Relocation from China (with Chinese Characteristics)

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Abstract

Rising global political tensions and increasing use of trade policies are popularly seen as potential threats to globalization. Will these factors lead to the 'decoupling' of affected economies, or reshape relations between trade partners in more complex ways? We consider this question by studying the recent evolution of the economic relationship between China and the US, in the context of a sharp fall in direct China-US trade. Using firm-level and product-level data, we show that Chinese manufacturing investment and Chinese-produced parts have increasingly flowed to third-country 'winners' who have simultaneously increased their US market share. This suggests that Chinese economic actors have continued to participate in reorganized China-US supply chains. We present evidence that our findings capture expanding indirect relationships linking China and the US rather than broader economic trends within the 'winners' themselves.

JEL codes: F14, F21, O19.
Keywords: China, trade, FDI, global supply chains, relocation, decoupling.

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1 Introduction

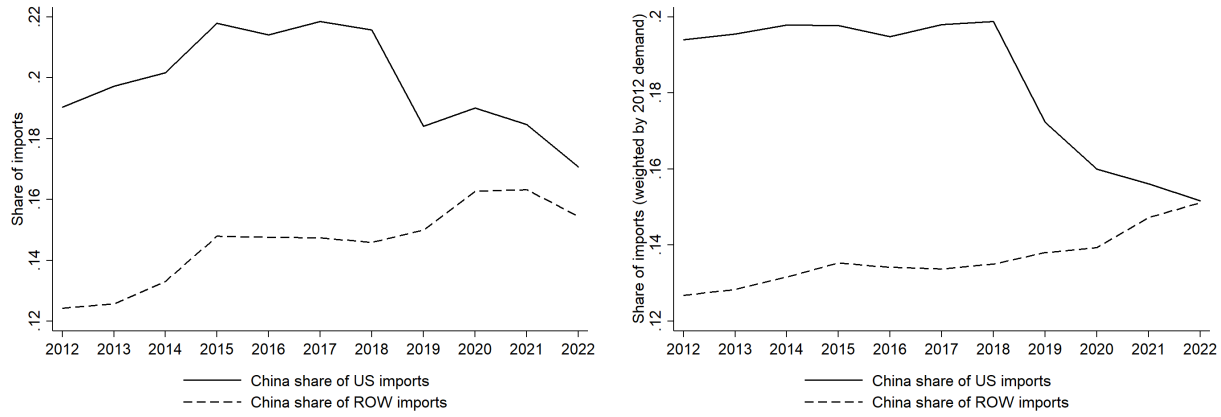
As global political tensions rise and governments shift towards activist trade and industrial policies, globalization appears increasingly threatened. A trend towards 'deglobalization' could have important implications for the developing world, since exports to wealthy markets and participation in global supply chains are key building blocks of many countries' growth strategies. However, the global economy is a complex system, and so political shocks and policy changes may not simply result in extreme outcomes such as unwinding of supply chains or 'decoupling' of affected economies. How might such factors affect economic linkages between trade partners in practice?

We consider this question by studying the recent evolution of the economic relationship between China and the United States. The election of Donald Trump in 2016 ushered in a sharp change in US economic policy towards China, which was largely maintained by the Biden administration. At the same time, the two countries' geopolitical rivalry has intensified. Firm surveys and media reports indicate rising uncertainty about their future economic and political relations (e.g. Jett, De Luce and Mackey Frayer 2023; Zhou 2023).

A first look at the aggregate data indicates that these events have coincided with a notable change in China-US trade. Figure 1 Panel A plots the share of Chinese goods in total US import value annually between 2012 and 2022, and shows that China's importance in US imports took a sharp downturn after 2018. This decline is even more apparent when we account for the changing composition of US demand (such as in the early stages of the pandemic) by holding product-level demand shares fixed at their 2012 levels in Panel B. Figure 1 also shows that there has been no similar pattern of decline in China's share in the imports of the rest of the world.

The trend pictured in Figure 1 suggests that a nontrivial share of production for the US market has been relocated from China to some of its competitors.[1] However, this decline in direct trade does not necessarily tell the full story about changing China-US relations. A key question is whether this trend actually represents 'decoupling', in the following sense: where production for the US market has shifted away from China, are Chinese economic actors no longer participating in the production process? Or has relocated production sometimes involved ongoing, but indirect, China-US economic relations?

[1]This statement is supported by the findings of a burgeoning literature on growing bilateral economic relations between 'winner' countries and the US due to the US-China trade war, including Dang, Krishna and Zhao (2023), Fajgelbaum et al. (2024), Mayr-Dorn et al. (2023), Ngoc and Wie (2023a, 2023b), Rotunno et al. (2023) and Utar, Cebreros Zurita and Torres Ruiz (2023).



Panel A - Import share of China - US vs. ROW (calculated from raw import data)

Panel B - Import share of China - US vs. ROW (weighted by 2012 product-level demand shares)

Figure 1: Share of China in imports of US and rest of world

This figure displays the share of Chinese goods (by value) in the imports of the US and the rest of the world (ROW) annually from 2012 to 2022. In Panel A, this is calculated from raw import data. In Panel B, this is a weighted average of China's import share for each six-digit product, where the weights are the share of each product in the total imports of the US or ROW as of 2012. The solid line is based on US imports. The dashed line is based on the total imports of the 124 countries (other than the US and China) for which import data is available for all eleven years. Data is from UN Comtrade.

In this paper, we consider two channels through which relocated production for the US market might have retained 'Chinese characteristics'. First, if new trade barriers and increased uncertainty have changed the comparative advantage of third countries (relative to China) as suppliers to the US, then they could also have become attractive destinations for Chinese investment in manufacturing facilities. Some of the relocation of production from China to the 'winners' of greater US market share might therefore have involved capital from Chinese firms themselves.

In line with this hypothesis, media reports have provided anecdotal evidence of foreign manufacturing investments by individual Chinese firms targeting the US market (e.g. Curran et al. 2023, Goodman 2023). At the macroeconomic level, Alfaro and Chor (2023) and Gopinath et al. (2025) use cross-country comparisons to document rising aggregate flows of Chinese FDI to certain 'winner' countries whose US market share has recently risen. However, this phenomenon has not yet been explored systematically using microeconomic evidence based on firm-level variation.

We build such evidence by leveraging the fact that stock market-listed firms in China produce annual reports in which their foreign affiliates must be disclosed. Because these reports also specify the business scope of each affiliate, we can determine whether particular

affiliates are engaged in manufacturing production, rather than other activities such as local sales. In our empirical analysis, we first use Chinese customs data to observe the set of products exported to the US as of 2016 by each listed Chinese firm. We then check whether firms have opened more new manufacturing affiliates in countries where these products subsequently experienced especially large rises in US import share. Our regressions include country fixed effects, so our comparisons are based on variation across products within each 'third country'.

The second channel we explore relates to the use of Chinese-made parts. Even if some goods for the US market are increasingly manufactured in countries other than China, the lowest-cost supplier of the required intermediate inputs might still be a Chinese firm. The apparent shift away from China evident in Figure 1 may therefore fail to reflect the continued presence of Chinese value added in relocated production.

Some other recent papers have considered this possibility. Freund et al. (2024) and Gopinath et al. (2025) draw on observed global trade patterns to argue that some China-US supply chains may be lengthening rather than disappearing, due to the continued use of Chinese intermediate inputs. These exercises do not employ information on input-output relationships, but instead provide evidence based on trade by industry or product category.

In contrast, our analysis precisely distinguishes between different supply chain stages of a particular type of good, by taking advantage of a convenient feature of the Harmonized System (HS) product classification. We identify 153 categories of goods (such as industrial furnaces or vacuum cleaners) for which we can separately observe trade in parts intended for those goods (i.e. 'parts of industrial furnaces' or 'parts of vacuum cleaners'). This allows us to consider whether countries increasing their US import share for certain products have also become larger recipients of Chinese exports of parts specific to these products.[2]

Using this precisely defined variation, we find strong evidence of comovement of both Chinese manufacturing investment and Chinese parts exports with gains in US import share. We interpret these results as indicating that some of the relocation of US-bound production from China to other countries has involved capital and parts from China itself. In other words, we find that new indirect China-US relationships have emerged even as China's importance as a direct US trade partner has declined.[3]

[2]While our study considers changes in global trade flows, Utar, Cebreros Zurita and Torres Ruiz (2023) provide evidence for a single 'third country', showing that Mexican firms specializing in products with higher US tariff hikes on Chinese imports tend to increase exports to the US and imports of inputs from China.

