The Return to Protectionism

Appendices for Online Publication

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A Data Appendix

A.1 Definitions

Recall from the main text that we use the following definitions throughout our analysis:

- *Products* are HS-10 codes. For example, the HS-10 code 7206100000 covers the product "iron and non-alloy steel ingots."
- *Varieties* are product-country pairs. For example, imports (exports) of "iron and non-alloy steel ingots" from (to) Canada are a distinct variety.
- *Sectors* are NAICS-4 codes. For example, the NAICS-4 code 3312 covers "Steel Product Manufacturing from Purchased Steel."

A.2 Trade Data

A.2.1 Census Trade Data

Our sample is a monthly panel of variety-level traded goods from January 2017 to April 2019. This sample covers the universe of countries and HS-10 codes available in the Census data, including both manufacturing and agricultural products. The Census data does not cover imports or exports of services, such as education or tourism.

In these data we observe the following variables:

- USD value of all imports and exports.
- Quantities of imports and exports. Quantities are missing for approximately 16% of observations in the variety-level import sample and 20% of observations in the variety-level export sample. Within HS-10 codes, units of quantity are homogeneous.
- For imports, we observe the USD value of duties collected by U.S. customs.

A.2.2 Import Tariffs

Our import tariff database is a monthly variety-level panel of tariffs on U.S. imports from 2017:1 to 2019:4. To construct this database, we scrape the U.S. tariff schedule from publicly available official U.S. International Trade Commission (USITC) documents. USITC publishes a "baseline"

tariff schedule in January of each year, and publishes revisions to the baseline schedule to reflect changes in tariff policy. These revision files (14 revisions in total for 2018) document the ad-valorem tariff increases that we use as identifying variation in our empirical analysis. We find 99.8% overlap in the value of targeted import products when comparing our dataset to the compilation of targeted products by Bown and Zhang (2019).

The U.S. typically implemented tariff increases at the level of HS-8 codes, and this is why we cluster standard errors at the HS-8 level in our analyses of U.S. import tariffs. However, in rare cases the U.S. exempted specific HS-10 codes within HS-8 categories. A total of 18 Chinese varieties received tariff exemptions at the 10-digit level. These varieties have a 2017 annual value of $1 million. By using HS-10 codes as our definition of products, we are able to exploit this variation in our empirical analysis.

The U.S. and trade partners frequently enacted tariff increases in the middle of the month. In our event study analyses, we assign event time = 0 to the subsequent month if tariffs increases were implemented after the 15th of the month. When estimating the elasticities, we scale tariff increases by the number of days of the month they were in effect. For example, a 15 p.p. tariff increase enacted on the 20th day of a 30-day month is assigned a 10 p.p. tariff increase (15 * 20/30 = 10) in the initial month, and an additional 5 p.p. increase in the subsequent month.[1]

Here we provide additional details about which countries are targeted or exempt for each U.S. tariff wave; this information is intended to complement Table I in the main text.

1. **Washer Tariffs:** Apply to all countries except Canada and GSP Least Developed Nations.[2]
2. **Solar Panel Tariffs:** Apply to all countries except GSP Least Developed Nations.
3. **Steel Tariffs:** Apply to all countries except Argentina, Australia, Brazil, and South Korea. Canada, Mexico, and the EU were exempt until June 1, 2018, after which exemptions were lifted.
4. **Aluminum Tariffs:** Apply to all countries except Argentina (subject to quotas) and Australia (fully exempt with no quota restrictions). Canada, Mexico, and the EU were exempt until June 1, 2018, after which exemptions were lifted.
5. **China Tariffs:** Apply only to imports of Chinese varieties.

[1] Our database does not account for antidumping or countervailing tariffs. It also does not account for a very small fraction of varieties for which tariff increases apply only after surpassing a quota threshold; we estimate that such quota thresholds affect only $16 million (out of ~$300 billion) of annual targeted imports. We also ignore all 2018 tariff changes not associated with the trade war, such as tariff reductions resulting from long-standing treaty commitments. Our empirical specifications are thus identified solely from plausibly exogenous changes in tariffs implemented during the trade war.

[2] GSP Least Developed Nations include: Afghanistan, Angola, Benin, Bhutan, Burkina Faso, Burma, Burundi, Cambodia, Central African Republic, Chad, Comoros, Djibouti, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nepal, Niger, Rwanda, Samoa, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, Tanzania, Togo, Tuvalu, Uganda, Vanuatu, Yemen, and Zambia.

A.2.3 Retaliatory Tariffs

Our export (retaliatory) tariff database is a monthly variety-level panel of tariffs on U.S. exports from January 2017 to April 2019. We collect "baseline" tariff rates on U.S. exports using *ad valorem* equivalent MFN rates from the most recently available vintage of the WTO World Tariff Database. We then collect official documentation from foreign finance ministries describing retaliatory tariff actions due to the trade war. We construct the retaliatory tariff rate as the MFN rate plus the *ad valorem* retaliatory tariff increase, and follow the same event date assignment and tariff scaling rules as we use for the import tariffs.

Since we do not have access to foreign customs data, we do not observe tariff revenue collected by U.S. trade partners on U.S. exports. We thus construct the duty-inclusive price as (one plus) the value of U.S. exports multiplied by the retaliatory tariff rate.

In rare cases, retaliatory tariffs increased over multiple months: for example, Mexico announced retaliatory tariffs in June 2018 that were increased in July 2018. In other rare cases, retaliatory tariffs decreased over time: for example, in January 2019 China reinstated the MFN tariff rate on U.S. autos and auto parts as a result of tariff negotiations.[3]

Finally, we note that HS codes are only harmonized across countries up to the level of HS-6 codes. Finer codes, such as HS-8 and HS-10 codes, are developed independently by each country for internal classifications. Thus when U.S. trade partners enact tariffs using their own versions of HS-8 codes, we nevertheless assign tariffs at the HS-6 level. In principle, this could imply that our analysis overestimates the value of U.S. exports subject to tariffs and underestimates the foreign import demand elasticity. However, when we estimate the foreign demand elasticity using a merge between Chinese HS-10 to U.S. HS-10 codes, we estimate $\hat{\sigma^*}$ =1.08(se 0.36) which is not statistically different from our baseline estimate of $\hat{\sigma}^*$=1.04 (se 0.32). This merge does not use an official concordance between the two countries' HS classifications, and therefore we perform all the analyses by assigning retaliatory tariffs at the HS-6 level.

A.3 Sector-Level Data

1. **BLS Price Indexes**: The BLS Producer Price Index (PPI) is a monthly sector-level panel indexing the prices received by producers for their output, covering virtually all tradeable non-farm domestic output. The BLS Import Price Index (MPI) and Export Price Index (XPI) are monthly sector-level panels that measure FOB price inflation in imported and exported goods. All three price indexes are Laspeyres indexes, and thus hold the quality and availability of goods constant over time. The MPI and XPI exclude price inflation due to tariffs and use two-year lagged annual trade value weights.
2. **Federal Reserve G17 Industrial Production Index (G17)**: The Fed G17 is a monthly sector-level panel indexing real output in non-farm sectors. Index values are computed as a

[3] As with the import tariffs, our retaliatory tariff database does not capture antidumping or countervailing duties. It also does not capture potential non-tariff retaliatory actions, such as changes in purchasing behavior by state-owned enterprises.

Fisher index, with weights constructed from annual estimates of value added.

3. **BEA 2016 Input-Output (IO) Accounts**, "Use" Tables: These tables quantify annual 2016 inputs and outputs of commodities by intermediate and final users.
4. **Pierce and Schott (2012)** provide a cross-walk between HS-10 and NAICS codes. For the quantitative model, we classify NAICS-4 sectors as tradeable if they match to an HS code.

A.4 County-Level Data

- **Census County Business Patterns (CBP)**: These data provide annual 2016 industry employment and wage data at the county-level for non-farm sectors.
- **BEA Local Area Personal Income and Employment**: These data provide annual 2016 farm-sector employment and wage data at the country-level.
- **American Community Survey, 5-Year**: We collect the following country-level variables: share unemployed, share white, share with a college degree, and mean income. These data are used in Online Appendix Table A.15.
- **U.S. Federal Election Commission**: Country-level voting patterns for each political party in the 2016 federal elections.

B Appendix to Section II.D (Event Study)

In Figure II, we document a sharp temporary increase in U.S. imports of targeted varieties at event period = 2, followed by a sharp decline in event time = 3. The pattern driven by targeted Chinese varieties in December 2018, and is apparent across a broad range of sectors, implying that it is not a result of seasonality, which in any case would be controlled for by α_{gt} fixed effects. Here, we provide evidence that this effect reflects an anticipatory response to an announcement made by the U.S. at the end of September 2018 that the U.S. would increase tariffs on approximately $200 billion of already-targeted Chinese varieties from 10% to 25% on January 1, 2019.

To isolate this anticipation effect, we first split targeted import varieties into two subsamples: (1) Chinese varieties worth approximately $200 billion that were initially targeted with a 10% tariff increase in late September 2018, and then threatened with an additional 15% tariff increase in January 2019; and (2) all other targeted varieties, worth approximately $100 billion. We then re-estimate the event study specification from Equation 1, but allow the event-time coefficients to vary for threatened and non-threatened varieties. If the anticipation explanation is correct, we should not observe a surge in imports at event period = 2 for non-threatened varieties.[4]

Figure A.4 plots the event-time coefficients for both groups relative to untargeted varieties. At event period = 2, we observe a sharp increase in imports for the threatened varieties, corresponding

[4]Recall that for tariffs implemented after the 15th of the month, we assign event time = 0 to the following month. In this case, that means the September 24th tariff wave is assigned event time = 0 in October, and event time = 2 corresponds to December.

to a surge in anticipatory imports in December 2018 prior to expected tariff increases in January 2019. As expected, we do not observe a similar import surge for non-threatened varieties and the pronounced jump at event time 2 is concentrated entirely in threatened Chinese varieties.

