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POLICY BRIEF

21-18 Collateral Benefits? South Korean Exports to the United States and the US-China Trade War

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INTRODUCTION

Reducing US reliance on imports from China was among the many objectives cited by the Trump administration for its trade war with China.[1] This form of forced “decoupling“ found support not just from the president’s fellow Republicans but also from Democratic leaders wary of overdependence on a country seen as an unfair trader.[2] In forming the initial list of products subject to US tariffs, the administration considered the existence of alternative sources of supply for US buyers.

After four rounds of tit-for-tat hikes, by the end of 2019 each side had levied average duties of almost 20 percent against each other, with tariffs covering almost two-thirds of US imports from China and about 57 percent of Chinese imports from the United States (Bown 2021). These tariffs reduced the value of US imports of taxed Chinese products by an estimated 32 percent (Fajgelbaum et al. 2020).

US imports from China are highly concentrated in a few sectors. Before the start of the trade war, three sectors—computers and telecommunication devices, electrical equipment, and machinery—accounted for 54 percent of US imports from

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1 Trump used Twitter to claim that his goal in the trade war was to reduce US reliance on China. He urged American companies to find alternate suppliers outside China (www.reuters.com/article/us-usa-trade-china/china-u-s-kick-off-new-round-of-tariffs-in-trade-war-idUSKCN1VM0V9).

2 In June 2018, then Senate Minority Leader Charles Schumer (D-NY) praised the imposition of tariffs on $50 billion of imports from China, citing his belief that China was taking advantage of open US markets (https://thehill.com/policy/international/392636-schumer-on-china-tariffs-china-needs-us-more-than-we-need-them).

China (Lovely and Liang 2018). Besides mainland China, other Asian trade partners are important suppliers of these products to the United States. South Korea is a major source for the United States in all three sectors. In responding to US tariffs, Korea was a likely place for US buyers to search for alternatives suppliers.

This Policy Brief assesses the extent to which the United States increased its imports from South Korea after the imposition of taxes on US imports from China. It uses highly disaggregated US import and tariff data to examine adjustments in US purchases of manufactured goods from its trade partners. The analysis indicates that Korea made a small gain in the US market following the levying of US tariffs on Chinese exports, with Korea's share of overall US manufacturing imports rising 0.9 percent and its share of US manufacturing imports subject to trade war tariffs rising 1.0 percent. Gains were spread across a variety of manufacturing sectors, reflecting both the choices made by US officials regarding which Chinese exports to tax and the nature of preexisting trade relationships between South Korea and the United States.

SOUTH KOREAN EXPORTS TO THE UNITED STATES AND DIRECT COMPETITION WITH CHINESE EXPORTS

The United States is one of Korea's most important export destinations. In 2019, following the successful renegotiation of the Korea-US Free Trade Agreement (KORUS), the United States purchased 15.7 percent of Korea's exports. Despite their size, these flows are second to those between Korea and mainland China. China is the most important destination for Korean exports, purchasing 25.1 percent of its exports in 2019.

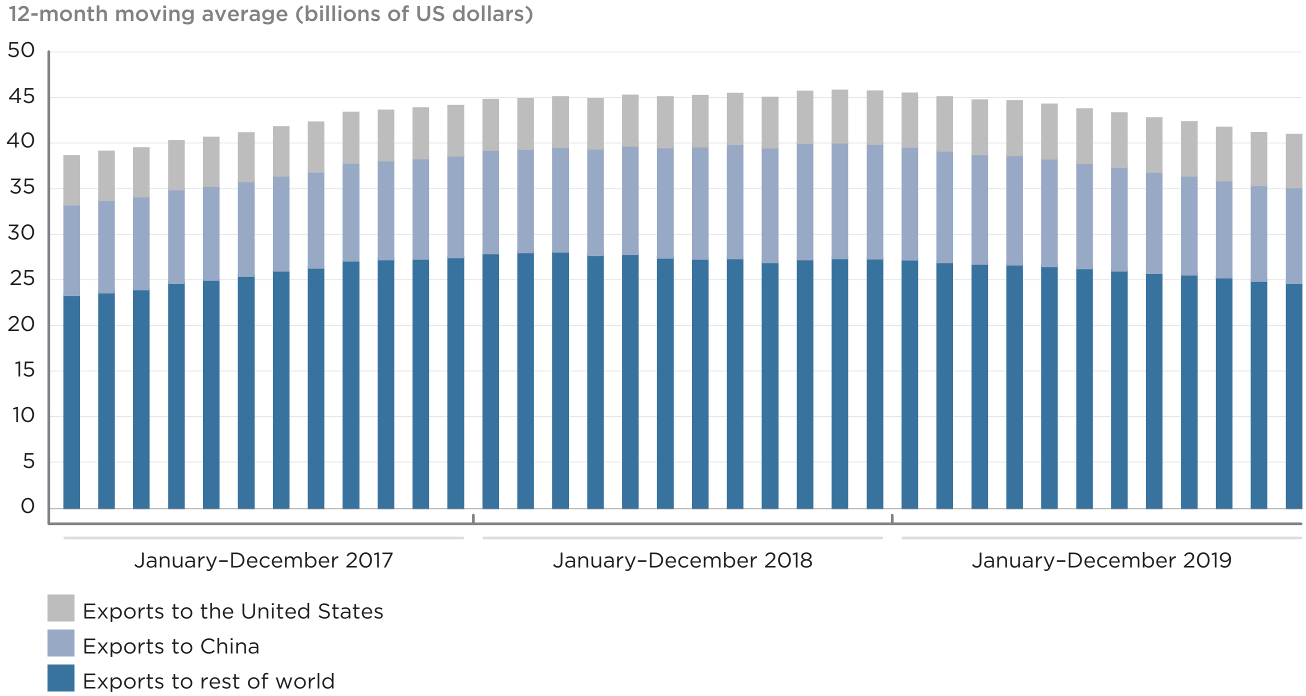
Korean sales of manufactured goods to the world grew through 2018 (figure 1). Much of this growth occurred in the country's exports to China. Despite this rise through 2018, the moving average of exports to China was lower in December 2019 than it was in December 2017. Meanwhile, the value of Korean manufacturing exports to the United States rose during the period.

