Policy Research Working Paper 10593

Is US Trade Policy Reshaping Global Supply Chains?

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WORLD BANK GROUP
East Asia and the Pacific Region &
Prospects Group
October 2023

Policy Research Working Paper 10593

Abstract

This paper examines the reshaping of supply chains using detailed US 10-digit import data (tariff-line level) between 2017 and 2022. The results show that while US-China decoupling in bilateral trade is real, supply chains remain intertwined with China. Over the period, China's share of US imports fell from 22 to 16 percent. The paper shows that the decline is due to US tariffs. US imports from China are being replaced with imports from large developing countries with revealed comparative advantage in a product. Countries replacing China tend to be deeply integrated into China's supply chains and are experiencing faster import growth from China, especially in strategic industries. Put differently, to displace China on the export side, countries must embrace China's supply chains. Within products, the reorientation of trade is consistent with a "China + 1" strategy, as opposed to diversified sourcing across multiple countries. There is some evidence of nearshoring, but it is exclusive to border nations, and there is no consistent evidence of reshoring. Despite the significant reshaping, China remained the top supplier of imported goods to the US in 2022.

This paper is a product of the Office of the Chief Economist, East Asia and the Pacific Region and the Prospects Group, Development Economics. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at http://www.worldbank.org/prwp. The authors may be contacted at clfreund@ucsd.edu, amattoo@worldbank.org, amulabdic@worldbank.org, and mruta@imf.org.

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Keywords: global value chains, tariffs, diversification, reshoring

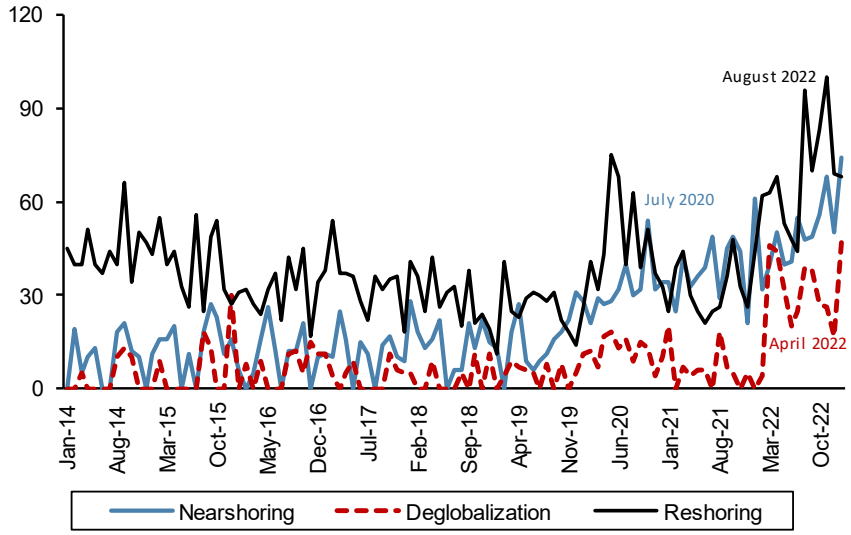
JEL Classification: F13, F14, F63

The authors are at UC San Diego, School of Global Policy and Strategy; World Bank; World Bank; and IMF, respectively. We are grateful to Davin Chor, Ruixue Jia, Shafaat Yar Khan, Michele Mancini, Ralph Ossa and participants at the Workshop on International Trade and Multilateralism (Villars, Switzerland); the IMF Conference on Geoeconomic Fragmentation; the conference on "Trade, value chains and financial linkages in the global economy" at the Bank of Italy; the Villa Mondragone International Economics Seminar (Rome); the International Agricultural Trade Research Consortium (IATRC); and the University of International Business and Economics (Beijing) for comments on an earlier version of the paper. Standard disclaimers apply.

1. Introduction

The rhetoric surrounding trade is at odds with actual trade dynamics. In the wake of US-China tensions, reshoring, nearshoring and deglobalization dominate the news. Google search trends show all three terms have experienced maximum search activity since 2020 (Figure 1). But goods trade was at an all-time high in 2022, after years of slow growth. US imports in 2022 were close to 40 percent above pre-COVID levels, suggesting that deglobalization and reshoring were not yet significant.

Figure 1: Searches for nearshoring, deglobalization, and reshoring



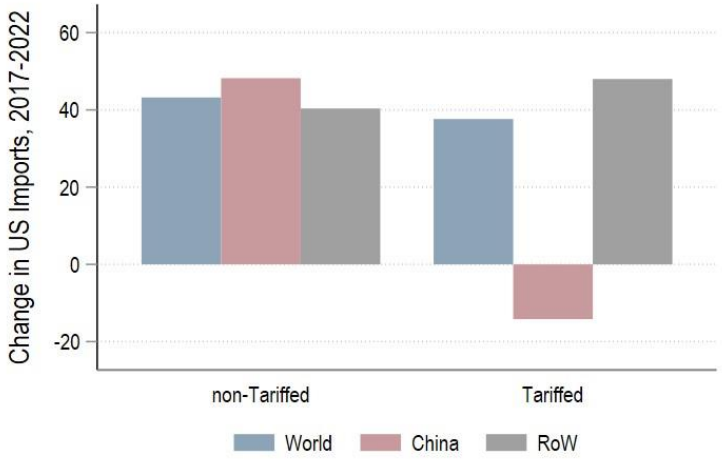
Source: Google trends data, downloaded on July 21, 2023.

While trade is thriving, cracks in US-China trade are emerging. In 2018 and 2019, the US imposed tariffs on over 60 percent of imports from China, mostly at the 25 percent level. In 2022, US imports from China in tariffed goods were 14 percent lower than in 2017, while imports from the rest of the world were 48 percent higher for those same products (Figure 2). As a result, China's share in US imports fell from 21.6 to 16.3 percent between 2017 and 2022 and is now back at the level it was in 2007, before the global financial crisis.

The sizable reduction in China's share of US imports and increase in total US imports implies that importers are turning to new sources of supply. A couple of specific examples illustrate this shift. Between 2017 and 2022 the US share of imports from China of sewing machines fell by 23 percentage points, while the share from Vietnam increased by 17 percentage points. US import shares from China of advanced technology products like laser printers and ADP input/output units fell by 23 and 40 percentage points, while the

import shares of these products from Mexico and Vietnam increased by 14 and 35 percentage points, respectively.

Figure 2: Percentage changes in US imports, tariffed and non-tariffed goods, 2017-2022



Source: US International Trade Commission.

This paper explores whether the reshuffling of supply chains observed in the data is the result of US trade policy interventions. Using highly disaggregated trade data, we examine how US tariffs on imports from China are impacting trade patterns. The analysis relies on a simple identification strategy. First, we focus on differences between trade in tariffed and non-tariffed goods, controlling for product and market characteristics. Second, we examine the characteristics of countries that are taking China's place in the US market, especially in strategic sectors. We also investigate whether the tariffs led to a diversification of imports, reshoring, nearshoring or friendshoring.