C Appendix to Section III (Trade Framework and Identification)

C.1 Utility and Price Indexes

The demands of consumers and final producers are aggregated at the sector level. Each tradeable sector $s = 1, .., S$ is used for consumption C_s and as intermediate I_s. Sector-level aggregate demands are:

$$C_s + I_s = \left(A_{Ds}^{\frac{1}{\kappa}} D_s^{\frac{\kappa-1}{\kappa}} + A_{Ms}^{\frac{1}{\kappa}} M_s^{\frac{\kappa-1}{\kappa}} \right)^{\frac{\kappa}{\kappa-1}}, \tag{C.1}$$

where D_s and M_s are composite domestic and imported products,

$$D_s = \left(\sum_{g \in \mathcal{G}_s} a_{Dg}^{\frac{1}{\eta}} d_g^{\frac{\eta-1}{\eta}} \right)^{\frac{\eta}{\eta-1}}, \tag{C.2}$$

$$M_s = \left(\sum_{g \in \mathcal{G}_s} a_{Mg}^{\frac{1}{\eta}} m_g^{\frac{\eta-1}{\eta}} \right)^{\frac{\eta}{\eta-1}}, \tag{C.3}$$

where d_g and m_g is U.S. consumption of the domestic variety and an aggregate of imported varieties of product g, respectively, and where $\mathcal{G}_s$ is the set of products in sector s. The imported products are further differentiated by origin. For each $g \in \mathcal{G}_s$, the quantity imported is

$$m_g = \left(\sum_i a_{ig}^{\frac{1}{\sigma}} m_{ig}^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}, \tag{C.4}$$

where m_{ig} is the quantity of product g imported from country i. The terms A_{Ds}, A_{Ms}, a_{Dg}, and a_{ig} denote demand shocks at the different tiers.

The sector level price index associated with (C.1) is

$$P_s = \left(A_{Ds} P_{Ds}^{1-\kappa} + A_{Ms} P_{Ms}^{1-\kappa} \right)^{\frac{1}{1-\kappa}}, \tag{C.5}$$

where P_{Ds} and P_{Ms} are the price indexes of domestic and imported goods in sector s associated with (C.2) and (C.3),

$$P_{Ds} = \left(\sum_{g \in \mathcal{G}_s} a_{Dg} p_{Dg} \right)^{\frac{1}{1-\eta}}, \tag{C.6}$$

$$P_{Ms} = \left(\sum_{g \in \mathcal{G}_s} a_{Mg} p_{Mg} \right)^{\frac{1}{1-\eta}}, \tag{C.7}$$

where p_{Dg} is the price of the domestic variety of good g, and p_{Mg} is the price index of imported

varieties associated with (C.4),

$$p_{Mg} = \left(\sum_i a_{ig} p_{ig}^{1-\sigma} \right)^{\frac{1}{1-\sigma}}, \tag{C.8}$$

where p_{ig} is the domestic price defined in (5).

D Appendix to Section V (Aggregate and Distributional Effects)

D.1 Wages

The inverse labor demand resulting from profit maximization (23) is

$$w_{sr} = \left(\frac{Z_{sr} p_s}{(L_{sr}/\alpha_{L,s})^{\alpha_{K,s}} \phi_s^{\alpha_{I,s}}} \right)^{\frac{1}{1-\alpha_{I,s}}}, \tag{D.1}$$

for $s = 1, .., S$, where L_{sr} is the number of workers by sector and region. We define the tradeable sector wage as

$$w_{T,r} = \frac{\sum_{s \in \mathcal{S}} w_{sr} L_{sr}}{\sum_{s \in \mathcal{S}} L_{sr}}.$$

Using the non-traded wage $w_{NT,r} = P_{NT,r} Z_{NT,r}$, market clearing in the non-traded sector gives:

$$w_{NT,r} = \beta_{NT} \frac{X_r}{L_{NT,r}}. \tag{D.2}$$

The wage per person in the non-traded sector is $w_{NT,r} = P_{NT,r} Z_{NT,r}$.

D.2 General-Equilibrium System in Changes

We derive the model solution as a system of first-order approximations around an initial equilibrium corresponding to the period before the tariff war. We use this system for the numerical experiments in Section V. Every market clearing condition is expressed in log-changes. The outcome depends on endogenous variables, observed initial shares, elasticities and tariff shocks.

Letting $\hat{x} \equiv d \ln x$, the system gives the change in each endogenous variable given shocks to U.S. and foreign tariffs, $\left\{ d\tau_{ig}, d\tau_{ig}^* \right\}$. Using market clearing conditions, the solution of the model can be expressed as a system for the changes in wages per efficiency unit $\{\hat{w}_{sr}\}$, average wages in the traded sectors $\left\{ \hat{w}_r^T \right\}$, wages in the non-traded sector $\left\{ \hat{w}_r^{NT} \right\}$, producer prices $\{\hat{p}_s\}$, intermediate input prices $\left\{ \hat{\phi}_s \right\}$, employment in the tradeable sector $\left\{ \hat{L}_r^T \right\}$, sector price indexes $\left\{ \hat{P}_s \right\}$, import price indexes $\left\{ \hat{P}_{Ms} \right\}$, product level price indexes $\{\hat{p}_{Mg}\}$, duty-inclusive prices of imported varieties $\{\hat{p_{ig}}\}$, tariff revenue $\hat{R}$, sector level expenditures $\left\{ \hat{E}_s \right\}$, national final consumer expenditures $\hat{X}$, national value added $\hat{Y}$, national intermediate expenditures by sector $\left\{ \hat{P_s I_s} \right\}$, national sales by sector $\left\{ p_s \hat{Q}_s \right\}$, and final consumer expenditures by region $\left\{ \hat{X}_r \right\}$.

We now describe the full system that characterizes the solution to these outcomes. To organize the presentation, it is convenient to split it in 4 blocks.

Wages, Producer Prices, Input Prices, and Tradable Employment

The first block characterizes $\left\{\hat{ws}_{sr}, \hat{w_{T,r}}, \hat{w_{NT,r}}, \hat{p}_s, \hat{\phi}_s, \hat{L_r^T}\right\}$ given $\left\{\hat{X}_r, \hat{E}_s, \hat{P}_s, \hat{\tau_{ig}^*}\right\}$. We let χ^I be an indicator variable for whether labor is immobile across sectors, as in our benchmark (otherwise, it is perfectly mobile). From (D.1) to (D.2):

$$\hat{ws}_{sr} = \frac{\chi^I}{1-\alpha_{I,s}}\left(\hat{p}_s - \alpha_{I,s}\hat{\phi}_s\right) + \left(1-\chi^I\right)\hat{w_{T,r}}, \tag{D.3}$$

$$\hat{w_{T,r}} = \left(1-\chi^I\right)\frac{\sum_{s\in\mathcal{S}}\left(\frac{w_{sr}L_{sr}}{w_{T,r}L_r^T}\right)\frac{\hat{p}_s-\alpha_{I,s}\hat{\phi}_s}{\alpha_{K,s}} - \hat{L_r^T}}{\sum_{s\in\mathcal{S}}\left(\frac{w_{sr}L_{sr}}{w_{T,r}L_r^T}\right)\frac{1-\alpha_{I,s}}{\alpha_{K,s}}} + \chi^I\sum_{s\in\mathcal{S}}\left(\frac{w_{sr}L_{sr}}{w_{T,r}L_r^T}\right)\frac{\hat{p}_s-\alpha_{I,s}\hat{\phi}_s}{1-\alpha_{I,s}}, \tag{D.4}$$

$$\hat{w_{NT,r}} = \chi^I\hat{X}_r + \left(1-\chi^I\right)\hat{w_{T,r}}. \tag{D.5}$$

From the equilibrium in the non-traded sector, the change in traded sector employment is

$$\hat{L_r^T} = \left(1-\chi^{\mathrm{I}}\right)\left(\hat{w_{T,r}} - \hat{X}_r\right)\frac{L_r^{NT}}{L_r^T}. \tag{D.6}$$

Adding up (25) across all varieties within a sector and using the sector supply Q_s implied by (23), the producer price in sector s changes according to:

$$\hat{p_s} = \frac{\frac{P_{Ds}D_s}{p_sQ_s}\left(\hat{E}_s + (\kappa-1)\hat{P}_s\right) + \frac{\alpha_{I,s}}{\alpha_{K,s}}\hat{\phi}_s + \sum_{r\in\mathcal{R}}\frac{p_sQ_{sr}}{p_sQ_s}\frac{\alpha_{L,s}}{\alpha_{K,s}}\hat{ws}_{sr} - \sigma^*\sum_{g\in G_s}\sum_{i\in\mathcal{I}}\frac{p_{Dg}x_{ig}}{p_sQ_s}\frac{d\tau_{ig}^*}{1+\tau_{ig}^*}}{\frac{1-\alpha_{K,s}}{\alpha_{K,s}} + \frac{P_{Ds}D_s}{p_sQ_s}\kappa + \left(1-\frac{P_{Ds}D_s}{p_sQ_s}\right)\sigma^*}. \tag{D.7}$$

Finally using (22) the price index of intermediates is

$$\hat{\phi}_s = \sum_{s'\in\mathcal{S}}\frac{\alpha_s^{s'}}{\alpha_{I,s}}\hat{P}_{s'}. \tag{D.8}$$

Consumer Prices, Import Prices, and Tariff Revenue

The second block characterizes $\left\{\hat{P}_s, \hat{P_{Ms}}, \hat{p}_{gM}, \hat{p_{gi}}, \hat{R}\right\}$ given $\left\{\hat{E}_s, d\tau_{ig}\right\}$. From (C.5), the sector price index changes according to a weighted average of producer prices and the import price index,

$$\hat{P}_s = \frac{P_{Ds}D_s}{E_s}\hat{p}_s + \left(1-\frac{P_{Ds}D_s}{E_s}\right)\hat{P}_{Ms}. \tag{D.9}$$

From (2), (4), (6), (C.7), and (C.8), the import price index $\hat{P}_{Ms}$ in sector s changes according to

$$\hat{P_{Ms}} = \sum_{g\in\mathcal{G}_s}\left(\frac{p_{Mg}m_g}{P_{Ms}M_s}\right)\hat{p_{Mg}}, \tag{D.10}$$

where the product-level import price index changes according to

$$\hat{p}_{Mg} = \sum_{i\in\mathcal{I}}\left(\frac{p_{ig}m_{ig}}{p_{Mg}m_g}\right)\hat{p}_{ig}, \tag{D.11}$$

and where the CIF price changes according to

$$\hat{p_{ig}} = \frac{\omega^*}{1+\omega^*\sigma}\left(\hat{E}_s + (\kappa-1)\hat{P}_s + (\eta-\kappa)\hat{P}_{Ms} + (\sigma-\eta)\hat{p}_{Mg}\right) + \frac{1}{1+\omega^*\sigma}\frac{d\tau_{ig}}{1+\tau_{ig}}. \tag{D.12}$$

