

Online Appendix for  
“Rising Import Tariffs, Falling Exports:  
When Modern Supply Chains Meet Old-Style Protectionism”

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## A Data Appendix

**Monthly Export Data** We use monthly, public-use U.S. export data provided by the U.S. Census Bureau from 2015 to 2019 (U.S. Census Bureau, 2019). This data spans a major revision of the HS nomenclature in 2017. To construct time consistent export flows at the 6-digit product level, we concord data from 2017-2019 back to the 2012 revision of the HS using concordances from the UN Statistics Division (United Nations Statistics Division (2019)). The compiled data is available in Handley et al. (2023).

Our baseline sample excludes the products that undergo any merging or splitting of codes. Some 6-digit product codes from a prior revision may continue to be reused in subsequent revisions, but they might be aggregated or split in new ways. We keep track of the codes that undergo any revision where we have to aggregate for consistency.

**Import Tariff Data** We collected data at the 8-digit tariff line level on new tariffs levied by the U.S. from 2018-2019 as part of Sections 201, 232, and 301 investigations.

- Section 201: Solar Products, January 23, 2018. We use the list of products and country exemptions from Presidential Proclamation 9693 (Federal Register, Vol 83, p. 3541) of January 23, 2018.
- Section 201: Washing Machines, January 23, 2018. We use the list of products and country exemptions from Presidential Proclamation 9694 (Federal Register, Vol 83, p. 3553).
- Section 232: Steel and Aluminum, March 8, 2018 with subsequent waves adding or dropping countries (see Figure 2). These include the products listed in the Annexes to Presidential Proclamation 9704 (Federal Register, Vol. 83, p. 11619) and Presidential Proclamation 9705 (Federal Register, Vol. 83, p. 11625).
- Section 301: China, wave 1 (July 6, 2018), wave 2 (August 23, 2018), and wave 3 (September 24, 2018 and escalated on May 23, 2019). There are many modifications and changes, especially to wave 3, where products are added and removed from earlier annexes in a series of Federal Register notices. We use an official list provided by the USITC ((U.S. International Trade Commission, 2020)).<sup>1</sup>

**Export Tariffs and Retaliation Tariff Data** Lists of new retaliatory tariffs levied against U.S. exports by various countries is gathered from destination country sources, following information produced for the trade war timeline in Bown and Kolb (2019). Since HS6 is the most dis-aggregated product category that is consistent across countries, we aggregate these lists to the HS 6-digit level. Tariffs are associated with the month in which they were imposed. The total amount of trade subject to retaliatory tariffs is computed using U.S. export data at the HS 6-digit level in 2017. We include the following retaliation actions:

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<sup>1</sup>There are some duties levied at the HS 10-digit level against China, which we aggregated to the HS 8-digit level.

- Canada, July 2018: Retaliatory tariffs on \$17.8 billion of U.S. exports. Information on the products facing retaliation (“June 29 list”) accessed at <https://www.piie.com/system/files/documents/bown-2018-07-05.xlsx>.
- China, April 2018: Retaliatory tariffs on \$2.4 billion of U.S. exports. Raw list of categories accessed at: <http://images.mofcom.gov.cn/www/201803/20180326085959196.pdf>, with additional information here: <https://piie.com/system/files/documents/2018-04-09-piie-chart-lu-schott.xlsx>.
- China, July 2018. Retaliatory tariffs on \$29.2 billion of U.S. exports. Information on products facing retaliation (“Tariffs effective July 6”) accessed at: <https://www.piie.com/system/files/documents/bown-2018-06-22.xlsx>
- China, August 2018. Retaliatory tariffs on \$15.3 billion of U.S. exports. Information on products facing retaliation accessed at: <http://images.mofcom.gov.cn/www/201808/20180808201049842.pdf>.
- China, September 2019: Retaliatory tariffs on \$51.3 billion of U.S. exports. Information on products facing retaliation accessed at: <https://www.piie.com/system/files/documents/bown2018-09-20.zip>.
- China, June 2019: Retaliatory tariffs on \$39.8 billion of U.S. exports. Information on products facing retaliation (“China Tariff Rates”, Column M) accessed at: <https://www.piie.com/system/files/documents/bown-jung-zhang-2019-06-12.xlsx>.
- European Union, June 2018: Retaliatory tariffs on \$4.2 billion of U.S. exports. Information on the products facing “immediate retaliation” accessed at <https://www.piie.com/system/files/documents/bown-2018-06-29.xlsx>.
- India, June 2019: Retaliatory tariffs on \$1.3 billion of U.S. exports. List of affected products accessed at [https://docs.wto.org/dol2fe/Pages/FE\\_Search/FE\\_S\\_S009-DP.aspx?language=E&CatalogueIdList=246009,245254&CurrentCatalogueIdIndex=0&FullTextHash=371857150&HasEnglishRecord=True&HasFrenchRecord=True&HasSpanishRecord=True](https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-DP.aspx?language=E&CatalogueIdList=246009,245254&CurrentCatalogueIdIndex=0&FullTextHash=371857150&HasEnglishRecord=True&HasFrenchRecord=True&HasSpanishRecord=True).
- Mexico, June 2018: Retaliatory tariffs on \$4.5 billion of U.S. exports. Information on the products facing retaliation (group 2) accessed at [http://www.dof.gob.mx/nota\\_detalle.php?codigo=5525036&fecha=05/06/2018](http://www.dof.gob.mx/nota_detalle.php?codigo=5525036&fecha=05/06/2018).
- Turkey, May 2018: Retaliatory tariffs on \$1.6 billion of U.S. exports. Information on the products facing retaliation accessed at [https://docs.wto.org/dol2fe/Pages/FE\\_Search/FE\\_S\\_S009-DP.aspx?language=E&CatalogueIdList=245272&CurrentCatalogueIdIndex=0&FullTextHash=371857150&HasEnglishRecord=True&HasFrenchRecord=False&HasSpanishRecord=True](https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-DP.aspx?language=E&CatalogueIdList=245272&CurrentCatalogueIdIndex=0&FullTextHash=371857150&HasEnglishRecord=True&HasFrenchRecord=False&HasSpanishRecord=True).
- Turkey, August 2018: Retaliatory tariffs on \$1.6 billion of U.S. exports. List is identical to May 2018 list, but rates are increased by different amounts. Information on the products facing retaliation accessed at <https://www.resmigazete.gov.tr/eskiler/2018/08/20180815-6.pdf>.

