Trade wars and the future of globalisation

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Part 1:The post-WWII Global Trading System

- The growth of global trade
- Trade policy in the liberal era pre-2018
- China's entry into the World Trading System

Part 2: Concerns over globalisation

- Concerns in the US, EU, and China
- The WTO's role as an arbiter of disputes
- Policy choices in the US, EU, and China

Part 3: Evaluating the consequences of trade war

- Economic research on the gains from trade
- Pricing and market power in the global economy
- The price and welfare effects of trade war

Integration of the global economy: 1947 through the early 2010s

The World Trading System

The modern World Trading System is an overlapping network of international trade agreements that establish rules for trade in goods under the umbrella of the World Trade Organization (WTO).

A foundational principle of the WTO system is reciprocal, mutually beneficial reductions of tariffs – taxes on trade.

Beginning in 1947, multiple rounds of trade negotiations over 7 decades expanded the system from 23 countries to around 165 and reduced policy barriers to trade fall dramatically.

For high income countries, tariffs fell from around 25% in 1947 to close to zero today. Bown and Irwin (2015)

Global trade grew exponentially after World War II...

...until a series of events including..

- the Global Financial Crisis of 2008-2009,
- the Great Trade Slowdown, beginning in 2010,
- the US-China Trade War, beginning in 2018, and
- the Covid pandemic in 2020.

Source: https://data.worldbank.org/indicator/TX.VAL.MRCH.CD.WT

Trade to GDP ratio, 1995-2023, as a percent

More recent data suggests that global trade as a share of global GDP is settling around 25 - 30%.

But the path and future look rocky.

Source: WTO-UNCTAD estimates and International Monetary Fund (IMF) World Economic Outlook (WEO).
Note: The trade-to-GDP ratio is estimated as an economy's trade in goods and commercial services (the average of exports and imports on a balance-of-payments basis) divided by GDP.

Source: https://www.wto.org/english/blogs_e/data_blog_e/blog_dta_24apr24_e.htm

The World Trading System embodies commitments to liberal trade...

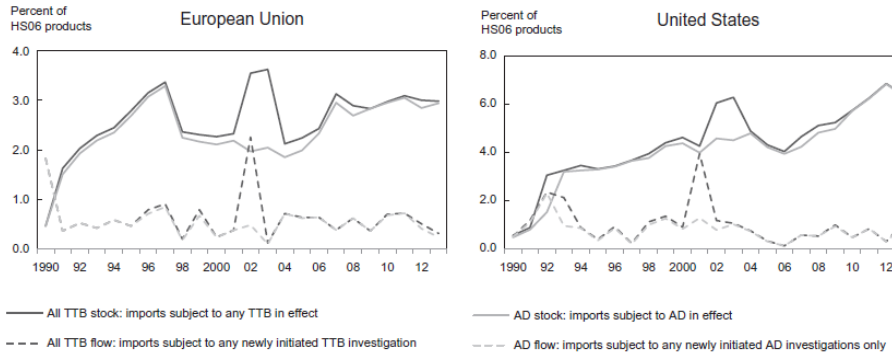
Applied and Bound Import Tariffs, 2013

Country/territory	MFN applied rate, simple average (1)	WTO binding rate, simple average (2)	Products with binding coverage (3)	Products with applied duties > 15% (4)	Products with binding rates > 15% (5)	Maximum MFN applied rate (6)
G20 High-income						
Australia	2.7	10.0	97.0	0.1	13.4	140.0
Canada	4.2	6.8	99.7	6.8	7.3	484.0
European Union	5.5	5.2	100.0	5.1	4.8	511.0
Japan	4.9	4.7	99.6	3.7	3.7	736.0
Korea	13.3	16.6	94.6	10.4	20.5	887.0
United States	3.4	3.5	100.0	2.7	2.7	350.0
G20 Emerging						
Argentina	13.4	31.9	100.0	36.0	97.8	35.0
Brazil	13.5	31.4	100.0	36.2	96.4	55.0
China	9.9	10.0	100.0	15.6	16.4	65.0
India	13.5	48.6	74.4	19.0	71.5	150.0
Indonesia	6.9	37.1	96.6	1.7	90.7	150.0
Mexico	7.9	36.2	100.0	15.7	98.7	210.0
South Africa	7.6	19.0	96.1	20.7	39.6	>1000
Turkey	10.8	28.6	50.3	13.6	28.9	225.0