A second order approximation to the change in tariff revenue, defined as $R = \sum_{s\in\mathcal{S}}\sum_{g\in\mathcal{G}_s}\sum_{i\in\mathcal{I}}\tau_{ig}p^*_{ig}m_{ig}$, gives:

$$\hat{R} = \sum_s \sum_{g\in G_s}\sum_i \frac{p^*_{gi}m_{gi}}{R}d\tau_{gi} + \sum_s \sum_{g\in G_s}\sum_i \frac{p^*_{gi}m_{gi}}{R}\left(\tau_{gi}+d\tau_{gi}\right)\left(\hat{p^*_{gi}}+\hat{m_{gi}}\right) + \frac{1}{2}\sum_s\sum_{g\in G_s}\sum_i \tau_{gi}d^2\left(p^*_{gi}m_{gi}\right),$$

where $d^2\left(p^*_{gi}m_{gi}\right) = d\tau'\frac{\partial\left(p^*_{gi}m_{gi}\right)}{\partial\tau'\partial\tau}d\tau$.[5] From the equilibrium in the market for each variety that results from combining (4) and (6), using the solution for $\hat{p_{ig}}+\hat{m_{ig}}$ we obtain an equation relating tariff revenue to observable shares, changes in tariffs, and changes in price indexes and expenditure shifters computed in the previous blocks of equations:

$$\begin{aligned}\hat{R} = &\sum_s\sum_{g\in G_s}\sum_i \left(\tau_{gi}+d\tau_{gi}\right)\frac{p^*_{gi}m_{gi}}{R}\frac{1+\omega^*}{1+\omega^*\sigma}\left(\hat{E}_s+\left(\kappa-1\right)\hat{P}_s+\left(\eta-\kappa\right)\hat{P}_{Ms}+\left(\sigma-\eta\right)\hat{p}_{gM}\right)\\ &+\sum_s\sum_{g\in G_s}\sum_i\left(1-\tau_{ig}\frac{\sigma-1}{1+\omega^*\sigma}\right)\frac{p^*_{ig}m_{ig}}{R}\frac{d\tau_{ig}}{1+\tau_{ig}}\\ &-\sum_s\sum_{g\in G_s}\sum_i\frac{p^*_{ig}m_{ig}}{R}\sigma\frac{1+\omega^*}{1+\omega^*\sigma}\left(\frac{d\tau_{ig}}{1+\tau_{ig}}\right)^2.\end{aligned} \tag{D.13}$$

Sector and Region Demand Shifters

The third block characterizes the sector and region level expenditure shifters $\left\{\hat{E}_s,\hat{X}_r\right\}$ given $\left\{\hat{R},\hat{p_s},\hat{\phi}_s,\hat{w_{NT,r}},\hat{w_{sr}}\right\}$. Sector-level expenditures are defined as $E_s = P_sC_s + P_sI_s$. Hence, they change according to:

$$\hat{E}_s \equiv \frac{P_sC_s}{E_s}\hat{X} + \left(1-\frac{P_sC_s}{E_s}\right)\hat{P_sI_s}, \tag{D.14}$$

where national consumer consumer expenditures change as function of the change in net income $\hat{Y}$ and tariff revenue,

$$\hat{X} = \frac{Y}{X}\hat{Y} + \frac{R}{X}\hat{R}, \tag{D.15}$$

and where net national income changes according to

$$\hat{Y} = \sum_{r\in\mathcal{R}}\left(\frac{P_{NT,r}Q_{NT,r}}{Y}\right)\hat{X_r} + \sum_{s\in\mathcal{S}}\left(1-\alpha_{I,s}\right)\left(\frac{p_sQ_s}{Y}\right)\sum_{r\in\mathcal{R}}\left(\frac{p_sQ_{sr}}{p_sQ_s}\right)\left(\hat{p_s}+\hat{Q_{sr}}\right). \tag{D.16}$$

Aggregate expenditures $\hat{P_sI_s}$ in intermediates from sector s are given by

$$\hat{P_sI_s} = \sum_{s'\in\mathcal{S}}\alpha^s_{s'}\sum_{r\in\mathcal{R}}\frac{p_{s'}Q_{s'r}}{P_sI_s}\left(\hat{p_{s'}}+\hat{Q_{s'r}}\right). \tag{D.17}$$

Using local labor market clearing we obtain the change in sales of sector s in region r entering in the last three expressions:

$$\hat{p_s}+\hat{Q_{sr}} = \frac{1}{\alpha_{K,s}}\hat{p_s} - \frac{\alpha_{I,s}}{\alpha_{K,s}}\hat{\phi}_s - \frac{\alpha_{L,s}}{\alpha_{K,s}}\hat{w_{sr}}. \tag{D.18}$$

[5] Since initial tariffs are small, we set the product of initial tariffs and the second order term $\frac{1}{2}\tau d^2\left(p^*m\right)$ to zero. The product of tariffs and the first-order term in the change of imports, tdm, is 0.003% of GDP.

Finally using (26) final expenditures in region r change according to

$$\hat{X}_r = \frac{\sum_{s\in\mathcal{S}} \frac{p_{sr}Q_{sr}}{X_r}(1-\alpha_{I,s})\left(\hat{p_s}+\hat{Q_{sr}}\right)+\frac{b_r R}{X_r}\hat{R}}{1-\frac{P_{NT,r}Q_{NT,r}}{X_r}}. \tag{D.19}$$

D.3 Numerical Implementation and Parametrization

To implement the system (D.3)-(D.13) we write it in the reduced form $A\hat{x} = y$, where $\hat{x}$ is a column vector stacking all the endogenous variables, y is a column vector with functions of the tariff shocks, and A collects elasticities and observed shares. The reduced-form of the system, giving the solution for endogenous variables as function of shocks, takes the form $\hat{x} = A^{-1}y$. We check numerically that the matrix A has full rank and that, therefore, the equilibrium in changes is uniquely defined. The vector $\hat{x}$ includes $1,020,045$ endogenous variables, hence the matrix A has 10^{12} elements. However the matrix A is very sparse, making this inversion computationally feasible and quick. The reason the matrix is very sparse is that, as noted above, the various blocks of the system interact only through a few variables. Specifically, of the approximately 1 million endogenous variables, about $700,000$ correspond to the variety prices $\hat{p_{ig}}$, which only enter in the rows of A corresponding to import prices and tariff revenue.

To parametrize the system (D.3)-(D.13), from the IO tables we use sales from tradeable sector s' to sector s ($P_{s'}I_s^{s'}$), consumption expenditures by sector (P_sC_s), exports by sector, import expenditures by sector ($P_{Ms}M_s$), total labor compensation (w_sL_s), and gross operating surplus ($\sum_r \Pi_{sr}$). Tradeable sectors are defined as those for which we find a concordance with the HS codes using the concordance of Pierce and Schott (2012).[6] Since non-traded sectors only use labor in the model, sector payments to non-traded sectors are accounted as payments to labor, and non-traded sector purchases from other sectors are accounted as final absorption. We construct total sales (p_sQ_s in the model) as the sum of sales to other sectors, final absorption and net exports.

The elasticities $\{\sigma, \sigma^*, \omega, \eta, \kappa\}$ are point estimates from the estimation in Section IV, and bootstrapped confidence intervals are computed using the 1,000 bootstrapped estimates. The technology parameters $\alpha_s^{s'}$, $\alpha_{K,s}$ and $\alpha_{L,s}$ are defined as intermediate input, gross operating surplus, and labor shares of sales. The tradeable consumption shares β_s are defined as the sectoral shares in the domestic absorption columns of the IO tables. We set a non-traded share of expenditures of $\beta_{NT} = 0.7$ such that the model matches the observed 15% share of imports in GDP.

Implementing the system (D.3)-(D.13) also requires information on labor income and employment shares by counties. We allocate the total labor compensation from IO tables across U.S. counties using the regional labor compensation shares from the 2016 County Business Patterns database. We keep counties with positive employment in both tradeable and non-tradeable sectors (this drops 41 counties). Consistent with our assumption that the Cobb-Douglas function is constant across regions within a sector, county-level sales by sector are constructed by applying the (inverse) national labor share to the regional wage bill by sector.

[6] The NAICS codes that do not match to any HS code using the concordance of Pierce and Schott (2012) are included in the non-traded sector: 23, 42, 55, 115, 44, 45, 48, 49, 52, 53, 56, 62, 71, 72, 2131, 22, 3328, 51, 54, 61, 81.

Finally, implementing the system requires information on import and export flows by variety. We apply the import and export shares within each 4-digit NAICS sector from customs data for 2016 to the sector-level import and export flows of the IO table. To limit the scale of the counterfactuals we restrict the trade dataset to the largest trade partners accounting for 99% of U.S. trade and to the largest varieties accounting for 99% of trade within each sector and at least $10,000.

As a result, we match the model to 2016 data on economic activity for 3,067 U.S. counties, 88 traded sectors (4-digit NAICS), 71 trade partners, 10,228 imported HS-10 products, 213,578 imported varieties (unique product-country origin), 3,684 exported products, and 53,508 unique product-destination countries.

D.4 Producer Price Increases

When foreign export supply is perfectly elastic ($\omega = 0$), we can combine our previous solution for the increase in the producer price index from (D.7) with the price indexes (D.9) to (D.12) to obtain the following decomposition of the change in producer prices in response to a tariff shock:

$$\hat{p_s} = \frac{1}{\Phi_s}\left(DomExpenditure_s + TariffShock_s + CostShock_s\right) \tag{D.20}$$

where

$$\begin{aligned}
DomExpenditure_s &\equiv \frac{P_{Ds}D_s}{p_sQ_s}\hat{E}_s, \\
TariffShock_s &\equiv (\kappa-1)\sum_{g\in\mathcal{G}_s}\sum_{i\in\mathcal{I}}\frac{P_{Ds}D_s}{p_sQ_s}\frac{p_{ig}m_{ig}}{E_s}\frac{d\tau_{ig}}{1+\tau_{ig}} - \sigma^*\sum_{g\in\mathcal{G}_s}\sum_{i\in\mathcal{I}}\frac{p_{Dg}x_{ig}}{p_sQ_s}\frac{d\tau^*_{ig}}{1+\tau^*_{ig}}, \\
CostShock_s &\equiv \frac{\alpha_{I,s}}{\alpha_{K,s}}\hat{\phi}_s + \sum_{r\in\mathcal{R}}\frac{p_sQ_{sr}}{p_sQ_s}\frac{\alpha_{L,s}}{\alpha_{K,s}}\hat{w_{sr}}, \\
\Phi_s &\equiv \frac{1-\alpha_{K,s}}{\alpha_{K,s}} + \frac{P_{Ds}D_s}{p_sQ_s}\frac{P_{Ds}D_s}{E_s} + \frac{P_{Ds}D_s}{p_sQ_s}\frac{P_{Ms}M_s}{E_s}\kappa + \left(1-\frac{P_{Ds}D_s}{p_sQ_s}\right)\sigma^*.
\end{aligned}$$

This decomposition highlights the general-equilibrium effects on the producer prices in the U.S. when U.S. or foreign tariffs change. The first two components, domestic expenditures and tariffs, drive price changes through reallocation of domestic and foreign demand. The first component includes demand shifters ($\hat{E}_s$) entering through the shares of sectors and final consumers in aggregate demand. The second component (tariffs) implies that higher domestic tariffs ($d\tau_{ig} > 0$) and higher foreign tariffs ($d\tau^*_{ig} > 0$) reallocate expenditures into or away of domestic products, respectively leading to higher or lower prices. The third component shows that domestic prices change with costs, either through input linkages or wages in those regions where the sector is more concentrated. The intensity of these effects is mediated by the estimated elasticities σ^* and κ, entering through the tariff component and through the constant Φ_s.

