquartered MNEs, and column (5) for affiliates of European MNEs.

Table 6: Effects of the Trade War on MNE Affiliates in Third Countries

	(1) Whole sample	(2) Whole sample	(3) Chinese MNEs	(4) U.S. MNEs	(5) European MNEs
Panel A. Sales					
Δ China's tariff on U.S.	-0.922***	-0.982***	-10.685***	-3.582	-1.720***
	(0.299)	(0.302)	(2.738)	(4.561)	(0.462)
Δ U.S. tariff on China	0.632**	0.562*	4.295*	13.676***	0.583
	(0.292)	(0.291)	(2.444)	(4.202)	(0.433)
Δ China's input tariff on U.S.	1.268***	1.374***	14.195***	6.663	2.549***
	(0.452)	(0.458)	(3.730)	(6.850)	(0.697)
Δ U.S. input tariff on China	-1.095**	-1.009**	-7.901**	-20.164***	-1.178*
	(0.449)	(0.449)	(3.693)	(6.040)	(0.647)
Panel B. Employment					
Δ China's tariff on U.S.	-0.276***	-0.271***	-3.102***	-2.598**	-0.383***
	(0.090)	(0.090)	(0.802)	(1.104)	(0.123)
Δ U.S. tariff on China	0.136*	0.141*	1.371**	1.842	0.116
	(0.072)	(0.073)	(0.638)	(1.123)	(0.099)
Δ China's input tariff on U.S.	0.332***	0.322***	4.029***	4.131**	0.525***
	(0.122)	(0.122)	(1.020)	(1.688)	(0.173)
Δ U.S. input tariff on China	-0.246**	-0.252**	-2.505***	-3.150*	-0.235
	(0.115)	(0.115)	(0.953)	(1.684)	(0.152)
Panel C. Linkages					
Δ China's tariff on U.S.	0.061	0.055	-1.719***	1.679	0.020
	(0.112)	(0.112)	(0.620)	(4.152)	(0.178)
Δ U.S. tariff on China	0.092	0.082	0.837*	2.079	0.053
	(0.088)	(0.086)	(0.505)	(2.614)	(0.138)
Δ China's input tariff on U.S.	-0.089	-0.079	1.919**	-2.284	0.077
	(0.172)	(0.172)	(0.756)	(6.083)	(0.251)
Δ U.S. input tariff on China	-0.172	-0.158	-1.690**	-5.159	-0.020
	(0.157)	(0.155)	(0.726)	(4.522)	(0.232)
Observations	828,562	828,562	17,623	17,623	309,836
Clusters	410	410	410	410	410
HQ-country-affiliate-country FE		×			
Long difference	×	×	×	×	×
Tariff controls	×	×	×	×	×

Notes: The table reports estimates of the effects of the U.S.–China trade war on MNE outcomes for affiliates located in third countries. The unit of observation is a headquarters-country × affiliate-country-industry pair. Panel A reports sales, measured as $\ln(1+x)$; panel B reports employment, measured as $\ln(1+x)$; and panel C reports the number of linkages in levels. All variables are transformed as long differences between 2018 and 2022 (Δ). Column (2) additionally controls for country-pair-specific trends. Column (3) restricts the sample to affiliates of Chinese MNEs, column (4) to affiliates of U.S. MNEs, and column (5) to affiliates of European MNEs. The controls include China's and the United States' output and input tariffs vis-à-vis third countries, their bilateral output and input tariffs with the country under consideration (all in long differences). Standard errors are clustered at the affiliate industry level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Focusing first on affiliate sales, we find results that broadly mirror those of the industry-level specifications. China's tariffs on the U.S. depressed affiliate sales in third countries. These effects are particularly large for affiliates of Chinese MNEs, consistent with complementarity between U.S. exports to China and third-country sales by multinationals. Alternatively, this finding may reflect a reallocation of affiliate sales toward China, in line with the proximity–concentration hypothesis. European firms likewise experienced sizable declines in affiliate sales, whereas the effect for U.S. MNEs is not statistically significant.

U.S. tariffs on China also increased affiliate sales in the same industry in third countries. These effects are especially pronounced for affiliates of Chinese and U.S. MNEs and are consistent with trade diversion away from China. In particular, U.S. and Chinese MNEs appear to have shifted production away from China toward third countries in order to use them as export platforms for the U.S. market.

Turning to the effects of China's tariffs on inputs sourced from the U.S. on third-country affiliate sales, we find positive and highly statistically significant coefficients. The response was particularly large for affiliates of Chinese MNEs, whereas U.S. MNEs did not react significantly to these tariffs. Because these input tariffs raised production costs in China and weakened the competitiveness of local production, they tended to shift economic activity toward alternative locations. A plausible interpretation is that Chinese MNEs tried to avoid tariffs on U.S. inputs by relocating economic activity to third countries. More broadly, this finding highlights the complexity of firms' production decisions in the presence of vertically fragmented production chains, as emphasized by Antràs and De Gortari (2020).

Finally, we consider the effects of U.S. tariffs on Chinese inputs on third-country affiliate sales. These tariffs had negative effects on affiliate sales in the downstream industry in third countries, with the strongest responses observed for Chinese- and U.S.-headquartered MNEs. This finding is consistent with the view that higher input costs in U.S. manufacturing reduced competitiveness and, through complementarities, also depressed demand for third-country products. In addition, the negative response of Chinese MNEs is consistent with increasing returns in China's upstream industries: reduced output in those industries raised input costs in China and weakened the performance of firms that rely on these inputs.

In panel B of Table 6, we consider third-country affiliate employment as the outcome. We find responses that are qualitatively very similar to those for sales, although the coefficients are much smaller in magnitude. Moreover, while employment responses were highly significant for affiliates of Chinese and European MNEs, employment responses to U.S. tariffs tended to be insignificant for U.S.-headquartered MNEs.

Finally, panel C presents the results for the number of linkages between headquarters and third-

country affiliates. Trade-war tariffs had no statistically significant effects on the full sample of MNE affiliates. However, Chinese multinationals responded strongly and in a statistically significant manner: they reduced linkages with third countries in response to China's tariffs on the U.S. and U.S. input tariffs on China. By contrast, they increased linkages with third countries in response to U.S. tariffs and China's input tariffs on the U.S., consistent with efforts to avoid U.S. tariffs and higher input costs in China. Additional unreported decompositions distinguish between total linkages and linkages associated with continuing MNE relationships. For Chinese MNEs, the significant effects on total linkages were substantially smaller and statistically insignificant when the outcome counts only parent–country or parent–country–industry relationships present in both 2018 and 2022. This pattern suggests that the response operated mainly through entry, exit, and geographic reallocation rather than adjustments within pre-existing destination-country relationships.