During the US-China trade war, market positions shifted. Between the 18-month period before the start of the US-China trade war (July 2016–December 2017) and the 18-month period after the final trade battle (July 2018–December 2019), the market shares of two groups of HS10 products (those on which the United States levied tariffs on Chinese varieties and those on which the United States did not) changed (figure 2).[3] Among goods subject to trade war tariffs, China's share of the US market fell by 4.12 percentage points. For the same set of products, Mexico's market share rose by 1.63 percentage points and Korea's share rose by 0.57 percentage points. No other partner gained more.

Of course, this comparison does not control for any confounding trends that may drive partner market shares up or down in any given period. That market factors and shocks influence trade shares can be seen by the substantial movement in the market shares for goods not taxed during the trade war in figure 2. Simple market share averages may also hide heterogeneity in the

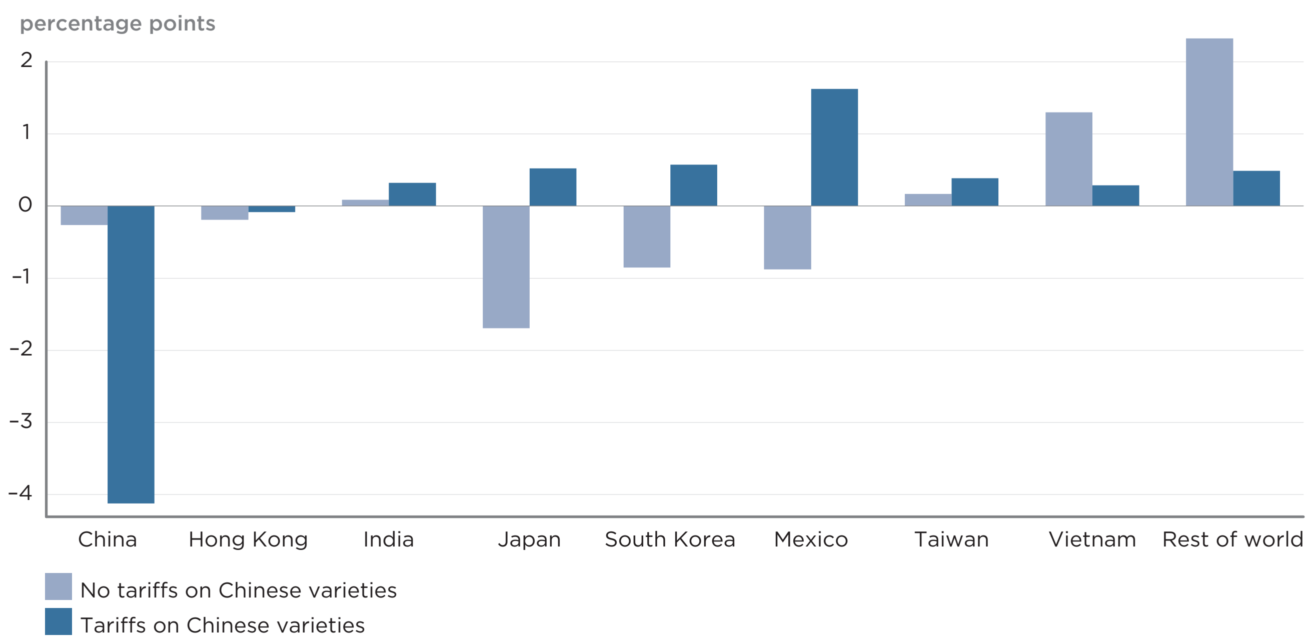
3 The Harmonized Commodity Description and Coding System, also known as HS codes, is an internationally standardized system of names and numbers to classify traded products. Section and Chapter titles describe broad categories of goods, while headings and subheadings describe products in more detail. Members of the World Trade Organization apply a common 6-digit classification to facilitate cross-border monitoring, taxation, and regulation. Further disaggregation is possible at the country level and the United States uses a 10-digit classification system in its Tariff Schedule.

Figure 1
Korean manufacturing exports, 2017–19



Source: UN Comtrade database.

Figure 2
Changes in US import market share, by product group and trading partner



Note: Changes in market share reflect change in each partners' average US import market share during the period July 2016–December 2017 and the period July 2018–December 2019.

Source: Calculated by authors using data from the US Census Bureau.

experience of different export sectors driven by the timing and design of US tariff policy. The goal of our research is to use highly disaggregated trade data and reduced-form regressions to assess the association between changes in the pattern of Korean exports to the United States and changes in US tariffs on imports from China.