Source: Bown and Crowley (2016)

...alongside contingency rules that permit temporary tariff increases

Percent of HS06 products subject to a temporary trade barrier, 1990-2013



Punchline: Trade policy by the US and EU (including the UK) consisted of open markets for almost all goods alongside import tariffs and restrictions for a small fraction of goods.
Source: Bown and Crowley (2016)

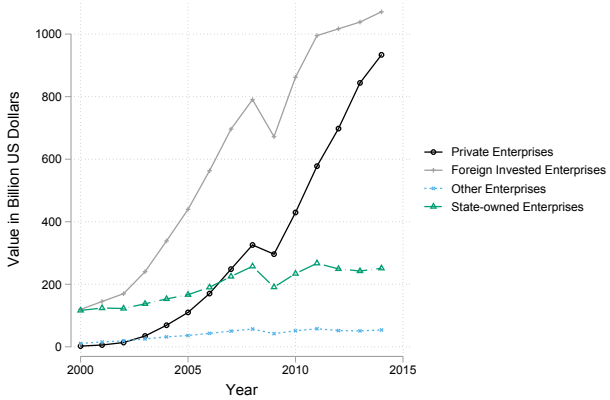
So, what went wrong?

China's Entry into the WTO in 2001 transformed the World Trading System

Between 2001 and 2021, China's trade grew 810% compared to only 180% for overall global trade.

WTO membership caused:

- $\Rightarrow$ one-third of growth of Chinese export value to the US over 2000-2005 (Handley and Limao, 2017)
- $\Rightarrow$ entry in the US of 40% of new exporters from China over 2000-2009 (Crowley, Meng, and Song, 2018)



Source: Corsetti, Crowley, Han, and Song (2024)

Concerns with the consequences and structure of globalisation

In the US, China is blamed for the loss of manufacturing jobs

Chinese imports explain 55% of the decline in US manufacturing employment 2000-2007.

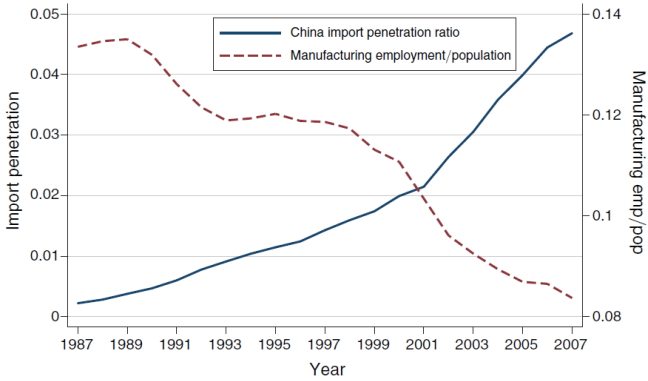


FIGURE 1. IMPORT PENETRATION RATIO FOR US IMPORTS FROM CHINA (*left scale*), AND SHARE OF US WORKING-AGE POPULATION EMPLOYED IN MANUFACTURING (*right scale*)

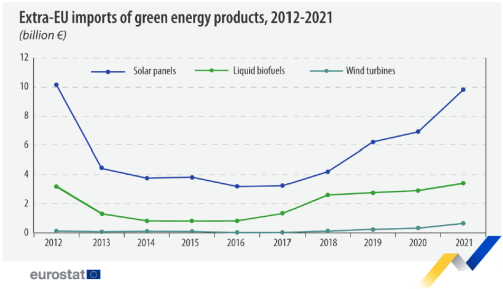
Source: Autor, Dorn and Hanson (2013)

In Europe, anxiety over dependence on China in strategic industries

Consider solar panels:

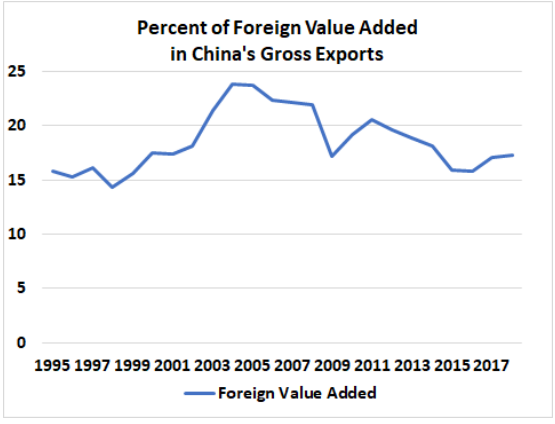
- In 2011, Chinese exporters captured 80% of the EU market for solar panel modules.
- The EU restricted imports from China from 2012-2018.
- Solar panel imports rose when restrictions were removed.

