The Cost of Dissolving the WTO:
The Role of Global Value Chains

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ASSA Meetings: January 2022

Background

Free Trade Agreements are Under Attack!

The New York Times | https://nyti.ms/3dbGdHQ

The W.T.O. Should Be Abolished

In concert with other free nations, America must restore its economic sovereignty.

By Josh Hawley
Mr. Hawley is a Republican senator from Missouri.

May 5, 2020

The Cost of Abolishing FTAs in the Age of Global Value Chains

Research Question: Has the rise of global value chains amplified the cost of abolishing free trade agreements (FTAs)?

$$\text{Cost of abbolishing FTAs} \approx \frac{\partial \text{Welfare}}{\partial \text{trade restrictions}} \times \Delta \text{trade restrictions}$$

- It is well-known that IO linkages amplify $\frac{\partial \text{Welfare}}{\partial \text{trade restrictions}}$
- Less consensus on how IO linkages affect Δ trade restrictions.

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This Paper

– We characterize (non-cooperative) optimal tariffs under IO linkages to determine

$$\Delta \text{ trade restrictions} = \text{ optimal tariffs } - \text{ applied tariffs}$$

– Guided by theory, we quantify the *"Cost of abolishing FTAs"* under IO linkages.

Main findings

1. Under IO linkages, import tariffs can mimic good-specific export taxes via *"tariff re-exportation"* $\longrightarrow$ non-cooperative tariffs are more distortive.
2. Overlooking IO linkages understates the *"Cost of abolishing FTAs"* by **48%**

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Theoretical Contribution: *Optimal Policy under IO Linkages*

1st-best import tariffs & export subsidies under IO linkages

- Lashkaripour & Lugovskyy (2021): many countries/industries + scale economies or markup distortions + firm heterogeneity + political economy pressures
- 1st-best import tariffs are IO-blind

2nd-best import tariffs under IO linkages

- Antras et al (2021): scale economies + vertical production ⟶ tariff escalation
- Caliendo et al (2021): double marginalization ⟶ lower optimal tariffs
- Blanchard et al (2017): final good tariffs raise input prices ⟶ optimal final good tariffs depend on foreign input content
- **This paper:** tariff re-exportation via IO network ⟶ more potent optimal tariffs

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Quantitative Contribution: *The Cost of Trade Wars*

- Ossa (2014, AER)
  - abstracts from IO linkages
  - precludes non-cooperative export policies
- Lashkaripour (2021, JIE)
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Theoretical Framework: *Bullet Point Summary*

Caliendo & Parro (2015)

- Two countries: Home (h) and Foreign (f)
- Many industries: $k = 1,..., \mathcal{K}$
- Production employs labor & tradable intermediates + CRS technology
- Industry-level trade elasticity θ_k denotes degree of input & final good differentiation in industry k

Notation: goods are indexed by origin–destination–industry

$$\text{good } fh,k \sim \text{origin } f - \text{destination } h - \text{industry } k$$

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Policy Instruments: *Import & Export Taxes*

– Trade taxes create a wedge b/w *producer prices* (P) and *consumer prices* ($\tilde{P}$):

$$\tilde{P}_{fh,k} = \left(1 + t_{h,k}\right)\left(1 + x_{f,k}\right) P_{fh,k}; \qquad \tilde{P}_{hh,k} = P_{hh,k}$$

– Trade tax revenues are rebated to consumers in a lump-sum fashion.[1]

– NRTBs are excluded from the policy set, because there is no rationale for using NRTBs when non-cooperative governments can apply revenue-raising trade taxes.

[1] **Note:** lump-sum transfers are isomorphic to uniform consumption subsidies in the present setup because the labor supply is inelastic—see Dixit (1980).