E Appendix to Section V.F (Tariff Protection, Wages, and Voting Patterns)

In Section V.F we document that import tariffs were targeted toward politically competitive counties (as measured by their 2016 presidential vote share), whereas retaliatory tariffs were tar-

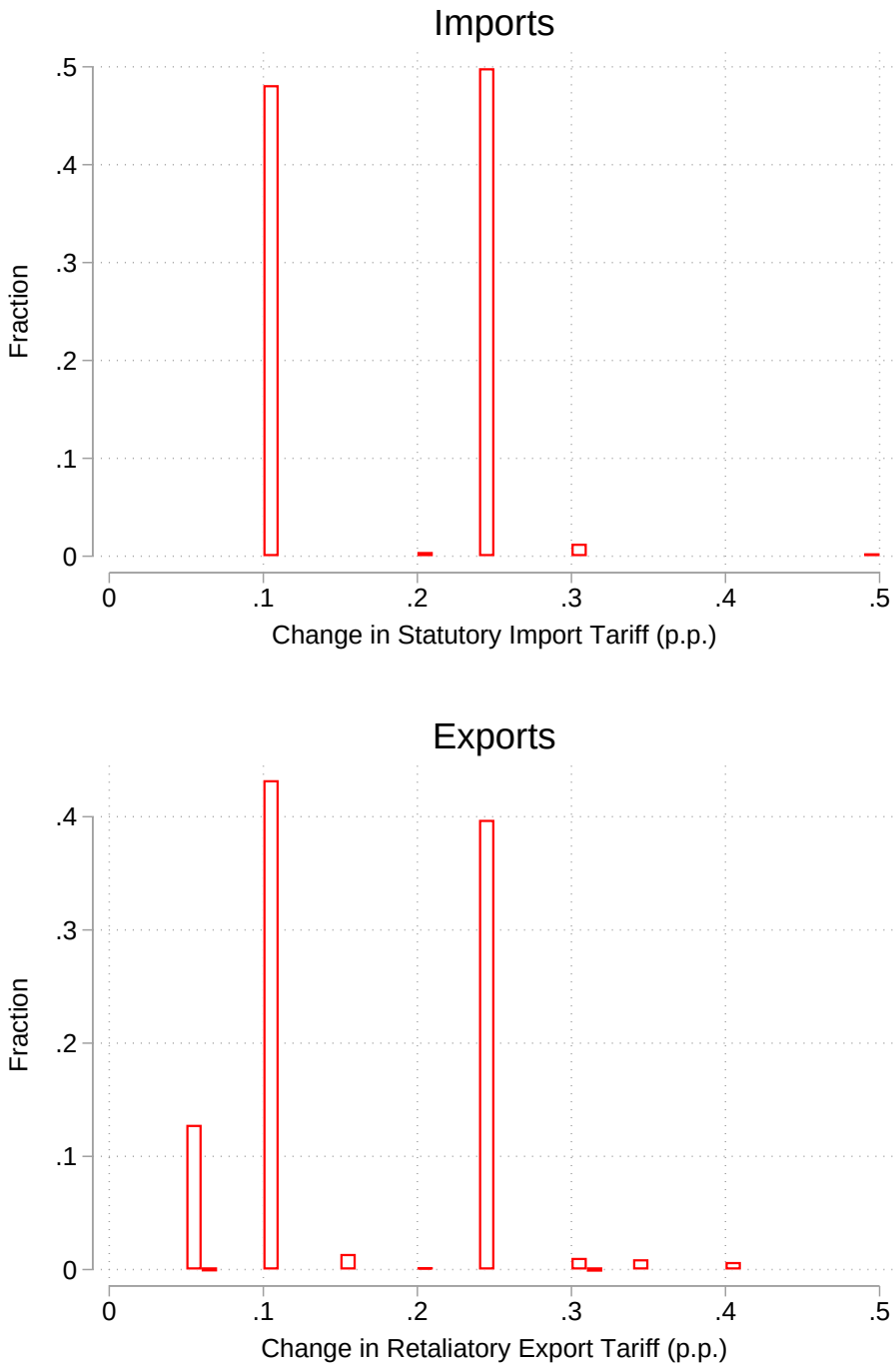
geted at heavily Republican counties. Here, we further explore how these patterns vary with other political, economic, and demographic characteristics of counties.

First, we examine whether the inverted U-shape pattern in import tariffs holds when we restrict to counties that are located in politically competitive states in the U.S. Electoral College. Figure A.5 plots county-level tariffs for states that had GOP vote shares of 45-55% in the 2016 presidential election and match the list of the most competitive states in the electoral college by fivethirtyeight.com: AZ, CO, FL, GA, MI, MN, NC, NH, NM, NV, OH, PA, VA, and WI. The inverted U-shape pattern in import tariffs is even more pronounced in these states.

Table A.15 further explores how these patterns vary with counties' economic and demographic characteristics. For U.S. tariffs, Panel A shows that the inverted-U pattern over county-level Republican vote share remains even after controlling for agriculture employment shares, several measures of county demographic characteristics, and pre-existing trends in county employment and income growth. For retaliatory tariffs, Panel B shows that the positive relationship with county Republican vote share disappears once we control for agriculture employment share.

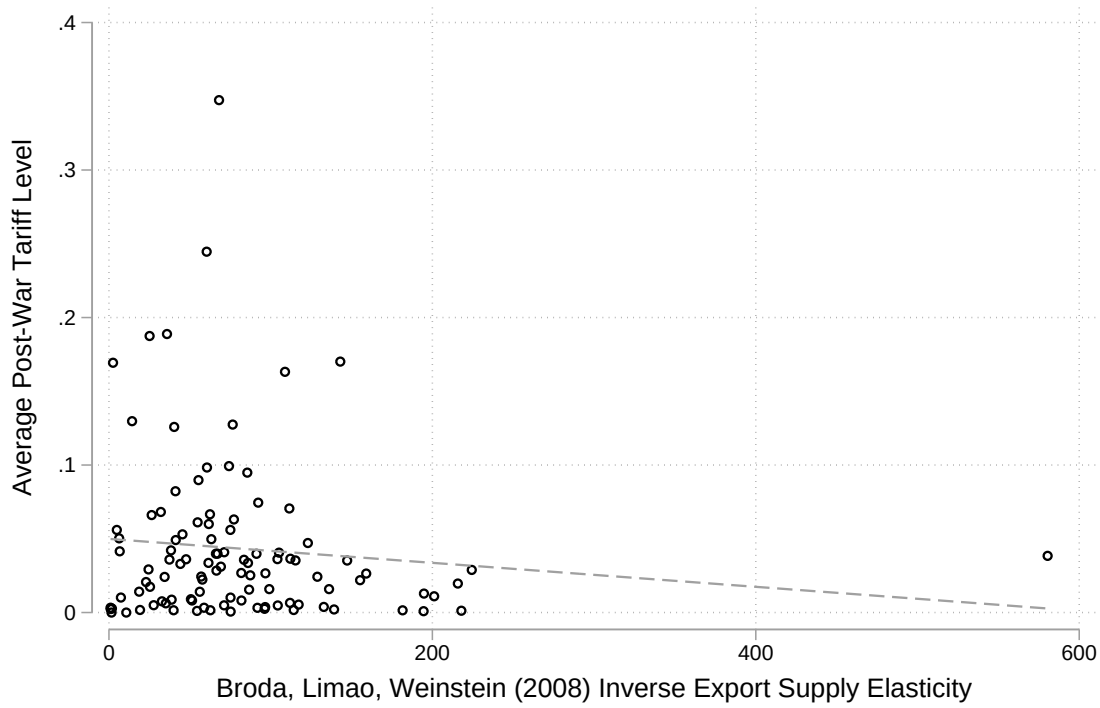
Online Appendix Figures and Tables

Figure A.1: Statutory Tariff Changes



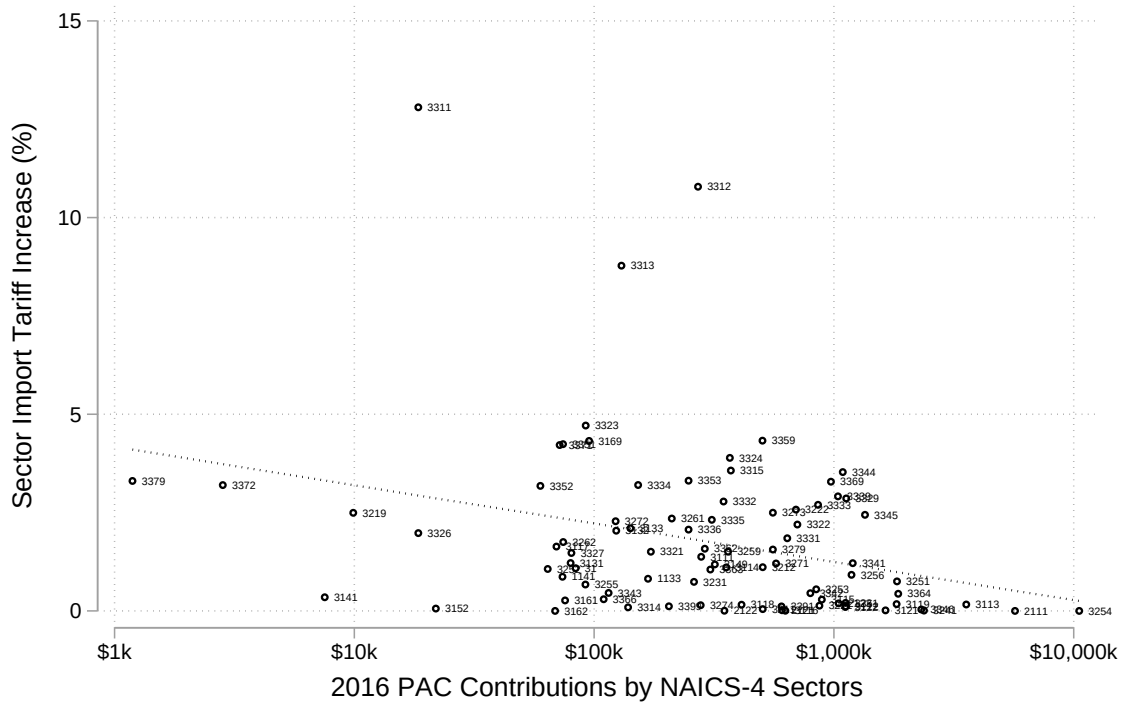
Notes: Figures show the distribution of tariff increases due to the trade war. Import tariff changes constructed from U.S. International Trade Commission (USITC) documents, and retaliatory tariff changes constructed using official documents from foreign finance and trade ministries.