We find that the tariffs reduced import growth from China and stimulated import growth from other countries. Overall imports of the tariffed products, however, grew at rates similar to those of other goods, offering little evidence that the US re-shored production. When we focus on strategic industries, defined as the eleven 2-digit sectors where the US government's list of Advanced Technology Products reside, we find the impact of US tariffs on imports from China is higher. There is weak evidence of an increase in import diversification—reflecting a "China + 1" strategy—and no robust evidence of re-shoring for these products.

An important question relates to which countries picked up the slack as US imports moved away from China. We perform a difference-in-differences analysis, comparing shifts in trade patterns of products

where the import share of China fell markedly with the shifts in other products, while controlling for exporter and product specific time-varying shocks. We find that large developing countries were the primary beneficiaries of import relocation. Countries with revealed comparative advantage in a product also improved their market share. There is evidence that importers sought suppliers in bordering countries, but they did not look to other relatively proximate suppliers and, if anything, sought more distant suppliers.

We also find evidence that the reshaping of US imports away from China may not have reduced dependence on China as much as bilateral import numbers suggest because countries that were more deeply engaged in Chinese supply chains experienced the most rapid export growth to the US. In particular, countries that saw faster export growth to the US in certain sectors also had more intense intra-industry trade with China in those same sectors. Specifically, our estimated coefficients imply that an increase in the bilateral intra-industry trade index with China from the 25th to the 75th percentile is associated with higher export growth to the US market of around 3 percentage points for all tariffed products and 4.5 percentage points for strategic goods. For strategic industries, there is also evidence of increased integration with China and potential transshipment as exports expand. Growth in imports of goods at both the 2-digit and 6-digit levels from China is positively correlated with growth in exports of goods at the related 10-digit levels to the United States.

This paper is related to the recent literature on the economic effects of the US-China trade war.[1] Several studies (Amiti, Redding, and Weinstein, 2019; Fajgelbaum, Goldberg, Kennedy, and Khandelwal, 2020; Cavallo, Gopinath, Neiman, and Tang, 2021; Flaaen, Hortaçsu, and Tintelnot, 2020) analyze the impact of the tariffs on US import prices, finding that US consumers and importers have borne the brunt of the tariffs through higher prices. This literature also finds that the tariffs reduced US export growth (Handley, Kamal, and Monarch, 2020), lowered employment (Flaaen and Pierce 2019) and had a negative effect on aggregate real income in both the US and China (Amiti et al. 2019; Fajgelbaum et al. 2020; Grossman, Helpman, and Redding, 2023). Closer to our work is the paper by Fajgelbaum, Goldberg, Kennedy, Khandelwal, and Taglioni (2023) that studies the impact of the US-China trade war on exports by third countries, finding that they largely increased exports to the US and to the rest of the world in response to the tariffs. Differently from these studies, our paper contributes to this literature by focusing explicitly on the impact of US tariffs on US imports and the direct and indirect supply chain linkages with China.

[1] See Fajgelbaum and Khandelwal (2022) for a review of the literature.

Similarly to our paper, recent work by Alfaro and Chor (2023) shows that US sourcing has been reallocated away from China and toward other locations, notably Mexico and Vietnam, and that prices of imports from these countries are on the rise.

The rest of the paper is organized as follows. Section 2 describes the data. Section 3 studies the impact of the trade war on the reconfiguration of supply chains. Section 4 takes a closer look at where production moved after the shock. Section 5 concludes.

2. Data

We use 10-digit import data at the country level from US Customs for 2017 and 2022. There are more than 17,891 products and 157 countries.[2] Tariff data are from Bown (2023). Strategic industries are defined as the 2-digit categories identified as Advanced Technology Products by the US government (see Appendix Table 1 for a list of the industry codes).

Information on country and country-pair characteristics has been obtained from various sources. The Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) GeoDist database (Mayer and Zignago 2011) provides information on bilateral distance in kilometers and an indicator variable that captures if two countries share a border. Data on population and GDP per capita are from the World Bank's World Development Indicators (WDI). Data on UN voting alignment with the US are from Voeten (2004). Measures of revealed comparative advantage (RCA), export similarity with China, and intra-industry trade with China have been computed using trade data from UN Comtrade. Data on Free Trade Agreements (FTAs) are from Mario Larch's Regional Trade Agreements Database based on Egger and Larch (2008). A summary of the main variables is presented in Appendix Table 2.

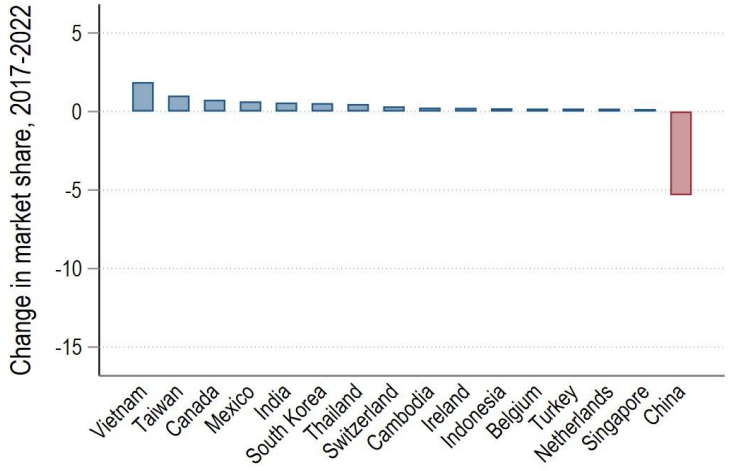
Prima facie evidence on the reshuffling of the top trade partners from 2017 to 2022 is presented in Figure 3. China's share fell 5.3 percentage points (ppts). For strategic products, this decline is even more massive, from 36.8 percent in 2017 to 23.1 percent in 2022. Focusing on the overall shares, the countries with the biggest gains in market share were Vietnam (1.9 ppt), Taiwan, China (1 ppt), Canada (0.75 ppt), Mexico (0.64 ppt), India (0.57 ppt), and the Republic of Korea (0.53 ppt). These six countries more than account for China's 5.3 percentage point decline. Their combined gain does not, however, mean that these countries are the main or only beneficiaries, as they may be increasing their market share in products that China does not export or for reasons unrelated to the tariffs on imports from China. These

[2] As is common in the literature, we exclude countries with population less than 1 million.

