Multinational Production and Trade Policy

Agustín Gutiérrez
University of Wisconsin–Madison

Sebastian Heise
Federal Reserve Bank of New York

Nicolo Rizzotti
University of Chicago

Felix Tintelnot
Duke University

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Introduction

- Multinational enterprises (MNEs) account for a large share of world trade flows.
- In the U.S., MNEs account for 70% of trade, with one-third of their exports and majority of their import conducted intra-firm.
- Yet we know little about how their presence shapes the design of optimal trade policy.
- Why might tariff effects differ with MNEs?
  1. Relocation of production to new/ existing affiliates dampens tariff effects,
  2. Transfer-pricing dampens the MNEs' tariff burden, lowering its incentive to relocate,
  3. MNEs' profits abroad reflect aggregate imbalances that can be addressed with trade taxes.

This paper

Explores the design and welfare consequences of trade policy in the presence of MNEs

What we do and what we find (1/2)

Empirical regularities on intra-firm trade and 2018-2019 import tariffs

Three facts on Related-party (RP) and Arms'-length (AL) trade using Census micro data:

1. Share of trade that is under RP is low for China and varies across industries
2. Quantity declines more strongly in RP than in AL for continuing relationships in response to tariffs
3. Import prices (excl. tariffs) decline in continuing AL and RP relationships

What we do and what we find (2/2)

Optimal trade policy in a quantitative model with Local and Global firms.

- We provide sufficient statistics formulas for optimal trade policy in models with MP.
- Optimal tariffs respond to standard forces, but MNEs reshape how these forces operate relative to *trade-only* models.
  - *Terms-of-trade* motive are restricted by domestic MNEs production relocation.
  - MNEs profits abroad generate aggregate imbalances creating new *profit-shifting* motives.
  - MNEs break Lerner symmetry, and tariffs imperfectly substitute for missing export taxes.
- Quantitatively we find that transfer-price manipulation makes tariff less effective in achieving any of this objectives.

Related Literature

1. Optimal Trade Policy:

[Johnson (1954), Gros (1987), Venables (1987) , Bagwell and Staiger (1999, 2001), Ossa (2011), Costinot et al. (2015), Caliendo and Parro (2022), Lashkaripour and Lugovsky (2023), Antràs et al (2023), Caliendo et al (2023), Dyrda et al. (2024), Itskhoki and Mukhin (2025)]

+ Optimal tariff structure in the presence of MP

2. Multinational enterprises and Trade:

[Goldberg (1995), Blonigen and Feenstra (1996), Feinberg and Keane (2001, 2006), Ludema (2002), Helpman et al. (2004), Bernard, Jensen, Schott (2006), Cole and Davies (2011), Ramondo and Rodriguez-Clare (2012), Holmes et al. (2015), Tintelnot (2017), Flaaen and Pierce (2019), Flaeen et al. (2020), Xue (2024)]

+ How MNEs activities shape the rationale behind trade policy.

3. Effects of recent trade war:

[Amiti, Redding, and Weinstein (2019); Flaaen and Pierce (2020); Handley, Kamal, and Monarch (2020); Fajgelbaum et al. (2020); Fajgelbaum and Khandelwal (2022); Dang et al. (2023); Fajgelbaum et al. (2024), and many others...]

+ Import responses by their intra-firm content.

Outline of Talk

1. Intoduction.
2. Empirical regularities on intra-firm trade and 2018-19 import tariffs.
3. Quantitative model with Local and Global firms.
4. Limiting cases to build intuition.
5. Optimal import tariff and counterfactuals.

Empirical regularities on Intra-firm trade and U.S. Tariffs

Data

1. **Transaction-level U.S. import data:** From LFTTD of the U.S. Census, for 2016-2020
   - Contains U.S. importer name, foreign exporter ID, HS10 product, date, country
   - Flag for whether each transaction is conducted by related parties (RP)

2. **U.S. import tariffs:** From US International Trade Commission (USITC)
   - At the HS10 product-country-month level
   - Convert specific tariffs into ad-valorem tariffs