Because our export sample data goes back to 2015, we combine these retaliatory tariffs with the longer panel of destination-product export tariff data collected by Fajgelbaum et al. (2019) available from their replication package. As such, our measure of export tariffs combines the applied rate prior to the trade war and the increase from retaliation in 2018 and beyond, where applicable.

**Input-Output Based Tariff Exposure Construction** We construct a HS6 product measure of exposure,  $\text{InputTE}_p$ , incorporating exporters’ potential import tariff exposure through input-output linkages. Since, economy-wide I-O linkages are only available at a more aggregated industry level, we rely on a set of concordances between HS6 product  $p$  and IO industry  $j$ .<sup>2</sup>

Input usage ( $\text{prod}_{jk}$ ) and total cost ( $\text{prod}_j$  and  $\text{comp}_j$ ) of each industry is obtained from the most recent Use Table, 2012, of the detailed input-output accounting tables published by the U.S. Bureau of Economic Analysis (BEA). These tables show the “use” in dollars of inputs that each U.S. industry purchases (domestic or imports) from all other industries. To maintain coherence between BEA I-O methodology, we calculate the implied duty share faced by each industry,  $\frac{\text{duties}_k}{\text{imports}_k}$ , using public-use annual merchandise imports in 2016. The BEA input-output tables are designed to capture linkages between an output industry’s use of goods and services inputs from suppliers. This requires that we assign each imported good to the industry that would have produced the product rather than the industry code of the actual importer of record, which might be a retailer, wholesaler, or other services firm in the LFTTD. Nevertheless, the firm-level linkages between exporters and industries are recovered when we apportion the IO exposure measure to disaggregated 6-digit product exports, which would not be feasible without the information in LFTTD.

We concord HS6 imported products across the 405 BEA IO industry codes in two steps. First, we match every HS6 product to a 4-digit NAICS (HS-NAICS) using a 2016 import value trade weight. In the public-use import data, 92% of imports match to a manufacturing NAICS code (31-33), 4% to mining, utilities and construction (21-23), and 3% to agriculture (11) with the residual to public administration. Second, we concord the more aggregated BEA IO industry codes to each of the 4-digit NAICS codes (IO-NAICS).<sup>3</sup>

Now we assign an IO based import tariff exposure to an exported HS6 product  $p$  according to exporter industry codes  $j$  we observe in data. The share of product  $p$  in industry  $j$ ’s exports,  $\frac{\text{exports}_{pj}}{\text{exports}_j}$ , is calculated by aggregating firm level exports. For each exporting firm in 2016, we assign a 4-digit NAICS representing the predominant industry of firm  $i$ , which we define as the industry with highest employment across the firm’s establishments. Using the IO-NAICS concordance we can assign each firm IO duty share as in equation (??). To map these into products, we take a weighted average using export values of all the firms that export product  $p$ . The mapping of an exported product  $p$  to an IO industry  $j$  thus

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<sup>2</sup>Construction of firm-level IO tables is outside the scope of this paper especially given well-documented challenges in U.S. data of allocating firm level imports across multiple sectors for multi-unit, multi-activity firms that dominate goods trade (Feenstra and Jensen, 2012).

<sup>3</sup>We are grateful to Abdul Munasib for sharing the concordance between NAICS and BEA IO industries used in Helper and Munasib (2022).

relies on confidential firm level data. The main advantage of this approach, compared to using the public-use HS-NAICS concordance, is that the HS6 mappings are based on firms' actual export patterns and can accommodate common situations where firms in multiple different NAICS industries all export the same product (violating assumptions used in unique concordances).

**Table A1. Weighted Correlations**

	ImpExpTE <sub>p</sub>	ImpExpTE <sub>p</sub> <sup>VC</sup>	ImpExpTE <sub>p</sub> <sup>T1</sup>	ImpExpTE <sub>p</sub> <sup>T2</sup>	ImpExpTE <sub>p</sub> <sup>T3</sup>	ImporterTE <sub>p</sub>
ImpExpTE <sub>p</sub> <sup>VC</sup>	0.901					
ImpExpTE <sub>p</sub> <sup>T1</sup>	0.064	0.056				
ImpExpTE <sub>p</sub> <sup>T2</sup>	0.033	0.081	-0.014			
ImpExpTE <sub>p</sub> <sup>T3</sup>	0.994	0.889	0.059	-0.081		
ImporterTE <sub>p</sub>	0.412	0.387	0.057	0.038	0.407	
InputTE <sub>p</sub>	-0.024	-0.077	-0.020	-0.029	-0.020	0.930

**Notes:** This table presents correlations of the tariff exposure measures constructed in the paper, with each HS6 product weighted by its weight in total imports. The sample used to generate these correlations is the same as the sample for the regressions above.

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