[3]The mechanisms we consider – the opening of affiliates engaged in manufacturing and the use of imported inputs in production – should be distinguished from the transshipment of traded products, as studied in recent contributions to the literature on entrepôt trade (e.g. Ganapati, Wong and Ziv 2024, Do et al. 2024). Iyoha

2 Changes in US import shares

We first introduce our baseline definition of the 'winners' of increased US market share. Based on the timing of the trend break pictured in Figure 1, we mainly consider long differences in trade flows between 2018 and 2022, though we use 2017 as an alternative base year in robustness checks.[4] For most of our empirical exercises, we employ variation in changes in US import share by country and six-digit product. To calculate these changes, we use data on imports as reported by the US, downloaded from the UN Comtrade database.

Before proceeding to our main analysis, we briefly provide summary statistics at a more aggregate level. Table A1 lists the ten countries with the largest increases in their share of total US imports from 2018 to 2022, and the ten countries with the largest declines. Notably, more than half of the countries on the list of 'winners' are in East and Southeast Asia. Among the 'losers', China's decline by 4.50 percentage points is by far the largest.

Importantly for our empirical exercises, which use within-country comparisons, these trends vary substantially across sectors. To demonstrate this, we calculate 2018-2022 differences in US import share for 29 two-digit manufacturing industries, across the 221 countries from which the US imported goods in these years (excluding China). Observations in the top percentile of this measure are reported in Table A2. This includes a broad range of countries (28) and industries (27). Countries with more than three industries represented on the list include Vietnam (13), Mexico (6), Korea (5), Canada (4), India (4) and Indonesia (4).

3 Manufacturing affiliates of Chinese listed firms

3.1 Data description

We begin our main analysis by studying the foreign manufacturing affiliates of Chinese firms. We focus on firms listed on the Chinese stock markets, and use data from their annual reports. In these reports, listed firms are required to disclose affiliates in which they have a controlling interest. In the large majority of cases, the business scope of each affiliate is also outlined, allowing us to identify affiliates involved in manufacturing production.

Information from listed firms' annual reports is available in the China Stock Market and Accounting Research (CSMAR) database. Our sample includes manufacturing firms

et al. (2024) observe rises in transshipment of Chinese-made goods via Vietnam due to the US-China trade war.

[4]This was the year before the first wave of US tariffs on China, so is often defined as the final 'pre-treatment' year in the literature on the US-China trade war.

for which we have annual reports in every year from 2016 to 2022. We identify firms in manufacturing sectors by using the reported industry of each firm as of 2016.

The CSMAR database does not provide affiliate identifiers, instead simply transcribing the information on affiliates provided by listed firms in any given year. We panelize the data by tracking the same affiliate across different years, using the reported name and location of each affiliate in each annual report. We also attempt to identify affiliates whose names change by checking for cases where other reported information remains similar or identical. We are interested in investment relationships between China and 'third countries', so we exclude US affiliates from our analysis. We also drop affiliates located in Hong Kong and Macau.[5]

In order to separately identify affiliates engaged in manufacturing production, we use the reported (Chinese-language) business scope of each affiliate and search for certain keywords: 'industry', 'manufacturing', 'production', 'processing' and 'assembly'. Affiliates with a business scope containing one or more of these keywords in any year from 2016 to 2022 are labelled as manufacturing affiliates. Affiliates with a nonmissing business scope variable in at least one year, but for which the above keywords do not appear, are classified as 'non-manufacturing affiliates'. The most commonly observed business scope descriptions for these affiliates are 'trade', 'sales', 'investment' and 'business'.

We also use Chinese customs data to identify the set of products exported from China to the US by each firm as of 2016.[6] Since we are interested in firms' investments in foreign affiliates – i.e. the evolution of the segment of each firm's business group that is based abroad – we account for the exports of each listed firm's full domestic business group. This includes subsidiaries, joint ventures and associated companies within mainland China, as outlined in the listed firm's 2016 annual report. We match this full list of companies to the 2016 customs data and calculate their total US exports for each product.[7]

As we discuss below, our baseline sample only includes listed manufacturing firms for which we observe at least one new foreign manufacturing affiliate after 2018. There are 304 such firms in the CSMAR dataset, with 663 new manufacturing affiliates during this period, of which we match 250 firms with 527 new manufacturing affiliates to the 2016 customs data.

[5]Because the US does not trade with North Korea, we exclude one North Korean affiliate.

[6]This is the last year of customs data that is available to us, similarly to other recent studies of China-US economic relations such as Benguria et al. (2022) and Chor and Li (2024).

[7]We match these firms across datasets using exact firm names. Some other papers use fuzzy matching to link listed firms to Chinese customs data (e.g. Benguria et al. 2022, Huang et al. 2023). Because such algorithms may pick up subsidiaries with similar names rather than listed firms themselves, we prefer exact matching for our approach using the full domestic business group.

For both firms and affiliates, this corresponds to a match rate of approximately 80%.[8] Table A3 provides additional summary statistics for this sample.

3.2 Empirical strategy

Our goal here is to assess whether listed Chinese firms have tended to open new manufacturing affiliates in countries experiencing gains in US import share for a particular set of products: the specific products exported by the firm to the US at baseline.[9] As discussed above, we define third-country 'winners' using long differences in US import shares between 2018 and 2022. Our baseline measure of foreign investment by Chinese firms thus employs the same timeframe; specifically, we consider the cumulative entry of foreign affiliates for each firm after 2018 and up to 2022.[10] We analyze the placement of each firm's foreign affiliates net of country-level trends and total firm-level affiliate entry, by adding country and firm fixed effects to our regressions.

In order to calculate a country-specific 'change in US import share' variable based on each firm's product mix, we begin by taking the difference between the 2022 and 2018 US import shares of each country for each six-digit product. We then take a weighted sum according to the share of each product in the total 2016 US exports of a given listed firm and its related companies. In other words, for firm f and country c (denoting products by p):

$$\Delta USImportShare_{fc} = \sum_{p} \frac{ExportstoUS_{pf,2016}}{ExportstoUS_{f,2016}} \left(\frac{USImports_{pc,2022}}{USImports_{p,2022}} - \frac{USImports_{pc,2018}}{USImports_{p,2018}} \right) \quad (1)$$

This variable identifies the countries gaining more or less US market share in the products in which each listed firm specialized (in terms of its own trade with the US) as of 2016.

Because our left-hand side variable is a count of each firm's new affiliates in a given country, we employ a Poisson specification. Regressions using this functional form drop categories where the dependent variable is uniformly equal to zero and thus perfectly predicted by the relevant fixed effects. So the comparisons we make only include firms opening at least one new manufacturing affiliate between 2019 and 2022, and countries with at least one

[8] If we match listed firms only, rather than all firms in the domestic business group, 181 listed firms with 358 manufacturing affiliates are successfully matched. Our main results remain similar when we implement our empirical strategy using this alternative approach (see Table A5 Panel A).

[9] We focus on entry of new affiliates, rather than growth of existing affiliates, because our dataset only includes affiliate-specific accounting data for a small share of affiliates.

[10] Our main results remain very similar if we use 2017 rather than 2018 as our base year for these variables, as shown in Table A5 Panel B.

new manufacturing affiliate during the same period. The question we address is therefore as follows: among firms and countries with new manufacturing affiliates, have firms with a given product mix opened more affiliates in countries with larger increases in US import share for those products?

Our baseline estimating equation is as follows:

$$NewAffiliates_{fc} = exp(\beta \Delta USImportShare_{fc} + \delta_f + \gamma_c) \times \epsilon_{fc} \tag{2}$$

Here, $NewAffiliates_{fc}$ represents cumulative entry of manufacturing affiliates after 2018 by firm f in country c, $\Delta USImportShare_{fc}$ is the change in the country's share of US import value in 2022 relative to 2018 for the firm-specific product mix, and δ_f and γ_c are firm and country fixed effects respectively. Standard errors are estimated using two-way clustering by firm and country.

In interpreting our coefficient estimates, two important considerations should be kept in mind. First, this regression does not estimate a causal parameter, but instead provides descriptive evidence of a particular global trend. We hypothesize that falling direct trade between China and the US may have coincided with a multilateral economic realignment involving new indirect China-US relations. This empirical exercise is designed to investigate the hypothesis in a simple and transparent way, allowing for many possible destinations of Chinese investment without specifying any particular source of bilateral (China-US) variation other than initial firm-level conditions.

Second, the foreign affiliates in our dataset originate from only a small subset of all Chinese manufacturers. These enterprises form an important component of the Chinese economy: as of 2016, the manufacturing firms in the CSMAR data reported assets corresponding to approximately 20% of the total asset value of all manufacturing firms participating in the China-wide Annual Survey of Industrial Enterprises.[11] However, the exclusion of other Chinese firms means that our results should not be seen as capturing trends in FDI across all Chinese exporters. In particular, smaller exporters may have been less likely to open foreign manufacturing affiliates as compared to the relatively large listed firms in our sample. Similarly, our regressions have nothing to say about the changing foreign investment patterns of non-Chinese firms with an initial manufacturing presence in China. Instead, our findings are best interpreted in terms of our paper's main motivation: to provide microeconomic evidence of the emergence of new indirect relationships between China and the US, by focusing on the subset of Chinese firms for which we can most reliably observe such evidence.