Table 1
Chinese and Korean export varieties in US imports, 2019, by sector

Export sector	Number of unique products in sector	Share of products with positive imports from China (percent)	Share of products with positive imports from Korea (percent)	Number of unique products imported from both China and Korea	Share of all products imported from both China and Korea (percent)
Chemicals	2,053	81	32	619	30
Plastic, rubber	503	96	78	386	77
Hides, skins	319	66	36	113	35
Wood	901	72	27	227	25
Textiles, clothing	3845	89	40	1,490	39
Footwear	474	99	37	174	37
Stone, glass	571	93	47	263	46
Metals	1,770	81	55	889	50
Machinery	1,613	92	68	1,063	66
Electronics	897	97	79	701	78
Transportation Equipment	456	70	42	179	39
Toys, games, sports equipment	110	100	56	62	56
Furniture, bedding, lamps	227	99	56	126	56
Miscellaneous	1,036	87	45	463	45

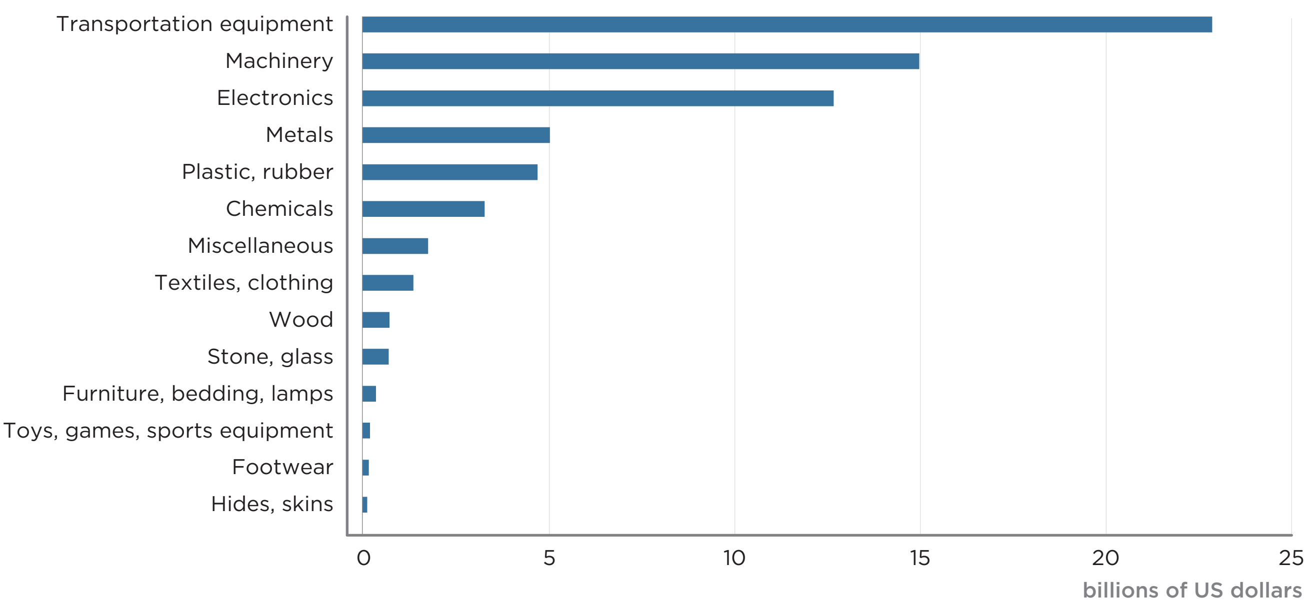
Source: Authors' calculations using US import data from the US Census Bureau for 2019.

As direct competitors in the US market, China and Korea go head-to-head in many sectors. China and Korea offer different varieties of many of the same items, with Korean products tending to command higher prices. Analysis of detailed import data shows that China has positive export sales of most products imported into the United States (table 1). Chinese varieties are purchased in almost all narrowly defined product categories in toys, games and sports equipment, footwear, and furniture. China's lowest product coverage is in hides and skins, for which it has sales in only about two-thirds of all products in the sector.

Korean exporters provide competing varieties covering most products in its top export sectors to the United States. Korea and China compete directly in 78 percent of all electronics products, 77 percent of all plastic and rubber products, 66 percent of all machinery products, and 50 percent of all metal products. Only in chemicals does a clear differentiation appear: Both Korea and China have positive sales in only 30 percent of all chemical products, indicating that they specialize in different market segments.

The content of Korean exports to the United States motivates our use of highly disaggregated trade data, which reveal specialization within broad industrial sectors. Rankings by value indicate the prominence of Korea's exports of transportation equipment to the United States (figure 3).[4] Machinery has the second-most valuable export bundle to the United States, followed by electronics, metal products, chemicals, and plastic and rubber.

Figure 3
Top Korean manufacturing exports to the United States, 2019



Source: UN Comtrade database.

This review of the nature of Korea's exports to the United States provides two insights that guide our investigation of the effect of the US-China trade war on Korean exports. First, Korea and China compete within the US market in many of the same product categories, suggesting that US tariffs on Chinese varieties may have increased US purchases of the same or similar goods from Korean exporters.

4 Figures 3 and 4 use sectoral groupings of traded products (HS codes) created by Chad P. Bown to characterize the sectoral composition of US trade war tariffs. Appendix A provides a list of tariff codes included in each sector.