Figure A.2: Import Tariffs and Export Supply Elasticities from Broda et al. (2008)



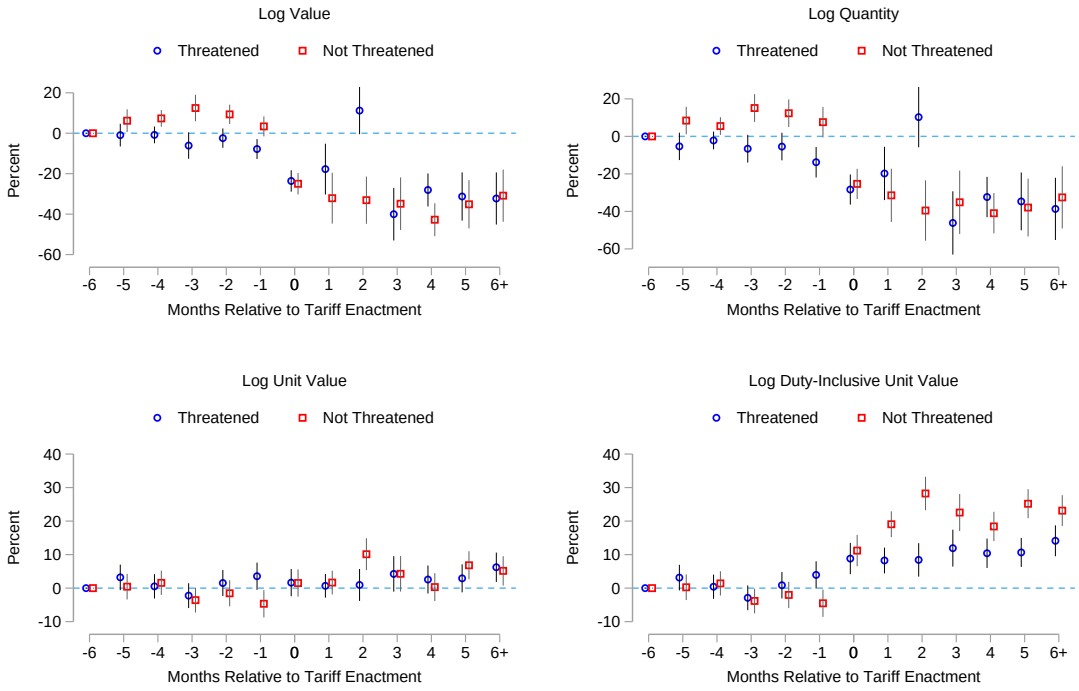
Notes: Figure plots post-war tariff levels against export supply elasticities estimated by Broda et al. (2008). Unit of analysis is NAICS-4 sectors.

Figure A.3: Political Contributions and Statutory Tariff Changes



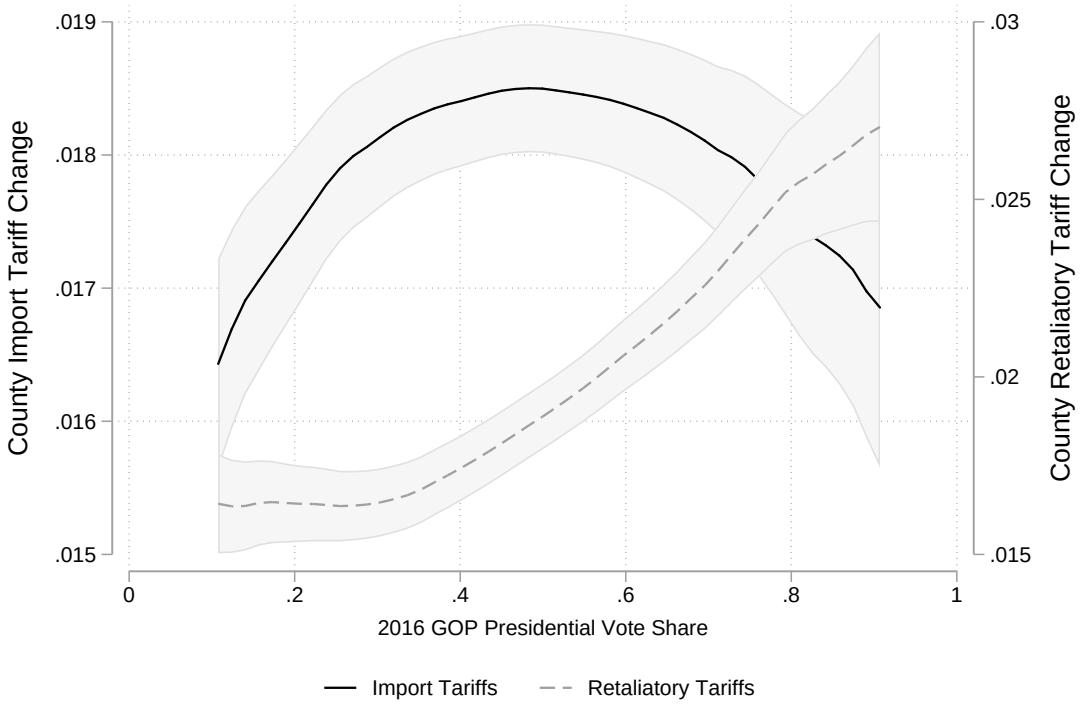
Notes: Figure plots 2016 financial campaign contributions against tariff changes at the sector level. Campaign contributions are measured using legal disclosure data compiled by the Center for Responsive Politics and cover contributions to candidates for the U.S. House of Representatives during the 2016 election cycle. Import tariffs are trade-weighted averages within NAICS-4 sectors.

Figure A.4: Import Event Study for 2019 Threatened Varieties



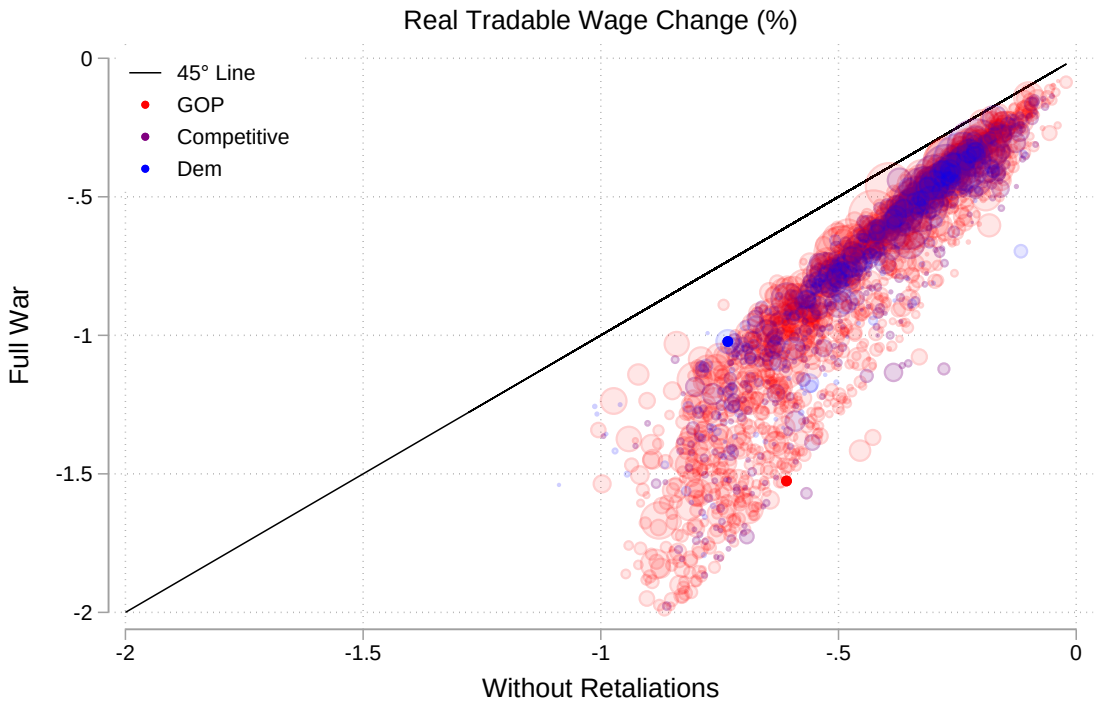
Notes: Figure reports the event study specification from equation (1) but allows the event-time coefficients to vary over two subsamples of targeted varieties: (a) Chinese varieties that were initially targeted in late September 2018 and threatened with additional tariff increases in January 2019 (shown in blue), and (b) targeted import varieties that were not threatened by additional tariff increases in January 2019 (shown in red). The graph plots the event-time coefficients for both targeted subsamples relative to untargeted varieties. Standard errors clustered by country and HS-8. Error bars show 95% confidence intervals. Significance: * 0.10, ** 0.05, *** 0.01. Monthly variety-level import data from U.S. Census. Sample period is 2017:1 to 2019:4.

Figure A.5: Tariff Changes vs. 2016 Republican Vote Share in Politically Competitive States



Notes: Figure shows a population-weighted non-parametric fit of county-level 2017-2018 tariff changes due to the trade war against the 2016 GOP presidential vote share within the following states: AZ, CO, FL, GA, MI, MN, NC, NH, NM, NV, OH, PA, VA, and WI.

Figure A.6: Simulated Real Tradeable Wage Impacts by Political Orientation



Notes: Unit of analysis is U.S. counties. The y-axis indicates the real tradeable wage change due to both U.S. and retaliatory tariffs, as simulated from the model. The x-axis indicates the simulated real tradeable wage change in a counterfactual scenario in which U.S. trade partners did not retaliate. Blue (red) markers indicate counties where Democrats (Republicans) received >60% of the two-party 2016 presidential vote. Purple markers indicate politically competitive counties where both the Democratic and Republican party received between 40-60% of the two-party vote. Marker sizes are proportional to each county's 2016 population. Counties with a less than 2% decline in the full-war real tradeable wage or with only agriculture employment are dropped to improve the data visualization; the dropped counties are overwhelmingly Republican and fall far below the 45-degree line.