[11] This number is based on data from CSMAR and the China Statistical Yearbook.

3.3 Results

Before discussing our main results, we begin by briefly citing suggestive evidence based on country-level variation. Figure 2 Panel A displays aggregate trends for the ten countries with the largest gains in total US import share in 2022 relative to 2018. We observe that during this period, these countries have also hosted a sharply increasing share of the foreign manufacturing affiliates (outside the US) of Chinese listed firms.

We now proceed to the firm-level evidence from equation (1), in which country-level trends are absorbed into fixed effects, and results are instead based on within-country variation in US import growth across products. The estimated coefficient of interest from this specification is displayed in column (1) of Table 1. This indicates that a firm with a given product mix opened approximately 8.6% more new manufacturing affiliates in countries that increased their US import share for this set of products by one percentage point, as compared to countries with no gain.[12] This result is statistically significant with a p-value of 0.008.

We next add a control variable capturing the cross-sectional distribution of manufacturing affiliates as of 2017. This allows us to compare firms with the same number of affiliates in a given country before the intensification of US-China economic tensions.[13] As shown in column (2), our main result changes little with the inclusion of this control.

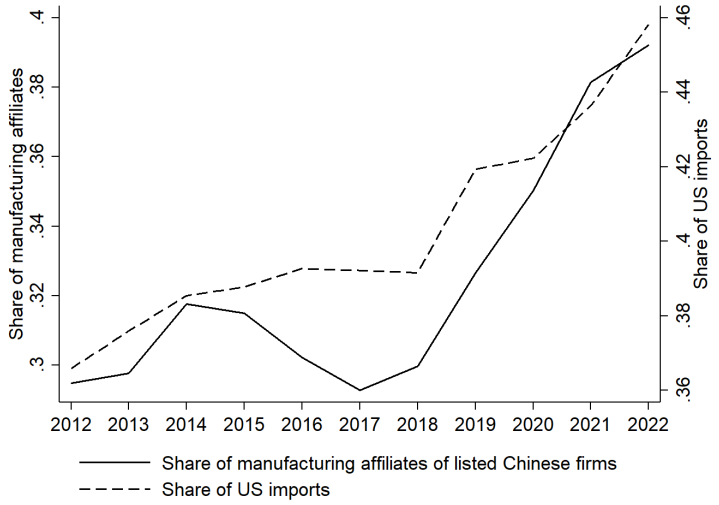
These results provide evidence that some of the relocation of US-bound production from China to 'winner' countries has also involved expansion of indirect US-China relationships, via new manufacturing affiliates of Chinese firms. However, an alternative possibility is that the observed 'winners' of increased US market share simply experienced generally higher economic growth during this period. Although we account for country-level trends by using country fixed effects, our findings might capture local growth trends in particular regions specializing in certain subsets of products.

In this case, we might expect firms to open more affiliates in these places in general, including affiliates engaged in non-manufacturing activities such as sales. However, as shown in columns (3) and (4) of Table 1, we observe no such pattern. Here, we replace our dependent variable with the cumulative entry of new non-manufacturing affiliates from 2019 to 2022.[14] The estimated coefficients are much smaller in magnitude, of a different sign and not statistically significant. We provide further evidence against a 'local growth' interpretation

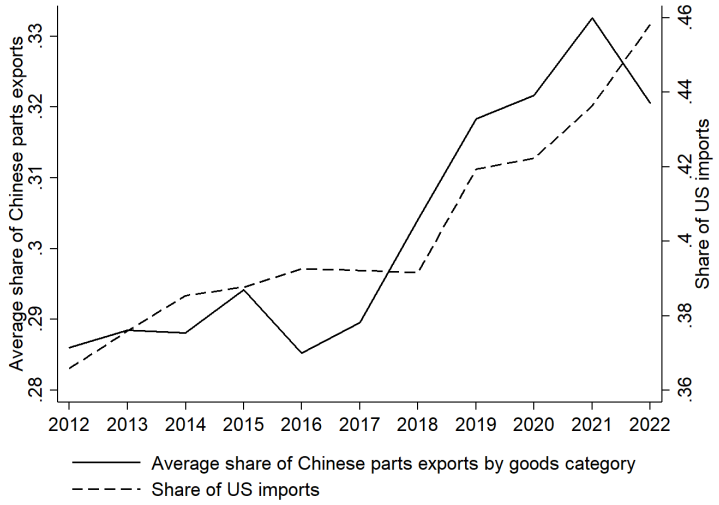
[12] This interpretation is based on the calculation $(e^{8.237\times0.01} - 1) \times 100 = 8.6\%$.

[13] We use the 2017 distribution of affiliates so that we can attempt robustness checks with 2017 as our base year (Table A5 Panel B) without changing this control variable. Our results remain similar if we instead control for the number of affiliates in 2018.

[14] See Table A3 for relevant summary statistics.



Panel A - Share of manufacturing affiliates of listed Chinese firms



Panel B - Share of Chinese parts exports on average across goods categories

Figure 2: Trends in Chinese economic relations with top ten 'winner' countries

This figure displays trends in the economic relations of China with the ten countries experiencing the largest increases in share of total US import value between 2018 and 2022 (as listed in Table A1). In both panels, the dashed line depicts these countries' share of US import value in each year from 2012 to 2022. In Panel A, the solid line represents these countries' share of the foreign manufacturing affiliates of listed Chinese firms. Affiliates in the US, Hong Kong and Macau are excluded from this calculation. In Panel B, the solid line depicts these countries' share of Chinese export value of parts, on average across 153 categories of goods where parts are distinguished from their downstream uses in the Harmonized System (HS) product classification. Exports to the US, Hong Kong and Macau are excluded from this calculation. Data is from UN Comtrade and the China Stock Market and Accounting Research (CSMAR) database.

Table 1: Number of new affiliates by firm and country

	Manufacturing affiliates		Non-manufacturing affiliates	
	(1)	(2)	(3)	(4)
Δ US import share	8.237	8.103	-1.516	-1.442
	(3.127)	(3.340)	(1.775)	(1.945)
Number of affiliates in 2017		0.334		0.203
		(0.090)		(0.080)
Firm FEs	Yes	Yes	Yes	Yes
Country FEs	Yes	Yes	Yes	Yes
Firms	250	250	352	352
Countries	67	67	91	91
Observations	16,750	16,750	32,032	32,032

This table considers the relationship between product-level changes in the US import share of a country between 2018 and 2022 and the number of new affiliates of Chinese listed firms in that country. Observations vary by Chinese listed firm and partner country. Each firm is associated with the mix of six-digit products that the firm's mainland Chinese business group (the firm itself, subsidiaries, related firms and joint ventures) exported to the US in 2016, weighted using the share of each product in the group's total 2016 exports to the US. Subsidiaries, related firms or joint ventures appearing in more than one business group are excluded from this calculation. The dependent variable is the number of new affiliates in a given country that are reported by the listed firm between 2019 and 2022. In columns (1) and (2), this includes only manufacturing affiliates, and in columns (3) and (4), this includes only non-manufacturing affiliates. The variable 'Δ US import share' is the change in the country's share of US import value between 2018 and 2022 for the mix of products exported to the US in 2016 by the firm's domestic business group. The variable 'number of affiliates in 2017' is the number of the firm's manufacturing affiliates (column (2)) or non-manufacturing affiliates (column (4)) in a given country as reported in the firm's 2017 annual report. All specifications include firm and country fixed effects. All regressions are estimated using Poisson pseudo-maximum likelihood. Standard errors (in parentheses) are estimated using two-way clustering by firm and country.

of our main results in Section 5.

We also attempt specifications with a dummy variable identifying 'top winners' on the right-hand side in place of $\Delta USImportShare_{fc}$. We set this variable equal to one for the country with the largest increase in US import share for each firm's product mix (Table A6 Panel A), or alternatively for the top three countries by this measure for each firm (Table A6 Panel B). We find that listed firms opened 113% more manufacturing affiliates in the location experiencing the greatest rise in US market share for the firm's product mix (and 106% more in the top three locations), as compared to the other countries in the sample.

Finally, we consider the regional and sectoral heterogeneity underlying our findings. Panel A of Table A7 reproduces our main analysis for East and Southeast Asian countries only, while in Panel B, we instead remove these countries from the sample. The point estimates for manufacturing affiliates in East and Southeast Asia are slightly larger than those for the

full sample in Table 1, while the corresponding estimates for the rest of our sample are much closer to zero. When we further subdivide the 'rest of world' subsample to include only non-high-income countries such as Mexico and India (Panel C), we again observe point estimates similar to those in Table 1; only Chinese manufacturing investment in high-income countries does not follow this pattern (Panel D). Table A8 shows that the relationship observed in Table 1 is particularly strong among the 35% of sample firms who are manufacturers of machinery and electrical equipment.