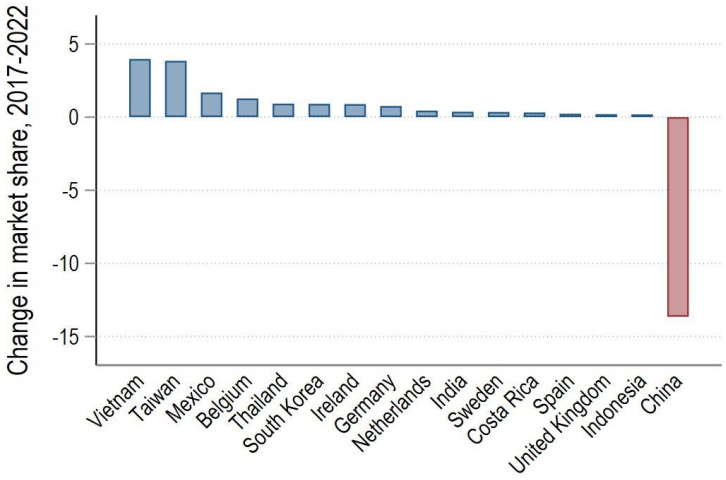
changes in the US market share also overlook small countries that may have gained significantly in niche products, but whose overall market share is small. The next section examines the decline in China's exports to the US and the reshaping of trade in more detail.

Figure 3: 2017 and 2022 US import share by top ten countries

All goods



Strategic goods



Source: US Customs.

3. US tariffs and changes in US imports

We use a difference-in-differences approach to examine whether: (i) US imports from China have grown less rapidly than those of other countries and whether tariffs are the reason; (ii) US imports have become more diversified across countries in products where imports shifted away from China; and (iii) overall import growth in the US was slower in tariffed products.

We first investigate whether US imports from China behaved differently from the imports from other countries and how tariffs affected that change. Specifically, we rely on the following specifications:

$$\Delta lnM_{ik}^{US} = \beta_0 I(CHN) + \beta_1 I(tariff_k) + \beta_2 I(tariff_k) \times I(CHN) + \varepsilon_{ik} \quad (1)$$

$$\Delta lnM_{ik}^{US} = \alpha_i + \sigma_k + \beta\, I(tariff_k) \times I(CHN) + \varepsilon_{ik}. \quad (2)$$

In specification (1) ΔlnM_{ik}^{US} is the growth of US imports from country i of HS 10-digit product k between 2017 to 2022. Tariff is an indicator variable taking value 1 if the 10-digit product was on the tariff list targeting China between 2017 and 2022. CHN is a dummy variable for China. The coefficient on CHN, β_0, reflects how imports from China grew relative to other countries, and we expect it to be negative. The coefficient on the China tariff, β_1, shows whether tariffs have a positive or negative affect on imports more broadly. The coefficient on the interaction term, β_2, captures how tariffed products imported from China are affected relative to other products. We expect β_2 to be negative.

Specification 2 includes $\alpha_i \; and \; \sigma_k$, which are respectively exporter- and product-fixed effects in place of the China dummy and the tariff dummy. This specification controls for source country or product characteristics that might affect import growth in the US market. We expect the coefficient of interest, β, to be negative if the tariff reduced US import growth from China as compared with US import growth from other countries.

Table 1 reports the results. Columns (1)-(3) show results for equation (1). Column (1) reports results including only an indicator variable taking the value 1 for tariffed goods, Column (2) only a dummy variable for China, and Column (3) both these variables as well as an interaction between the tariff indicator and the China dummy. The coefficient on the tariff indicator in Column (1) is statistically insignificant, suggesting that imports of tariffed products did not grow significantly more slowly than imports of non-tariffed products on average. The China dummy of -0.4 in Column (2) implies that US imports from China grew on average 36 percent (exp(-.4)) slower than imports from the rest of the world. Column (3) shows that the slower growth in imports from China is entirely due to the slower growth of imports subject to tariffs. The coefficient of –0.5 on the interaction between the tariff indicator and the China dummy in Column (3) implies that US imports of Chinese goods subject to tariffs grew 40 percent (exp(-.5)) slower than imports from other partners. Column 4 includes country-fixed effects and results remain robust.

Columns 5 and 6 show the results for the strategic sectors, i.e. the 11 sectors where Advanced Technology Products are found, and for other sectors separately. The larger coefficient in column (5) than in column (6) indicates that tariffs had a stronger effect on imports in strategic sectors compared non-strategic ones.

We next investigate whether US imports became more diversified across partners as they shifted away from China and whether overall imports grew more slowly in tariffed products, to look for evidence of potential reshoring, using the following specifications:

$$\Delta Y_k^{US} = K + \beta\, I(tariff_k) + \varepsilon_k \tag{3}$$

$$\Delta Y_{k \mid k \in tariff\ list}^{US} = K + \beta\, I(\Delta\ China\ share_{k_{2017-2022}} > median) + \varepsilon_k \tag{4}$$

In equations (3) and (4), the dependent variable ΔY is either the total import growth in a product or the change in diversification, as measured by the Herfindahl-Hirschman Index. In equation (4), we also focus on the group of tariffed products and examine whether import growth was slower or diversification greater in products China retreated from most swiftly. In this case, the independent variable is a dummy for the decrease in US market share of China between 2017 and 2022 being greater than the median of products subject to tariffs.

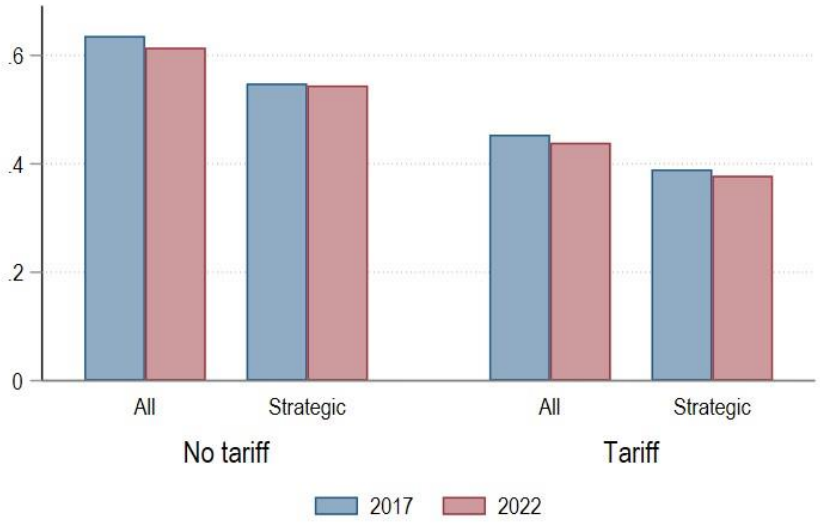
Table 2 shows the results for overall import growth. There is some evidence that aggregate import growth was slower in the tariffed products (column 1), but the coefficient is not statistically significant when the sample is split (columns 2 and 3) and economic effect on all trade is small. Total US import growth was 39 percent between 2017 and 2022 for the set of products in the regression (that had codes that existed in both periods). Overall import growth of the subset of tariffed goods was 38 percent as compared with 43 percent for non-tariffed goods, a 5 percentage point difference.[3] The -0.055 coefficient on all trade suggests a 2.4 (.055 * 43) percentage point difference in growth rates at the product level due to the tariff. This decline is small considering the 40 percent decline in US imports from China in the tariffed goods (Table 1). If the tariffs had led to large-scale reshoring, we would expect substantially lower aggregate growth in tariffed products, given China's average share of US imports of 27 percent in the tariffed goods.