- In 2022, 87% of German solar panel imports came from China.



Sources: Crowley, Meng and Song (2019) and Eurostat (2022)

In China, the rise of foreign value added in China's Exports...



...was a factor in Five Year Plans to support inward technology transfer and industrial development (which have been criticised by trading partners as infringements on foreign-owned intellectual property).

Source: Author's calculations from OECD Trade in Value Added (TiVA) Dataset 2021ed

American cooperation at the WTO falters

The WTO was successful in resolving conflicts through its Dispute Resolution System from its founding in 1995.

But, beginning with President Obama's administration (2009-2017), the US became frustrated by the outcome of several cases.

This frustration led President Trump to "paralyse" or "shut down" the WTO's Dispute Resolution System during his first term in office (2017-2021).

President Biden continued Trump's policies to keep the WTO Dispute Resolution System "on pause" or "in limbo."

Is more market fragmentation inevitable?

Fragmenting markets through trade policy

Trade War 2.0 tariffs are much higher and broader than expected

Trump wins election after passing 270 threshold

Source: The Telegraph, 6 November 2024.

"The word tariff is the most beautiful word in the dictionary."

- Trump, 19 Oct. 2024

Trump's Vast Tariffs Would Rock Global Businesses and Shake Alliances

Economists said Donald Trump's plan to return trade barriers to levels not seen in generations would be "a grenade thrown in the heart" of the international system.

- Ana Swanson, New York Times, 28 Oct. 2024

Fragmenting markets through strategic trade (and industrial) policy

"From wind to steel, from batteries to electric vehicles, our ambition is crystal clear: The future of our clean tech industry has to be made in Europe."

Employees work on the assembly line of C11 electric SUV at a factory of Chinese EV startup Leapmotor on April 26, 2023 in Jinhua, Zhejiang Province of China.

Vcg | Visual China Group | Getty Images

"...global markets are now flooded with cheaper Chinese electric cars. And their price is kept artificially low by huge state subsidies."

- Von der Leyen, 13 September 2023

- European Chips Act of 2023 $\Rightarrow$ €43 billion of policy-driven investment
- The EU imposed import tariffs of 17-35% on Chinese Electric Vehicles in Oct 2024
- Carbon Border Adjustment Mechanism import taxes begin in 2026

How should research on firms' engagement in the global economy inform policy analysis and policy design?

Economic modelling of trade and trade policy: A history

1979: Paul Krugman introduces the revolutionary idea that gains from trade exist among economies:

- populated by firms featuring increasing returns to scale production (e.g. high fixed start-up costs and low per unit production costs) and
- workers who love to consume a variety of goods.

1980s-1990s: International trade and policy analysis shifts focus to oligopolistic markets characterized by limited competition in industries like aircraft, semiconductors and autos. (Krugman, Helpman, Grossman, Eaton, Brander, & Spencer, Venables,...)

2003: Melitz introduces a more realistic rendering of Krugman's model featuring heterogeneous firms. This model combined with advanced computing power and increased availability of big data spawns a vast, new, empirically-driven approach to trade.

What did economic modelling of trade and trade policy teach us?

2012: Arkolakis, Costinot, and Rodriguez-Clare show theoretically that the gains from trade are small in popular trade models including the new trade theory (Krugman, Melitz) and classical Ricardian models (Eaton and Kortum).

2018: Arkolakis, Costinot, Donaldson and Rodriguez-Clare (2018) show that pro-competitive gains from trade are "elusive" – i.e., not present in many models which have the potential to deliver reductions in price-cost markups.

This raises important questions for academics and policymakers: If trade delivers little in human welfare gains, why are we working so hard to integrate markets and expand trade?

What are we missing?

The price-cost markups of exporting firms:

Global firms hold and exploit their market power

Research on pricing and exchange rates has found exchange rate disconnect (Amiti, Itskhoki, Konings, 2014), pricing to market (Fitzgerald and Haller, 2014) and that larger, more productive firms adjust markups more in response to exchange rate fluctuations (Berman, Martin and Mayer, 2012).