4 Chinese exports of parts

4.1 Data description

We now consider whether exports of Chinese intermediate inputs are increasingly directed towards countries gaining US import share in products using those inputs. To do this, we use data identifying international trade flows of specific categories of goods and their parts. This exercise is facilitated by the structure of the Harmonized System (HS) classification of traded products, which separately classifies various types of parts in terms of their downstream uses.

For example, the four-digit product code 8508 is made up of a set of six-digit codes relating to vacuum cleaners. Three of these codes relate to different types of vacuum cleaners, while the final code (850870) is for 'Parts of vacuum cleaners'. We therefore treat goods classified under this last code as inputs for goods classified under the other three. We repeat this exercise for all cases where manufactured parts are separately defined, at the six-digit level, from the downstream products in which they are used. While this approach relies only on widely available trade data, it nonetheless represents a novel contribution allowing us to capture input-output relationships more precisely than the more aggregate input-output tables used by much of the literature.

Our procedure gives us a sample including 153 categories of goods.[15] In general, these are complex products that involve a potentially large range of parts. According to the International Standard Industrial Classification (ISIC), 78% of these goods categories fall into the two-digit industries covering electronics and instruments, electrical equipment and other machinery.

[15] For 45 of the 153 categories, the HS classification groups 'parts' together with some other related products (usually 'accessories') within the same six-digit product code. Our main results remain very similar, though are less precisely estimated, when we drop these categories (see Table A9 Panel A). We exclude weapons and nuclear reactors from our dataset because these are sensitive products for which reporting of trade value may be incomplete.

Information on trade in these products is available from the UN Comtrade dataset. From this data, we use the export value of parts as reported by China and the import value of downstream goods as reported by the US. For each of the goods categories we study, we calculate the total value of trade for all of the six-digit products constituting that category (separately for parts and downstream goods). This is disaggregated by partner country.[16]

4.2 Empirical strategy

As in the previous section, we use long differences in US import shares between 2018 and 2022 to identify 'winners'.[17] These are calculated for each country and goods category, based on US imports of downstream products. We also define an analogous measure by country and goods category for Chinese exports of parts. Because we are again interested in reallocation of Chinese economic activity across 'third countries', we exclude the US from the Chinese export measure, along with Hong Kong and Macau. In contrast, we retain China in our calculation of US import shares, so that measured gains for 'third countries' are larger when US imports from China fall further.

Our baseline regression specification relates the 2018-2022 change in the share of each 'third country' in China's exports of parts to the contemporaneous change in the share of the same country in US imports of the downstream goods using those parts. These comparisons are made across 209 countries and the 153 goods categories discussed above. The specification is as follows:

$$\Delta ChinaExportShare_{gc} = \beta \Delta USImportShare_{gc} + \delta_g + \gamma_c + \epsilon_{gc} \tag{3}$$

Here, $\Delta ChinaExportShare_{gc}$ is the change between 2018 and 2022 in the share of country c in Chinese exports of parts in goods category g. The regressor $\Delta USImportShare_{gc}$ is the change from 2018 to 2022 in the country's share of US import value of downstream goods using these parts. Goods category and country fixed effects are represented by δ_g and γ_c respectively. We use ordinary least squares for this regression, and standard errors are estimated using two-way clustering by goods category and country.

As in Section 3, our analysis provides descriptive evidence of indirect China-US relations, rather than estimating a causal relationship. The variables $\Delta USImportShare_{gc}$ and

[16] We exclude North Korea, and several small countries with which either the US or China does not separately report trade. See Table A4 for relevant summary statistics.

[17] We again confirm the robustness of our main results to using 2017 rather than 2018 as our base year; see Table A9 Panel B.

$\Delta ChinaExportShare_{gc}$ should be viewed as moving together as global supply chains are realigned. Also, the sample used in this regression excludes products for which parts and final goods cannot be linked via the HS classification. Nonetheless, the products we study constitute an important part of world trade. As of 2017, the goods categories in our sample accounted for 50.7% of total US import value and 59.7% of the total value of Chinese exports.

4.3 Results

We again begin by briefly discussing cross-country trends. In particular, we consider Chinese exports of parts to the ten countries with the largest increases in US import share between 2018 and 2022. Panel B of Figure 2 shows that the share of China's parts exports flowing to these countries (on average across the 153 goods categories discussed above) has risen steeply, in parallel with their gains in US market share.

Column (1) of Table 2 displays the results of estimating equation (3). We estimate that the rise in the share of a country in Chinese exports of parts for a particular goods category was 0.118 percentage points larger if its increase in US import share for that category of goods was higher by one percentage point. This result is statistically significant with a p-value of 0.091.

Although our dataset linking parts to downstream products covers a substantial share of world trade, the distribution of trade value across these goods categories is highly skewed. Indeed, the top five categories (covering especially important goods such as office machines and motor vehicles) accounted for more than 50% of the total US downstream import value captured by our data as of 2017, while the bottom quartile of categories accounted for less than 0.3%. We attempt regressions that exclude the smallest goods categories (while still retaining sufficient variation for estimation), by sequentially dropping the bottom 5%, 10% and 25% of categories according to 2017 downstream US import value. The results, displayed in columns (2) to (4) of Table 2, are robust to these sample restrictions.

In Table A10, we replace $\Delta USImportShare_{gc}$ with a dummy variable that is equal to one for the country (Panel A) or three countries (Panel B) with the largest rise in downstream US import share for each goods category. Our point estimates suggest that the increase in the average share of Chinese parts exports of the three 'top winners' was larger than that of other countries by approximately 0.8 percentage points. In comparison, the average value of $\Delta USImportShare_{gc}$ for these countries is approximately 4.5 percentage points.

Finally, we consider heterogeneity by region and sector in the observed comovement between US imports of downstream goods and Chinese exports of parts. We find especially

Table 2: Share of Chinese parts exports by goods category and country

	All goods categories (1)	Excluding smallest 5% (2)	Excluding smallest 10% (3)	Excluding smallest 25% (4)
Δ US import share	0.118	0.156	0.165	0.141
	(0.069)	(0.082)	(0.101)	(0.063)
Goods category FEs	Yes	Yes	Yes	Yes
Country FEs	Yes	Yes	Yes	Yes
Goods categories	153	145	137	114
Countries	209	209	209	209
Observations	31,977	30,305	28,633	23,826

This table considers the relationship between the change in the US import share of a country for downstream products in a specific goods category and the change in that country's share of exports from China of parts used in products in that goods category. Observations vary by goods category and country. The dependent variable is the change in the country's share of Chinese export value of the parts in a specific goods category between 2018 and 2022. China's exports to the US, Hong Kong and Macau are excluded from the calculation of this share. The variable 'Δ US import share' is the change in the country's share of US import value of the downstream products in a specific goods category between 2018 and 2022. The sample in column (1) includes all goods categories for which parts and downstream products are separately observable in the Harmonized System product classification. The samples in columns (2), (3) and (4) exclude the smallest 5%, 10% and 25% of goods categories, respectively, according to total US imports of downstream products in each goods category as of 2017. All specifications include goods category and country fixed effects. All regressions are estimated using ordinary least squares. Standard errors (in parentheses) are estimated using two-way clustering by goods category and country.

strong evidence of this relationship within East and Southeast Asia (Table A11). We also observe smaller but statistically significant point estimates when we restrict our sample to non-high-income countries outside this region. The results for the subsample of high-income countries outside East and Southeast Asia are quite imprecisely estimated, and not statistically significant. Across industries, the relationship of interest is particularly strong for electrical equipment (Table A12), as with our findings for manufacturing affiliates above.

5 Relevance to US-China relations

In the previous two sections, we have documented the parallel evolution of the economic relations of the US and China with 'third countries' recently gaining US import share. We now conduct four additional exercises that provide further evidence of the relevance of these trends to the bilateral US-China economic relationship. As discussed in Section 3, an alternative explanation of our main results is that we have simply captured localized

economic growth among the 'winners', rather than relocation of Chinese production for the US market more specifically.

If this were the case, we might expect to see similar patterns of Chinese manufacturing investment and parts exports for 'winners' of higher market share in other advanced economies. We therefore reproduce our main empirical exercises using data for the EU, Japan or Canada, rather than the US. Table 3 Panel A shows results of running the regressions of Table 1 columns (1) and (3), and Table 2 columns (1) and (4), using these three alternative versions of each specification. None of these exercises yields a similar pattern to our findings for the US.