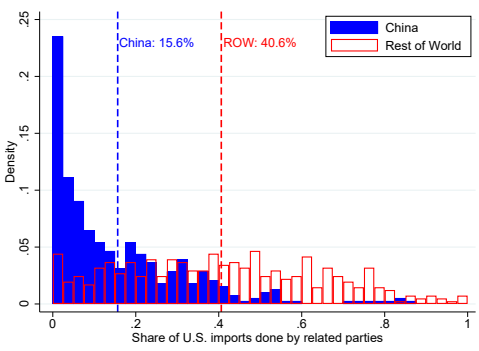
3. **Publicly available import data:** From Census Bureau
   - Merged with publicly available information on imports by related parties
   - Available at the 6-digit NAICS level, mapped to HS10 product(s)

Three Facts on the 2017-18 Tariffs and MNEs

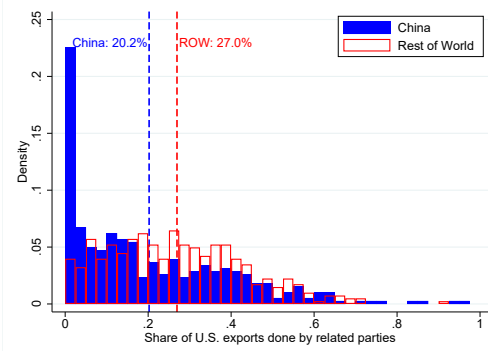
1. **Share of trade that is under RP is low for China and varies across industries**

Fact 1: RP Trade is Low for China and Varies across Industries

Figure 1: Share of U.S. RP Trade in 2017 across 6-Digit NAICS Industries



(a) Imports



(b) Exports

- Effects of trade policy may differ across industries/countries due to different RP shares

Three Facts on the 2017-18 Tariffs and MNEs

1. **Share of trade that is under RP is low for China and varies across industries**

2. **Quantity declines more strongly in RP than in AL for continuing relationships in response to tariffs**

Fact 2: Quantity Declines More Strongly for RP than AL

We run specifications of the following form, **separately for AL and RP trade**:

$$\Delta \ln y_{mxigt} = \eta_{mxig} + \eta_{gt} + \eta_{it} + \eta_{is(g)} + \sigma \Delta \ln(1 + \tau_{igt}) + \varepsilon_{mxigt}$$

where,

- y_{mxigt} = import **quantity**, **value**, or **price** (unit value) from importer m, exporter x, source country i, HS10 product g, in month t
- τ_{igt} = U.S. import tariff
- η_{mxig} = importer m by exporter x by source country i by HS10 product g fixed effect
- $\eta_{is(g)}$ = country i by 4-digit NAICS industry s fixed effect
- Drop observations associated with price changes larger than 3 log points in absolute value

Fact 2: Quantity Declines More Strongly for RP than AL

	1 mo	3 mo	12 mo	24 mo
Quantity				
- AL	-0.1268***	-0.1571***	-0.6088***	-0.6022***
	(0.0459)	(0.0437)	0.0422)	(0.0624)
- RP	-0.2321**	-0.1662**	-0.7392***	-1.136***
	(0.0959)	(0.0753)	(0.0880)	(0.1186)
Value				
- AL	-0.2162***	0.0281	-0.7952***	-0.8297***
	(0.0448)	(0.0456)	(0.0447)	(0.0664)
- RP	-0.2615***	-0.2975***	-0.8210***	-1.316***
	(0.0960)	(0.0717)	(0.0950)	(0.1276)
Observations - AL	17,180,000	14,480,000	8,975,000	4,505,000
Observations - RP	5,133,000	4,437,000	2,794,000	1,530,000

- Stronger quantity and import value declined for RP Product-level regressions

Three Facts on the 2017-18 Tariffs and MNEs

1. **Share of trade that is under RP is low for China and varies across industries**

2. **Quantity declines more strongly in RP than in AL for continuing relationships in response to tariffs**

3. **Import prices (excluding tariffs) decline in continuing AL and RP relationships**

Fact 3: Import Prices Decline in Continuing AL and RP Relationships

	1 mo	3 mo	12 mo	24 mo
Price				
- AL	-0.0893***	-0.1289***	-0.1864***	-0.2274***
	(0.0160)	(0.0131)	(0.0182)	(0.0263)
- RP	-0.0294	-0.1314***	-0.0818**	-0.1793***
	(0.0409)	(0.0310)	(0.0367)	(0.0495)
Observations - AL	17,180,000	14,480,000	8,975,000	4,505,000
Observations - RP	5,133,000	4,437,000	2,794,000	1,530,000