[3] Import growth rates are calculated using products that exist in both the HS 2017 and 2022 classifications.

Columns 4-6 of Table 2 examine the set of tariffed products to see if import growth was slower in those products that China exited more rapidly—where the decline in China's share of US imports was above the median (3.58 percentage points). These results do not reveal a significant effect on total import growth in the products where China's share declined most rapidly. If anything, overall US imports increased in products where China reduced its share, suggesting other foreign suppliers are bridging the gap. This evidence is consistent with the findings in Fajgelbaum et al. (2023) who find that the US-China trade war allowed third countries to gain scale and efficiency and expand exports.

Table 3 focuses on the effect of decoupling on diversification of suppliers, using the change in the Herfindahl index as the dependent variable. There is little evidence of an increase in diversification, related to tariffs, as shown in columns 1-3. Overall, the average Herfindahl indexes for non-tariffed and tariffed goods both fell by about 2 percentage points (Figure 4). Of relevance, tariffed goods tend to have greater average diversification (average HHI around 0.4) than non-tariffed products (average HHI 0.6), suggesting that less substitutable goods may have been exempted from tariffs. There is some evidence that diversification increased because of tariffs imposed on strategic goods, but again the magnitude of the effect is small.

Figure 4: Average Herfindahl Indexes, tariffed and non-tariffed goods, 2017-2022



Columns 4-6 of Table 3 record results on diversification within the set of tariffed products, focusing on those where the China share fell more than the median decline in China's share. This specification does

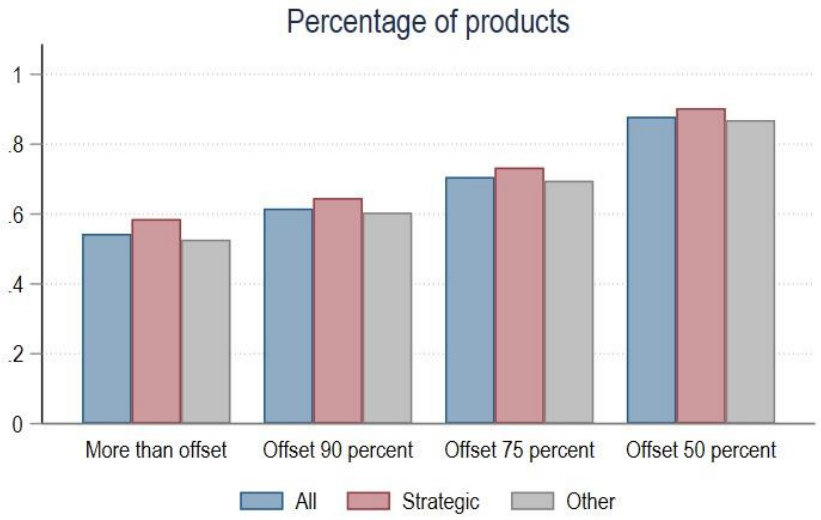
show an increase in overall diversification. Those products where the China share fell most substantially experienced significantly greater international diversification.

Apart from diversification across all import sources including China, we also examine the pattern of reallocation away from China. Specifically, did the retreat of China as a supplier lead to (i) a change in diversification among all *other* existing suppliers or (ii) a commensurate increase in one alternative supplier, as would happen if importers adopted a "China + 1" strategy.

Results relating to the change in diversification excluding China from the sample (in both periods) are shown in the bottom panel (Table 3, Panel B). These results show no effects of tariffs on diversification, and if anything a positive effect where the China share fell more than the median decline in China's share, indicating increased concentration within the group of non-China trade partners.

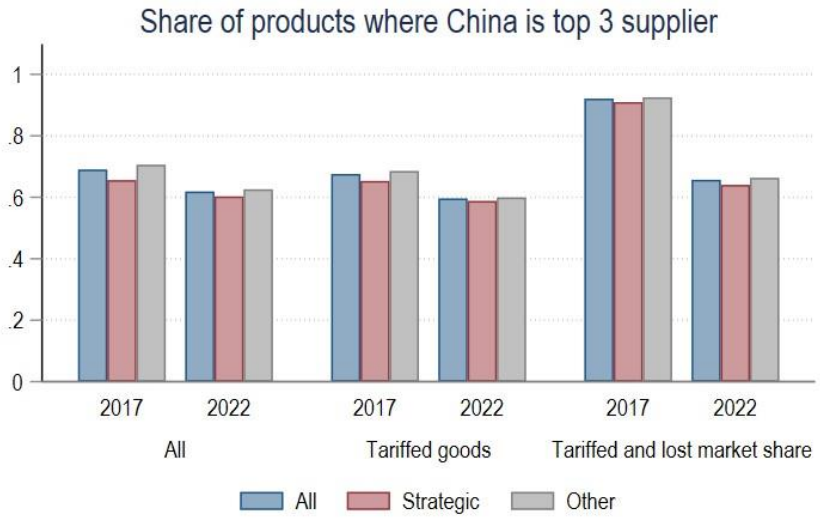
To examine the extent to which a single alternative supplier benefitted from China's market share loss, we next calculate the share of products for which the market share gain of an individual producer offset China's market share loss. Using the same set of products as above—tariffed and where China's loss was greater than its median loss—we identify the country with largest gain in market share in each product. Figure 5 records the share of the total number of products for which the gain in market share from one country more than offset China's loss; equaled at least 90 percent of China's lost market share; equaled at least 75 percent; or compensated for 50 percent or more. The results show that for over 70 percent of products, at least 75 percent of China's lost market share was made up by just one supplier. Moreover, for strategic industries, the share is slightly greater—suggesting these products are, if anything, less likely to be widely diversified across a number of suppliers, as China exits.

Figure 5: Share of products for which one supplier offset China's lost market share



If the move away from China is limited to just one other supplier, China is likely to remain a top supplier of most products, even as its share declines. Figure 6 records the share of products for which China was a top 3 supplier in 2017 and 2022, considering all products that China exported in one or both periods. The US was most dependent on China as a main supplier in precisely the products where China lost market share, as shown in the far-right columns. In these goods, China was a top 3 supplier in roughly 90 percent of products in 2017. Even following the reorientation to new suppliers, China remains a top 3 supplier in over 60 percent of these products. The reallocation has reduced dependence on China to a level that is more aligned with all trade. China's role as a top 3 supplier is similar irrespective of type of industry, strategic or other.