Research (Corsetti, Crowley, Han 2022; Corsetti, Crowley, Han,& Song 2024; and Crowley, Han, and Prayer, 2024) using the universe of international trade transactions for the UK (2010-2017); China (2000-2014); and 11 low and middle-income countries (2000-2012) has found evidence of pricing-to-market. Pricing-to-market is correlated with observables and more prevalent for:

- highly differentiated products (all),
- consumer versus intermediate goods (all),
- goods exported by foreign-invested firms (China),
- goods invoiced in the local currency of the destination (UK), but
- markups decline with trade agreements and tariff cuts that stimulate entry and intensify market competition.

Punchline: A wealth of empirical evidence shows firms hold and exploit market power in pricing.

Should economists re-think the models they use for trade and trade policy analysis?

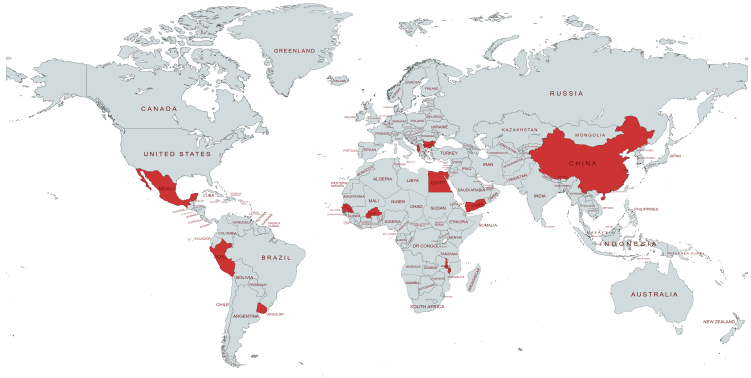
How does trade policy shape market structure exporters' market power, prices, and welfare?

Evidence from:

- "The Procompetitive Effects of Trade Agreements," by M. Crowley, L. Han and T. Prayer, *Journal of International Economics*, 2024.
- "Trade wars and the global reallocation of market power," by C. Cheng, G. Corsetti, M. Crowley, and L. Han, mimeo.

Data: 15.7 mil obs on 225k firms from 11 origin countries

exporting to 165 destinations under 25 preferential trade agreements



Albania	2004-2012	Egypt	2005-2013	Senegal	2000-2012
Burkina Faso	2005-2012	Malawi	2006-2012	Uruguay	2001-2012
Bulgaria	2001-2006	Mexico	2000-2012	Yemen	2008-2012
China	2000-2006	Peru	2000-2013		

How do tariffs and trade agreement affect:

- market structure and the number of exporters in over 3600 product markets in each country? and price-cost markups?

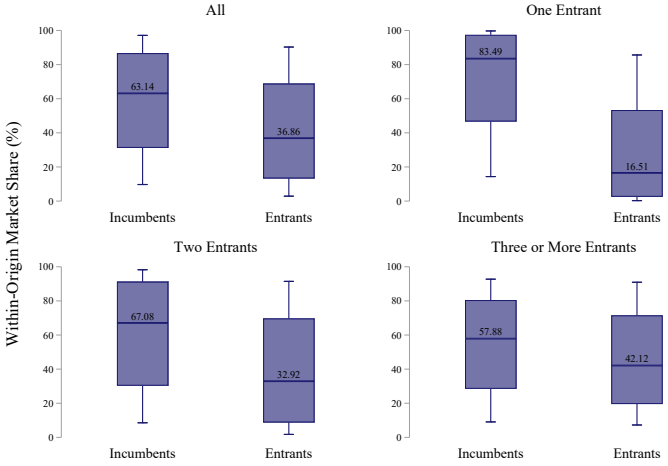
Observation: Few firms are active in each foreign product market

Average over 165 countries	25th Percentile	Median	75th Percentile
Number of firms	7.00	3.00	1.00
Cumulative market share cond. on ≥ 1 incumbent and ≥ 1 entrant			
– Incumbents	30.3%	61.9%	85.7%
– Entrants	69.7%	38.1%	14.3%
United Kingdom	25th Percentile	Median	75th Percentile
Number of firms	10.00	3.00	1.00
Cumulative market share cond. on ≥ 1 incumbent and ≥ 1 entrant			
– Incumbents	39.9%	70.9%	89.4%
– Entrants	60.1%	29.1%	10.7%

Note: This table presents summary statistics for the number of firms from an origin o selling product i to destination d at time t. There are 1.3 million product-origin-destination-year markets based on 3600 products, 11 origins, 165 destinations, and 12 years. At least one exporter is operating in each market. A product is defined as a 6-digit HS product.