Table A.1: Targeted Products, Intermediate vs. Final Goods

Targeted US Imports			
Product Type	# HS-10	mil USD	Δ Tariff
Intermediate/Capital Good	10,115	257,032	14.3
Final/Consumer Good	1,928	45,938	10.2
Total	**12,043**	**302,970**	**14.0**
Targeted US Exports			
Product Type	# HS-10	mil USD	Δ Tariff
Intermediate/Capital Good	6,212	104,402	11.0
Final/Consumer Good	1,861	22,746	14.5
Total	**8,073**	**127,148**	**13.1**

Notes: Intermediate and final consumer goods are classified using BEC codes. Table reports the number and 2017 annual value of targeted products, as well as the unweighted average tariff increase.

Table A.2: Tests of Pre-Existing Trends, 2013-17

Panel A: U.S. Import Trends

	(1)	(2)	(3)	(4)
	$\Delta \ln p^*_{ig} m_{ig}$	$\Delta \ln m_{ig}$	$\Delta \ln p^*_{ig}$	$\Delta \ln p_{ig}$
$\Delta_{17-18} \ln(1+\tau_{ig})$	-0.01	-0.07	0.08	0.08
	(0.05)	(0.08)	(0.06)	(0.06)
Country × Sector FE	Yes	Yes	Yes	Yes
Product FE	Yes	Yes	Yes	Yes
R2	0.11	0.12	0.11	0.11
N	273,550	228,753	228,753	228,753

Panel B: U.S. Export Trends

	(1)	(2)	(3)	(4)
	$\Delta \ln p^X_{ig} x_{ig}$	$\Delta \ln x_{ig}$	$\Delta \ln p^X_{ig}$	$\Delta \ln p^X_{ig}(1+\tau^*_{ig})$
$\Delta_{17-18} \ln(1+\tau^*_{ig})$	-0.04	0.02	-0.02	-0.02
	(0.06)	(0.08)	(0.06)	(0.06)
Country × Sector FE	Yes	Yes	Yes	Yes
Product FE	Yes	Yes	Yes	Yes
R2	0.08	0.09	0.09	0.09
N	328,666	263,919	263,919	263,919

Notes: Table reports pre-trend tests for import (Panel A) and export (Panel B) variety-level trade outcomes. Table reports regressions of the 2013:1-2017:12 average monthly changes in values, quantities, unit values, and tariff-inclusive unit values against the 2018 tariff changes. Standard errors clustered by country and HS-8 (imports) or HS-6 (exports). Significance: *** .01; ** 0.05; * 0.10.

Table A.3: Reduced Form Variety Import Outcomes, Applied Tariffs

	(1) $\Delta \ln(1+\tau^{app}_{igt})$	(2) $\Delta \ln p^{*}_{igt} m_{igt}$	(3) $\Delta \ln m_{igt}$	(4) $\Delta \ln p^{*}_{igt}$	(5) $\Delta \ln p_{igt}$
$\Delta \ln(1+\tau_{igt})$	0.61***				
	(0.07)				
$\Delta \ln(1+\tau^{app}_{igt})$		-2.50***	-2.55***	0.01	1.01***
		(0.15)	(0.24)	(0.14)	(0.14)
Product × Time FE	Yes	Yes	Yes	Yes	Yes
Country × Time FE	Yes	Yes	Yes	Yes	Yes
Country × Sector FE	Yes	Yes	Yes	Yes	Yes
1st-Stage F		80.5	76.9	76.9	76.9
R2	0.14	0.01	0.01	0.00	0.00
N	2,993,288	2,993,288	2,454,023	2,454,023	2,454,023

Notes: Table reports the variety-level import responses to applied import tariffs. Columns 1-4 report the reduced-form outcomes of import values, quantities, before-duty unit values, and duty-inclusive unit values regressed on $\Delta \ln(1+\tau^{app}_{igt})$, where $\Delta \ln(1+\tau^{app}_{igt})$ is instrumented by the statutory rate $\Delta \ln(1+\tau_{igt})$. All regressions include product-time, country-time and country-sector fixed effects. Sample: Monthly variety-level import data from 2017:1 to 2019:4. Standard errors clustered by country and HS-8. Significance: * 0.10, ** 0.05, *** 0.01.

Table A.4: Variety Import Outcomes with Trends

	(1) $\Delta \ln p^*_{igt} m_{igt}$	(2) $\Delta \ln m_{igt}$	(3) $\Delta \ln p^*_{igt}$	(4) $\Delta \ln p^*_{igt}(1+\tau_{igt})$	(5) $\Delta \ln p^*_{igt}$	(6) $\Delta \ln m_{igt}$
$\Delta \ln(1+\tau_{igt})$	-1.49***	-1.45***	0.01	0.60***		
	(0.19)	(0.26)	(0.08)	(0.13)		
$\Delta \ln m_{igt}$					-0.01	
					(0.06)	
$\Delta \ln p_{igt}$						-2.44***
						(0.25)
Product × Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Country × Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Country × Sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Variety FE	Yes	Yes	Yes	Yes	Yes	Yes
1st-Stage F					32.2	20.5
R2	0.16	0.16	0.15	0.15	0.02	.
N	2,956,057	2,419,851	2,419,851	2,419,851	2,419,851	2,419,851

Notes: Table reports the variety-level import responses to import tariffs, controlling for variety-specific time trends. Columns 1-4 report the reduced-form outcomes of import values, quantities, before-duty unit values, and duty-inclusive unit values regressed on $\Delta \ln(1+\tau_{igt})$. Column 5 reports the foreign export supply curve IV regression, $\hat{\omega}^*$, from equation (9); the first stage is column 2. Column 6 reports the import demand curve IV regression, $\hat{\sigma}$, from equation (8); the first stage is column 4. All regressions include variety, product-time, country-time and country-sector fixed effects. Standard errors clustered by country and HS-8. Sample: Monthly variety-level import data from 2017:1 to 2019:4. Significance: * 0.10, ** 0.05, *** 0.01.

Table A.5: Variety Import Outcomes with Long-Run Trends

	(1) $\Delta \ln p^*_{igt} m_{igt}$	(2) $\Delta \ln m_{igt}$	(3) $\Delta \ln p^*_{igt}$	(4) $\Delta \ln p^*_{igt}(1+\tau_{igt})$	(5) $\Delta \ln p^*_{igt}$	(6) $\Delta \ln m_{igt}$
$\Delta \ln(1+\tau_{igt})$	-0.79**	-0.78**	0.04	0.38**		
	(0.33)	(0.34)	(0.07)	(0.15)		
$\Delta \ln m_{igt}$					-0.05	
					(0.08)	
$\Delta \ln p_{igt}$						-2.07***
						(0.31)
Product × Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Country × Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Country × Sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Variety FE	Yes	Yes	Yes	Yes	Yes	Yes
1st-Stage F					5.2	6.3
R2	0.15	0.15	0.13	0.13	0.10	.
N	7,872,049	6,403,668	6,403,668	6,403,668	6,403,668	6,403,668

Notes: Table reports the variety-level import responses to import tariffs, controlling for long-run variety-specific time trends. Columns 1-4 report the reduced-form outcomes of import values, quantities, before-duty unit values, and duty-inclusive unit values regressed on $\Delta \ln(1+\tau_{igt})$. Column 5 reports the foreign export supply curve IV regression, $\hat{\omega}^*$, from equation (9); the first stage is column 2. Column 6 reports the import demand curve IV regression, $\hat{\sigma}$, from equation (8); the first stage is column 4. All regressions include variety, product-time, country-time and country-sector fixed effects. Standard errors clustered by country and HS-8. Sample: Monthly variety-level import data from 2013:1 to 2019:4. Significance: * 0.10, ** 0.05, *** 0.01.

Table A.6: Variety Export Outcomes with Trends

	(1) $\Delta \ln p^X_{igt} x_{igt}$	(2) $\Delta \ln x_{igt}$	(3) $\Delta \ln p^X_{igt}$	(4) $\Delta \ln p^X_{igt}(1+\tau^*_{igt})$	(5) $\Delta \ln p^X_{igt}$	(6) $\Delta \ln x_{igt}$
$\Delta \ln(1+\tau^*_{igt})$	-1.03***	-1.02***	-0.07	0.93***		
	(0.30)	(0.38)	(0.16)	(0.16)		
$\Delta \ln x_{igt}$					0.07	
					(0.17)	
$\Delta \ln p^X_{igt}(1+\tau^*_{igt})$						-1.10***
						(0.35)
Product × Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Country × Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Country × Sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Variety FE	Yes	Yes	Yes	Yes	Yes	Yes
1st-Stage F					7.0	33.6
R2	0.10	0.11	0.10	0.10	.	0.50
N	3,252,348	2,515,825	2,515,825	2,515,825	2,515,825	2,515,825

Notes: Table reports the variety-level export responses to retaliatory tariffs, controlling for variety-specific time trends. Columns 1-4 report reduced form regressions of export values, quantities, before-duty unit values, and duty-inclusive unit values on $\Delta \ln(1+\tau^*_{igt})$, the change in retaliatory export tariffs. Column 5 reports the IV regression that estimates the U.S. export supply elasticity, $\hat{\omega}$; the first stage is column 2. Column 6 reports the IV regression that estimates the foreign import demand elasticity, σ^*; the first stage is column 4. All regressions include variety, product-time, country-time and country-sector fixed effects. Standard errors clustered by country and HS-6. Sample: Monthly variety-level export data from 2017:1 to 2019:4. Significance: * 0.10, ** 0.05, *** 0.01.