In Panel B, we take the alternative approach of re-estimating our baseline regressions with an additional control variable. In particular, we define $\Delta ROWImportShare_{fc}$ (or $\Delta ROWImportShare_{gc}$) analogously to $\Delta USImportShare_{fc}$ (or $\Delta USImportShare_{gc}$), replacing US imports from country c with the imports of the rest of the world (ROW) from c. Including this control allows us to check the extent to which our estimates are driven by changes in global market shares at the country-product level, rather than rising imports to the US in particular. We find that accounting for potentially correlated growth in US and ROW market shares leads to little change in the coefficients in our baseline regressions.[18]

We next show that our main findings are entirely driven by cases where China's share of US imports has declined during the period studied. In Panel C columns (1) and (2), we present results from running our baseline specification in Table 1 for two subsamples of firms. We first take the set of products exported to the US by each firm in 2016 (weighted by export value) as in Section 3, and then calculate whether the China-wide trend in US import share for this product mix was negative or positive between 2018 and 2022.[19] Column (1) includes only firms with a product mix for which China lost US market share, while Column (2) includes all other firms.

Similarly, in columns (3) and (4) of Panel C, we run the baseline specification from Table 2 for two subsets of goods categories. These are defined according to whether China lost (column (3)) or gained (column (4)) US market share in the downstream products in each

[18]Table A13 shows that our main results are also robust to controlling for changes in import shares of the EU, Japan, Canada or China itself. The estimated coefficients on these controls are much smaller than the coefficient on $\Delta USImportShare$. Notably, Table 3 Panel B indicates that Chinese parts exports have risen to countries with larger total worldwide gains in downstream market share (see columns (3) and (4)). Our results suggest that the US is the only *individual* major economy whose downstream imports have been of substantial importance in driving this relationship.

[19]Because we do not have firm-level trade data after 2016, we cannot conduct this exercise using firm-specific trends.

Table 3: Additional evidence on relevance of main results to US-China relations

	(1) Manufacturing affiliates	(2) Non-manufacturing affiliates	(3) All goods categories	(4) Excluding smallest 25%
Panel A - Results for other major economies				
Δ EU import share	-1.394	-0.374	-0.005	0.010
	(4.588)	(1.326)	(0.026)	(0.034)
Observations	12,561	24,840	28,458	21,204
Δ Japan import share	-1.193	3.861	0.009	-0.010
	(2.437)	(0.720)	(0.014)	(0.023)
Observations	12,411	25,010	30,906	23,028
Δ Canada import share	1.150	0.316	0.016	0.030
	(5.093)	(0.762)	(0.015)	(0.060)
Observations	10,443	23,042	31,059	23,142
Panel B - Control for change in ROW import share				
Δ US import share	8.377	-1.353	0.114	0.120
	(3.167)	(1.712)	(0.069)	(0.058)
Δ ROW import share	-4.174	-2.844	0.107	0.272
	(5.134)	(3.628)	(0.052)	(0.056)
Observations	16,750	32,032	31,977	23,826
	Manufacturing affiliates		Share of parts exports	
	China loss	China gain	China loss	China gain
Panel C - Heterogeneity by Chinese loss or gain in US import share				
Δ US import share	9.728	-4.883	0.169	0.001
	(2.491)	(3.083)	(0.099)	(0.039)
Observations	12,915	1,350	21,736	10,241
	Manufacturing affiliates		Share of parts exports	
	Above-median exposure	Below-median exposure	Above-median exposure	Below-median exposure
Panel D - Heterogeneity by exposure to rises in US tariffs on Chinese goods				
Δ US import share	12.013	0.309	0.139	0.106
	(4.027)	(3.830)	(0.065)	(0.088)
Observations	6,000	6,875	15,884	16,093

This table reproduces specifications in Tables 1 and 2 with certain variations. Panels A and B are based on the specifications of Table 1 columns (1) and (3) and Table 2 columns (1) and (4). In Panel A, each column presents the results of three different regressions, where the variable 'Δ (economy) import share' in each regression is calculated using imports for the specified economy (rather than the US). Also, in columns (1) and (2) of Panel A, the firm-specific product mix is based on exports to the specified economy (rather than the US) by the firm's domestic business group in 2016. In Panel B, the control variable 'Δ ROW import share' is added to the specifications of Tables 1 and 2. This is calculated similarly to 'Δ US import share', but using the imports of the 131 countries (other than the US) for which product-level import data is available for both 2018 and 2022. In Panels C and D, columns (1) and (2) reproduce Table 1 column (1) for two different subsamples, and columns (3) and (4) reproduce Table 2 column (1) for two different subsamples. The construction of these subsamples is explained in the main text of Section 5.

category between 2018 and 2022. For both our affiliates and parts results, we observe positive and statistically significant estimates only for the subsamples where China experienced losses in US market share.

In Panel D, we instead divide firms and goods categories into subsamples based on a simple measure of exposure to US trade policy. This exercise uses data from Bown (2021) on rises in US tariffs on Chinese products in 2018 and 2019. For listed firms, we construct a measure weighting product-level tariff increases according to the firm's 2016 exports to the US of each product, divided by the firm's total 2016 export value. We also define an analogous measure for each goods category, using China's 2017 exports to the US of the downstream products within each category. So denoting firms or goods categories by i, products by p and the baseline year by t_0, we calculate:

$$TariffExposure_i = \sum_p \frac{ExportstoUS_{pi,t_0}}{TotalExports_{i,t_0}} \Delta USTariff_p \tag{4}$$

Columns (1) and (2) of Panel D present results of running the baseline regression from Table 1 separately for firms with above-median and below-median values of this measure. Only the first of these estimates is statistically significant and of a similar magnitude to the baseline result. The corresponding exercise for goods categories may be found in columns (3) and (4). In this case, the point estimate for above-median categories is larger, but this difference is not significant.

6 Conclusion

In this study, we have explored how global supply chains might evolve when political and economic tensions between major participants rise. Specifically, we have examined the changing economic relationship between China and the US, in the context of the intensification of these two countries' geopolitical rivalry and sharp changes in bilateral trade policy.

We have documented parallel shifts in the relations of both the US and China with 'winner' countries who have recently increased their US market share. In particular, we have found that as 'winner' countries' share of US imports has grown, so has their importance as destinations of manufacturing investment and intermediate inputs from China. This is evidence that relocation of production for the US market has not always removed Chinese economic actors from the production process. Instead, as political and economic tensions between China and the US have increased, one of the ways in which their supply chains have

changed is through new indirect relationships.

Our findings suggest that factors that currently appear to threaten globalization might not simply lead to the unwinding of supply chains or 'decoupling' of affected economies, but may instead result in more complex outcomes. Of course, this paper has been limited to providing a snapshot of a single important case: the evolution of China-US economic relations as of the early 2020s. Many future directions remain possible, both for the China-US relationship and for the global economy in general. Further research will play an important role in our understanding of these events.

References

[1] Alfaro, Laura and Davin Chor (2023). "Global Supply Chains: The Looming 'Great Reallocation'", in *Structural Shifts in the Global Economy*, Federal Reserve Bank of Kansas City, 213-278.

[2] Benguria, Felipe, Jaerim Choi, Deborah L. Swenson and Mingzhi (Jimmy) Xu (2022). "Anxiety or Pain? The Impact of Tariffs and Uncertainty on Chinese Firms in the Trade War", *Journal of International Economics* 137, 103608.

[3] Bown, Chad P. (2021). "The US-China Trade War and Phase One Agreement", Peterson Institute for International Economics Working Paper 21-2.

[4] Cameron, A. Colin, Jonah B. Gelbach and Douglas L. Miller (2008). "Bootstrap-based Improvements for Inference with Clustered Errors", *Review of Economics and Statistics* 90 (3), 414-427.

[5] Chor, Davin and Bingjing Li (2024). "Illuminating the Effects of the US-China Tariff War on China's Economy", *Journal of International Economics* 150, 103926.

[6] Curran, Enda, Shawn Donnan, Maeva Cousin, Nguyen Dieu Tu Uyen, Nguyen Xuan Quynh, Maciej Martewicz, Maya Averbuch, Brendan Murray, Annie Lee, Grace Sihombing and Claire Jiao (2023). "These Five Countries Are Key Economic 'Connectors' in a Fragmenting World", Bloomberg Businessweek, November 2.

[7] Dang, Alicia H., Kala Krishna and Yingyan Zhao (2023). "Winners and Losers from the U.S.-China Trade War", National Bureau of Economic Research Working Paper 31922.

[8] Do, Anh, Sharat Ganapati, Woan Foong Wong and Oren Ziv (2024). "Transshipment Hubs, Trade, and Supply Chains", working paper.

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

[10] Freund, Caroline, Aaditya Mattoo, Alen Mulabdic and Michele Ruta (2024). "Is US Trade Policy Reshaping Global Supply Chains?", *Journal of International Economics* 152, 104011.

[11] Ganapati, Sharat, Woan Foong Wong and Oren Ziv (2024). "Entrepôt: Hubs, Scale and Trade Costs", *American Economic Journal: Macroeconomics* 16 (4), 239-178.

[12] Goodman, Peter S. (2023). "Why Chinese Companies Are Investing Billions in Mexico", New York Times, February 3.