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Unilaterally Optimal Trade Taxes

Definition: Unilaterally Optimal Trade Policy

– Home's **1st-best** import tariffs and export taxes

$$\left\{\mathbf{t}_h^*, \mathbf{x}_h^*\right\} = \arg\max_{\mathbf{t}_h, \mathbf{x}_h} \quad W_h\left(\mathbf{t}_h, \mathbf{x}_h; \mathbf{t}_f, \mathbf{x}_f\right)$$

– Home's **2nd-best** import tariffs

$$\mathbf{t}_h^\star = \arg\max_{\mathbf{t}_h} \quad W_h\left(\mathbf{t}_h, \mathbf{x}_h; \mathbf{t}_f, \mathbf{x}_f\right) \qquad s.t. \qquad \mathbf{x}_h = \mathbf{0}$$

Note: the market equilibrium is globally efficient $\Longrightarrow$ $\mathbf{t}_h^*$, and $\mathbf{x}_h^*$ are globally inefficient but transfer surplus from Foreign to Home.

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Intermediate Result: *Unilaterally 1st-Best Policy*

– Home's unilaterally *1st-Best* policy is unique up to an arbitrarily-chosen uniform tariff shifter, $\bar{t}_h$:[2]

$$1 + t^*_{h,k} = 1 + \bar{t}_h$$

$$1 + x^*_{h,k} = \left(1 + \frac{1 - \Lambda_{hf,k}}{\Lambda_{hf,k} + \theta_k \lambda_{ff,k}}\right)(1 + \bar{t}_h)^{-1}$$

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share of good k that is reimported

trade elasticity

Foreign's domestic expenditure share

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Have GVCs made Trade Restrictions Less Attractive?

- 1st best import tariffs are uniform and IO-blind.[3]
- 1st best export taxes are lower to mitigate **re-importation**.

Corrollary 1. *Suppose we were to infer optimal policy choices from observable shares and trade elasticities: Accounting for GVCs implies lower export restrictions on upstream industries; but has no implications for import restrictions.*

[3] **Note:** The IO-blind property is robust but the uniformity result is weak and derives from the constant-returns to scale assumption (Lashkaripour & Lugovskyy, 2021).

2nd-Best Tariffs under IO Linkages

Second-Best Tariffs *without* IO Linkages

– 1st-best export taxes = optimal monopoly markup on export goods

$$x^*_{h,1} = \frac{1}{\theta_1 \lambda_{ff,1}}, \qquad x^*_{h,2} = \frac{1}{\theta_2 \lambda_{ff,2}}, \qquad \cdots \qquad x^*_{h,\mathcal{K}} = \frac{1}{\theta_{\mathcal{K}} \lambda_{ff,\mathcal{K}}}$$

– No IO linkages $\Longrightarrow$ 2nd-best import tariffs are uniform:

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Intuition: A uniform import tariff is akin to a uniform export tax, which is the best possible imitation of 1st-best export taxes *without* IO linkages.

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Second-Best Tariffs with IO Linkages

– With IO linkages, import tariffs can emulate more than a uniform export tax

– Import tariffs, $\{t_{i,1}, \cdots t_{i,\mathcal{K}}\}$, are equivalent to export taxes, $\{x_{i,1}, \cdots, x_{i,\mathcal{K}}\}$:

$$\begin{cases} 1+t_{h,1} = (1+\bar{t}_h)\,(1+\tau_{h,1}) \\ 1+t_{h,2} = (1+\bar{t}_h)\,(1+\tau_{h,2}) \\ \vdots \\ 1+t_{h,\mathcal{K}} = (1+\bar{t}_h)\,(1+\tau_{h,\mathcal{K}}) \end{cases} \equiv \begin{cases} 1+x_{h,1} = (1+\bar{t}_h)\ \prod_g (1+\tau_{h,g})^{\nu_{h,g1}} \\ 1+x_{h,2} = (1+\bar{t}_h)\ \prod_g (1+\tau_{h,g})^{\nu_{h,g2}} \\ \vdots \\ 1+x_{h,\mathcal{K}} = (1+\bar{t}_h)\ \prod_g (1+\tau_{h,g})^{\nu_{h,g\mathcal{K}}} \end{cases}$$

– $\nu_{h,gk}$ is the share of the tariff on good g that is re-exported as part of good k

– Home's government can choose $\{\tau_{h,1}, \tau_{h,2}, \cdots, \tau_{h,k}\}$ to mimic 1st-best export taxes on an industry-by-industry basis.