Overall, the comparison between affiliates of Chinese- and U.S.-headquartered MNEs points to a clear asymmetry in third-country responses. Chinese multinationals adjusted sales, employment, and linkages in third markets much more actively in response to trade-war tariffs, whereas U.S. MNEs reacted more weakly. This finding highlights the central role of Chinese MNEs in shaping third-country effects during the U.S.–China trade war.

In Appendix Table B.3, we estimate a continuous-treatment diff-in-diff specification at the HQ-country-affiliate-country-affiliate-industry level, using two stacked four-year long differences (2014-2018 and 2018-2022), by including the artificially created 2014 vintage. This specification allows us to control for industry-specific trends. We interact each industry's 2018–2022 China–U.S. tariff change with an indicator for the trade-war period and include affiliate-industry and period fixed effects. The sales results reveal a clear MNE-specific pattern. Among Chinese-MNE networks, exposure to increases in China's output tariffs was associated with lower third-country affiliate sales, whereas China's input tariffs were associated with higher sales. Among U.S.-MNE networks, U.S. output tariffs increased sales, while U.S. input tariffs are associated with lower sales. Employment generally displays the same sign pattern, whereas linkage effects were weaker and concentrated in Chinese-MNE networks.

In Appendix Table B.4 we again use our artificial 2014 data and consider the pre-trade war sample period 2014-2018. We report a placebo exercise and show that the trade-war (2018-2022) tariff changes had no significant impact on pre-trade-war changes in outcome ΔY_{has} between 2014 and 2018. For this exercise, we consider specification (3) but consider 2014-2018 for the dependent variable and 2018-2022 for tariff changes. We show that trade-war tariff changes had no significant effect on pre-trade-war MNE sales or employment growth in third countries. By contrast, MNE linkage growth in 2014-2018 is significantly correlated with trade-war tariffs. However, linkage

adjustment was not an important adjustment factor for MNEs, except for Chinese MNEs, so the absence of linkage adjustment during the trade war does not reflect omitted pretrends.

3.3.1 Third-Country Effects of the Trade War by Affiliate Region

Figure 7 plots the predicted third-country effects of the trade war on MNE affiliates by affiliate region: Asia (excluding China), North America (excluding the U.S.), Europe, and the rest of the world. Blue dots show the effects on sales, red diamonds show the effects on employment, and green squares show the effects on the number of linkages. For each region, we plot the predicted effects of U.S. and Chinese output and input tariffs, evaluated at the mean trade-war tariff changes, as well as their sum.

Individual tariff components had significant and sometimes sizable effects on MNE affiliate sales in Asia, North America, and Europe, with signs matching those in the full sample. For example, China's tariffs on the U.S. significantly reduced affiliate sales in Asia, North America and Europe, while U.S. tariffs on China tended to increase affiliate sales in Europe. However, the estimated total regional effects on sales are close to zero in all regions, reflecting the offsetting forces of U.S and China's output and input tariffs on third country affiliate activity. The effects of individual tariff components on employment and linkages were instead much more muted and their total effect, while negative in most regions, is not statistically significant.[7]

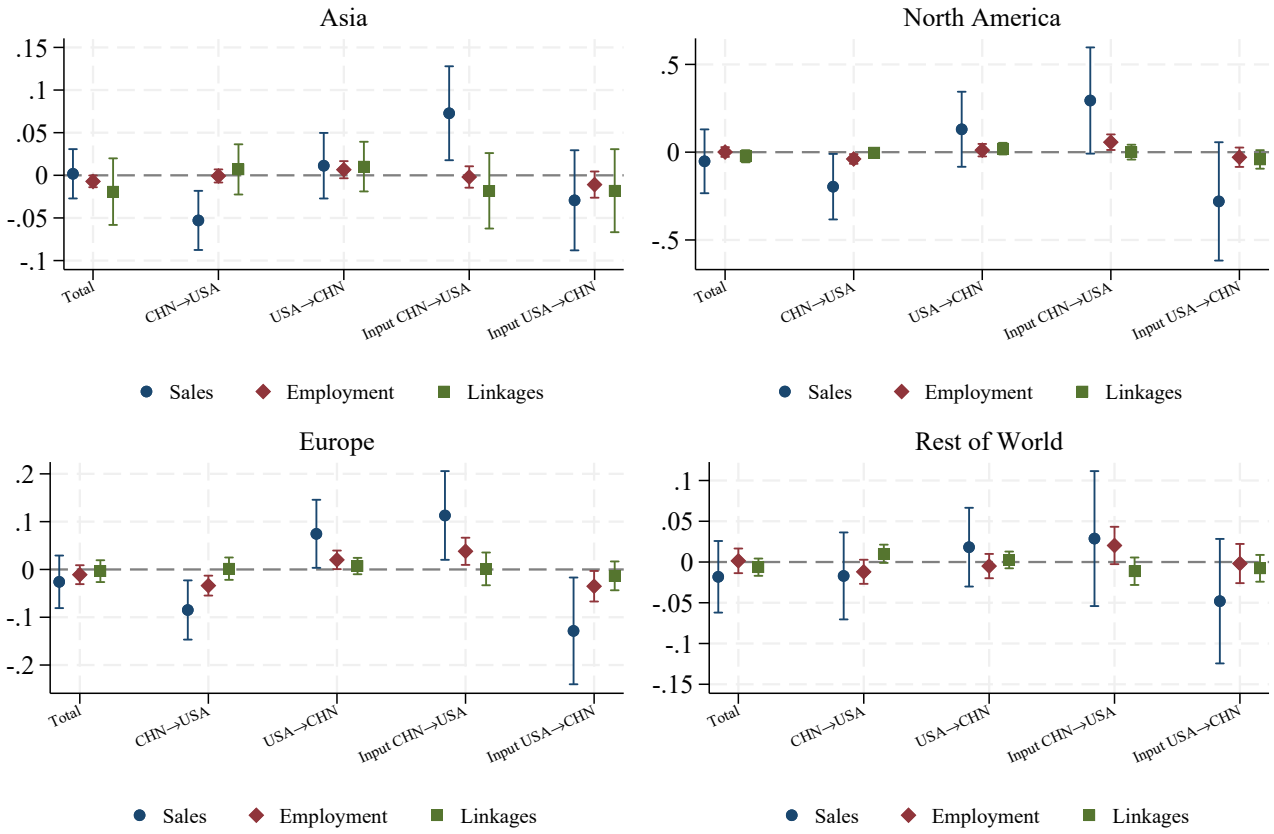
3.3.2 Third-Country Effects of the Trade War by Affiliates GVC Position

We now investigate heterogeneity in the third-country effects of the trade war on MNE affiliates depending on the vertical GVC position of the affiliate industry. Specifically, we rank industries by their upstreamness and run regression (3) separately by quartile of upstreamness (Q1 being the 25% most downstream and Q4 being the 25% most upstream industries).