- We re-run the same regression with price on the left-hand side
- Negative price effect for both AL and RP
- We are currently running regressions conditioning on exporters that do both AL and RP (results pending)

A Model of Multinational Production with Local and Global firms

Environment

- The world consists of N countries, denoted with either i , l , or m , and K sectors denoted with s or$k$.
- Within each country there are **two types of firms**:
  - **Local firms:** produce domestically and serve every country through exporting.
  - **Global firms:** produce **domestically and abroad**, and serve all countries from all production locations.
  - *Global* vs. *Local* is an endogenous choice.
- Goods $q^k_{i,lm}(\omega)$ are identified by the variety ω , the origin idea $i \in \mathcal{N}$, location of production $l \in \mathcal{N}$, destination market m, and the sector $k \in \mathcal{K}$.
- **Representative Household** has preference over goods, and supplies labor inelastically.
- **Government** in m sets import taxes t^k_{lm} and rebates proceeds lump-sum.

Household's preferences

- The representative household in country m has Cobb-Douglas preferences:

$$U_m = \prod_k^K \left(Q_m^k\right)^{e_k}, \qquad e_k \in (0,1),$$

where Q_m^k is the amount of sector k's composite good consumed in country m.

- The sectoral composite is a CES aggregate over firms' variety:

$$Q_m^k = \left[\sum_{i=1}^N \int_{\omega \in \Omega_i^k} Q_{i,m}^k(\omega)^{\frac{\sigma-1}{\sigma}} d\omega\right]^{\frac{\sigma}{\sigma-1}}, \quad \sigma > 1$$

with $Q_{i,m}^k(\omega)$ consumption of firm's variety $\omega \in \Omega_i^k$ with origin *idea* in country i.

Local Firms – Production and Market Structure

- Produce **domestically** and serve every country through exporting.
- Technology uses only labor, and it is given by:

$$q^k_{i,im}(\omega) = \frac{z(\omega)A^k_i}{\tau_{im}} \cdot \ell^k_{i,im}, \qquad \text{with} \quad \tau_{im} > 1 \text{ if } i \neq m.$$

- Local firms serve directly to Households, hence variety ω originated in i sold in m satisfies:

$$Q^k_{i,m}(\omega) = q^k_{i,im}(\omega)$$

- **Pricing rule:** Prices are a markup $\mu \geq 1$ over marginal cost

$$p^k_{i,im}(\omega) = \mu \cdot \frac{\tau_{im} w_i}{z(\omega)A^k_i}$$

Global Firms – Production and Market Structure

They produce both **domestically** and **abroad**, and serve all countries via exporting. Production involves three stages before reaching consumers:

Subsidiary in l **Intermediary in m** **Assembler in m**

Global Firms – Production and Market Structure

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Labor-only technology:

$$q^k_{i,lm}(\omega) = \frac{z(\omega)A^k_i}{\tau_{lm} \cdot \gamma^k_{i,l}} \cdot \ell^k_{i,lm}$$

Set price:

$$p^k_{i,lm}(\omega) = \mu\left(t^k_{lm}\right) \cdot \frac{\tau_{lm}\gamma^k_{i,l} w_l}{z(\omega)A^k_i}$$

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Intermediary in m

Imports at prices:

$$t^k_{lm} \cdot p^k_{i,lm}(\omega)$$

And re-sells at prices:

$$\tilde{p}^k_{i,lm}(\omega) = \tilde{\mu}\left(t^k_{lm}\right) \cdot t^k_{lm} p^k_{i,lm}(\omega)$$

Assembler in m

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Assembler in m

Combines all varieties:

$$Q^k_{i,m}(\omega) = \left[\sum_{l=1}^{N} q^k_{i,lm}(\omega)^{\frac{\varepsilon-1}{\varepsilon}}\right]^{\frac{\varepsilon}{\varepsilon-1}}$$

and sell to households at price:

$$P^k_{i,m}(\omega) = \left[\sum_{l=1}^{N} \tilde{p}^k_{i,lm}(\omega)^{1-\varepsilon}\right]^{\frac{1}{1-\varepsilon}}$$

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Labor-only technology:

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Set price:

$$p^k_{i,lm}(\omega) = \left(t^k_{lm}\right)^{-\rho_{tp}} \mu \cdot \frac{\tau_{lm}\gamma^k_{i,l} w_l}{z(\omega)A^k_i}$$