[13] Gopinath, Gita, Pierre-Olivier Gourinchas, Andrea F. Presbitero and Petia Topalova (2025). "Changing Global Linkages: A New Cold War?", *Journal of International Economics* 153, 104042.

[14] Iyoha, Ebehi, Edmund Malesky, Jaya Wen, Sung-Ju Wu and Bo Feng (2024). "Exports in Disguise?: Trade Rerouting During the US-China Trade War", working paper.

[15] Jett, Jennifer, Dan De Luce and Janis Mackey Frayer (2023). "Six Months After 'Zero Covid', U.S. Firms in China Still Face 'Uncertainty on Top of Uncertainty' ", NBC News, June 10.

[16] Mayr-Dorn, Karin, Gaia Narciso, Duc Anh Dang and Hien Phan (2023). "Trade Diversion and Labor Market Adjustment: Vietnam and the U.S.-China Trade War", Johannes Kepler University of Linz Working Paper No. 2304.

[17] Ngoc, Pham Phuong and Dainn Wie (2023a). "Fishing in Troubled Waters: The Impact of the US-China Trade War on Vietnam", National Graduate Institute for Policy Studies Discussion Paper 23-6.

[18] Ngoc, Pham Phuong and Dainn Wie (2023b). "Impact of the US-China Trade War on Vietnam's Labor Market", National Graduate Institute for Policy Studies Discussion Paper 23-9.

[19] Roodman, David, James G. MacKinnon, Morten Ørregaard Nielsen and Matthew D. Webb (2019). "Fast and Wild: Bootstrap Inference in Stata Using Boottest", *Stata Journal* 19 (1), 4-60.

[20] Rotunno, Lorenzo, Sanchari Roy, Anri Sakakibara and Pierre-Louis Vézina (2023). "Trade Policy and Jobs in Vietnam: The Unintended Consequences of Trump's Trade War", King's College London Quantitative Political Economy Research Group Working Paper 2023-56.

[21] Utar, Hâle, Alfonso Cebreros Zurita and Luis Bernardo Torres Ruiz (2023). "The US-China Trade War and the Relocation of Global Value Chains to Mexico", CESifo Working Paper 10638.

[22] Zhou, Marrian (2023). "U.S. Corporate Optimism on China Falls to Record Low: Survey", Nikkei Asia, September 20.

Table A1: Top ten and bottom ten countries by 2018-2022 change in US import share

Top ten countries		Bottom ten countries	
Country	Δ Aggregate US import share (pp)	Country	Δ Aggregate US import share (pp)
Vietnam	2.06	China	-4.50
Taiwan	1.04	Japan	-1.00
Canada	0.77	Venezuela	-0.50
Korea	0.67	Germany	-0.46
Thailand	0.60	United Kingdom	-0.44
India	0.54	Russia	-0.38
Indonesia	0.27	France	-0.30
Mexico	0.24	Saudi Arabia	-0.23
Ireland	0.24	Israel	-0.20
Cambodia	0.24	Iraq	-0.16

This table displays the change in the share of total US import value between 2018 and 2022 of the ten countries with the largest increases in this variable and the ten countries with the largest decreases in this variable. Changes in US import share are denoted in percentage points.

Table A2: Top 1% 'winner' increases in 2018-2022 US import share within industry

Country	Industry	Δ Share	Country	Industry	Δ Share	Country	Industry	Δ Share
Australia	Metal products	2.94	Korea	Chemicals	4.66	Thailand	Chemical fibers	2.71
Belgium	Pharmaceuticals	2.60		Automobiles	3.10		Electrical equipment	1.77
Bangladesh	Apparel	5.04		Iron and steel	1.79		Electronics	1.71
	Textiles	1.58		Non-ferrous metal	1.79	Turkey	Chemical fibers	3.03
Brazil	Wood products	1.73		Electrical equipment	1.70		Non-metal products	2.74
Cambodia	Leather/footwear	4.22	Malaysia	Furniture	1.45	UK	Recycling	3.50
Canada	Transport equipment	2.24	Mexico	Beverages	10.56	Vietnam	Furniture	10.89
	Iron and steel	1.98		Oil refining	3.96		Electronics	8.00
	Oil refining	1.85		Iron and steel	3.72		Leather/footwear	6.00
	Food processing	1.72		Automobiles	3.20		Chemical fibers	5.07
Dom. Rep.	Tobacco	4.84		Transport equipment	3.10		Apparel	4.15
Germany	Chemical fibers	1.56		Recycling	2.29		Rubber/plastic	3.03
India	Non-metal products	2.50	Netherlands	Oil refining	1.58		Printing	2.91
	Iron and steel	2.12	Nicaragua	Tobacco	5.26		Stationery/recreation	2.77
	Apparel	1.62	Saudi Arabia	Oil refining	3.46		Textiles	2.44
	Printing	1.46	South Africa	Non-ferrous metals	2.23		Electrical equipment	2.29
Indonesia	Chemical fibers	3.49	Spain	Recycling	1.50		Wood products	2.22
	Leather/footwear	3.01	Sweden	Paper products	1.83		Non-metal products	2.14
	Food processing	2.21	Switzerland	Metal products	9.19		General machinery	1.70
	Furniture	1.73		Instruments	2.83			
Iraq	Oil refining	2.61		Non-ferrous metals	1.44			
Ireland	Chemicals	1.96	Taiwan	Electronics	5.44			
Italy	Printing	2.01		Transport equipment	1.91			
	Leather/footwear	1.61		General machinery	1.40			

This table lists the top 1% of gains in US import share between 2018 and 2022 at the country-industry level, for countries other than China. This includes 29 two-digit manufacturing industries, based on the 2012 Chinese industrial classification, and 223 countries for which total US imports were not equal to zero during this period. For each country, industry and year, shares are calculated relative to total industry-level US imports in that year. Changes in US import share are denoted in percentage points.

Table A3: Summary statistics for Table 1

Panel A - Manufacturing affiliates in sample for Table 1 columns (1) and (2)

	Mean	SD	p25	p50	p75	Max	Total
By firm (250 firms):							
New manufacturing affiliates	2.11	2.35	1	1	2	16	527
Manufacturing affiliates in 2017	1.53	3.49	0	1	2	33	382
By country (67 countries):							
New manufacturing affiliates	7.87	13.35	1	3	9	85	527
Manufacturing affiliates in 2017	5.70	8.66	1	3	6	49	382
By firm-country (16,750 observations):							
New manufacturing affiliates	0.03	0.24	0	0	0	8	527
Manufacturing affiliates in 2017	0.02	0.22	0	0	0	11	382

Panel B - Non-manufacturing affiliates in sample for Table 1 columns (3) and (4)

	Mean	SD	p25	p50	p75	Max	Total
By firm (352 firms):							
New non-manufacturing affiliates	3.33	5.66	1	1.5	3	57	1172
Non-manufacturing affiliates in 2017	2.66	5.98	0	1	3	53	938
By country (91 countries):							
New non-manufacturing affiliates	12.88	21.33	1	5	14	146	1172
Non-manufacturing affiliates in 2017	10.30	18.89	1	3	12	97	938
By firm-country (32,032 observations):							
New non-manufacturing affiliates	0.03	0.34	0	0	0	28	1172
Non-manufacturing affiliates in 2017	0.03	0.32	0	0	0	25	938

Panel C - Changes in US import shares in samples for Table 1

	Mean	SD	p1	p5	p50	p95	p99
Δ US import share ($\times$100, pp):							
Manufacturing affiliates sample	0.11	1.56	-2.73	-0.46	0.00	1.20	5.18
Non-manufacturing affiliates sample	0.08	1.55	-2.56	-0.34	0.00	0.76	4.37

This table provides summary statistics for the samples used in Table 1. The sample of Table 1 columns (1) and (2) includes all firms and countries for which we observe at least one new manufacturing affiliate between 2019 and 2022 ('Manufacturing affiliates sample'). The sample of Table 1 columns (3) and (4) includes all firms and countries for which we observe at least one new non-manufacturing affiliate between 2019 and 2022 ('Non-manufacturing affiliates sample'). Panel A of this table relates to the 'Manufacturing affiliates sample' and Panel B relates to the 'Non-manufacturing affiliates sample'. Panel C provides summary statistics for both samples, across all firm-country observations in each sample. Changes in US import shares are denoted in percentage points.

