The US-China Trade War and Global Reallocations

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Motivation

In 2018 and 2019, the United States and China engaged in a trade war, mutually escalating tariffs that ultimately covered approximately $450 billion in trade flows.

Influence 1: Upended a decades-long trend toward lower global trade barriers.

Influence 2: Reduced trade between the United States and China.

$\Rightarrow$ A turning point in the globalization era? An opportunity for the "bystanders"?

Main Takeaways

1. The trade war created net trade opportunities, not just redistributed them.
2. Cross-country heterogeneity exists in export growth in targeted products.
3. The country-specific component explains the bulk (75.8%) of the heterogeneity.

Literature Review

Third-Market Effects

- Mau (2017); Albornoz-Crespo, Brambilla, and Ornelas (2021); Morales, Sheu, and Zahler (2019); Alfaro-Urena et al. (2023); Almunia et al. (2018); Flaaen, Hortacsu, and Tintelnot (2020)

Factors on the Demand Side

- Anderson and van Wincoop (2003); Eaton and Kortum (2002); Costinot, Donaldson, and Komunjer (2012); Caliendo and Parro (2015); Adao, Costinot, and Donaldson (2017); Lind and Ramondo (2023)

Factors on the Supply Side

- Antweiler and Trefler (2002); Costinot et al. (2019); Farrokhi and Soderbery (2020); Breinlich et al. (2022); Bartelme et al. (2019); Lashkaripour and Lugovskyy (2023)

Framework: Environment

Demand. In destination n, the share of spending in product ω imported from origin i is

$$s_{i\omega}^n = a_{i\omega}^n + \sum_{i' \in \mathcal{I}} \sigma_{i'i}^j \ln p_{i'\omega}^n \tag{1}$$

Supply. The tariff-inclusive prices faces by consumers in country n are

$$p_{i\omega}^n = T_{i\omega}^n \tau_{i\omega}^n p_{i\omega} = (1 + t_{i\omega}^n) \tau_{i\omega}^n p_{i\omega} \tag{2}$$

Total sales of ω in sector j from country i are

$$X_{i\omega} \equiv A_i^j p_{i\omega}^{1/b_i^j} Z_{i\omega} \tag{3}$$

Equilibrium. The aggregate sales must equal aggregate expenditures (markets clear):

$$X_{i\omega} = \sum_{n \in \mathcal{I}} \frac{s_{i\omega}^n}{T_{i\omega}^n} E_\omega^n \tag{4}$$

Framework: Impact of US-Chinese Tariffs on Bystanders' Exports

Exports $X_{i\omega}^n$ of product ω from exporter i to importer n change according to

$$\begin{aligned}\Delta \ln X_{i\omega}^n = \beta_{1i\omega}^n \Delta \ln T_{CH,\omega}^{US} + \beta_{2i\omega}^n \Delta \ln T_{US,\omega}^{CH} + \beta_{3i\omega}^n \Delta \ln T_{i,\omega}^{US} + \beta_{4i\omega}^n \Delta \ln T_{i,\omega}^{CH} \\ + \beta_{5i\omega}^n \sum_{j \neq CH,US,i} \Delta \ln T_{j,\omega}^{US} + \beta_{6i\omega}^n \sum_{j \neq CH,US,i} \Delta \ln T_{j,\omega}^{CH} + \eta_{i\omega}^n \end{aligned} \tag{5}$$

where, letting $E_\omega \equiv \sum_{n'} E_\omega^{n'}$ be world expenditures in product ω,

$$\beta_{1i\omega}^n \equiv \left(1\{n = US\} + \frac{E_\omega^{US}}{E_\omega} \frac{\frac{b_i^j \sigma_{ii}^j}{X_{i\omega}/E_\omega}}{1 - \frac{b_i^j \sigma_{ii}^j}{X_{i\omega}/E_\omega}} \right) \frac{\sigma_{CHi}^j}{s_{i\omega}^n} \tag{6}$$

$$\eta_{i\omega}^n \equiv \frac{b_i^j \sigma_{ii}^j (\sum_{n' \in \mathcal{I}} \frac{X_{i\omega}^{n'}}{X_{i\omega}} \hat{E}^{n'} - \hat{A}_i^j) + \hat{p}_{-i\omega}}{1 - \frac{\sigma_{ii}^j b_i^j}{X_{i\omega}/E_\omega}} \frac{1}{s_{i\omega}^n} + \hat{E}^n \tag{7}$$

Data and Summary Statistics

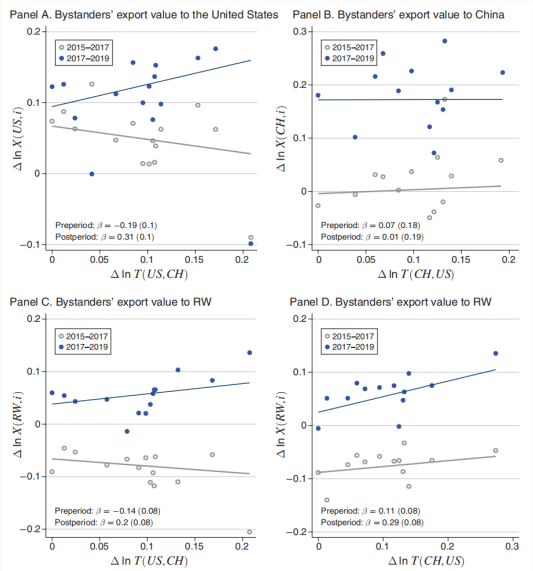
A sample covering 95.9% of global trade (or 70.5% excluding the US and China):