Second, as Korea does not compete in all sectors, trade diversion is likely to occur in products in which Korean exporters have already established relationships with US importers. We use detailed data on US imports and the import market shares of its trade partners to illuminate these dimensions of US market adjustment to higher tariffs on selected Chinese exports.

ESTIMATION METHOD AND DATA DESCRIPTION

Discriminatory tariff schedules alter trade patterns, shifting commerce toward partners that are more lightly taxed and away from partners that are more highly taxed. Preferential trade agreements (PTAs), which offer lower duties to some partners than to others, both create and divert trade. A trade war acts like a PTA in reverse: It results in higher duties on exports from some partners while maintaining status quo duties on others.

Trade wars lead to both trade destruction and trade diversion. In the case of the US-China trade war, higher tariffs probably eliminated some import purchases, with the intended consumption satisfied by domestic production or simply forgone, while diverting other purchases to alternative, possible more costly, sources.

The literature on trade diversion traces back to Viner (1950). One contribution of direct relevance to this Policy Brief is the recent analysis of KORUS, which went into force in March 2012. Russ and Swenson (2019) investigate the extent to which reduced US tariffs on imports from Korea diverted US imports from third parties. They find that such trade diversion was particularly strong for consumption goods and goods from trade partners that already had preferential agreements with the United States. These results imply that US import demand is responsive to policy changes that discriminate among suppliers, suggesting that the US-China trade war could plausibly be expected to shift import sales toward Korea and other US partners.[5]

To estimate the extent to which US trade war tariffs are associated with shifts in US demand toward imports from Korea, we estimate a reduced-form regression to measure the percentage change in values of imports from Korea associated with a one percentage point change in the US tariff on imports from China.[6] This method captures shifts across import varieties (i.e., across the same HS10 products distinguished by country of origin).[7]

This reduced-form approach essentially measures differences in observed Korean export values from those of a counterfactual. The counterfactual is based on observed trends in US imports of the same product from other sources. We regress the log change in import value on the log change in one plus the US tariff rate, allowing for separate trends in trade values across time and within product grouping.

5 Russ and Swenson (2019) draw causal inferences by employing a method pioneered by Romalis (2007) to control for confounding factors. They also introduced fixed effects into their regression analysis.

6 Fajgelbaum et al. (2020) estimate a similar reduced-form regression and separate supply and demand regressions using both ordinary least squares (OLS) and two-stage least squares. Unlike Fajgelbaum et al., we are not estimating underlying behavioral parameters but rather describing the relationship between tariff changes and changes in trade values.

7 Fajgelbaum et al. (2020) calculate the US welfare loss from the trade war, so in addition to the elasticity of substitution across varieties distinguished by origin, they estimate elasticities of substitution across imported products and between domestic goods and imports.

US Trade and Tariff Data

We built a monthly panel dataset of US imports from all source countries, starting with the panel data used in Fajgelbaum et al. (2020). We extended this panel to the end of 2019 using data from the US Census Bureau, which records values and quantities of import flows at the HS10 level. The dataset covers the period January 2017–December 2019 for the universe of countries and HS10 products. Appendix A provides more detail on the US-China trade war and the updates we made to the original Fajgelbaum et al. dataset.

Estimating the Response of US Imports of Korean Products

We employ these extensive trade and tariff data to explore the relationship between changes in US tariff rates and changes in US import demand. We observe monthly trade flows and finely disaggregated HS10 products over a two-year period spanning the US-China trade war. We regress US imports from a given country of a given product on the tariff levied by the United States on that product from that country.

During the period of study, almost all variation in US tariffs comes from changes in US trade policy toward China.[8] To capture the substitution of non-Chinese goods for Chinese-made goods in response to these tariff changes, we also regress changes in US import values from all countries other than China on the changes in US tariffs on China.

China exports to the United States in most HS10 product categories, while most US trade partners do not (see table 1). A country that does not export a particular product to the United States does not suddenly become an exporter of that good when the United States places a tariff on China. Instead, US importers may switch their purchases to incumbent untaxed sources that are already active in the US market. To capture this relationship between prior export sales in the United States and a possible increase in US sales deflected from Chinese sellers, we allow the impact of the US tariff to differ depending on the prior US market share of each trading partner.

The reduced-form regression on US import demand takes the following form:

$$\Delta log\ M^{U}_{igt} = \beta^{U}_{1}\,\Delta log(1 + \tau_{igt}) + \beta^{U}_{2}\,Share_{ig} + \beta^{U}_{3}\,\Delta \log(1 + \tau_{Cgt}) * Share_{ig} + \eta_{gt} + \eta_{it} + \eta_{is} + \varepsilon_{igt} \quad (1)$$

where M^{U}_{igt} is the value of US imports from country *i* of HS10 product *g* at time *t*;. $\Delta\log(1 + \tau_{igt})$ is the log difference of 1 plus the US tariff on product *g* from country *i* at time *t*; and $Share_{ig}$ is country *i*'s share of the US market for product *g* before the trade war.[9] This variable is set equal to 0 if the source country is China, as the relationship between the US tariff on China and imports from China is captured in the first term of the equation. τ_{Cgt} is the US tariff on product *g* from China at time *t*. The coefficient of interest is β^{U}_{3}, which describes the association between changes

8 We consider only manufactured goods (HS codes 28–96). To isolate the effect of trade war tariffs, we omit from our sample products that were subject to increased US duties other than tariffs on China (solar panels, washing machines, aluminum, iron, and steel).