We report results in Table 7. The general message is that the third-country effects of the trade war on MNE affiliate activity were strongly heterogeneous across industries with different GVC positions. Specifically, the effects in the pooled analysis in Table 6 were mostly driven by the response of the two downstream bins. In general, the magnitude of tariff elasticities of MNE activity is significantly smaller in more upstream industries compared to downstream ones and the tariff coefficients also tend to become insignificant for the two more upstream bins. These heterogeneous third-country effects are consistent with Antràs and De Gortari (2020), where more downstream industries are more responsive to trade cost shifters.

[7] In Appendix Figures B.1 and B.2 we show regional heterogeneity in the third-country effects of the trade war on industry outcomes. The results are a bit different from those for MNE affiliates. We find overall negative effects on industry sales for Asia and North America, no net effects on Europe and positive effect on the rest of the world.

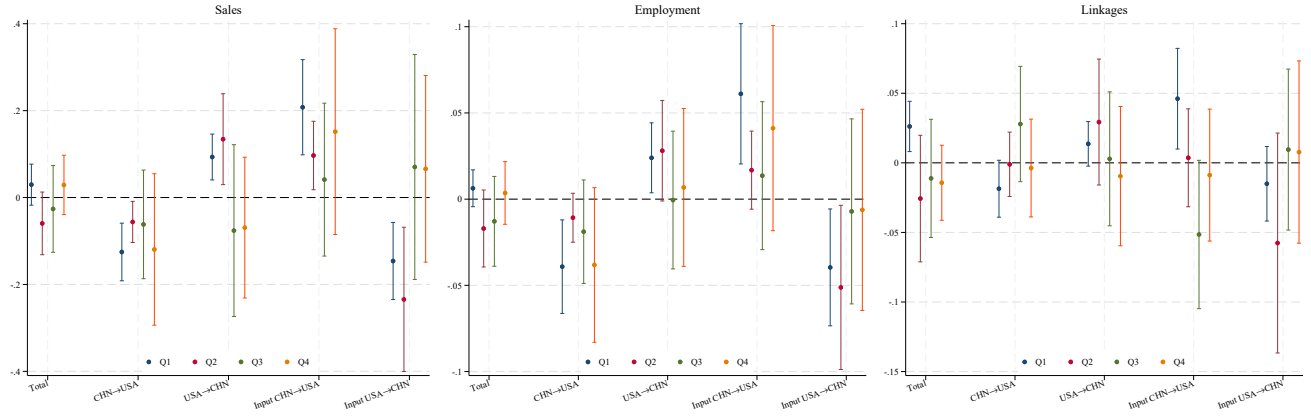
Figure 7: Third-Country Predicted Effect of the Trade War on MNEs by Affiliate Region



Notes: The figure presents predicted effects of the U.S.–China trade war on regional MNE outcomes for affiliates located in third countries at mean trade-war tariff changes (2018-2022). *CHN→USA*: mean impact of China's tariff changes on the U.S., *USA→CHN*: mean impact of U.S. tariff changes on China, *Input CHN→USA*: mean impact of China's tariff changes on U.S. inputs, *Input USA→CHN*: mean impact of U.S. tariff changes on Chinese inputs. *Total*: total effect of all trade-war tariff changes. The unit of observation is a headquarters-country by affiliate-country-industry pair. Blue dots show the effects on sales, measured as $\ln(1+x)$. Red diamonds show the effects on employment, measured as $\ln(1+x)$. Green squares show the effects on the number of linkages (in levels). Controls include China's and the United States' output and input tariffs vis-à-vis third countries, their bilateral output and input tariffs with the country under consideration. 90% confidence intervals with clustering at the affiliate industry level reported.

While tariff sensitivity of affiliates is larger downstream, the trade war implied smaller tariff increases in more downstream industries (see Figure 5). To assess the actual response of MNE affiliates to the trade war depending on their GVC position, in Figure 8 we show the predicted effect of the trade-war on MNE affiliate outcomes for each bin of upstreamness. Like for the full set of plants, we find that the third-country effects of the trade war on MNE affiliates were positive for the most downstream quartile of industries, most negative for the intermediate bins, and zero for the most upstream bin.[8]

Figure 8: Third-Country Predicted Effect of the Trade War on MNEs by Affiliate GVC Position



Notes: The figure presents predicted third-country effects of the U.S.–China trade war on MNE affiliate outcomes depending on their GVC position, evaluated at the mean of trade-war tariff changes. Affiliate industries are ranked by upstreamness, and the regression is estimated separately for each upstreamness quartile. Q1 denotes the quartile of the most downstream industries, and Q4 the quartile of the most upstream industries. *CHN→USA*: mean impact of China's tariffs on the U.S., *USA→CHN*: mean impact of U.S. tariffs on China, *Input CHN→USA*: mean impact of China's tariffs on U.S. inputs, *Input USA→CHN*: mean impact of U.S. tariffs on Chinese inputs. *Total*: total effect of all trade-war tariff changes. The unit of observation is a headquarters-country by affiliate-country-industry pair. Panel A reports results for ln(1 + sales), panel B for ln(1 + employment) and panel C for the number of linkages. Specifications are estimated in long differences (2018-2022). The controls include China's and the U.S. output and input tariffs vis-à-vis third countries, as well as their bilateral output and input tariffs with the country under consideration. 90% confidence intervals with clustering at the affiliate industry level reported.

[8]In Appendix Figure B.3 we instead show heterogeneity in the effect of the trade war on industry outcomes depending on the industries' GVC position. In line with the results for MNE affiliates, we find positive sales effects on the quartiles of most downstream and most upstream industries and negative effects for industries with intermediate GVC positions.

Table 7: Effects of the Trade War on MNE Affiliates in Third Countries: By Affiliate GVC Position