Foreign entrants capture market share from incumbent foreign firms

(conditional on the presence of at least one incumbent and one entrant)



Exporters' responses to tariff changes

	Quantity_{fiodt}
Destination's average MFN tariff_{idt}	-0.78***
	(0.06)
Bilateral (FTA/GSP) tariff_{iodt}	-2.40***
	(0.13)
Observations	13.3M
R^2	0.715

Note: Firm-product-origin-year and product-destination fixed effects added to all regressions

- Evaluate firm's response to destination's common (MFN) and bilateral origin-specific (FTA or GSP) tariffs

$\Rightarrow$ If competition is monopolistic$\Rightarrow$ same quantity response to both types of tariffs

$\Rightarrow$ If competition is oligopolistic $\Rightarrow$ diff. responses due to changes in rel. competitiveness

$\Rightarrow$ Oligopoly is the empirically-validated structure

Exporters' responses to tariff changes

	Quantity_{fiodt}	Markup_{fiodt}
Destination's average MFN tariff_{idt}	-0.78***	0.05**
	(0.06)	(0.02)
Bilateral (FTA/GSP) tariff_{iodt}	-2.40***	0.23***
	(0.13)	(0.03)
Observations	13.3M	13.3M
R^2	0.715	0.888

Note: Firm-product-origin-year and product-destination fixed effects added to all regressions

- Markups increase as tariff rises
- Markups fall as tariff are cut

Exporters' responses to tariff changes

	Quantity$_{fiodt}$	Markup$_{fiodt}$	Within-origin market share$_{fiodt}$	Origin's market share in dest$_{iodt}$
Destination's average MFN tariff$_{idt}$	-0.78***	0.05**	1.18***	-1.19**
	(0.06)	(0.02)	(0.09)	(0.11)
Bilateral (FTA/GSP) tariff$_{iodt}$	-2.40***	0.23***	3.54***	-3.89***
	(0.13)	(0.03)	(0.16)	(0.22)
Observations	13.3M	13.3M	13.3M	13.3M
R^2	0.715	0.888	0.776	0.887

Note: Firm-product-origin-year and product-destination fixed effects added to all regressions

- Price-cost markup changes are the outcome of two reallocation effects (Crowley, Han, Prayer; JIE 2024)

$\Rightarrow$ Within-origin market shares of surviving firms increase (due to exit of small firms from same origin)

$\Rightarrow$ Origin's market share decreases (as firms from the origin become less competitive relative to exporters from other origins)

Trade War: A multicountry, multiproduct model with oligopoly

Oligopoly, imperfect competition among firms, arises because

1. each firm must pay a cost to enter each (foreign) product market and
2. consumers value different varieties of a product and see these different varieties and products as somewhat substitutable.

Assumptions:

- Many firms from different countries producing the same product (shoes) compete in each country for consumers.
- Consumers view a product (shoes) sold by a Mexican firm as very substitutable with the same product (shoes) sold by another firm from Mexico.
- But, consumers view the same product (shoes) sold by a Chinese firm as a close, but not perfect substitute for a Mexican product.
- Consumers allocate their purchases over all goods recognising that one product (shoes) can be substituted for another (hats), but these are not close substitutes.

Goal: Calibrate the model to empirical findings to evaluate the price and welfare effects of a trade war.

Multicountry, multiproduct market structure

Consumers' preferences are captured by a triple nested CES demand structure with limited number of firms within each origin to incorporate imperfect competition

Across products $$Y_{dt} = \left(\int_i y_{idt}^{\frac{\eta-1}{\eta}} di \right)^{\frac{\eta}{\eta-1}},$$

Within product, across origins $$y_{idt} = \left(\sum_o y_{iodt}^{\frac{\rho-1}{\rho}} \right)^{\frac{\rho}{\rho-1}},$$

Across firms within an origin $$y_{iodt} = \left(\sum_{f \in \mathcal{F}_{iodt}} y_{fiodt}^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}},$$

where $\sigma \geq \rho \geq \eta > 1$.

Notation: f (firm), i (product), o (origin), d (destination), t (time)

Investigate price and welfare impacts of trade war

Experiment: Consider a world of four countries with 1000 products sold by firms in all countries.