9 *Share* is the share of US imports from a country in a product before the US-China trade war. It is computed as the average share of US imports in 2013–16, by country-product pair. It is computed using monthly import panel data from the US Census Bureau.

in US tariffs on imports from China and changes in the value of imports from countries other than China. The η_{gt} are product-time fixed effects, the η_{it} are country-time fixed effects, and the η_{is} are country-sector fixed effects.

Following Fajgelbaum et al. (2020), we use a strict monthly first difference to estimate the effect of the tariff. Therefore, our sample includes a product-month cell only if it contains positive import values in two consecutive months. We scale the tariff level used in the estimation to days in the month the tariff is imposed. We include three fixed effects in this regression: country-time, product-time, and country-sector.[10] These fixed effects provide a counterfactual baseline for country-time-product import values (i.e., in the absence of US tariff changes). Standard errors are clustered at the HS6 country level.

Our estimating approach restricts the coefficient estimates in equation (1) to be uniform across all products. However, by including an interaction with our *Share* variable in estimating equation (1), we permit heterogeneity in trade diversion based on the prior market share of partners. Although there are valid reasons to believe that there is variation in the elasticities themselves, uncovering such heterogeneity in the data has proven difficult. In their estimates of the response of US imports from China using an equation similar to equation (1), Fajgelbaum et al. (2020) find no systematic heterogeneity in estimated elasticities. Exploring 3 different classifications of final versus intermediate goods and 11 different product or sector characteristics (quality, markups, contract intensity, etc.), they "find no systematic evidence of heterogeneity with respect to observable characteristics" (p. 36).

Equation (1) also restricts the response to tariffs to the month in which they are levied. Such a specification is inappropriate if it takes time for importers to respond to higher prices, so that tariffs have a lagged effect on trade volumes. Although there are valid reasons to expect a stronger response over time, it does not appear in the data. Fajgelbaum et al. (2020) compute a "cumulative effect" of the US tariff on Chinese exports, by including a series of lags in their regression and using the estimated coefficients to compute a cumulative effect. They find that "the cumulative magnitudes displayed are quantitatively similar to the reduced-form estimates from the static regressions" (p. 33). If trade with China eliminated by the tariff does not increase much over time, it is possible that trade diversion does not either.

DID KOREA GAIN US MARKET SHARE IN PRODUCTS TARGETED IN THE TRADE WAR?

Regression of Changes in US Imports on Changes in Tariff Rates

We estimate equation (1) using linear regression with product-time, country-time, and country-sector fixed effects. The estimating equation is a reduced-form expression of the underlying import demand and export supply functions.[11] We therefore interpret the coefficient of interest, β_3^U, as the association between changes in US tariffs on imports from China and changes in the value of imports from countries other than China conditional on US market share. By introducing

10 *Sector* is defined by reference to four industrial classifications in the North American Industry Classification System (NAICS).

11 Fajgelbaum et al. (2020) estimate a similar reduced-form expression without regressors that capture the extent of trade diversion to other sources (table IV, column 1). They provide a derivation of the underlying import demand and export supply functions.

an interaction between the change in US tariffs on China and the share of the US market held by trade partners, we allow implied changes in export sales to differ across sources.

Table 2
Estimated response of US imports to changes in US tariffs on China

Dependent variable: First difference of log of US import value	
Variable	***Estimated coefficient***
First difference of log of US tariff	–1.459*** (0.0689)
Prior US market share	–0.033*** (0.0044)
First difference of log of US tariff applied to China Prior US market share	0.464*** (0.1691)
Constant	0.003*** (0.0001)
Product x time fixed effect	Yes
Country x time fixed effect	Yes
Country x sector fixed effect	Yes
R^2	0.13
Number of observations	3,158,996

Note: Table reports the HS10 US import responses to import tariffs. Robust standard errors are in parentheses.
***p <0.01, **p < 0.05, *p < 0.1.
Source: Authors' calculations using data and methods described in text.

Table 2 reports the results of this estimation. The specification exploits variation in tariff levels over time to estimate the response of US imports from China and other sources to changes in US tariffs on China. The estimated coefficient on change in own tariff shows that trade values drop with increases in the tariff applied to them. The estimated coefficient value, –1.46, is statistically significant at the 1 percent level. It implies that a 1 percent increase in one plus the US tariff is associated with a reduction in the value of imports from the newly taxed partner of 1.46 percent.[12]

12 This coefficient value is very similar to that estimated by Fajgelbaum et al. (2020) in their reduced-form regression of own tariffs on import values. They estimate a coefficient of –1.52.

Our main interest lies with the estimated coefficient on the interaction between the US tariff on imports from China and the prior market share of alternative import sources. The estimated coefficient value, 0.464, is statistically significant at the 1 percent level. It implies that for a non-Chinese partner with a 10 percent share of the US import market before the trade war, a 1 percent increase in one plus the US tariff on China is associated with a 0.0464 percent increase in sales to the United States. This estimate also suggests that imports from other sources did not fully replace the decline in the value of US imports from China.

Estimation of Changes in US Imports from Korea

To estimate the change in US imports from Korea, we rely on the estimated coefficient, β_3^U, from our regression analysis. We calculate the estimated change in US imports from Korea for each HS10 product as 0.464 * $\Delta\log(1 + \tau_{Cgt})$ * $Share_{ig}$. We calculate the change in the US tariff on each HS10 product imported from China between the start and end of the period 2017–19. *Share* is the share of US imports from Korea in a product (HS10 level), computed as the average for 2013–16.