Table A.7: Variety Export Outcomes with Long-Run Trends

	(1) $\Delta \ln p^X_{igt} x_{igt}$	(2) $\Delta \ln x_{igt}$	(3) $\Delta \ln p^X_{igt}$	(4) $\Delta \ln p^X_{igt}(1+\tau^*_{igt})$	(5) $\Delta \ln p^X_{igt}$	(6) $\Delta \ln x_{igt}$
$\Delta \ln(1+\tau^*_{igt})$	-0.41*	-0.38	-0.06	0.94***		
	(0.22)	(0.25)	(0.09)	(0.09)		
$\Delta \ln x_{igt}$					0.16	
					(0.28)	
$\Delta \ln p^X_{igt}(1+\tau^*_{igt})$						-0.40
						(0.26)
Product × Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Country × Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Country × Sector FE	Yes	Yes	Yes	Yes	Yes	Yes
Variety FE	Yes	Yes	Yes	Yes	Yes	Yes
1st-Stage F					2.2	105.0
R2	0.09	0.09	0.08	0.08	.	0.31
N	9,171,659	7,031,740	7,031,740	7,031,740	7,031,740	7,031,740

Notes: Table reports the variety-level export responses to retaliatory tariffs, controlling for long-run variety-specific time trends. Columns 1-4 report reduced form regressions of export values, quantities, before-duty unit values, and duty-inclusive unit values on $\Delta \ln(1+\tau^*_{igt})$, the change in retaliatory export tariffs. Column 5 reports the IV regression that estimates the U.S. export supply elasticity, $\hat{\omega}$; the first stage is column 2. Column 6 reports the IV regression that estimates the foreign import demand elasticity, σ^*; the first stage is column 4. All regressions include variety, product-time, country-time and country-sector fixed effects. Standard errors clustered by country and HS-6. Sample: Monthly variety-level export data from 2017:1 to 2019:4. Significance: * 0.10, ** 0.05, *** 0.01.

Table A.8: Product Fixed Effects

	(1) $\Delta \ln p^*_{gt} m_{gt}$, fe	(2) $\Delta \ln m_{gt}$, fe	(3) $\Delta \ln p^*_{gt}$, fe	(4) $\Delta \ln p_{gt}$, fe
$\Delta \ln(1+\tau_{gt})$, fe	-1.71***	-1.69***	-0.09	0.46**
	(0.33)	(0.38)	(0.20)	(0.20)
Sector-Time FE	Yes	Yes	Yes	Yes
R2	0.02	0.02	0.01	0.01
N	318,889	285,077	285,077	285,077

Notes: Outcomes are the product-time fixed effects from variety-level regressions of changes in import values, quantities, unit values, and tariff-inclusive unit values on product-time, country-time, and country-sector fixed effects. Regressor is the product-time fixed effect from a regression of the change in the import tariff on product-time, country-time, and country-sector fixed effects. Standard errors clustered by HS-8. Specification is a product-level regression from 2017:1 to 2019:4.

Table A.9: Variety Tariff Pass-Through, Final vs. Intermediates

Panel A: Import Unit Values and Import Tariffs

	(1) $\Delta \ln p^*_{igt}$	(2) $\Delta \ln p^*_{igt}$	(3) $\Delta \ln p^*_{igt}$
$\Delta \ln(1+\tau_{igt})$	0.01	0.01	-0.00
	(0.08)	(0.08)	(0.07)
$\Delta(1+\tau_{igt})\times$ BEC Final Good (0/1)	-0.44		
	(0.30)		
$\Delta(1+\tau_{igt})\times$ CPI Final Good (0/1)		-0.21	
		(0.22)	
$\Delta(1+\tau_{igt})\times$ Part or Component (0/1)			0.12
			(0.32)
FEs	gt,it,is	gt,it,is	gt,it,is
R2	0.11	0.11	0.11
N	2,449,311	2,454,023	2,454,023

Panel B: Export Unit Values and Retaliatory Tariffs

	(1) $\Delta \ln p^X_{igt}$	(2) $\Delta \ln p^X_{igt}$	(3) $\Delta \ln p^X_{igt}$
$\Delta \ln(1+\tau^*_{igt})$	0.01	0.02	-0.05
	(0.21)	(0.18)	(0.16)
$\Delta(1+\tau^*_{igt})\times$ BEC Final Good (0/1)	-0.16		
	(0.31)		
$\Delta(1+\tau^*_{igt})\times$ CPI Final Good (0/1)		-0.25	
		(0.28)	
$\Delta(1+\tau^*_{igt})\times$ Part or Component (0/1)			0.47
			(0.42)
FEs	gt,it,is	gt,it,is	gt,it,is
R2	0.06	0.06	0.06
N	2,557,707	2,564,731	2,564,731

Notes: Table reports the variety-level tariff pass-through for before-duty import and export unit values across binary classifications of final versus intermediate goods. Column 1 interacts the tariff with a final good indicator constructed from BEC codes. Column 2 classifies final goods according to whether there is a direct match in the description of the HS product code with the entry-line items from the BLS Consumer Price Index. Column 3 classifies intermediate goods as those with HS product descriptions that contain the words "parts" or "components." All regressions include product-time, country-time and country-sector fixed effects. Standard errors clustered by country and HS-8. Significance: * 0.10, ** 0.05, *** 0.01. Sample: monthly variety-level import data from 2017:1 to 2019:4.

Table A.10: Variety Import Tariff Pass-Through, Product Characteristics

	(1) $\Delta \ln p^*_{igt}$	(2) $\Delta \ln p^*_{igt}$	(3) $\Delta \ln p^*_{igt}$	(4) $\Delta \ln p^*_{igt}$	(5) $\Delta \ln p^*_{igt}$	(6) $\Delta \ln p^*_{igt}$	(7) $\Delta \ln p^*_{igt}$	(8) $\Delta \ln p^*_{igt}$	(9) $\Delta \ln p^*_{igt}$	(10) $\Delta \ln p^*_{igt}$	(11) $\Delta \ln p^*_{igt}$
$\Delta \ln(1+\tau_{igt})$	0.01	-0.01	0.04	0.03	0.10	0.08	0.06	0.02	0.02	-0.07	-0.61
	(0.08)	(0.09)	(0.10)	(0.08)	(0.11)	(0.09)	(0.07)	(0.10)	(0.11)	(0.13)	(0.77)
$\Delta(1+\tau_{igt})\times$ K (2010) Quality Ladder	0.00										
	(0.05)										
$\Delta(1+\tau_{igt})\times$ dLEU (2016) Markup		-0.02									
		(0.07)									
$\Delta(1+\tau_{igt})\times$ Coefficient of Price Variation			0.04								
			(0.07)								
$\Delta(1+\tau_{igt})\times$ BW (2006) Demand Elasticity				-0.17*							
				(0.09)							
$\Delta(1+\tau_{igt})\times$ CP (2015) Demand Elasticity					-0.05						
					(0.09)						
$\Delta(1+\tau_{igt})\times$ N (2007) Contract Intensity						0.05					
						(0.06)					
$\Delta(1+\tau_{igt})\times$ NS (2008) Price Stickiness							-0.01				
							(0.08)				
$\Delta(1+\tau_{igt})\times$ ACFH (2012) Upstreamness								-0.03			
								(0.07)			
$\Delta(1+\tau_{igt})\times$ (Inventories / Shipments)									-0.01		
									(0.10)		
$\Delta(1+\tau_{igt})\times$ R (1999) Differentiated (0/1)										0.11	
										(0.14)	
$\Delta(1+\tau_{igt})\times$ Durable (0/1)											0.61
											(0.76)
FEs	gt,it,is	gt,it,is	gt,it,is	gt,it,is	gt,it,is	gt,it,is	gt,it,is	gt,it,is	gt,it,is	gt,it,is	gt,it,is
R2	0.11	0.11	0.11	0.11	0.12	0.11	0.11	0.11	0.11	0.11	0.11
N	1,345,844	2,434,673	2,335,058	1,580,846	1,536,403	2,265,752	1,896,505	2,344,122	2,291,029	2,454,023	2,449,311

Notes: Table reports the variety-level tariff pass-through for before-duty import unit values for products with different characteristics. Each specification interacts the import tariff with the (standardized) product characteristic: 1) HS-10 quality ladders from Khandelwal (2010); 2) sector markups from De Loecker et al. (2018); 3) the HS-10 coefficient of unit value variation; 4) HS-6 elasticities of substitution from Broda and Weinstein (2006); 5) sectoral trade elasticities from Caliendo and Parro (2015); 6) HS-6 contract intensity from Nunn (2007); 7) the inverse frequency of sectoral micro-level price adjustments from Nakamura and Steinsson (2008) (a higher value denotes more price stickiness); 8) sectoral upstreamness from (Antràs et al., 2012); 9) sector inventory to sales ratios in 2016 from Census; 10) indicator of product differentiation from Rauch (1999); 11) durable good indicator from BEC. We trim the top and bottom 1% of continuous product characteristic measures, with the exception of markups, which varies only at the level of 2-digit NAICS sectors. All regressions include product-time, country-time and country-sector fixed effects. Standard errors clustered by country and HS-8. Significance: * 0.10, ** 0.05, *** 0.01. Sample: monthly variety-level import data from 2017:1 to 2019:4.

Table A.11: Variety Retaliatory Tariff Pass-Through, Product Characteristics

	(1) $\Delta \ln p^X_{igt}$	(2) $\Delta \ln p^X_{igt}$	(3) $\Delta \ln p^X_{igt}$	(4) $\Delta \ln p^X_{igt}$	(5) $\Delta \ln p^X_{igt}$	(6) $\Delta \ln p^X_{igt}$	(7) $\Delta \ln p^X_{igt}$	(8) $\Delta \ln p^X_{igt}$	(9) $\Delta \ln p^X_{igt}$	(10) $\Delta \ln p^X_{igt}$	(11) $\Delta \ln p^*_{igt}$
$\Delta \ln(1+\tau^*_{igt})$	0.06	-0.04	-0.02	0.22	0.22	-0.02	0.10	0.04	-0.01	-0.02	-0.32
	(0.35)	(0.14)	(0.18)	(0.36)	(0.23)	(0.17)	(0.17)	(0.16)	(0.18)	(0.15)	(0.32)
$\Delta(1+\tau^*_{igt})\times$ K (2010) Quality Ladder	-0.14										
	(0.21)										
$\Delta(1+\tau^*_{igt})\times$ dLEU (2016) Markup		-0.05									
		(0.12)									
$\Delta(1+\tau^*_{igt})\times$ Coefficient of Price Variation			-0.08								
			(0.12)								
$\Delta(1+\tau^*_{igt})\times$ BW (2006) Demand Elasticity				-0.50*							
				(0.26)							
$\Delta(1+\tau^*_{igt})\times$ CP (2015) Demand Elasticity					-0.18						
					(0.21)						
$\Delta(1+\tau^*_{igt})\times$ N (2007) Contract Intensity						-0.14					
						(0.16)					
$\Delta(1+\tau^*_{igt})\times$ NS (2008) Price Stickiness							0.21*				
							(0.12)				
$\Delta(1+\tau^*_{igt})\times$ ACFH (2012) Upstreamness								-0.06			
								(0.10)			
$\Delta(1+\tau^*_{igt})\times$ (Inventories / Shipments)									-0.24		
									(0.18)		
$\Delta(1+\tau^*_{igt})\times$ R (1999) Differentiated (0/1)										-0.06	
										(0.30)	
$\Delta(1+\tau^*_{igt})\times$ Durable (0/1)											0.33
											(0.43)
FEs	gt,it,is	gt,it,is	gt,it,is	gt,it,is	gt,it,is	gt,it,is	gt,it,is	gt,it,is	gt,it,is	gt,it,is	gt,it,is
R2	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
N	1,013,889	2,531,498	2,405,765	1,197,602	1,969,044	2,314,216	2,179,087	2,426,772	2,337,130	2,564,731	2,557,707