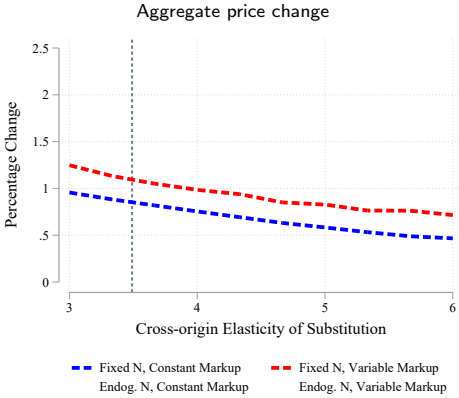
All countries set modest tariffs of 10% on imports from the other three economies initially.

A trade war arises between two (out of four) countries: bilateral tariffs go from 10% $\Rightarrow$ 20%

We consider four scenarios:

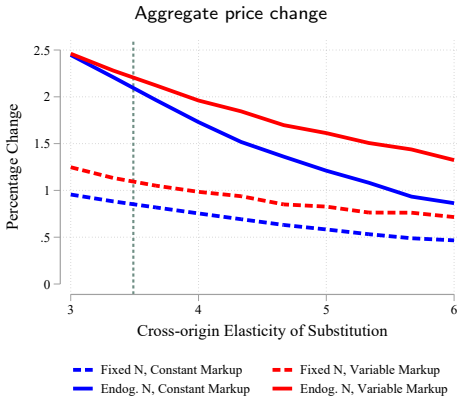
1. No entry or exit of firms+ monopolistic competition
2. No entry or exit of firms + oligopolistic competition and variable markups
3. Endogenous entry or exit + monopolistic competition
4. Endogenous entry or exit + oligopolistic competition and variable markups

Price and welfare impact on trade war economies



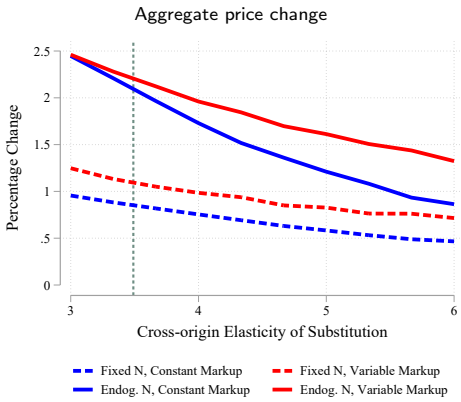
- Under a trade war, oligopolistic competition (red dashed line) leads to higher price increases as domestic firms raise their markups (relative to monopolistic competition)

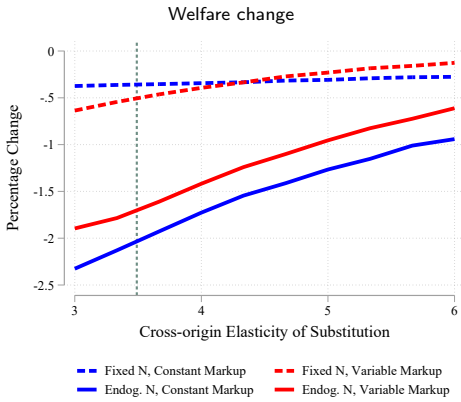
Price and welfare impact on trade war economies



- Under a trade war with oligopolistic competition in which foreign exporting firms exit markets when tariffs increase (solid red line), there is a large loss of product variety that pushes up aggregate prices

Price and welfare impact on trade war economies





- The welfare losses caused by a trade war are larger when the trade war causes foreign exporters to exit the market (solid red line) relative to an alternative model of oligopoly with no entry or exit (red dashed line).