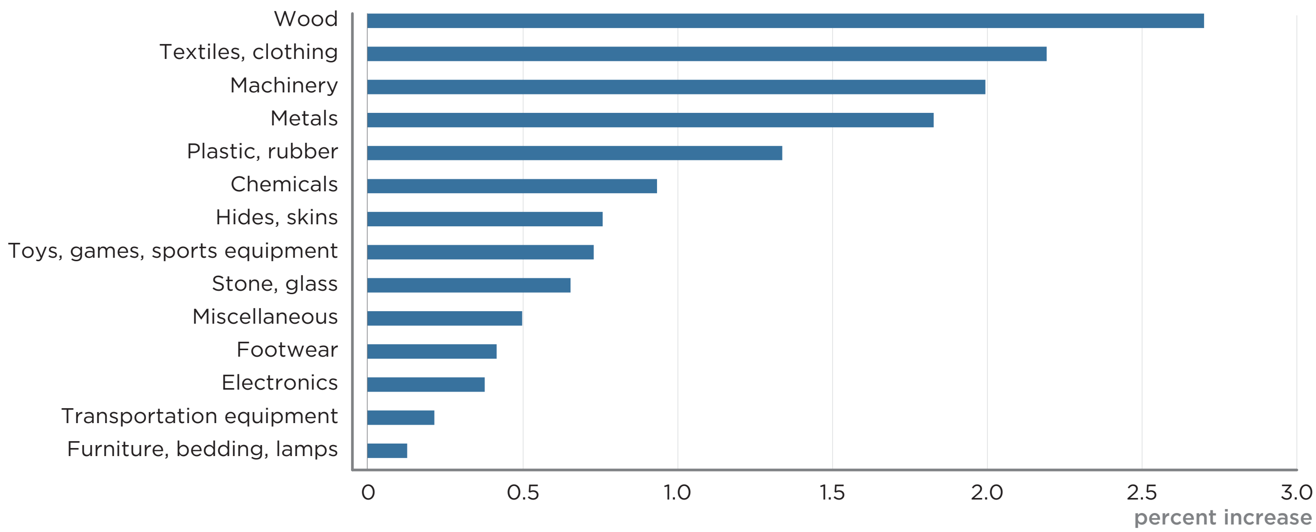
We then aggregate these estimated changes in US imports from Korea into 14 sectors, following Bown (2019). Appendix A provides detailed descriptions of the sectors. We aggregate from the HS10 product level by weighting the change in each product by its share of total 2017 sectoral import value.

The estimated increases in Korea's US sales range from less than 0.5 percent to more than 2.5 percent, driven by differences in prior US market share and the extent to which the United States taxed Chinese exports (figure 4). The biggest estimated increase is for wood products, a sector in which imports from China were heavily taxed in the trade war (figure 5).

Our estimates suggest that Korean sales to the United States of wood products rose 2.7 percent. The next largest increase is for the textiles and apparel sector, with an estimated bump in US imports of 2.2 percent. Machinery is estimated to have benefited from the next-largest increase (2.0 percent), followed by metals (1.8 percent). Korea's most important export sector, transportation equipment, is estimated to have benefited relatively little by trade diversion from China, despite the extensive coverage of US tariffs on imports from China, because Korea and China specialize in different products within this sector.

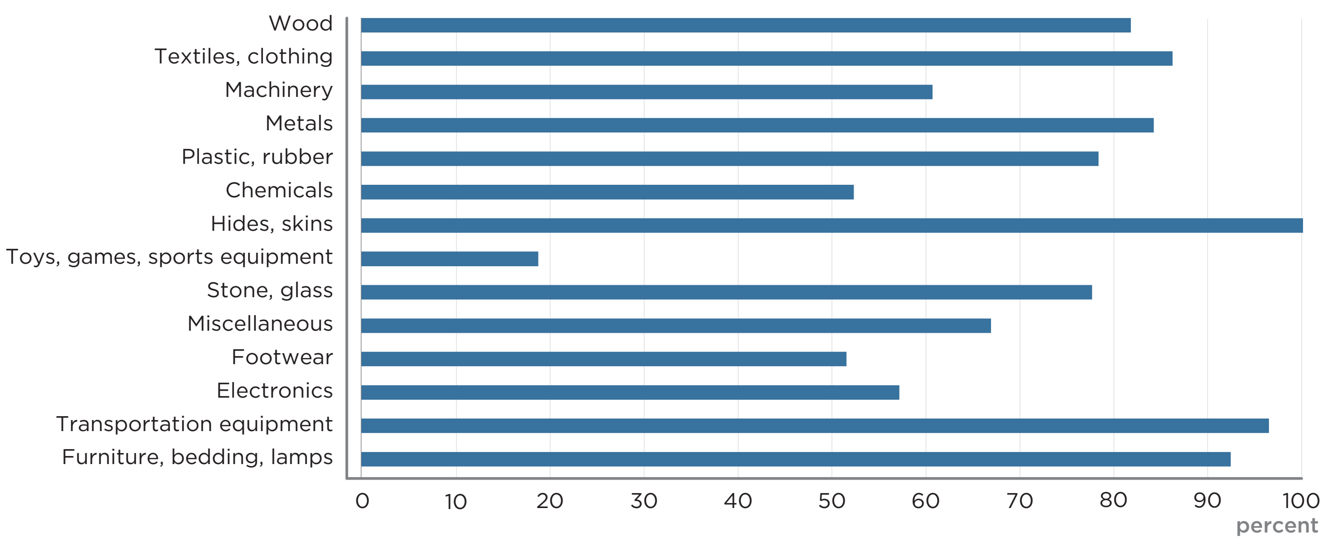
Summarizing our results using broad sectoral aggregates is useful, but aggregation hides some interesting detail. Appendix B provides a list of the 25 products that our analysis suggests had the largest increase in US sales associated with the US-China tariffs. Mechanical shovel exports (backhoes, shovels, clamshells and draglines) from Korea saw an estimated 10 percent increase in US sales. Several types of paper products have estimated sales jumps of over 9 percent. Finally, three types of organic chemicals (HS chapter 29) make the top 25 products with gains.