Table A4: Summary statistics for Table 2

	Mean	SD	p1	p5	p50	p95	p99
Δ US downstream import share (×100, pp):							
All goods categories	0.02	1.22	-1.38	-0.05	0.00	0.12	2.19
Excluding smallest 5%	0.02	1.12	-1.28	-0.05	0.00	0.12	2.13
Excluding smallest 10%	0.02	1.04	-1.21	-0.04	0.00	0.12	1.89
Excluding smallest 25%	0.03	0.83	-0.96	-0.04	0.00	0.12	1.67
Δ China parts export share (×100, pp):							
All goods categories	-0.00	1.42	-3.07	-0.39	0.00	0.51	2.88
Excluding smallest 5%	-0.00	1.42	-3.05	-0.39	0.00	0.50	2.85
Excluding smallest 10%	-0.00	1.38	-2.99	-0.39	0.00	0.49	2.77
Excluding smallest 25%	-0.00	1.11	-2.62	-0.37	0.00	0.47	2.48

This table provides summary statistics for the samples used in Table 2, across all goods category-country observations in each sample. Changes in US import shares for downstream goods and Chinese export shares for parts are denoted in percentage points.

Table A5: Number of new affiliates by firm and country – alternative measure and base year

	Manufacturing affiliates		Non-manufacturing affiliates	
	(1)	(2)	(3)	(4)
Panel A - Firm-specific product mix based on listed firms only				
Δ US import share	10.452	10.185	0.952	1.467
	(3.252)	(3.229)	(1.477)	(1.527)
Number of affiliates in 2017		0.306		0.628
		(0.079)		(0.119)
Firms	181	181	352	352
Countries	52	52	91	91
Observations	9,412	9,412	18,634	18,634
Panel B - Variables defined using 2017 base year				
Δ US import share	8.125	8.100	0.899	0.851
	(2.700)	(2.743)	(1.342)	(1.472)
Number of affiliates in 2017		0.299		0.207
		(0.111)		(0.078)
Firms	295	295	400	400
Countries	78	78	96	96
Observations	23,010	23,010	38,400	38,400

This table reproduces the specifications in Table 1 with certain variations. In Panel A, each firm is associated with the mix of six-digit products that the listed firm itself (rather than the firm's full mainland Chinese business group as in Table 1) exported to the US in 2016, weighted using the share of each product in the firm's total 2016 exports to the US. In Panel B, the dependent variable is the number of new affiliates in a given country that are reported by the listed firm between 2018 and 2022 (rather than between 2019 and 2022 as in Table 1). Also in Panel B, the variable 'Δ US import share' is the change in the country's share of US import value between 2017 and 2022 (rather than between 2018 and 2022 as in Table 1) for the (weighted) mix of products exported to the US in 2016 by the firm's domestic business group.

Table A6: Number of new affiliates by firm and country – 'top winners' regressions

	Manufacturing affiliates		Non-manufacturing affiliates	
	(1)	(2)	(3)	(4)
Panel A - Top 'winner' country by firm-specific product mix				
Top winner dummy	0.758	0.778	-0.079	-0.001
	(0.290)	(0.292)	(0.268)	(0.303)
Number of affiliates in 2017		0.341		0.203
		(0.092)		(0.079)
Firms	250	250	352	352
Countries	67	67	91	91
Observations	16,750	16,750	32,032	32,032
Panel B - Top three 'winner' countries by firm-specific product mix				
Top three winners dummy	0.721	0.695	0.055	0.104
	(0.311)	(0.302)	(0.177)	(0.192)
Number of affiliates in 2017		0.326		0.204
		(0.077)		(0.079)
Firms	250	250	352	352
Countries	67	67	91	91
Observations	16,750	16,750	32,032	32,032

This table reproduces the specifications in Table 1 with alternative regressors. In Panel A, the variable 'Top winner dummy' is equal to one for the country with the largest increase in US import share between 2018 and 2022 for the firm's product mix (as defined in Table 1), and zero otherwise. In Panel B, the variable 'Top three winners dummy' is equal to one for the three countries with the largest increases in US import share between 2018 and 2022 for the firm's product mix (as defined in Table 1), and zero otherwise.

Table A7: Number of new affiliates by firm and country – heterogeneity by region

	Manufacturing affiliates		Non-manufacturing affiliates	
	(1)	(2)	(3)	(4)
Panel A - Countries in East and Southeast Asia				
Δ US import share	11.250	12.346	-0.344	-0.250
	(3.272)	(3.302)	(3.060)	(3.007)
	{0.131}	{0.144}	{0.921}	{0.943}
Number of affiliates in 2017		0.648		0.133
		(0.262)		(0.051)
		{0.041}		{0.400}
Firms	149	149	199	199
Countries	12	12	12	12
Observations	1,788	1,788	2,388	2,388
Panel B - Countries outside East and Southeast Asia				
Δ US import share	0.799	-0.031	-2.318	-2.305
	(5.029)	(5.011)	(1.489)	(1.523)
Number of affiliates in 2017		0.251		0.246
		(0.038)		(0.089)
Firms	142	142	253	253
Countries	55	55	79	79
Observations	7,810	7,810	19,987	19,987

Continued on next page.

Table A7: Number of new affiliates by firm and country – heterogeneity by region (continued from previous page)

	Manufacturing affiliates		Non-manufacturing affiliates	
	(1)	(2)	(3)	(4)
Panel C - Non-high-income countries outside East and Southeast Asia				
Δ US import share	9.855	8.769	-2.175	-2.053
	(4.904)	(5.422)	(1.634)	(1.682)
	{0.255}	{0.379}	{0.427}	{0.454}
Number of affiliates in 2017		0.308		0.250
		(0.174)		(0.407)
		{0.364}		{0.539}
Firms	71	71	95	95
Countries	26	26	40	40
Observations	1,846	1,846	3,800	3,800
Panel D - High-income countries outside East and Southeast Asia				
Δ US import share	-2.255	-3.321	-2.858	-3.014
	(6.199)	(5.838)	(2.090)	(2.196)
	{0.821}	{0.725}	{0.281}	{0.279}
Number of affiliates in 2017		0.220		0.256
		(0.035)		(0.079)
		{0.099}		{0.000}
Firms	91	91	211	211
Countries	29	29	39	39
Observations	2,639	2,639	8,229	8,229

This table (continued from the previous page) reproduces the specifications in Table 1 for different subsamples of countries. Panel A includes countries in East and Southeast Asia, Panel B includes all other sample countries, and Panels C and D divide the sample of Panel B into countries defined as non-high-income (Panel C) and high-income (Panel D) by the World Bank in its 2017 fiscal year. The p-values in Panels A, C and D (in curly brackets) are calculated using the wild bootstrap approach of Cameron, Gelbach and Miller (2008) due to the small number of clusters, employing the boottest Stata package of Roodman et al. (2019).

Table A8: Number of new affiliates by firm and country – heterogeneity by industry

	Manufacturing affiliates		Non-manufacturing affiliates	
	(1)	(2)	(3)	(4)
Panel A - Electronics and instruments				
US import share	4.349	3.657	-4.253	-4.173
	(3.579)	(3.528)	(3.535)	(3.533)
	{0.396}	{0.488}	{0.252}	{0.264}
Number of affiliates in 2017		1.354		0.048
		(0.307)		(0.037)
		{0.031}		{0.286}
Firms	57	57	75	75
Countries	27	27	59	59
Observations	1,539	1,539	4,425	4,425
Panel B - Electrical equipment				
US import share	18.836	18.496	-8.145	-7.663
	(3.948)	(5.049)	(4.345)	(5.377)
	{0.021}	{0.026}	{0.225}	{0.321}
Number of affiliates in 2017		1.400		0.175
		(0.617)		(0.095)
		{0.029}		{0.244}
Firms	36	36	44	44
Countries	22	22	39	39
Observations	792	792	1,716	1,716

Continued on next page.

Table A8: Number of new affiliates by firm and country – heterogeneity by industry (continued from previous page)

	Manufacturing affiliates		Non-manufacturing affiliates	
	(1)	(2)	(3)	(4)
Panel C - Other machinery				
US import share	10.945	9.171	-3.474	-4.008
	(5.574)	(6.173)	(5.565)	(6.032)
	{0.109}	{0.168}	{0.590}	{0.579}
Number of affiliates in 2017		0.822		0.669
		(0.166)		(0.217)
		{0.005}		{0.041}
Firms	50	50	63	63
Countries	41	41	53	53
Observations	2,050	2,050	3,339	3,339
Panel D - All other industries				
US import share	5.891	6.404	2.973	3.481
	(5.164)	(5.733)	(2.676)	(2.601)
Number of affiliates in 2017		0.320		0.476
		(0.086)		(0.094)
Firms	107	107	170	170
Countries	52	52	69	69
Observations	5,564	5,564	11,730	11,730

This table (continued from the previous page) reproduces the specifications in Table 1 for different subsamples of firms by two-digit International Standard Industrial Classification (ISIC) Revision 4 industry. Each firm is classified into an ISIC industry based on its two-digit industry as of 2016 according to the Chinese industrial classification. Panels A, B and C include firms in ISIC industries 26, 27 and 28 respectively. These are the three most commonly observed industries for the sample of firms in Table 1 columns (1) and (2). Panel D includes firms in all other manufacturing industries. The p-values in Panels A, B and C (in curly brackets) are calculated using the wild bootstrap approach of Cameron, Gelbach and Miller (2008) due to the small number of clusters in some or all specifications, employing the boottest Stata package of Roodman et al. (2019).