- UN Comtrade (2022) data recording bilateral exports in $5,203$ HS6 products
- 24-month intervals (2014/2015; 2016/2017; 2018/2019)
- data of top exporting countries, excluding oil exporters

Key sets of tariff changes considered in the analysis include:

- US-imposed tariffs on Chinese goods, denoted as $T^{US}_{CH,\omega}$,
- Chinese-imposed tariffs on US goods, denoted as $T^{CH}_{US,\omega}$,
- US-imposed tariffs on other countries, denoted as $T^{US}_{i,\omega}$,
- Chinese-imposed tariffs on other countries, denoted as $T^{CH}_{i,\omega}$.

Average Export Responses



$$\Delta \ln X = \alpha + \beta \Delta \ln T + \varepsilon \qquad (8)$$

A: Bystanders increased exports to the US in products with high US tariffs on China

B: Countries didn't reallocate exports to China due to China's tariffs on the US

C&D: Exports to RW (the rest of the world) increased with both tariffs.

Heterogeneous Export Responses

Capture the heterogeneity by imposing a linear structure:

$$\beta^n_{zi\omega} = \beta^n_{zi} + \beta^n_{zj(\omega)} + \Gamma^n_z \text{SIZE}^n_{zi\omega} \quad \text{for } z = 1, 2, 3, 4 \tag{9}$$

Define the structural and reduced-form residuals as follows:

$$\eta^n_{i\omega} + \varepsilon^n_{i\omega} \equiv \alpha^n_{ij(\omega)} + \Omega^n \text{SIZE}_{i\omega} + \pi^n \Delta \ln X^n_{i\omega,t-1} + \epsilon^n_{i\omega}$$

The resulting specification is run separately to each destination, $n = \text{US}, \text{CH}, \text{RW}$:

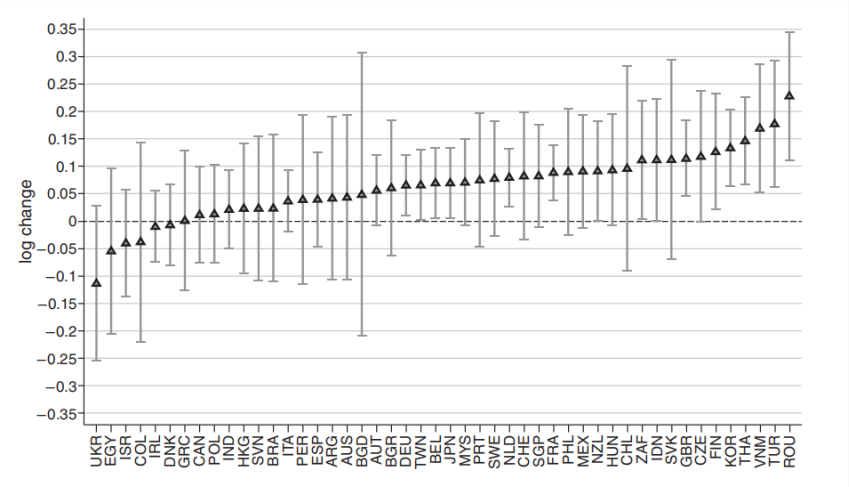
$$\begin{aligned}\Delta \ln X^n_{i\omega} = \beta^n_{1i\omega} \Delta \ln T^{US}_{CH,\omega} + \beta^n_{2i\omega} \Delta \ln T^{CH}_{US,\omega} + \beta^n_{3i\omega} \Delta \ln T^{US}_{i,\omega} + \beta^n_{4i\omega} \Delta \ln T^{CH}_{i,\omega} \\ + \alpha^n_{ij(\omega)} + \Omega^n \text{SIZE}_{i\omega} + \pi^n \Delta \ln X^n_{i\omega,t-1} + \varepsilon^n_{i\omega}\end{aligned} \tag{10}$$

Having estimated the $\beta^n_{zi\omega}$, we predict the growth of variety $i\omega$ to the world:

$$\begin{aligned}\Delta \ln \hat{X}^{WD}_i = \sum_{\omega} \sum_{n=\text{US,CH,RW}} \lambda^n_{i\omega} (\hat{\beta}^n_{1i\omega} \Delta \ln T^{US}_{CH,\omega} + \hat{\beta}^n_{2i\omega} \Delta \ln T^{CH}_{US,\omega} + \hat{\beta}^n_{3i\omega} \ln T^{US}_{i,\omega} \\ + \hat{\beta}^n_{4i\omega} \ln T^{CH}_{i,\omega})\end{aligned} \tag{11}$$