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Theorem. *Country i's 2nd-best optimal import tariffs are*

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where $\tau_{h,k}$ is chosen to capitalize on "tariff re-exportation":

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Application: Cost of Abolishing FTAs

The Non-Cooperative Nash Equilibrium

– Abolishing FTAs can lead to the adoption of Nash trade taxes.

– Nash taxes solve the following system of best policy response functions:

$$\begin{cases} \mathbf{t}_h = \boldsymbol{t}_h^*(\mathbf{x}_h; \mathbf{t}_f, \mathbf{x}_f); & \mathbf{x}_h = \boldsymbol{x}_h^*(\mathbf{t}_h; \mathbf{t}_f, \mathbf{x}_f) \\ \mathbf{t}_f = \boldsymbol{t}_f^*(\mathbf{x}_f; \mathbf{t}_h, \mathbf{x}_h); & \mathbf{x}_f = \boldsymbol{x}_f^*(\mathbf{t}_f; \mathbf{t}_h, \mathbf{x}_h) \end{cases}.$$

Note #1: The Nash equilibrium represents a prisoner's dilemma situation where countries acting in their own self-interest creates a inefficient (lose-lose) outcome.

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Note #2: Following Bagwell & Staiger (2004), the implicit gains from existing trade agreements (like the WTO) can be calculated as

$$\text{Gains from FTAs}_i = \frac{W_i(\mathbf{x}, \mathbf{t})}{W_i(\mathbf{x}^*, \mathbf{t}^*)}$$

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factual

Nash

Data Sources for Quantitative Analysis

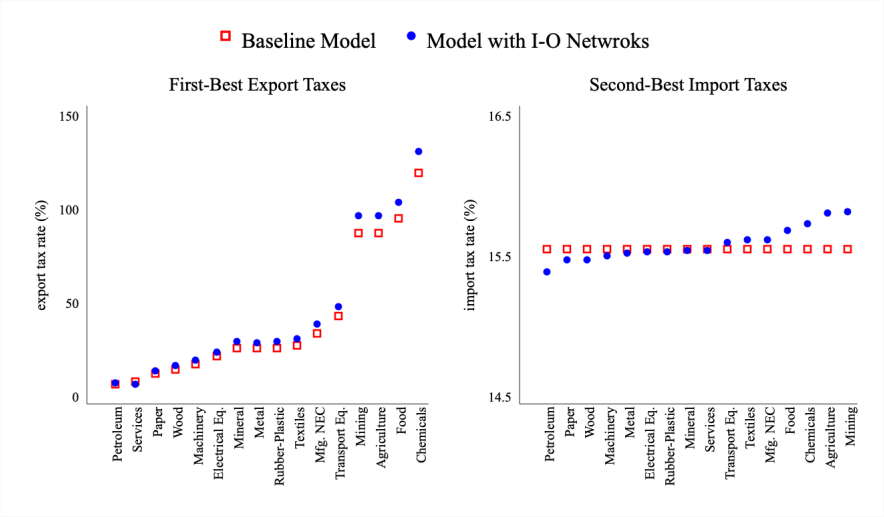
World Input-Output Database (2014)

- expenditure matrix by *origin*×*destination*×*industry* + input-output tables.
- 44 Countries + an aggregate of the rest of the world
- 56 Industries

UNCTAD-TRAINS Database: Applied Tariffs

Trade elasticities: We estimate θ_k by applying Caliendo & Parro's (2015) triple-difference technique to our expenditure and tariff data. Estimated values

E.U.'s Non-Cooperative Trade Barriers



back to findings

The Gains from FTAs ~ The Cost of Abolishing FTAs

Case #1: The gains from preventing non-cooperative export + import barriers:

- Accounting for global I-O networks: **$2.8 trillion**
- Not accounting for global I-O networks: **$1.5 trillion**

Case #2: The gains from preventing non-cooperative import barriers:

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Bottomline: Abolishing FTAs is akin to erasing France from the global economy!