Figure 6: China remains an important supplier of most goods



If it is costly to find a new trade partner for a product, who can meet quality and/or customization standards at scale, as suggested in the trade literature (see for example World Bank, 2020), maintaining China as a supplier and adding an additional supplier (China + 1) may be a more cost-effective way of diversifying away from China than finding several new suppliers. Although the evidence presented here is from product-level data and not firm-level data, there is often one main supplier, especially given the high level of specificity at the 10-digit product codes. Trade tends to be very skewed where the top exporter in a product accounts for a large share of a country's exports (Freund and Pierola 2015).

In the products where China's share fell markedly, the distribution of imports across all suppliers to the US market became less concentrated, but the distribution across suppliers other than China became more concentrated. Thus, China's share was not reallocated across suppliers according to their initial shares. Instead, the allocation is consistent with the China + 1 strategy, where producers continue exporting from China but supplement with one additional supplier to reduce risk. Similarly, when we examine China's market share loss and the largest market share gain of an alternative supplier (Figure 5), there is additional support for China + 1 as the dominant strategy in a given product. For most goods, one alternative supplier picks up the lion's share of exports. Further, China remains a top 3 supplier to the US market in most products for which it exports in at least one year (Figure 6), again consistent with a China + 1 strategy.

4. US tariffs and the reconfiguration of supply chains

In this section, we investigate the characteristics of the countries that are stepping into China's shoes in the US market. We focus on the sample of tariffed products and equation (5) below:

$$\Delta lnM_{ik}^{US} = \alpha_i + \sigma_k + \beta[I(\Delta China\ share_{2017-2022} > median) \times (characteristic_i)] + \varepsilon_{ik} \quad (5)$$

The dependent variable is US import growth from country *i* in product *k*, characteristic is an exporter country characteristic, such as population, income, or distance from the US. The purpose is to explore the characteristics of the countries that displaced China in the products subject to tariffs in which China's share declined markedly. Country- and product-fixed effects control for average exporter growth and average product growth in order to isolate which countries benefit from drops in China's shares relative to other products and to other exporters.

In addition to income, size, and distance, we also include independent variables to reflect economic and political linkages with China or the US. Export similarity with China would promote exports if investors were eschewing China as an export hub and replacing it with otherwise similar economies. Revealed comparative advantage in a product would be important if the most competitive alternative suppliers are gaining market share. UN voting aligned with the United States would be important if US importers want to focus on friendly trade partners. Finally, the intra-industry trade index (Grubel and Lloyd, 1975) is included to reflect whether supply chain integration with China matters. We also tried including a host of other variables, including distance from China, regional trade agreement with the US, regional trade agreement with China, and historical estimates of value-added trade with China, but they were never significant.

While trade in value added with China would be a better measure of supply chain linkages, existing data only provide broad estimates of trade in value added, relying on assumptions about input-output matrices, cover only 22 goods industries that are defined differently from trade statistics, and for a limited sample of countries. The advantage of the Grubel-Lloyd index (GLI) is that it can be precisely measured using bilateral trade data. In the specification below, GLI is calculated at the 4-digit level (1,237 x sectors). A value of one for a given country and China in a sector implies that total bilateral trade (exports + imports) is balanced (exports = imports), while a value of zero implies that the country either only exports to or only imports from China. One interpretation of the GLI, especially using more disaggregate data, is that it captures trade in differentiated goods because of consumer demand for variety. However, at the industry or sector level, it also captures supply chain linkages because it reflects the amount of back-and-forth trade among parts, components, and final goods and hence vertical integration, a point first made by

Balassa (1978). There are a number of examples where the GLI has been shown to represent supply chains or used as an independent variable in an analysis to capture the effects of supply linkages in response to a shock. Fukasaku (1992) finds that as Pacific-Asian countries integrated in the 1980s, the level of intra-industry trade expanded. Brakman and Marrewijk (2019) find that the GLI captures measures of supply chain integration in examining countries' responses to the great recession better than trade in value added measures because it is more precisely calculated. UNCTAD (2020) uses the GLI to measure supply chain integration with China to estimate trade impacts from early stages of the spread of COVID-19.

Table 4 presents the results. As shown in the top row, the coefficient on population is positive and highly significant, showing larger countries gain when China relinquishes market share. GDP per capita is negative and highly significant, implying that low-income countries tend to displace China in US imports, suggesting that labor costs matter. Distance is positive and significant, implying that countries further from the US benefit relatively more—precisely the opposite of what nearshoring would imply. However, contiguity is also positive, implying that it is both far countries and bordering countries that benefit from reducing imports from China.

While in general countries with revealed comparative advantage tend to lose market share—indicating large exporters do not grow as fast—this effect is mitigated in products where China exited (column 2). Countries with revealed comparative advantage experienced relatively faster growth in products where China lost market share. There is some evidence of friendshoring, countries where the UN vote is aligned with the US tend to see higher export growth in products China exited (column 3). There is no significant evidence that looking like China (export similarity to China) helped countries to replace China (column 4).We also find that countries that were initially highly integrated with China, as reflected by intra-industry trade with China, experienced the fastest growth (column 5).

Including all variables, we find the strongest predictors are country size, shared border, revealed comparative advantage, and integration into Chinese supply chains.

To gauge the magnitude of the estimate of the integration with China, we compare the impacts of increasing the intra-industry trade index from the 25th percentile to the 75th percentile of the variable. The estimated coefficient of 0.09 indicates that export growth of tariffed products is around 3 percentage points higher for countries more integrated with China.

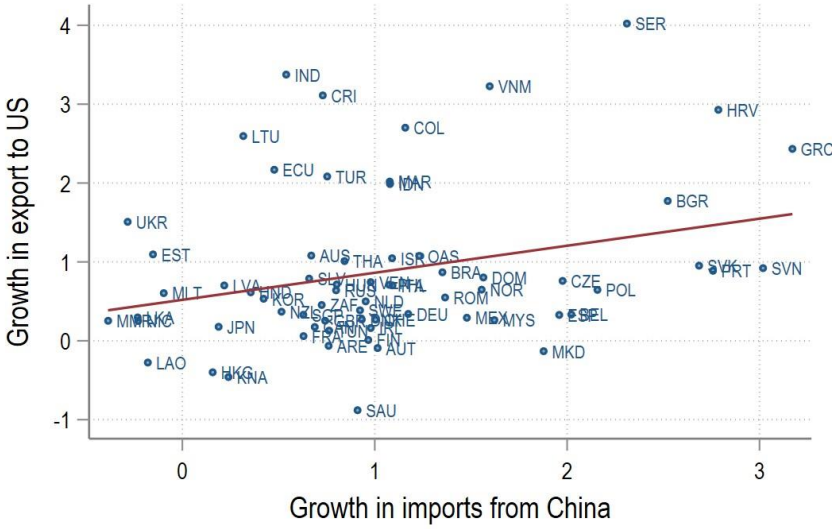
Repeating the exercise, separating the strategic products and other products, highlights important differences among the two groups. For both types of goods low-income countries tend to benefit and

RCA is important. For strategic goods, border and distance are also important, and linkages to China's supply chains are critical. In contrast, for other goods, geographical location is not significant, and the most important variable is country size, suggesting scale is important.