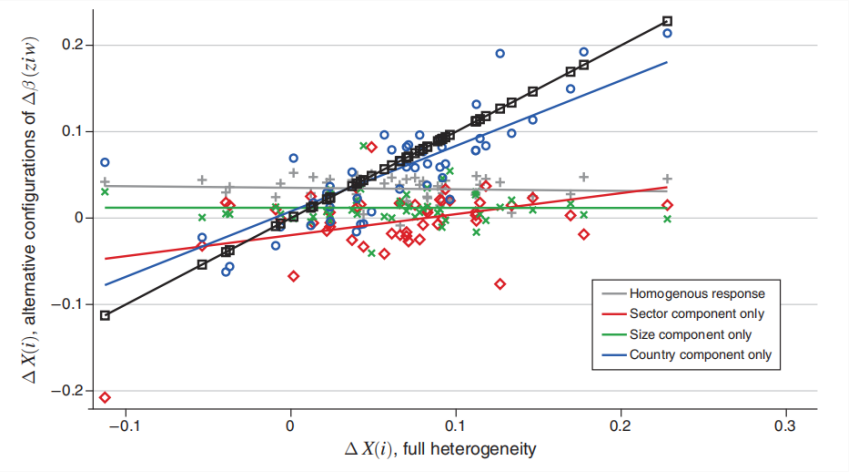
Heterogeneity: Export Growth in Targeted Products

$$\Delta \ln \hat{X}_i^{WD} = \sum_\omega \sum_n \lambda_{i\omega}^n (\hat{\beta}_{1i\omega}^n \Delta \ln T_{CH,\omega}^{US} + \hat{\beta}_{2i\omega}^n \Delta \ln T_{US,\omega}^{CH} + \hat{\beta}_{3i\omega}^n \ln T_{i,\omega}^{US} + \hat{\beta}_{4i\omega}^n \ln T_{i,\omega}^{CH})$$



Heterogeneity: Export Growth in Targeted Products (Cont'd)

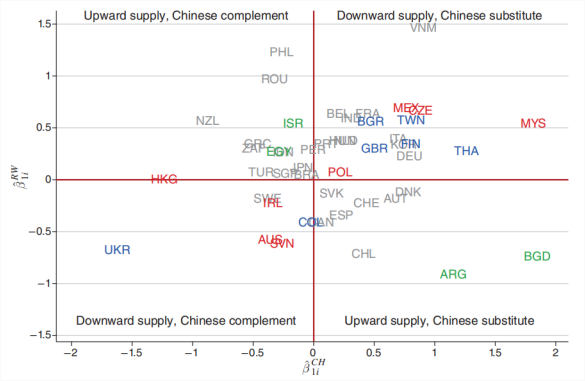
$$\Delta \ln \hat{X}_i^{WD} = \sum_\omega \sum_n \lambda_{i\omega}^n (\hat{\beta}_{1i\omega}^n \Delta \ln T_{CH,\omega}^{US} + \hat{\beta}_{2i\omega}^n \Delta \ln T_{US,\omega}^{CH} + \hat{\beta}_{3i\omega}^n \ln T_{i,\omega}^{US} + \hat{\beta}_{4i\omega}^n \ln T_{i,\omega}^{CH})$$

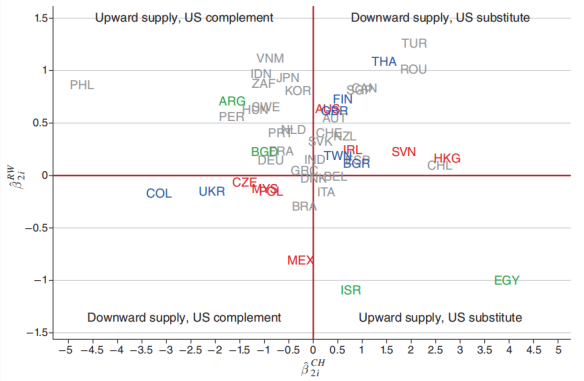


Heterogeneity: Supply and Demand Forces

		Country i's Export Response to US ($\beta_{1i\omega}^{US}$)	
		Decrease	Increase
Country $i's$ Export Response to RW ($\beta_{1i\omega}^{RW}$)	Increase	China Complement Upward-Sloping Supply $\sigma_{CHi} < 0; b_i > 0$	China Substitute Downward-Sloping Supply $\sigma_{CHi} > 0; b_i < 0$
	Decrease	China Complement Downward- Sloping Supply $\sigma_{CHi} < 0; b_i < 0$	China Substitute Upward-Sloping Supply $\sigma_{CHi} > 0; b_i > 0$

Heterogeneity: Supply and Demand Forces (Cont'd)





Conclusion and Reflections

- Several countries increased global exports in products with higher US-Chinese tariffs relative to nontaxed products. (Don't support the "turning point")
- While product-level global trade data can uncover broad reallocation patterns, firm-level data can unpack the factors driving the country-specific elasticities.
- The reduced-form tariff elasticities in this paper could also be used to target moments and identify parameters in estimated general equilibrium models.