	(1) Q1	(2) Q2	(3) Q3	(4) Q4
Panel A. Sales				
Δ China's tariff on U.S.	-1.915***	-0.809*	-0.768	-1.472
	(0.616)	(0.415)	(0.945)	(1.305)
Δ U.S. tariff on China	1.279***	1.884**	-0.726	-0.688
	(0.440)	(0.892)	(1.147)	(0.978)
Δ China's input tariff on U.S.	2.970***	1.369**	0.511	1.869
	(0.951)	(0.678)	(1.325)	(1.774)
Δ U.S. input tariff on China	-1.785***	-3.035**	0.697	0.679
	(0.659)	(1.307)	(1.559)	(1.341)
Panel B. Employment				
Δ China's tariff on U.S.	-0.599**	-0.155	-0.235	-0.470
	(0.252)	(0.125)	(0.227)	(0.336)
Δ U.S. tariff on China	0.329*	0.394	-0.005	0.067
	(0.169)	(0.249)	(0.232)	(0.276)
Δ China's input tariff on U.S.	0.873**	0.238	0.169	0.508
	(0.353)	(0.195)	(0.323)	(0.446)
Δ U.S. input tariff on China	-0.484*	-0.663*	-0.070	-0.064
	(0.252)	(0.375)	(0.323)	(0.364)
Panel C. Linkages				
Δ China's tariff on U.S.	-0.284	-0.015	0.347	-0.046
	(0.190)	(0.203)	(0.313)	(0.263)
Δ U.S. tariff on China	0.187	0.412	0.027	-0.095
	(0.133)	(0.386)	(0.279)	(0.302)
Δ China's input tariff on U.S.	0.659**	0.052	-0.638	-0.108
	(0.314)	(0.303)	(0.402)	(0.355)
Δ U.S. input tariff on China	-0.183	-0.746	0.095	0.080
	(0.199)	(0.622)	(0.348)	(0.409)
Observations	205,907	216,281	206,212	200,162
Clusters	102	107	102	99
Long difference	×	×	×	×
Tariff controls	×	×	×	×

Notes: The table reports estimates of the effects of the U.S.–China trade war on MNE outcomes for affiliates located in third countries depending on their GVC position. Affiliate industries are ranked by upstreamness, and the regression is estimated separately for each upstreamness quartile. Q1 denotes the quartile of the most downstream industries, and Q4 the quartile of the most upstream industries. The unit of observation is a headquarters-country by affiliate-country-industry pair. Panel A reports sales, measured as $\ln(1+x)$; panel B reports employment, measured as $\ln(1+x)$; and panel C reports the number of linkages in levels. All specifications are estimated in long differences (2018-2022). Controls include China's and the U.S.' output and input tariffs vis-à-vis third countries, their bilateral output and input tariffs with the country under consideration. Standard errors are clustered at the affiliate industry level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4 Conclusion

In this paper, we provide empirical evidence on how the U.S.–China trade war reshaped global manufacturing activity in third countries. Combining establishment-level data on virtually all multinational and domestic firms worldwide with detailed tariff information, we document how changes in trade policy during the U.S.–China trade war affected sales, employment, and the number of establishments across countries, industries, and stages of production.

Our analysis yields three main findings. First, the effects of U.S. and Chinese output and input tariffs on third countries are highly heterogeneous and tend to offset one another, such that the net effects were only moderately negative. China's tariffs on U.S. goods reduced manufacturing activity in third countries, consistent with demand complementarities with U.S. production, whereas U.S. tariffs on China had positive effects on third-country manufacturing outcomes through trade diversion away from China. By contrast, China's tariffs on U.S. inputs benefited third countries by weakening Chinese producers, while U.S. tariffs on Chinese inputs reduced third-country manufacturing activity, likely because they reduce the competitiveness of U.S. producers and because of complementarities in production or demand.

Second, most of the adjustment in global manufacturing activity was driven by multinational enterprises. MNEs primarily responded to the trade war by reallocating sales and production across existing affiliate networks, thereby cushioning the effects of tariff shocks, whereas domestic firms reacted much less. Chinese MNEs exhibited particularly strong reallocation of activity toward affiliates in third countries.

Third, third-country responses vary systematically with industries' positions in global value chains. More downstream industries were substantially more sensitive to the trade war, whereas upstream industries responded more modestly. At the same time, tariff increases were larger in more upstream industries. As a result, the most downstream and the most upstream industries experienced net gains in economic activity, while intermediate industries tended to lose.

Taken together, these results show that the incidence of the trade war extended well beyond the directly targeted bilateral relationship between the U.S. and China. Bilateral tariff shocks propagated systematically to third countries, both along production chains and through the global affiliate networks of multinational firms, generating highly heterogeneous adjustments across locations and sectors. More broadly, our findings highlight the importance of taking firms' global production networks seriously when assessing the distributional and aggregate consequences of trade policy.

References

Alfaro, Laura, Pol Antràs, Davin Chor, and Paola Conconi. Internalizing Global Value Chains: A Firm-Level Analysis. *Journal of Political Economy*, 127(2):509–559, 2019.

Antràs, Pol, Davin Chor, Thibault Fally, and Russell Hillberry. Measuring the Upstreamness of Production and Trade Flows. *American Economic Review: Papers and Proceedings*, 102(3):412–416, 2012.

Antràs, Pol and Alonso De Gortari. On the Geography of Global Value Chains. *Econometrica*, 88(4):1553–1598, 2020.

Antràs, Pol, Teresa Fort, Agustìn Gutierérrez, and Felix Tintelnot. Trade Policy and Global Sourcing: A Rationale for Tariff Escalation. Manuscript, Harvard University, 2022.

Barattieri, Alessandro and Matteo Cacciatore. Self-Harming Trade Policy? Protectionism and Production Networks. *American Economic Journal: Macroeconomics*, 15(2):97–128, 2023.

Barrot, Jean-Noël and Julien Sauvagnat. Input Specificity and the Propagation of Idiosyncratic Shocks in Production Networks. *Quarterly Journal of Economics*, 131(3):1543–1592, 2016.

Blanchard, Emily, Chad Bown, and Robert Johnson. Global Supply Chains and Trade Policy. *Review of Economic Studies*, 93(1):181–214, 2026.

Boehm, Christoph E., Aaron Flaaen, and Nitya Pandalai-Nayar. Input Linkages and the Transmission of Shocks: Firm-Level Evidence from the 2011 Tōhoku Earthquake. *Review of Economics and Statistics*, 101(1):60–75, 2019.

Bown, Chad, Paola Conconi, Aksel Erbahar, and Lorenzo Trimarchi. Trade Protection Along Supply Chains. *American Economic Journal: Economic Policy*, forthcoming.

Cavalcanti, Tiago, Pedro Ogeda, and Emanuel Ornelas. The US-China trade war creates jobs (elsewhere). *Journal of International Economics*, page 104249, 2026.

Conconi, Paola, Manuel García-Santana, Laura Puccio, and Roberto Venturini. From Final Goods to Inputs: The Protectionist Effect of Rules of Origin. *American Economic Review*, 108(8):2335–2365, 2018.

Conteduca, Francesco Paolo, Marco Errico, Fabrizio Leone, Ludovic Panon, and Giacomo Romanini. The Impact of Trade Wars on Firms in Third Countries. Working Paper, Bank of Italy, 2026.

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

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

Fally, Thibault. On the Fragmentation of Production in the U.S. Manuscript, University of Colorado Boulder, 2012.

Feng, Chaonan, Liyan Han, and Lei Li. Who Pays for the Tariffs and Why? A Tale of Two Countries. CESifo Working Paper 10497, CESifo, 2025. Also CRC Discussion Paper No. 432.