To put the results on supply chains in economic context, shifting from the 25th to the 75th percentile in depth of linkages to China, for strategic products, leads to higher growth of roughly 4.5 percentage points (Table 4B). To provide an example, we focus on broadcasting equipment (HS 8525), an important sector in US-China trade relations that in 2017 accounted for over 10 percent of US imports from China. This sector includes products such as media streaming stick devices and internet set top boxes (HS 8525.50.10) that are imported by large companies like Roku and Amazon. For this sector, a shift in trade integration with China from the 50th percentile (India's level) to the 90th percentile (Vietnam's level) is associated with a 12.7 percent increase in export growth to the US.

In addition to initial characteristics, alternative suppliers' integration with China could change as their exports to the US expand. For example, electronics is the category where we see the largest reallocation of exports away from China, accounting for more than half of the total decline in China's market share. Figure 7 shows import growth from China and export growth to the US between 2017 and 2022 across countries in the electronics sector. The correlation suggests that countries that exported more electronics to the US also imported more electronics from China.

Figure 7: Correlation between import growth from China and export growth to the US in electronics



Source: WITS, 2-digit HS 85 data. Countries with US market share lower less than 0.01 percent are excluded.

Table 5 explores this correlation in more detail. It uses the detailed 10-digit import data and examines whether growing imports from China in a product or industry are associated with expanded exports to the United States, controlling for the significant variables from Table 4. For all goods (Table 5A), exports to the US are not significantly correlated with growing imports from China. For strategic industries (Table 5B), there is evidence that increased imports from China are correlated with increased exports to the United States. When we control for intra-industry trade, growth in 2-digit and 6-digit imports matter for strategic industries. The former is consistent with value chain trade, while the latter could reflect transshipment or limited additional value added before goods being shipped to the United States. The coefficient of 0.04 on 6-digit imports implies that a 10 percentage points increase in imports from China is associated with 0.4 percentage points higher exports to the United States. The effect of growth in imports from China at the 2-digit level is about twice as important, as reflected by the higher coefficient (albeit lower significance). In terms of economic importance, using standardized coefficients, intra-industry trade is roughly six times more important than what could be transshipment (as measured by growth in 6-digit imports). For other goods (Table 5C), growth in imports from China is not important.

5. Conclusion

This paper uses detailed trade data from 2017 to 2022 to study how US trade policy is impacting global supply chains. Despite the tariffs imposed by the US administration in 2018-19, the aggregate data show that overall US openness to the world, as measured by its aggregate imports, has not declined. Even so, we find that US tariffs on imports from China have induced significant direct decoupling, with China's share of US imports falling by more than 5 percentage points relative to its level in 2017.

This decoupling has not led to a major diversification across import sources. Rather specific countries have benefitted—especially large developing countries, both those on the border with the US and those far from the US. Countries with revealed comparative advantage in a product and those more deeply engaged in supply chains with China have also benefitted the most, especially in strategic sectors. The results are consistent with a "China + 1" strategy, where within product categories one alternative supplier has been the main beneficiary, while China has remained an important trade partner even in the products where decoupling has occurred.

This evidence highlights the potential tension between, on the on hand, efficiency and, on the other hand, decoupling and diversification. China remains an attractive source of manufacturing imports for firms,

given its comparative advantage and scope for scale economies, as well as the sunk costs firms have incurred in establishing subsidiaries or relationships in that country. Therefore, full decoupling may not be feasible, at least in the near term, and measures to limit direct trade may serve only to strengthen indirect linkages between US and China through the industrial supply chains of their trade partners. The large-fixed costs of establishing trade relationships with new countries may also limit the optimal diversification, our analysis suggests to just one or two other countries.

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Table 1: Import growth from China in tariffed goods

	(1) All	(2) All	(3) All	(4) All	(5) Strategic	(6) Other
I(tariff list)	-0.007		0.023			
	(0.015)		(0.016)			
I(China)		-0.444***	0.007			
		(0.014)	(0.042)			
I(China) x I(tariff list)			-0.503***	-0.530***	-0.610***	-0.445***
			(0.044)	(0.045)	(0.071)	(0.058)
Observations	204,910	204,910	204,910	203,335	69,731	133,599
R-squared	0.000	0.003	0.004	0.137	0.130	0.143
Product FE	NO	NO	YES	YES	YES	YES
Country	NO	NO	NO	YES	YES	YES

Note: The dependent variable is 10-digit product level import growth from 2017 to 2022, between US and its trade partners. The sample is limited to countries with a population over 1 million. China is a dummy variable for trade with China. Tariff list is a dummy variable equal to one for products on the list of China tariffs. Robust standard errors are in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Table 2: Effect of decoupling on overall imports in tariffed products

	(1) All	(2) Strategic	(3) Other	(4) All	(5) Strategic	(6) Other
I(tariff list)	-0.055*	-0.067	-0.051			
	(0.031)	(0.048)	(0.041)			
I(Δ China share > median)				0.004	0.58*	-0.019
				(0.018)	(0.030)	(0.022)
Observations	16,357	4,699	11,658	12,731	3,779	8,952
R-squared	0.000	0.000	0.000	0.034	0.011	0.041

Note: The dependent variable is 10-digit product level import growth from 2017 to 2022. Tariff list is a dummy variable equal to one for products on the list of China tariffs. Δ China share > median indicates a dummy for products where the loss in China's share of the US market from 2017 to 2022 was above the median (fell more than 3.58 percentage points). Robust standard errors are in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Table 3: Effect of decoupling on diversification

Panel A: All countries

	(1) All	(2) Strategic	(3) Other	(4) All	(5) Strategic	(6) Other
I(tariff list)	-0.007	-0.036*	0.017			
	(0.011)	(0.019)	(0.013)			
I(Δ China share > median)				-0.086***	-0.047***	-0.102***
				(0.008)	(0.014)	(0.009)
Observations	16,357	4,699	11,658	12,732	3,779	8,953
R-squared	0.000	0.001	0.000	0.009	0.003	0.013

Panel B: China excluded

	(1) All	(2) Strategic	(3) Other	(4) All	(5) Strategic	(6) Other
I(tariff list)	0.004	0.006	-0.000			
	(0.014)	-0.021	(0.019)			
I(Δ China share > median)				0.095***	0.094***	0.095***
				(0.008)	(0.015)	(0.010)
Observations	16,089	4,627	11,462	12,554	3,740	8,814
R-squared	0.000	0.000	0.000	0.011	0.011	0.011

Note: The dependent variable is the change in the Herfindahl Index, calculated among US trade partners, for the 10-digit product from 2017 to 2022. Panel B excludes China, in calculating the Herfindahl Index. Tariff list is a dummy variable equal to one for products on the list of China tariffs. Δ China share > median indicates a dummy for products where the loss in China's share of the US market from 2017 to 2022 was above the median (fell more than 3.58 percentage points). Robust standard errors are in parentheses.