Figure 4
Estimated increase in US imports from Korea in response to US-China tariffs, by product category



Source: Authors' calculations using estimated coefficients shown in table 1 and actual tariff changes.

Figure 5
Share of US imports from China subject to US trade war tariffs



Source: Bown (2020).

POLICY IMPLICATIONS OF TRADE WAR–INDUCED SHIFTS IN US IMPORTS

US imports from China that were taxed heavily during the US-China trade war were partially replaced by purchases from other suppliers. Korea benefited from this shift in US imports, although the increase was relatively small in most sectors. In the aggregate, our reduced-form regression implies that Korean sales in the US market rose by 1 percent. Sectors in which the United States taxed Chinese exports heavily and Korean exporters held larger market shares—such as wood products, textiles and apparel, and machinery—experienced a sales bump of 2 percent or more.

Korean exporters may also have been harmed by the trade war, however, in ways that are less directly tied to US policy changes and hence less visible. China is an important market for Korean exports in many of the same sectors that dominate its trade flows to the United States. Korean intermediates and machinery are embedded in Chinese production, some of which flows to US importers. For example, foreign content in Chinese electronics exports to the United States typically includes the most technologically advanced components of these products, such as high-performance semiconductors and flat panel displays. Korea is a particularly important supplier of such intermediate goods. These supply chain linkages suggest that decreased US demand for Chinese exports may have spilled over to China's demand for Korean-made goods.

Evidence of supply chain disruptions from the US-China trade war is highly relevant for Korean policy. The first reason why supply chain effects are important is distributional. Sectors that gain US market share are unlikely to be the same sectors that lose sales because of trade war–induced Chinese factory downsizing. Although Korea and China compete in many product spaces, Korea's exports to China differ from its exports to the United States. Chinese demand skews toward intermediate goods and capital goods, while US demand skews toward final goods.

The second reason why supply chain effects matter is that any disruption in trade flows to China is likely to have a nonnegligible effect on the Korean economy. China is Korea's largest export market; its trade with China supports many jobs and brings in much government revenue. Little research has been conducted on how discriminatory tariffs reverberate through supply chains. Such analysis could inform policy related to future supply disruptions.[13] We leave this investigation of how the US-China trade war affected Chinese demand for imports from Korea to a follow-up study.

REFERENCES

Bown, Chad P. 2019. *Phase One China Deal: Steep Tariffs Are the New Normal*. PIIE Trade and Investment Policy Watch, December 19. Washington: Peterson Institute for International Economics.

Bown, Chad P. 2021. *The US–China Trade War and Phase One Agreement*. PIIE Working Paper 21-2. Washington: Peterson Institute for International Economics.

Bown, Chad P., and Meredith A. Crowley. 2007. Trade Deflection and Trade Depression. *Journal of International Economics* 72, no. 1: 176–201.

Fajgelbaum, Pablo D., Pinelopi K. Goldberg, Patrick J. Kennedy, and Amit K. Khandelwal. 2020. The Return to Protectionism. *Quarterly Journal of Economics* 135, no. 1: 1–55.

13 Bown and Crowley (2007) is an exception. It is the first paper to empirically examine whether a country's use of an import-restricting trade policy distorts a foreign country's exports to third markets.

Lovely, Mary E., and Yang Liang. 2018. *Trump Tariffs Primarily Hit Multinational Supply Chains, Harm US Technology Competitiveness.* PIIE Policy Brief 18-12. Washington: Peterson Institute for International Economics.

Romalis, John. 2007. NAFTA's and CUSTA's Impact on International Trade. *Review of Economics and Statistics* 89, no. 3: 416–35.

Russ, Katheryn N., and Deborah L. Swenson. 2019. Trade Deficits and Trade Diversion: The Case of the Korea-U.S. Free Trade Agreement. *Journal of the Japanese and International Economies* 52, no. 1: 22–31.

Viner, Jacob. 1950. *The Customs Union Issue*. Technical Report. Washington: Carnegie Endowment for International Peace.

APPENDIX A DESCRIPTION OF DATASETS USED FOR STATISTICAL ANALYSIS

US Trade and Tariff Data

We compiled a monthly panel dataset of US statutory import tariffs based on two sources. Fajgelbaum et al. (2020) provide a comprehensive set of US tariffs from January 2016 to April 2019. Their sample period does not cover the increase in the third round of US tariffs on China enacted on June 15, 2019, or the fourth round, enacted on September 1, 2019. Using tariff rates from Bown (2019), we updated the tariff panel to include those changes (table A.1). The original source of both Fajgelbaum et al. (2020) and Bown (2019) is the US International Trade Commission (USITC).