Flaaen, Aaron, Ali Hortacsu, and Felix Tintelnot. The Production Relocation and Price Effects of U.S. Trade Policy: The Case of Washing Machines. *American Economic Review*, 2020.

Flaaen, Aaron and Justin Pierce. Disentangling the Effects of the 2018–2019 Tariffs on a Globally Connected US Manufacturing Sector. *Review of Economics and Statistics*, pages 1–45, 2024.

Freund, Caroline, Aaditya Mattoo, Antonia Mulabdic, and Michele Ruta. Is U.S. Trade Policy Reshaping Global Supply Chains? *Journal of International Economics*, 152:104011, 2024.

Garred, Jason and Song Yuan. Relocation from China. *Journal of Development Economics*, 176:103510, 2025.

Giroud, Xavier and Holger M. Mueller. Firms' Internal Networks and Local Economic Shocks. *American Economic Review*, 109(10):3617–3649, 2019.

Graziano, Alejandro G, Monika Sztajerowska, and Christian Volpe Martincus. Trading Places: How Trade Policy Is Reshaping Multinational Firms' Location. CESifo Working Paper, CESifo, 2024.

Handley, Kyle, Fariha Kamal, and Ryan Monarch. Supply Chain Adjustments to Tariff Shocks: Evidence from Firm Trade Linkages in the 2018–2019 US Trade War. *Economics Letters*, 244:112009, 2024.

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

Jiang, Lingduo, Yi Lu, Hong Song, and Guofeng Zhang. Responses of Exporters to Trade Protectionism: Inferences from the US-China Trade War. *Journal of International Economics*, 140:103687, 2023.

Ju, Jiandong, Hong Ma, Zi Wang, and Xiaodong Zhu. Trade Wars and Industrial Policy Competitions: Understanding the US-China Economic Conflicts. *Journal of Monetary Economics*, 141:42–58, 2024.

Pierce, Justin and Peter Schott. Concording U.S. Harmonized System Codes over Time. *Journal of Official Statistics*, 2012.

Shen, Binchao. Have Global Value Chains Shifted? *Journal of International Economics*, 152:104264, 2026.

Sheng, Liugang, Huasheng Song, and Xueqian Zheng. How Did Chinese Exporters Manage the Trade War? *Journal of International Money and Finance*, 153:103300, 2025.

Utar, Hâle, Alfonso Cebreros Zurita, and Luis Torres. The US-China Trade War and the Relocation of Global Value Chains to Mexico. *Review of Economics and Statistics*, pages 1–47, 2025.

A Data Appendix

A.1 Crosswalk from 6-Digit HS Codes to 4-Digit SIC Industries

Since the original tariffs and trade flows are reported at the 6-digit HS product level, a time-consistent crosswalk between the product codes and the industries is necessary to match the two data sources. We use the comprehensive concordance from Pierce and Schott (2012), mapping 10-digit HS codes to 4-digit SIC industries.

This concordance covers both import and export HS codes from 1989 to 2018. We extend it by manually matching missing SIC codes, ultimately producing a 6-digit HS to SIC crosswalk. Of all HS–SIC combinations, about 72.3% are a $1:1$ map, and 27.7% of the HS codes map $m:1$ into the SIC classification.

A.2 Cleaning Procedure for Tariffs

The raw tariff data is retrieved from the 'World Integrated Trade Solution' (WITS) at the 6-digit HS product level. WITS reports four duty types: effectively applied (AHS), MFN, preferential (PRF), and bound tariffs. AHS is our baseline: it equals the MFN rate unless a lower negotiated preferential rate applies, and is reported only for country-pairs that actually trade the 6-digit HS product. We process the raw data as follows:

- **Trade values.** Missing WITS trade values are filled with UN Comtrade imports; remaining missing values are set to zero, following the WITS convention that unreported trade is zero.
- **EU treatment.** Intra-EU and EU customs union tariffs are set to zero (1993–2018), accounting for enlargement and Brexit; missing EU members' tariffs on non-members are set to the average EU outward tariff by partner and product.
- **Filling missing tariffs**: missing AHS is replaced by PRF; then, for HS products only in comtrade and absent from WITS, by the importer's product MFN rate; then by the average non-missing tariff within the same importer–product group; and finally within the same importer–SIC group.
- **Filling trade-war tariffs** U.S. and Chinese WITS tariffs duties are replaced/filled in by manually collected duties between 2018 and 2022 (see main text)

- **Aggregation to SIC.** We map 6-digit HS to 4-digit SIC based on the crosswalk we created. We then compute import-weighted tariffs,

$$\tau^{w}_{ij,s} = \frac{x_{ij,s}}{\sum_s x_{ij,s}} \tau_{ij,s},$$

setting missing weights to zero, and collapse to the 4-digit SIC level by summing import values and averaging the weighted tariffs.

B Additional Results

Table B.1: Effects of the Trade War on Industries in China and the U.S.

	(1)	(2)	(3)	(4)	(5)	(6)
	China			U.S.		
	MNE	Domestic plants	All plants	MNE	Domestic plants	All plants
Panel A. Sales						
Δ China's tariff on U.S.	5.19	9.18**	7.54**	-3.93	0.63	-2.96
	(8.84)	(4.06)	(3.79)	(4.19)	(2.39)	(1.85)
Δ U.S. tariff on China	-0.00	5.48*	5.34	9.95*	2.64	3.35
	(7.47)	(3.19)	(3.38)	(5.17)	(2.36)	(2.24)
Δ China's input tariff on U.S.	-15.31	-12.81**	-11.17**	2.81	-1.99	3.12
	(13.05)	(6.15)	(5.55)	(7.41)	(3.71)	(2.78)
Δ U.S. input tariff on China	1.82	-5.76	-5.73	-14.42*	-4.01	-5.30
	(10.16)	(4.60)	(4.81)	(7.70)	(3.48)	(3.24)
Observations	392	409	409	407	411	411
Clusters	392	409	409	407	411	411
Panel B. Employment						
Δ China's tariff on U.S.	9.07	12.57*	10.79*	-1.62	2.08	-0.21
	(6.64)	(6.54)	(6.03)	(2.97)	(1.66)	(1.90)
Δ U.S. tariff on China	4.50	10.09**	8.97*	-1.76	-1.45	-1.94
	(5.95)	(5.12)	(4.69)	(4.22)	(1.50)	(2.65)
Δ China's input tariff on U.S.	-15.29	-13.77	-12.44	1.94	-3.89	-0.31
	(9.53)	(9.19)	(8.39)	(4.32)	(2.62)	(2.87)
Δ U.S. input tariff on China	-7.53	-10.97	-9.72	1.32	1.44	2.14
	(8.08)	(7.02)	(6.42)	(5.95)	(2.30)	(3.79)
Observations	396	409	409	409	411	411
Clusters	396	409	409	409	411	411
Panel C. Establishments						
Δ China's tariff on U.S.	14.56**	9.29*	9.10*	-1.84	1.80**	0.13
	(5.68)	(4.84)	(4.85)	(1.46)	(0.90)	(0.84)
Δ U.S. tariff on China	1.36	5.67	5.59	3.65**	-0.60	1.06
	(4.45)	(4.17)	(4.17)	(1.57)	(0.82)	(0.82)
Δ China's input tariff on U.S.	-20.14**	-11.25	-11.05	1.54	-3.38**	-1.31
	(8.51)	(6.94)	(6.92)	(2.17)	(1.33)	(1.33)
Δ U.S. input tariff on China	0.74	-5.11	-5.17	-5.64**	1.35	-1.31
	(6.36)	(5.93)	(5.91)	(2.22)	(1.21)	(1.20)
Observations	401	409	409	409	411	411
Clusters	401	409	409	409	411	411
Long difference	×	×	×	×	×	×
Tariff controls	×	×	×	×	×	×