*** p<0.01, ** p<0.05, * p<0.1.

Table 4: Who gains when China exits?

Panel A: All goods

	dependent variable: export growth to the US on full sample subject to US-China tariffs						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
I(ΔChina share> median) x …							
… x (log of Pop.)	0.018**	0.030***	0.026***	0.027***	0.026***	0.028***	0.023**
	(0.008)	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)	(0.009)
… x (log of GDPpc)	-0.050***	-0.072***	-0.033*	-0.079***	-0.081***	-0.077***	-0.025
	(0.016)	(0.015)	(0.019)	(0.015)	(0.015)	(0.014)	(0.023)
… x I(Border)	0.105*						0.111*
	(0.063)						(0.065)
… x (log of distance)	0.074*						0.059
	(0.040)						(0.042)
… x I(RCA>1)		0.078***					0.086***
		(0.018)					(0.021)
… x (UN voting)			0.041***				0.019
			(0.015)				(0.018)
… x (Export similarity to China)				0.065			-0.274**
				(0.111)			(0.138)
… x (Intra-industry trade w/China)					0.084**		0.090**
					(0.033)		(0.040)
… x (RTA w/USA)						-0.009	
						(0.022)	
I(RCA>1)		-0.090***					-0.086***
		(0.013)					(0.015)
Intra-industry trade w/China					-0.031		-0.028
					(0.024)		(0.028)
Observations	140,276	163,657	166,575	169,759	168,117	169,759	134,797
R-squared	0.134	0.128	0.124	0.128	0.128	0.128	0.133
Country FE	YES	YES	YES	YES	YES	YES	YES
Product FE	YES	YES	YES	YES	YES	YES	YES

Note: The dependent variable is 10-digit product level import growth from 2017 to 2022, between US and its trade partners, China excluded. The sample is limited to products on the list of China tariffs and to countries with a population over 1mln. Δ China share > median indicates a dummy for products where the loss in China's share of the US market from 2017 to 2022 was above the median (fell more than 3.58 percentage points). Robust standard errors are in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Panel B: Strategic products

	dependent variable: export growth to the US on strategic products subject to US-China tariffs						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
I(ΔChina share > median) x …							
… x (log of Pop.)	0.004	0.014	0.015	0.007	0.014	0.016	-0.003
	(0.015)	(0.014)	(0.013)	(0.014)	(0.013)	(0.013)	(0.016)
… x (log of GDPpc)	0.020	-0.070**	-0.015	-0.065**	-0.073**	-0.053*	-0.043
	(0.034)	(0.031)	(0.036)	(0.030)	(0.031)	(0.029)	(0.041)
… x I(Border)	0.434***						0.480***
	(0.115)						(0.121)
… x (log of distance)	0.294***						0.305***
	(0.075)						(0.080)
… x I(RCA>1)		0.112***					0.098***
		(0.031)					(0.036)
… x (UN voting)			0.026				-0.021
			(0.025)				(0.029)
… x (Export similarity to China)				0.394**			0.042
				(0.189)			(0.230)
… x (Intra-industry trade w/China)					0.128**		0.145**
					(0.055)		(0.066)
… x (RTA w/USA)						-0.055	
						(0.038)	
I(RCA>1)		-0.117***					-0.104***
		(0.021)					(0.024)
Intra-industry trade w/China					-0.091**		-0.109**
					(0.040)		(0.045)
Observations	47,513	55,790	56,339	57,333	57,212	57,333	46,208
R-squared	0.124	0.121	0.118	0.122	0.122	0.122	0.124
Country FE	YES	YES	YES	YES	YES	YES	YES
Product FE	YES	YES	YES	YES	YES	YES	YES

Note: The dependent variable is 10-digit product level import growth from 2017 to 2022, between US and its trade partners, China excluded. The sample is limited to products in strategic industries on the list of China tariffs and to countries with a population over 1mln. Δ China share > median indicates a dummy for products where the loss in China's share of the US market from 2017 to 2022 was above the median (fell more than 3.58 percentage points). Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Panel C: Other goods

	dependent variable: export growth to the US on other goods subject to US-China tariffs						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
I(ΔChina share > median) x …							
… x (log of Pop.)	0.028***	0.036***	0.033***	0.038***	0.034***	0.037***	0.035***
	(0.010)	(0.009)	(0.009)	(0.010)	(0.009)	(0.009)	(0.011)
… x (log of GDPpc)	-0.065***	-0.076***	-0.035	-0.082***	-0.085***	-0.084***	-0.012
	(0.019)	(0.017)	(0.024)	(0.018)	(0.017)	(0.016)	(0.028)
… x I(Border)	0.017						0.022
	(0.076)						(0.079)
… x (log of distance)	0.016						0.008
	(0.047)						(0.050)
… x I(RCA>1)		0.061***					0.077***
		(0.023)					(0.027)
… x (UN voting)			0.050**				0.031
			(0.020)				(0.023)
… x (Export similarity to China)				-0.052			-0.373**
				(0.137)			(0.175)
… x (Intra-industry trade w/China)					0.043		0.030
					(0.043)		(0.051)
… x (RTA w/USA)						0.010	
						(0.028)	
I(RCA>1)		-0.075***					-0.083***
		(0.017)					(0.019)
Intra-industry trade w/China					0.016		0.027
					(0.031)		(0.036)
Observations	92,760	107,863	110,231	112,421	110,900	112,421	88,586
R-squared	0.141	0.135	0.130	0.135	0.134	0.135	0.141
Country FE	YES	YES	YES	YES	YES	YES	YES
Product FE	YES	YES	YES	YES	YES	YES	YES

Note: The dependent variable is 10-digit product level import growth from 2017 to 2022, between US and its trade partners, China excluded. The sample is limited to products in non-strategic industries on the list of China tariffs and to countries with a population over 1mln. Δ China share > median indicates a dummy for products where the loss in China's share of the US market from 2017 to 2022 was above the median (fell more than 3.58 percentage points). Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Dynamic supply chain effects