Notes: Table reports the variety-level retaliatory tariff pass-through for before-tariff export unit values for products with different characteristics. Each specification interacts the import tariff with the (standardized) product characteristic: 1) HS-10 quality ladders from Khandelwal (2010); 2) sector markups from De Loecker et al. (2018); 3) the HS-10 coefficient of unit value variation; 4) HS-6 elasticities of substitution from Broda and Weinstein (2006); 5) sectoral trade elasticities from Caliendo and Parro (2015); 6) HS-6 contract intensity from Nunn (2007); 7) the inverse frequency of sectoral micro-level price adjustments from Nakamura and Steinsson (2008) (a higher value denotes more price stickiness); 8) sectoral upstreamness from (Antràs et al., 2012); 9) sector inventory to sales ratios in 2016 from Census; 10) indicator of product differentiation from Rauch (1999); 11) durable good indicator from BEC. We trim the top and bottom 1% of continuous product characteristic measures, with the exception of markups, which varies only at the level of 2-digit NAICS sectors. All regressions include product-time, country-time and country-sector fixed effects. Standard errors clustered by country and HS-8. Significance: * 0.10, ** 0.05, *** 0.01. Sample: monthly variety-level export data from 2017:1 to 2019:4.

Table A.12: Tariff Pass-Through at Alternative Data Frequencies

Panel A: Import Unit Values and Import Tariffs

	(1)	(2)	(3)	(4)
	$\Delta \ln p^*_{igt}$	$\Delta \ln p^*_{igt}$	$\Delta \ln p^*_{igt}$	$\Delta \ln p^*_{igt}$
$\Delta \ln(1+\tau_{igt})$	0.00	0.04	0.11	0.25*
	(0.08)	(0.07)	(0.07)	(0.14)
FEs	gt,it,is	gt,it,is	gt,it,is	gt,it,is
Data Frequency	Monthly	2 Months	3 Months	4 Months
R2	0.11	0.10	0.10	0.09
N	2,454,023	1,521,091	1,180,044	874,774

Panel B: Export Unit Values and Retaliatory Tariffs

	(1)	(2)	(3)	(4)
	$\Delta \ln p^X_{igt}$	$\Delta \ln p^X_{igt}$	$\Delta \ln p^X_{igt}$	$\Delta \ln p^X_{igt}$
$\Delta \ln(1+\tau^*_{igt})$	-0.04	0.11	0.16	0.00
	(0.16)	(0.15)	(0.13)	(0.10)
FEs	gt,it,is	gt,it,is	gt,it,is	gt,it,is
Data Frequency	Monthly	2 Months	3 Months	4 Months
R2	0.06	0.06	0.05	0.05
N	2,564,731	1,710,275	1,370,953	1,045,078

Notes: Table reports the variety-level tariff pass-through to before-duty import (Panel A) and export (Panel B) unit values at different data frequencies. Each column estimates the regression in first differences at different data frequencies. Column 1 is the baseline monthly data (in the top panel, column 1 is the same as column 4 of Table IV and the bottom panel column 1 is the same as column 4 of Table VII. Columns 2-4 run the specification after aggregating the data to every two months, quarterly and every four months, respectively. All regressions include product-time, country-time and country-sector fixed effects. Standard errors clustered by country and HS-8 (for imports) or HS-6 (for exports). Significance: * 0.10, ** 0.05, *** 0.01. Sample: variety-level import and export data from 2017:1 to 2019:4.

Table A.13: Tariff Pass-Through with Alternative Fixed Effects

Panel A: Import Unit Values and Import Tariffs

	(1) $\Delta \ln p^*_{igt}$	(2) $\Delta \ln p^*_{igt}$	(3) $\Delta \ln p^*_{igt}$	(4) $\Delta \ln p^*_{igt}$	(5) $\Delta \ln p^*_{igt}$	(6) $\Delta \ln p^*_{igt}$	(7) $\Delta \ln p^*_{igt}$	(8) $\Delta \ln p^*_{igt}$
$\Delta \ln(1+\tau_{igt})$	0.00	-0.01	0.04	0.01	0.01	0.19	0.26***	0.04
	(0.08)	(0.05)	(0.05)	(0.06)	(0.04)	(0.12)	(0.08)	(0.05)
Product × Time FE	Yes	No	No	Yes	No	Yes	No	No
Country × Time FE	Yes	Yes	Yes	No	No	No	No	No
Country × Sector FE	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Sector × Time FE	No	Yes	No	No	Yes	No	No	No
Country × Sector × Time FE	No	No	No	No	No	Yes	Yes	No
Time FE	No	No	No	No	No	No	No	Yes
R2	0.11	0.00	0.00	0.11	0.00	0.16	0.05	0.00
N	2,454,023	2,524,251	2,524,253	2,454,511	2,524,736	2,416,617	2,488,081	2,524,738

Panel B: Export Unit Values and Retaliatory Tariffs

	(1) $\Delta \ln p^X_{igt}$	(2) $\Delta \ln p^X_{igt}$	(3) $\Delta \ln p^X_{igt}$	(4) $\Delta \ln p^X_{igt}$	(5) $\Delta \ln p^X_{igt}$	(6) $\Delta \ln p^X_{igt}$	(7) $\Delta \ln p^X_{igt}$	(8) $\Delta \ln p^X_{igt}$
$\Delta \ln(1+\tau^*_{igt})$	-0.04	-0.02	-0.01	-0.03	-0.02	0.06	0.03	0.01
	(0.16)	(0.15)	(0.14)	(0.14)	(0.14)	(0.19)	(0.17)	(0.15)
Product × Time FE	Yes	No	No	Yes	No	Yes	No	No
Country × Time FE	Yes	Yes	Yes	No	No	No	No	No
Country × Sector FE	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Sector × Time FE	No	No	No	No	Yes	No	No	No
Country × Sector × Time FE	No	No	No	No	No	Yes	Yes	No
Time FE	No	No	No	No	No	No	No	Yes
R2	0.06	0.01	0.01	0.06	0.00	0.14	0.08	0.00
N	2,564,731	2,591,089	2,591,090	2,564,999	2,591,357	2,504,753	2,531,680	2,591,358

Notes: Table reports the variety-level tariff pass-through to before-duty import (Panel A) and export (Panel B) unit values using alternative sets of fixed effects. In the top panel, column 1 is the same as column 4 of Table IV. In the bottom panel, column 1 is the same as column 4 of Table VII. Standard errors clustered by country and HS-8 (for imports) or HS-6 (for exports). Significance: * 0.10, ** 0.05, *** 0.01. Sample: variety-level import and export data from 2017:1 to 2019:4.

Table A.14: BLS PPI, Import and Export Price Indexes

	(1) $\Delta \ln p_{st}^{PPI}$	(2) $\Delta \ln p_{st}^{PPI}$	(3) $\Delta \ln p_{st}^{XPI}$	(4) $\Delta \ln p_{st}^{XPI}$	(5) $\Delta \ln p_{st}^{MPI}$	(6) $\Delta \ln p_{st}^{MPI}$
$\Delta \ln(1+\tau_{st})$	0.26**	0.22**	0.23	0.28	0.10	0.05
	(0.11)	(0.10)	(0.14)	(0.21)	(0.08)	(0.08)
$\Delta \ln(1+\tau_{st}^{*})$	0.10	0.17	-2.31**	-1.96*	-0.52	-0.41
	(0.15)	(0.16)	(1.09)	(1.06)	(0.31)	(0.37)
Time FE	No	Yes	No	Yes	No	Yes
Sector FE	No	Yes	No	Yes	No	Yes
R2	0.01	0.07	0.02	0.07	0.00	0.05
N	2,399	2,399	1,099	1,099	1,596	1,596

Table reports impacts of sector-level import and retaliatory tariffs on official BLS PPI, import price (MPI) and export price (XPI) indexes. Sectoral tariffs are constructed as averages of variety-level tariffs. Standard errors clustered by sector. Sample: Monthly panel of NAICS-4 manufacturing sectors. Significance: * 0.10, ** 0.05, *** 0.01. Sample: monthly variety-level export data from 2017:1 to 2019:4.

Table A.15: Correlates of County-Level Tariff Exposure

Panel A: Outcome is County Import Tariff Exposure

	(1) $\Delta(\tau_r)$	(2) $\Delta(\tau_r)$	(3) $\Delta(\tau_r)$	(4) $\Delta(\tau_r)$
2016 GOP Pres. Vote Share	0.03***	0.02**	0.01**	0.02**
	(0.01)	(0.01)	(0.01)	(0.01)
2016 GOP Pres. Vote Share Sq.	-0.03***	-0.01*	-0.01**	-0.01**
	(0.01)	(0.01)	(0.01)	(0.01)
Ag Employment Share		-0.07***	-0.07***	-0.07***
		(0.01)	(0.01)	(0.01)
Demographic Controls	No	No	Yes	Yes
Pre-Trends	No	No	No	Yes
R2	0.03	0.13	0.14	0.15
N	3,111	3,111	3,111	3,111

Panel B: Outcome is County Export Tariff Exposure

	(1) $\Delta(\tau_r^*)$	(2) $\Delta(\tau_r^*)$	(3) $\Delta(\tau_r^*)$	(4) $\Delta(\tau_r^*)$
2016 GOP Pres. Vote Share	0.03***	0.00*	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.01)
2016 GOP Pres. Vote Share Sq.				-0.00
				(0.01)
Ag Employment Share		0.28***	0.25***	0.25***
		(0.02)	(0.02)	(0.02)
Demographic Controls	No	No	Yes	Yes
Pre-Trends	No	No	No	Yes
R2	0.09	0.40	0.43	0.44
N	3,111	3,111	3,111	3,111

Notes: Unit of analysis is U.S. counties. Outcome variables are the 2017-18 change in import and export tariff exposure due to the trade war, defined as the county-specific tradeable wage-weighted average of sector-level tariff increases. Employment and demographic variables measured in 2016 from Census CBP and 5Y ACS. Agriculture industries defined as NAICS codes beginning with 11. Demographic controls are: share unemployed, share white, share with a college degree, and log mean income. Pre-trend controls are 2013-2016 changes in: manufacturing and agriculture employment shares, share unemployed, and log mean income. Regressions weighted by county population. Standard errors clustered by state.