Notes: The table reports estimates of the effects of the U.S.–China trade war on outcomes in 4-digit manufacturing industries in China and in the U.S. Panel A reports results for log sales, panel B for log employment, and panel C for the log number of establishments. The dependent variables are constructed by aggregating plant-level outcomes to the industry level. The aggregation is carried out separately for MNE affiliates, domestic plants, and all plants. All specifications are estimated in long differences between 2018 and 2022. The controls include China's and the U.S. output and input tariffs vis-à-vis third countries. Standard errors are clustered at the industry level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.2: Effects of the Trade War on Third-Country Industries, Stacked Long Differences, Continuous-Treatment DID

	Sales			Employment			Establishments		
	MNEs	Domestic	All	MNEs	Domestic	All	MNEs	Domestic	All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Trade-war × Δ China's tariff on U.S.	-4.36	1.74	1.29	-3.57	-0.23	-1.51	-0.76	0.10	-0.74
	(3.01)	(1.72)	(1.69)	(2.49)	(1.66)	(1.74)	(0.94)	(1.22)	(1.16)
Trade-war × Δ U.S. tariff on China	4.65*	1.08	1.35	-0.65	1.72	2.43*	0.25	-0.47	-0.09
	(2.53)	(1.54)	(1.48)	(2.32)	(1.32)	(1.44)	(0.93)	(1.04)	(1.02)
Trade-war × Δ China's input tariff on U.S.	6.18	-2.08	-1.54	5.55	0.52	2.32	1.76	-0.06	1.00
	(4.29)	(2.53)	(2.43)	(3.59)	(2.42)	(2.55)	(1.40)	(1.78)	(1.69)
Trade-war × Δ U.S. input tariff on China	-7.47**	-1.07	-1.79	0.12	-2.35	-3.42*	-0.46	1.01	0.53
	(3.63)	(2.24)	(2.15)	(3.32)	(1.90)	(2.07)	(1.35)	(1.48)	(1.47)
Observations	14,452	26,515	26,962	14,862	26,588	27,015	17,937	27,267	27,804
Clusters	410	411	411	410	411	411	410	411	411
Industry FE	×	×	×	×	×	×	×	×	×
LD-period FE	×	×	×	×	×	×	×	×	×
Tariff controls	×	×	×	×	×	×	×	×	×

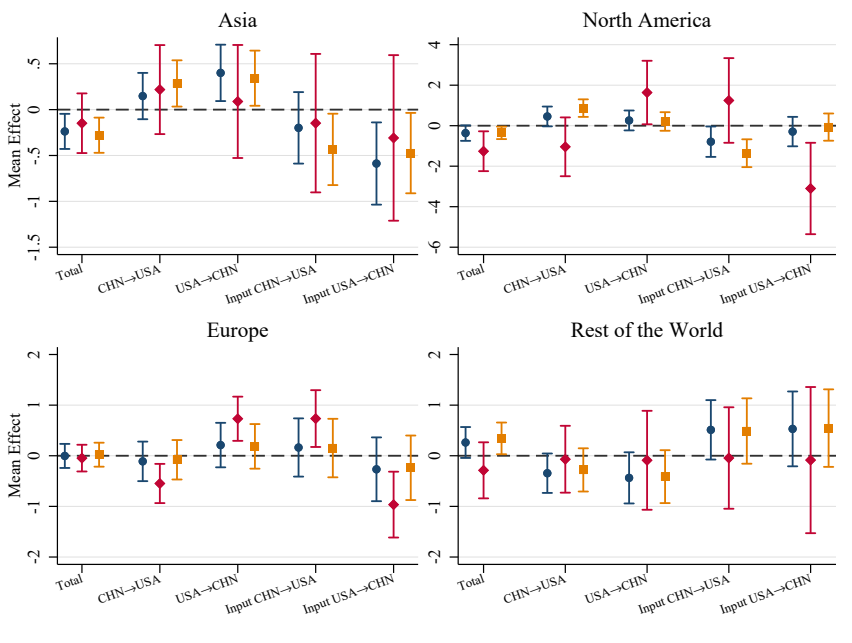
Notes: The table reports estimates of the effects of the U.S.–China trade war on outcomes in 4-digit manufacturing industries in third countries. Columns (1)-(3) report results for log sales, columns (4)-(6) for log employment, and columns (7)-(9) for the log number of establishments. The dependent variables are constructed by aggregating plant-level outcomes to the industry level. The aggregation is carried out separately for MNE affiliates, domestic plants, and all plants. All specifications are estimated in two stacked long differences (2014-2018) and (2018-2022) and include period and 4-digit SIC industry fixed effects that absorb tariff changes in the baseline period (2014-2018). Reported tariff coefficients for 2018-2022 are interacted with a a trade war dummy (=1 for period 2018-2022). The controls include China's and the U.S. output and input tariffs vis-à-vis third countries, as well as their bilateral output and input tariffs with the country under consideration and their interactions with a trade war dummy. Standard errors are clustered at the industry level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.3: Effects of the Trade War on MNE Affiliates in Third Countries, Stacked Long Differences, Continuous-Treatment DID