Panel A: All goods

	dependent variable: export growth to the US on full sample subject to US-China tariffs				
	(1)	(2)	(3)	(4)	(5)
I(ΔChina share> median) x …					
… x (Growth China Imports HS6)	0.009				0.009
	(0.008)				(0.010)
… x (Growth China Imports HS4)		0.005			-0.005
		(0.013)			(0.016)
… x (Growth China Imports HS2)			0.027		0.018
			(0.024)		(0.027)
… x (Intra-industry trade w/China)				0.082**	0.092**
				(0.039)	(0.042)
Growth China Imports HS6	-0.007				-0.004
	(0.006)				(0.007)
Growth China Imports HS4		-0.014			-0.008
		(0.009)			(0.011)
Growth China Imports HS2			-0.032*		-0.026
			(0.018)		(0.019)
Intra-industry trade w/China				-0.023	-0.053*
				(0.027)	(0.030)
Observations	118,452	120,184	120,776	134,797	118,448
R-squared	0.135	0.135	0.136	0.133	0.135
Country FE	YES	YES	YES	YES	YES
Product FE	YES	YES	YES	YES	YES

Note: The dependent variable is 10-digit product level import growth from 2017 to 2022, between US and its trade partners, China excluded. The sample is limited to products on the list of China tariffs and to countries with a population over 1mln. Δ China share > median indicates a dummy for products where the loss in China's share of the US market from 2017 to 2022 was above the median (fell more than 3.58 percentage points). The regressions include controls, not reported in the table, for the log of population, log of GDP per capita, log of distance, a border dummy, a dummy for revealed comparative advantage, interacted with a dummy for Δ China share > median. Robust standard errors are in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Panel B: Strategic products

	dependent variable: export growth to the US on strategic products subject to US-China tariffs				
	(1)	(2)	(3)	(4)	(5)
I(ΔChina share> median) x …					
… x (Growth China Imports HS6)	0.040**				0.044**
	(0.016)				(0.017)
… x (Growth China Imports HS4)		0.014			-0.021
		(0.025)			(0.029)
… x (Growth China Imports HS2)			0.086*		0.087*
			(0.051)		(0.051)
… x (Intra-industry trade w/China)				0.147**	0.154**
				(0.065)	(0.066)
Growth China Imports HS6	-0.004				-0.005
	(0.009)				(0.010)
Growth China Imports HS4		0.000			0.005
		(0.017)			(0.019)
Growth China Imports HS2			-0.012		-0.022
			(0.036)		(0.037)
Intra-industry trade w/China				-0.110**	-0.110**
				(0.044)	(0.046)
Observations	43,373	43,753	43,821	46,208	43,373
R-squared	0.123	0.122	0.123	0.124	0.123
Country FE	YES	YES	YES	YES	YES
Product FE	YES	YES	YES	YES	YES

Note: The dependent variable is 10-digit product level import growth from 2017 to 2022, between US and its trade partners, China excluded. The sample is limited to products in strategic industries on the list of China tariffs and to countries with a population over 1mln. Δ China share > median indicates a dummy for products where the loss in China's share of the US market from 2017 to 2022 was above the median (fell more than 3.58 percentage points). The regressions include controls, not reported in the table, for the log of population, log of GDP per capita, log of distance, a border dummy, a dummy for revealed comparative advantage, interacted with a dummy for Δ China share > median. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Panel C: Other goods

	dependent variable: export growth to the US on other goods subject to US-China tariffs				
	(1)	(2)	(3)	(4)	(5)
… x (Growth China Imports HS6)	0.001				-0.003
	(0.010)				(0.012)
… x (Growth China Imports HS4)		0.007			0.010
		(0.015)			(0.020)
… x (Growth China Imports HS2)			0.021		0.007
			(0.028)		(0.032)
… x (Intra-industry trade w/China)				0.021	0.027
				(0.051)	(0.055)
Growth China Imports HS6	-0.010				-0.003
	(0.007)				(0.009)
Growth China Imports HS4		-0.019*			-0.015
		(0.010)			(0.014)
Growth China Imports HS2			-0.034		-0.020
			(0.021)		(0.024)
Intra-industry trade w/China				0.031	-0.015
				(0.036)	(0.040)
Observations	75,074	76,426	76,950	88,586	75,070
R-squared	0.145	0.146	0.146	0.141	0.145
Country FE	YES	YES	YES	YES	YES
Product FE	YES	YES	YES	YES	YES

Note: The dependent variable is 10-digit product level import growth from 2017 to 2022, between US and its trade partners, China excluded. The sample is limited to products in non-strategic industries on the list of China tariffs and to countries with a population over 1mln. Δ China share > median indicates a dummy for products where the loss in China's share of the US market from 2017 to 2022 was above the median (fell more than 3.58 percentage points). The regressions include controls, not reported in the table, for the log of population, log of GDP per capita, log of distance, a border dummy, a dummy for revealed comparative advantage, interacted with a dummy for Δ China share > median. Robust standard errors are in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Appendix Table 1: Strategic Industries, Broad 2-digit categories

- 28 inorganic chemicals; organic and inorganic compounds of precious metals; of rare earth metals, of radio-active elements and of isotopes
- 29 organic chemicals
- 30 pharmaceutical products
- 38 chemical products n.e.c
- 84 nuclear reactors, boilers, machinery and mechanical appliances; parts thereof
- 85 electrical machinery and equipment and parts thereof; sound recorders and reproducers; television image and sound recorders and reproducers, parts and accessories of such articles
- 87 vehicles; other than railway or tramway rolling stock, and parts and accessories thereof
- 88 aircraft, spacecraft and parts thereof
- 90 optical, photographic, cinematographic, measuring, checking, medical or surgical instruments and apparatus; parts and accessories
- 93 arms and ammunition; parts and accessories thereof
- 98 special classification provisions

Appendix Table 2: Summary statistics

	N	mean	sd	min	max	p50	p25	p75
I(All)	427,664	1	0	1	1	1	1	1
I(Strategic Industry)	427,664	0.320	0.467	0	1	0	0	1
I(Other Industry)	427,664	0.680	0.467	0	1	1	0	1
Export growth	201,009	0.370	1.795	-10.80	12.71	0.335	-0.558	1.283
I(tariff list)	427,664	0.915	0.278	0	1	1	1	1
log of Pop.	416,285	17.06	1.625	9.290	21.03	17.39	15.99	18.08
log of GDPpc	413,036	10.15	0.830	6.621	11.72	10.43	9.580	10.79
UN voting USA	403,355	2.128	0.903	0.152	4.260	1.874	1.453	3.023
I(RCA>1)	359,686	0.334	0.472	0	1	0	0	1
Export similarity to China	415,806	0.283	0.0968	0.0635	0.522	0.309	0.193	0.351
I(Border)	350,426	0.0759	0.265	0	1	0	0	0
log of distance USA	425,463	9.007	0.479	7.640	9.727	9.022	8.911	9.406
Intra-industry trade w/China	399,294	0.194	0.275	0	1	0.0412	0.000452	0.304