Sectoral Definitions Used to Aggregate Estimated Export Changes

To summarize estimated export changes experienced by Korean exporters, we aggregated changes calculated at the HS10 level to broad industrial sectors. Bown (2019) used these sectors to illustrate sectoral coverage of US tariffs on imports from China. Using them here permits easy cross-reference between US tariff coverage and associated changes in Korean exports.

Table A.1
US tariffs levied on imports from China during the US-China trade war

Tariff wave	Date enacted	Number of products taxed (HS10)	Value of targeted imports from China, 2017 (billions of dollars)	Share of US imports, 2017 (percent)	Average US tariff rate (percent)	
					2017	*2019*
1	July 6, 2018	1,664	33.51	1.4	0.8	26.1
2	August 23, 2018	433	14.01	0.6	1.7	26.8
3	September 24, 2018; June 15, 2019	8,997	199.22	8.3	2.0	27.6
4	September 1, 2019	4,578	102.20	4.3	7.4	22.1

Note: Tariff rates are unweighted monthly HS10 average tariff rates applied to imports from China only.
Source: This table excerpts and updates table 1 in Fajgelbaum et al. (2020).

Table A.2
Classification scheme used to aggregate HS codes to sectors

Sector name	Two-digit HS codes included in sector
Chemicals	28–38
Plastic, rubber	39–40
Hides, skins	41–43
Wood	44–49
Textiles, clothing	50–63
Footwear	64–67
Stone, glass	68–71
Metals	72–83
Machinery	84
Electronics	85
Transportation equipment	86–89
Toys, games, sports equipment	95
Furniture, bedding, lamps	94
Miscellaneous	90–93, 96

Note: Because we include only manufacturing data (HS 28–96) in our analysis, our definition of "miscellaneous" is slightly different from that in Bown (2019) (we do not include HS2 97–99).

APPENDIX B KOREAN EXPORT PRODUCTS WITH THE LARGEST ESTIMATED INCREASES IN US SALES

Table B.1 lists the top 25 products based on the estimated percentage change in US sales associated with trade diversion from China.

Table B.1
Top 25 Korean export products ranked by estimated increase in US sales

HS10 code	Product description	Estimated increase in US sales (percent)
8429521020	Backhoes, shovels, clamshells and draglines	10.0
2901103000	n-Pentane and isopentane (a kind of saturated acyclic hydrocarbons)	9.6
4810142090	Paper products weighing more than 150 g/m2 and coated on both sides	9.3
4809904000	Decalcomania paper: simplex	9.1
8451290090	Drying machines: Each of a dry linen capacity exceeding 10kg	8.5
4002190020	Styrene-butadiene rubber (SBR); carboxylated styrene-butadiene rubber (XSBR): containing over 50 percent styrene by weight of the dry polymer	8.4
3814002000	Organic composite solvents and thinners, not elsewhere specified or included; prepared paint or varnish removers: Containing more than 25 percent by weight of one or more aromatic or modified aromatic substances	8.2
8607190600	Truck assemblies, axles and wheels, and parts thereof: Part of axles	8.0
7312106030	Ropes, cables and cordage other than stranded wire: Of stainless steel: With a diameter not exceeding 9.5 mm	7.7
2921439040	p-Toluidine-m-sulfonic acid (CAS No. 88-44-8)	7.6
7307939010	Butt welding fittings: With an inside diameter of 360 mm or more: Of iron or nonalloy steel: Not machined, not tooled and not otherwise processed after forging	7.5
7317005560	Nails, tacks, drawing pins, corrugated nails, staples (other than those of heading 8305) and similar articles, of iron or steel, whether or not with heads of other material, but excluding such articles with heads of copper: Other: Of one piece construction: Made of round wire: Not coated, plated or painted	7.5
7407213000	Copper bars, rods and profiles: Of copper-zinc base alloys (brass): Other	7.3
5402480070	Synthetic filament yarn (other than sewing thread), not put up for retail sale, including synthetic monofilament of less than 67 decitex: Other, of polypropylene: Other	7.2
4802100000	Handmade paper and paperboard	7.1

HS10 code	Product description	Estimated increase in US sales (percent)
5407612100	Wholly of polyester, of single yarns measuring not less than 75 decitex but not more than 80 decitex, having 24 filaments per yarn and with a twist of 900 or more turns per meter (619)	7.1
5408210060	Woven fabrics of artificial filament yarn, unbleached or bleached, weighing more than 170 g/m^2	7.0
5503200015	Synthetic staple fibers, not carded, combed or otherwise processed for spinning: Of polyesters, Bi-component fibers having an outer copolymer sheath that melts at a lower temperature than the core, of a kind used for bonding fibers together	7.0
5208523090	Cheesecloth	6.9
5402479040	Other yarn, Other, of polyesters: Multifilament, with twist of 5 turns or more per meter	6.9
2836401000	Dipotassium carbonate	6.9
3606100000	Ferrocerium and other pyrophoric alloys in all forms: Liquid or liquefied-gas fuels in containers of a kind used for filling or refilling cigarette or similar lighters and of a capacity not exceeding 300 cm3	6.7
2921441000	Nitrodiphenylamine	6.6
8408901040	Engines to be installed in agricultural or horticultural machinery or equipment: Not exceeding 37.3 kW	6.6
8529900400	Tuners of television apparatus	6.6

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