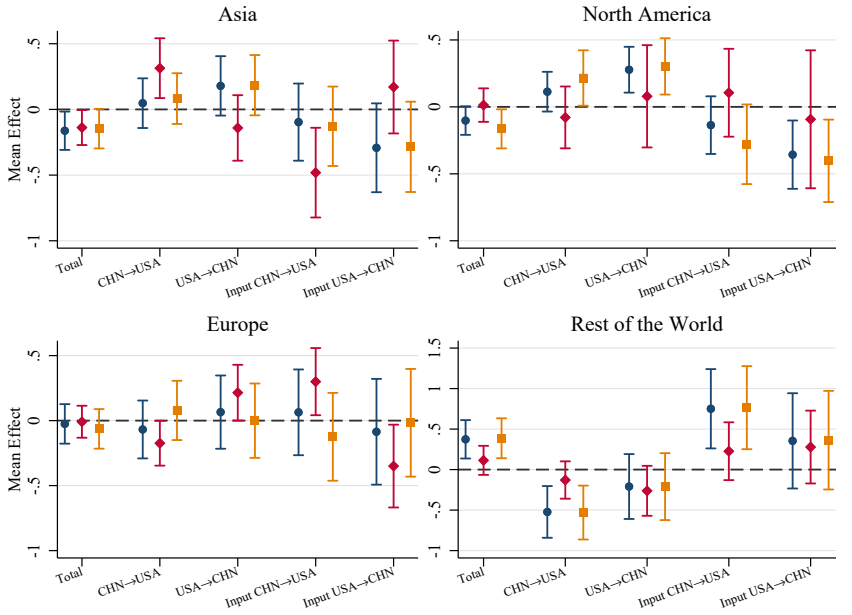
	Sales			Employment			Linkages		
	Chinese MNEs (1)	U.S. MNEs (2)	All MNEs (3)	Chinese MNEs (4)	U.S. MNEs (5)	All MNEs (6)	Chinese MNEs (7)	U.S. MNEs (8)	All MNEs (9)
Trade-war × Δ China's tariff on U.S.	-7.85***	-1.19	-0.78***	-2.52***	-1.88*	-0.25***	-1.12**	3.72	0.15
	(2.47)	(4.62)	(0.25)	(0.74)	(1.07)	(0.08)	(0.51)	(4.17)	(0.12)
Trade-war × Δ U.S. tariff on China	2.81	12.21***	0.49**	1.11*	1.19	0.11*	0.55	1.17	0.02
	(2.41)	(4.29)	(0.25)	(0.61)	(1.10)	(0.06)	(0.44)	(2.45)	(0.09)
Trade-war × Δ China's input tariff on U.S.	10.32***	3.60	1.16***	3.20***	3.34**	0.31***	1.26*	-4.71	-0.19
	(3.56)	(7.00)	(0.39)	(0.97)	(1.65)	(0.11)	(0.70)	(6.00)	(0.17)
Trade-war × Δ U.S. input tariff on China	-5.58	-18.85***	-0.80**	-2.11**	-2.47	-0.19*	-1.27*	-3.47	-0.04
	(3.68)	(6.21)	(0.37)	(0.93)	(1.65)	(0.10)	(0.67)	(4.14)	(0.14)
Observations	35,242	35,242	1,656,896	35,242	35,242	1,656,896	35,242	35,242	1,656,896
Clusters	410	410	410	410	410	410	410	410	410
Affiliate-industry FE	×	×	×	×	×	×	×	×	×
LD-period FE	×	×	×	×	×	×	×	×	×
Tariff controls	×	×	×	×	×	×	×	×	×

Notes: The observation is an HQ-country × affiliate-country × affiliate-industry × long-difference-period cell. The stacked periods are 2014–2018 and 2018–2022. Treatment intensity is the 2018–2022 tariff change and enters only through its interaction with the 2018–2022 period indicator. Sales and employment are first differences of $\ln(1+x)$; linkages are first differences in levels. All regressions include affiliate-industry and LD-period fixed effects and ten similarly interacted tariff controls. The strict paired sample requires complete changes for all four core tariffs and ten controls in both long-difference periods. Affiliates located in China or the United States are excluded. Standard errors in parentheses are clustered by affiliate industry. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure B.1: Third-Country Predicted Effect of the Trade War by Region



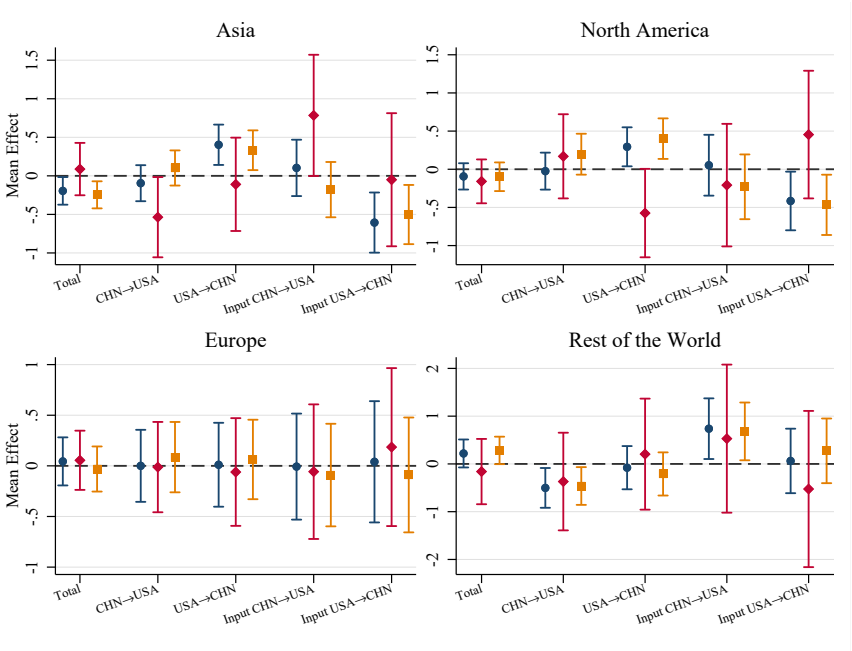
(a) Sales



(b) Establishments

Notes: The figure presents predicted third-country effects of the U.S.–China trade war on changes in industry log sales (a) and log establishments (b) by region, evaluated at the mean of trade-war tariff changes. *CHN→USA*: mean impact of China's tariffs on the U.S., *USA→CHN*: mean impact of U.S. tariffs on China, *Input CHN→USA*: mean impact of China's tariffs on U.S. inputs, *Input USA→CHN*: mean impact of U.S. tariffs on Chinese inputs. *Total*: total effect of all trade-war tariff changes. Dependent variables are constructed by aggregating plant-level outcomes to the industry level. The aggregation is carried out separately for all plants (circle markers) MNE affiliates (diamond markers), and domestic plants (square markers). Specifications include importer-country-by-industry and year fixed effects. Controls include China's and the U.S. output and input tariffs vis-à-vis third countries, and bilateral output and input tariffs with the country under consideration. 90% confidence intervals with clustering at the industry level reported.