Table A9: Share of Chinese parts exports by goods category and country – alternative measure and base year

	All categories	Excluding smallest 5%	Excluding smallest 10%	Excluding smallest 25%
	(1)	(2)	(3)	(4)
Panel A - Excluding categories where parts are grouped with other products				
Δ US import share	0.113	0.155	0.170	0.124
	(0.085)	(0.106)	(0.119)	(0.065)
Goods categories	108	102	96	79
Countries	209	209	209	209
Observations	22,572	21,318	20,064	16,511
Panel B - Variables defined using 2017 base year				
Δ US import share	0.065	0.091	0.113	0.162
	(0.039)	(0.042)	(0.049)	(0.049)
Goods categories	153	145	137	114
Countries	209	209	209	209
Observations	31,977	30,305	28,633	23,826

This table reproduces the specifications in Table 2 with certain variations. In Panel A, we exclude 45 goods categories for which the HS classification groups parts together with some other related products within the same six-digit product code. In Panel B, the dependent variable is the change in the country's share of Chinese export value of the parts in a specific goods category between 2017 and 2022 (rather than between 2018 and 2022 as in Table 2). Also in Panel B, the variable 'Δ US import share' is the change in the country's share of US import value of the downstream products in a specific goods category between 2017 and 2022 (rather than between 2018 and 2022 as in Table 2).

Table A10: Share of Chinese parts exports by goods category and country – 'top winners' regressions

	All categories (1)	Excluding smallest 5% (2)	Excluding smallest 10% (3)	Excluding smallest 25% (4)
Panel A - Top 'winner' country by goods category				
Top winner dummy	0.008	0.008	0.008	0.011
	(0.008)	(0.008)	(0.009)	(0.009)
Goods categories	153	145	137	114
Countries	209	209	209	209
Observations	31,977	30,305	28,633	23,826
Panel B - Top three 'winner' countries by goods category				
Top three winners dummy	0.008	0.008	0.007	0.009
	(0.003)	(0.003)	(0.003)	(0.003)
Goods categories	153	145	137	114
Countries	209	209	209	209
Observations	31,977	30,305	28,633	23,826

This table reproduces the specifications in Table 2 with alternative regressors. In Panel A, the variable 'Top winner dummy' is equal to one for the country with the largest increase in US import share between 2018 and 2022 for the downstream products in the goods category, and zero otherwise. In Panel B, the variable 'Top three winners dummy' is equal to one for the three countries with the largest increases in US import share between 2018 and 2022 for the downstream products in the goods category, and zero otherwise.

Table A11: Share of Chinese parts exports by goods category and country – heterogeneity by region

	All categories (1)	Excluding smallest 5% (2)	Excluding smallest 10% (3)	Excluding smallest 25% (4)
Panel A - Countries in East and Southeast Asia				
Δ US import share	0.184	0.192	0.187	0.211
	(0.057)	(0.058)	(0.072)	(0.088)
	{0.052}	{0.044}	{0.057}	{0.033}
Goods categories	153	145	137	114
Countries	15	15	15	15
Observations	2,295	2,175	2,055	1,710
Panel B - Countries outside East and Southeast Asia				
Δ US import share	0.090	0.138	0.157	0.058
	(0.096)	(0.129)	(0.154)	(0.064)
Goods categories	153	145	137	114
Countries	194	194	194	194
Observations	29,682	28,130	26,578	22,116
Panel C - Non-high-income countries outside East and Southeast Asia				
Δ US import share	0.045	0.095	0.099	0.146
	(0.018)	(0.045)	(0.047)	(0.029)
Goods categories	153	145	137	114
Countries	126	126	126	126
Observations	19,278	18,270	17,262	14,364
Panel D - High-income countries outside East and Southeast Asia				
Δ US import share	0.098	0.144	0.165	0.019
	(0.115)	(0.149)	(0.179)	(0.070)
Goods categories	153	145	137	114
Countries	68	68	68	68
Observations	10,404	9,860	9,316	7,752

This table reproduces the specifications in Table 2 for different subsamples of countries. Panel A includes countries in East and Southeast Asia, Panel B includes all other sample countries, and Panels C and D divide the sample of Panel B into countries defined as non-high-income (Panel C) and high-income (Panel D) by the World Bank in its 2017 fiscal year. The p-values in Panel A (in curly brackets) are calculated using the wild bootstrap approach of Cameron, Gelbach and Miller (2008) due to the small number of clusters, employing the boottest Stata package of Roodman et al. (2019).

Table A12: Share of Chinese parts exports by goods category and country – heterogeneity by industry

	All categories (1)	Excluding smallest 5% (2)	Excluding smallest 10% (3)	Excluding smallest 25% (4)
Panel A - Electronics and instruments				
Δ US import share	0.123	0.142	0.116	0.170
	(0.066)	(0.065)	(0.103)	(0.121)
	{0.224}	{0.157}	{0.313}	{0.229}
Goods categories	36	35	34	28
Countries	209	209	209	209
Observations	7,524	7,315	7,106	5,852
Panel B - Electrical equipment				
Δ US import share	0.299	0.299	0.299	0.299
	(0.112)	(0.112)	(0.112)	(0.112)
	{0.044}	{0.044}	{0.044}	{0.044}
Goods categories	21	21	21	21
Countries	209	209	209	209
Observations	4,389	4,389	4,389	4,389
Panel C - Other machinery				
Δ US import share	0.009	0.022	0.019	0.096
	(0.027)	(0.036)	(0.044)	(0.079)
	{0.755}	{0.602}	{0.719}	{0.163}
Goods categories	63	58	52	39
Countries	209	209	209	209
Observations	13,167	12,122	10,868	8,151
Panel D - All other industries				
Δ US import share	0.516	0.531	0.530	0.097
	(0.270)	(0.272)	(0.274)	(0.038)
	{0.007}	{0.019}	{0.024}	{0.085}
Goods categories	33	31	30	26
Countries	209	209	209	209
Observations	6,897	6,479	6,270	5,434

This table reproduces the specifications in Table 2 for different subsamples of goods categories by two-digit International Standard Industrial Classification (ISIC) Revision 4 industry. Each goods category is classified into an ISIC industry based on product descriptions in the Harmonized System (HS) classification. Panels A, B and C include goods categories in ISIC industries 26, 27 and 28 respectively. Goods categories classified in 'all other industries' (Panel D) are those in the two-digit HS codes for apparel, footwear, headgear, umbrellas, metal tools, other metal products, railway products, aircraft, musical instruments and miscellaneous manufactures, and some categories from the two-digit HS codes for articles of iron and steel, non-electrical machinery, electrical machinery, other vehicles and furniture. The p-values in all panels (in curly brackets) are calculated using the wild bootstrap approach of Cameron, Gelbach and Miller (2008) due to the small number of clusters in some or all specifications, employing the boottest Stata package of Roodman et al. (2019). All regressions in Panel B are identical because no goods categories in this industry are among the smallest 25% of those in the full sample, according to total US imports of downstream products as of 2017.

Table A13: Controls for changes in import shares of major economies

	Manufacturing affiliates (1)	Non-manufacturing affiliates (2)	All goods categories (3)	Excluding smallest 25% (4)
Panel A - Control for change in EU import share				
Δ US import share	9.356	-0.640	0.094	0.151
	(2.417)	(1.967)	(0.048)	(0.072)
Δ EU import share	-3.319	0.315	0.004	0.019
	(4.351)	(2.686)	(0.015)	(0.023)
Observations	10,320	19,206	27,693	20,634
Panel B - Control for change in Japan import share				
Δ US import share	8.881	-0.693	0.110	0.129
	(3.167)	(1.696)	(0.072)	(0.067)
Δ Japan import share	-3.921	0.992	0.023	-0.000
	(1.641)	(0.800)	(0.008)	(0.026)
Observations	16,104	30,171	30,294	22,572
Panel C - Control for change in Canada import share				
Δ US import share	7.828	-1.274	0.127	0.146
	(3.241)	(2.052)	(0.075)	(0.063)
Δ Canada import share	0.326	-0.403	0.023	0.027
	(1.811)	(1.681)	(0.017)	(0.030)
Observations	16,302	31,061	30,600	22,800
Panel D - Control for change in China import share				
Δ US import share	8.152	-1.521	0.112	0.140
	(3.115)	(1.759)	(0.075)	(0.062)
Δ China import share	1.390	0.127	-0.009	0.011
	(0.842)	(0.527)	(0.015)	(0.027)
Observations	16,750	32,032	31,768	23,826

This table reproduces the specifications of Table 1 columns (1) and (3) and Table 2 columns (1) and (4) with an additional control variable. As in Table 3 Panel B, the control variable 'Δ (economy) import share' in each regression is calculated using imports for the specified economy (rather than the US).