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The Gains from FTAs: *Select Countries*

	Gains from preventing *export & import barriers*		Gains from preventing *import barriers*		Overall Gains from Trade	
Country	Baseline	IO Networks	Baseline	IO Networks	Baseline	IO Networks
EU	1.0%	2.1%	1.2%	1.2%	4.1%	5.8%
BRA	0.2%	0.5%	0.4%	0.4%	3.3%	4.4%
CHN	0.8%	2.7%	1.0%	1.3%	3.3%	5.2%
MEX	1.9%	3.1%	1.8%	2.3%	19.9%	25.0%
USA	1.1%	1.9%	1.2%	1.1%	3.8%	4.8%
Average	2.00%	3.69%	1.75%	2.07%	9.60%	12.70%

Cross-national differences in gains are driven by differences in

- Export composition: market power *vis-a-vis* the RoW
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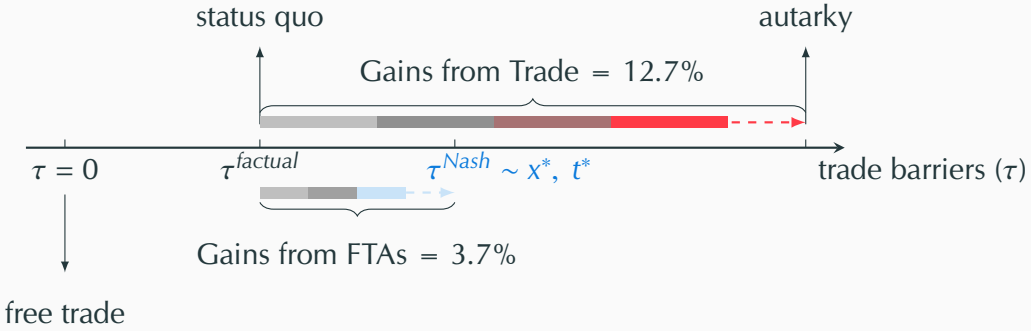
status quo
autarky
Gains from Trade = 12.7%
$\tau = 0$
$\tau^{factual}$
$\tau^{Nash} \sim x^*,\ t^*$
trade barriers (τ)
Gains from FTAs = 3.7%
free trade

Summary of Findings

- The globalization of value chains has not diminished the appeal of beggar-thy-neighbor trade restrictions...
- ... But it has made these restrictions more disruptive than ever.
- Abolishing FTAs will shave $2.7 trillion from the global GDP, which amounts to 30% of the total gains from trade.

Thank You.

Two Issues Worth Highlighting

What about non-tariff barriers (NTBs)?

- NTBs are unilaterally inefficient. It's only sensible to use NTBs if governments are committed to FTAs that ban revenue-raising trade taxes.

What about political economy motives for protection?

- Political economy motives concern intra-national redistribution of rents.
- Terms-of-trade (ToT) motives concern cross-national redistribution of surplus.
- If governments act efficiently, political economy motives have minimal effect on cross-national ToT externalities (Ossa, 2016)

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Estimated Trade Elasticities: *WIOD Industry Categories 1-8*

Number	Description	θ_k	std. err.	Obsv.
1	Crop and animal production, hunting Forestry and logging Fishing and aquaculture	0.93	0.19	12,341
2	Mining and Quarrying			
3	Food, Beverages and Tobacco	0.53	0.13	12,300
4	Textiles, Wearing Apparel and Leather	2.71	0.51	12,341
5	Wood and Products of Wood and Cork	5.64	0.87	12,183
6	Paper and Paper Products Printing and Reproduction of Recorded Media	4.65	1.49	12,300
7	Coke, Refined Petroleum and Nuclear Fuel	13.38	1.94	9,538
8	Chemicals and Chemical Products Basic Pharmaceutical Products	2.36	0.91	12,300

Estimated Trade Elasticities: *WIOD Industry Categories 9-16*

Number	Description	θ_k	std. err.	Obsv.
9 10 11	Rubber and Plastics Other Non-Metallic Mineral Basic Metals Fabricated Metal Products	1.51	0.89	12,341
12	Computer, Electronic and Optical Products Electrical Equipment	4.07	1.02	12,341
13	Machinery and Equipment n.e.c	5.65	1.34	12,341
14	Motor Vehicles, Trailers and Semi-Trailers Other Transport Equipment	2.70	0.45	12,341
15	Furniture; other Manufacturing	2.04	0.59	12,341
16	All Service-Related Industries (WIOD Industry No. 23-56)	3.80	0.84	12,341

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