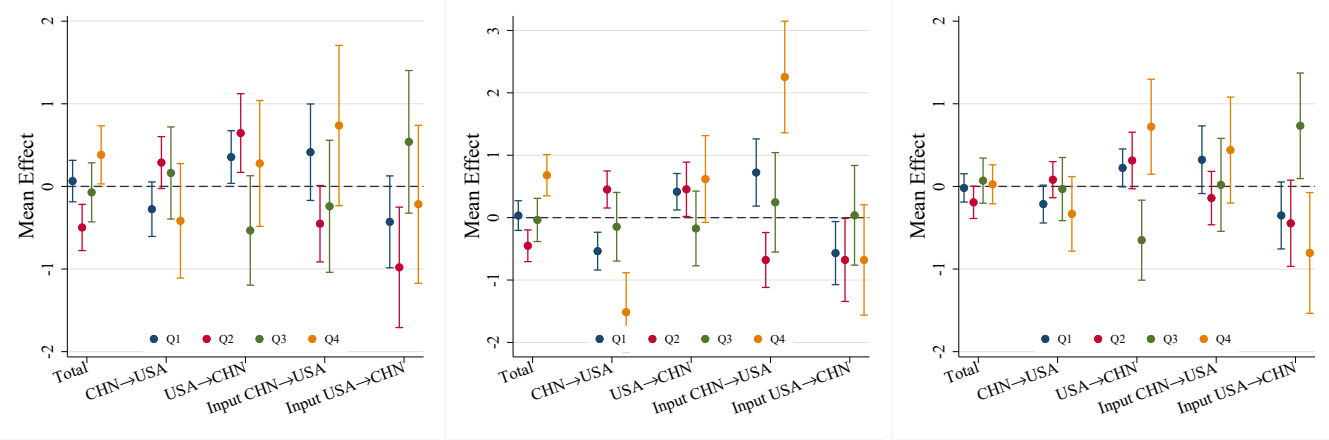
Figure B.2: Third-Country Predicted Effect of the Trade War by Region: Employment



(a) Employment

Notes: The figure presents predicted third-country effects of the U.S.–China trade war on changes in industry log employment by region, evaluated at the mean of trade-war tariff changes. *CHN→USA*: mean impact of China's tariffs on the U.S., *USA→CHN*: mean impact of U.S. tariffs on China, *Input CHN→USA*: mean impact of China's tariffs on U.S. inputs, *Input USA→CHN*: mean impact of U.S. tariffs on Chinese inputs. *Total*: total effect of all trade-war tariff changes. Dependent variables are constructed by aggregating plant-level outcomes to the industry level. The aggregation is carried out separately for all plants (circle markers) MNE affiliates (diamond markers), and domestic plants (square markers). Controls include China's and the U.S. output and input tariffs vis-à-vis third countries, and bilateral output and input tariffs with the country under consideration. 90% confidence intervals with clustering at the industry level reported.

Figure B.3: Third-Country Predicted Effect of the Trade War by Industries' GVC Position



(a) Sales (b) Employment (c) Establishments

Notes: The figure presents predicted third-country effects of the U.S.–China trade war on changes in industry log sales (a), log employment (b), and log establishments (c), by the industry's GVC position, evaluated at the mean of trade-war tariff changes. Industries are ranked by upstreamness, and the regression is estimated separately for each upstreamness quartile. Q1 denotes the quartile of the most downstream industries and Q4 the quartile of the most upstream industries. *CHN→USA*: mean impact of China's tariffs on the U.S., *USA→CHN*: mean impact of U.S. tariffs on China, *Input CHN→USA*: mean impact of China's tariffs on U.S. inputs, *Input USA→CHN*: mean impact of U.S. tariffs on Chinese inputs. *Total*: total effect of all trade-war tariff changes. Dependent variables are constructed by aggregating plant-level outcomes to the industry level. Controls include China's and the U.S. output and input tariffs vis-à-vis third countries, and bilateral output and input tariffs with the country under consideration. 90% confidence intervals with clustering at the industry level reported.

Table B.4: Effects of the Trade War on MNE Affiliates in Third Countries – Placebo

	(1) Whole sample	(2) Whole sample	(3) Chinese MNEs	(4) U.S. MNEs	(5) European MNEs
Panel A. Sales					
Future change in China's tariff on U.S.	-0.156	-0.158	-0.144	-0.146	-0.145
	(0.100)	(0.100)	(0.099)	(0.099)	(0.099)
Future change in U.S. tariff on China	0.139	0.137	0.147	0.145	0.146
	(0.105)	(0.105)	(0.104)	(0.104)	(0.104)
Future change in China's input tariff on U.S.	0.136	0.139	0.115	0.119	0.118
	(0.157)	(0.157)	(0.156)	(0.156)	(0.156)
Future change in U.S. input tariff on China	-0.292*	-0.290*	-0.301*	-0.297*	-0.299*
	(0.173)	(0.173)	(0.172)	(0.172)	(0.172)
Panel B. Employment					
Future change in China's tariff on U.S.	-0.032	-0.032	-0.031	-0.032	-0.032
	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
Future change in U.S. tariff on China	0.028	0.028	0.028	0.028	0.028
	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
Future change in China's input tariff on U.S.	0.024	0.025	0.024	0.024	0.024
	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)
Future change in U.S. input tariff on China	-0.055	-0.054	-0.054	-0.053	-0.053
	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)
Panel C. Linkages					
Future change in China's tariff on U.S.	-0.098**	-0.099**	-0.094**	-0.094**	-0.095**
	(0.045)	(0.045)	(0.044)	(0.044)	(0.045)
Future change in U.S. tariff on China	0.074	0.074	0.076	0.075	0.075
	(0.056)	(0.056)	(0.056)	(0.056)	(0.056)
Future change in China's input tariff on U.S.	0.113*	0.113*	0.106*	0.107*	0.107*
	(0.063)	(0.063)	(0.062)	(0.062)	(0.062)
Future change in U.S. input tariff on China	-0.133*	-0.133*	-0.135*	-0.134*	-0.134*
	(0.080)	(0.080)	(0.080)	(0.080)	(0.080)
Observations	828,562	828,562	828,562	828,562	828,562
Clusters	410	410	410	410	410
HQ-country-affiliate-country FE		×			
Long difference	×	×	×	×	×
Tariff controls	×	×	×	×	×

Notes: The table reports estimates of the effects of the U.S.–China trade war on MNE outcomes for affiliates located in third countries. The unit of observation is a headquarters-country × affiliate-country-industry pair. Panel A reports sales, measured as $\ln(1+x)$; panel B reports employment, measured as $\ln(1+x)$; and panel C reports the number of linkages in levels. All outcome variables are transformed as long differences(Δ). In this placebo exercise dependent variables are measured as 2014-2018 changes and tariff changes are for the trade-war period (2018-2022). Column (3) restricts the sample to affiliates of Chinese MNEs, column (4) to affiliates of U.S. MNEs, and column (5) to affiliates of European MNEs. The controls include China's and the United States' output and input tariffs vis-à-vis third countries, their bilateral output and input tariffs with the country under consideration (all in long differences). Standard errors are clustered at the affiliate industry level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.