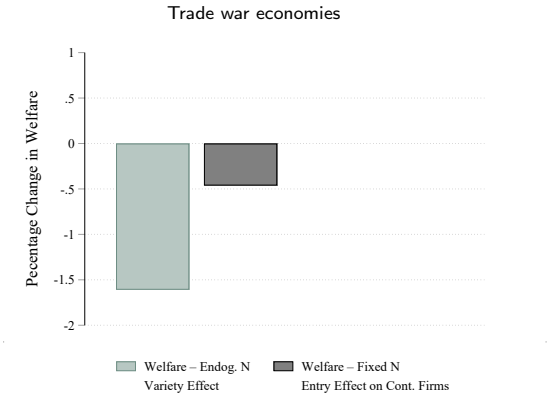
Welfare decomposition

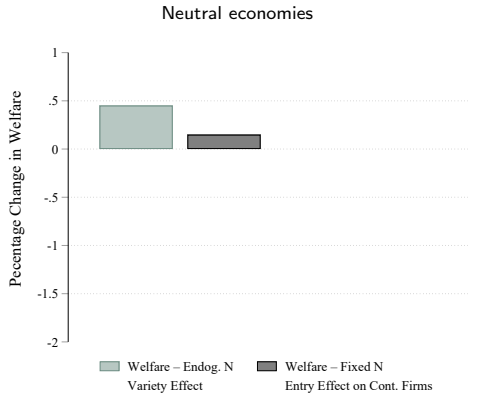
We extend the welfare decomposition of Baqaee and Farhi (2024) to decompose the welfare loss in the trade war countries into components:

Change in national welfare	$\approx$	change in profits, labour income, & tariff revenue
	$-$	distortions from changes in price-cost markups
	$-$	distortions from tariffs
	$+$	change from the variety of goods available

▸ Welfare decomposition equation

Decomposing entry effect on welfare

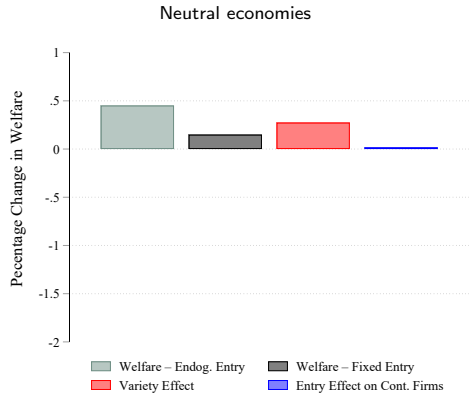




- The welfare effect of trade war is larger in a model accounting for the exit of oligopolistic foreign firms

▸ Markup and Factor Contribution

Decomposing entry effect on welfare



- Exit of foreign firms has two effects:

  loss of product variety reduces consumer well-being

  + continuing domestic firms raise their price-cost markups, earning higher profits

▸ Markup and Factor Contribution

Summary: trade wars and the global reallocation of market power

Entry/exit of large firms and strategic pricing are key elements in the analyses of trade policy changes under trade agreements and trade wars.

- Empirically, relying on firm-product data from 11 countries, we document
  - Highly concentrated origin-destination-product markets
  - Differences in exporters' responses to common vs bilateral tariff changes
    $\Rightarrow$ Evidence of strategic behaviour by foreign exporters (and domestic firms)

- Theoretically, we decompose price and welfare impact of bilateral trade war
  - Extend Baqaee and Farhi (2024) to allow for entry and exit of firms in response to tariff changes
  - Exit of (relatively) large firms in a trade war $\Rightarrow$ 2-3 times larger price and welfare impacts

Concluding Remarks

Evidence from international macro has long emphasized the importance of market power and persistent price difference across markets.

After decades of trade liberations that have stimulated intense price-reducing competition, trade and industrial policy have shifted focus to emphasize the importance of (profits of) national champion industries.

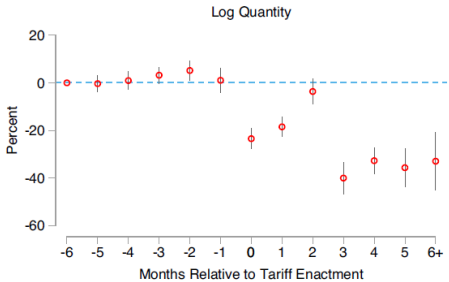
With the election of Donald Trump, a greater fragmentation of the global economy appears inevitable.

Policy analysis incorporating firms' strategic interactions can better inform us about the winners and losers of trade wars.

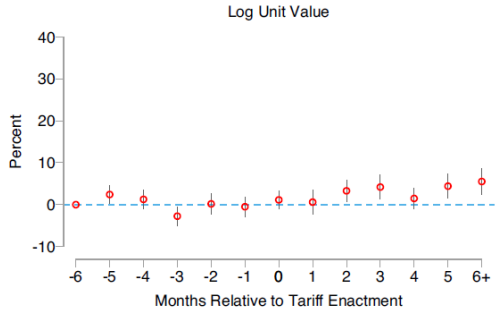
Appendix

Estimated impacts of the 2018 US-China Trade War

Decline in US imports from China



Prices (ex.tariff) of Chinese exporters to US



Source: Figure II from Fajgelbaum, Goldberg, Kennedy, and Khandelwal (2020)

Similar price effects found in Amiti, Redding and Weinstein (2019) and Carvallo, Gopinath, Neiman, and Tang (2021)

Quantitative model

Simulate a model of 4 countries with 1000 products; SMM to match empirical estimates

Estimated parameters	Value
Within-origin elasticity of substitution σ	6.05
Cross-origin elasticity of substitution ρ	3.49
Productivity dispersion (inverse)	9.95
Heterogeneous demand preference	0.39

	Data		Model	
Targeted tariff elasticity estimates	Common	Bilateral	Common	Bilateral
Quantity	-0.78	-2.40	-1.58	-2.39
Markup	0.05	0.23	0.11	0.22
Firm's within-origin market share	1.18	3.54	1.16	2.70
Origin's market share in dest.	-1.19	-3.89	-1.41	-3.93

Welfare decomposition

- Extend Baqaee and Farhi (24) to allow for extensive margin adjustment:

$$\mathrm{d}\log W_d \approx \underbrace{-\sum_a \tilde{\lambda}_{ad}\,\mathrm{d}\log\tau_{ad}}_{\Delta\text{Tariff wedge}} \underbrace{-\sum_a \tilde{\lambda}_{ad}\,\mathrm{d}\log\mu_{ad}}_{\Delta\text{Markup wedge}} + \underbrace{\sum_b \left(\Lambda_{bd}-\tilde{\lambda}_{bd}\right)\mathrm{d}\log\Lambda_b}_{\Delta\text{Factor income wedge}} + \underbrace{E_d}_{\text{Variety effect}}$$

  - first three terms capture welfare changes brought by continuing firms
  - a is firm-product-origin triplet; b captures labor, tariff revenue, and profit 'factor'
  - $\tilde{\lambda}_{ad}$: d's expenditure exposure to a; Λ_{bd} : share of factor b in d's income;
  - Λ_b : share of factor b in world income

- Approximation of variety effect:

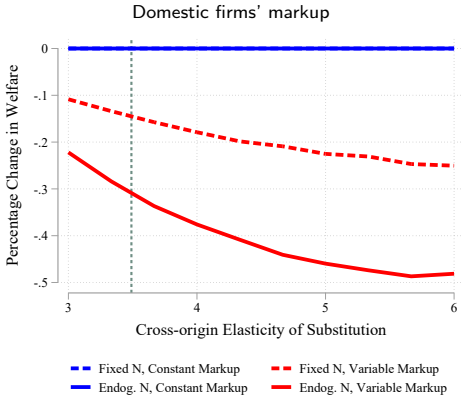
$$E_d \approx \underbrace{-\frac{1}{\varepsilon}\left[\sum_{a\in\mathcal{A}_{dt}\cap a\notin\mathcal{A}_{dt-1}} \tilde{\lambda}_{ad} - \sum_{a'\notin\mathcal{A}_{dt}\cap a'\in\mathcal{A}_{dt-1}} \tilde{\lambda}_{a'd}\right]}_{\text{Effect on aggregate price (a la Feenstra 94)}} + \underbrace{\sum_{b\in\mathcal{B}_{dt}\cap b\notin\mathcal{B}_{dt-1}} \Lambda_{bd} - \sum_{b'\notin\mathcal{B}_{dt}\cap b'\in\mathcal{B}_{dt-1}} \Lambda_{b'd}}_{\text{Effect on factor income}}$$

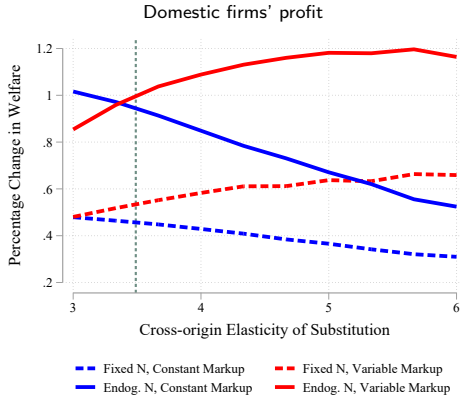
where ε is trade elasticity

Decomposition

Contribution of domestic firms' markup and factor wedges

Domestic firms' profit rises as markup increases





Two offsetting welfare effects:

(a) markup increase $\Rightarrow$ welfare $\downarrow$ + (b) profit increase $\Rightarrow$ higher purchasing power $\Rightarrow$ welfare $\uparrow$

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