Intermediary in m

Imports at prices:

$$t^k_{lm} \cdot p^k_{i,lm}(\omega)$$

And re-sells at prices:

$$\tilde{p}^k_{i,lm}(\omega) = \left(t^k_{lm}\right)^{\rho_c} \cdot t^k_{lm} p^k_{i,lm}(\omega)$$

Assembler in m

Combines all varieties:

$$Q^k_{i,m}(\omega) = \left[\sum_{l=1}^{N} q^k_{i,lm}(\omega)^{\frac{\varepsilon-1}{\varepsilon}}\right]^{\frac{\varepsilon}{\varepsilon-1}}$$

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$$P^k_{i,m}(\omega) = \left[\sum_{l=1}^{N} \tilde{p}^k_{i,lm}(\omega)^{1-\varepsilon}\right]^{\frac{1}{1-\varepsilon}}$$

To become a global firm, a fixed cost $f_i > 0$ must be paid in units of headquarters labor.

Government

- Government sets (**gross**) taxes $\{t_{lm}^k\}_{k,l}$ on sector k goods from country l.
- Revenues are rebated back to the Household lump-sum.
- Letting T_m denote the transfers to the household, the gov. budget constraint is given by:

$$T_m = \sum_{k=1}^{K} \sum_{i=1}^{N} \int_{\omega \in \Omega_i^k} \sum_{l=1}^{N} \left(t_{lm}^k - 1 \right) p_{i,lm}^k(\omega) q_{i,lm}^k(\omega) d\omega$$

Definition of Equilibrium and Optimal Unilateral Import Tariffs

1. Definition of Equilibrium.

An equilibrium given trade taxes $(\mathbf{t})$ is an allocation $\mathbb{Q}(\mathbf{t})$, prices $\mathbb{P}(\mathbf{t})$, wages $\mathbb{W}(\mathbf{t})$, and measures of global and local firms $\mathbb{M}(\mathbf{t})$ such that:

1. Households maximize utility, and firms maximize profits.
2. Governments balance their budget.
3. Labor markets clear.

2. Optimal Unilateral Trade Taxes

m's Domestic Planner takes as given $\mathbf{t}_{-\mathbf{m}}$ and chooses import taxes $\mathbf{t}_{\mathbf{m}}$ to

$$\max U_m \qquad \text{s.t.} \quad \{\mathbb{Q}(\mathbf{t}_{\mathbf{m}}, \mathbf{t}_{-\mathbf{m}}), \mathbb{P}(\mathbf{t}_{\mathbf{m}}, \mathbf{t}_{-\mathbf{m}}), \mathbb{W}(\mathbf{t}_{\mathbf{m}}, \mathbf{t}_{-\mathbf{m}}), \mathbb{M}(\mathbf{t}_{\mathbf{m}}, \mathbf{t}_{-\mathbf{m}})\}\,.$$

Limiting Cases to Build Intuition

We first consider four simplifying assumptions

Asm 1. We impose $f_i = 0$.

- No selection into Global firms, all firms engage in multinational production.

Asm 2. Constant markups, $\mu(t_{lm}^k) = \mu \geq 1$

- No transfer-price manipulation.

Asm 3. Small Open Economy (SOE) Details

- We extend the methods in Demidova, et al. (2024) and Caliendo, and Feenstra (2024) to construct a SOE with meaningful MP.

Asm 4. Restrict the Planner to choose Homogeneous Import Tariff

- This constraint is **occacionally** redundant.

A sufficient statistic for Optimal Trade Policy

Country m's optimal homogeneous import taxes are given by:

$$t_{jm} = \left(1 + \frac{1}{\bar{\theta}_m}\right) \frac{Ex_m \bar{\theta}_m}{Ex_m \bar{\theta}_m - \bar{\Pi}_m^{MNE} \tilde{\theta}_m} \Upsilon_m, \qquad \forall j \neq m$$

where,

- $\bar{\theta}_m$ and $\tilde{\theta}_m$ are trade elasticities for country m's exports, and m's affiliates exports.
- $\Upsilon_m \leq 1$ is an equilibrium object that depends on $\bar{\Pi}_{-m}^{MNE}$.
- Ex_m, Im_m, $\bar{\Pi}_m^{MNE}$, and $\bar{\Pi}_{-m}^{MNE}$ satisfy:

$$Im_m - Ex_m = \bar{\Pi}_m^{MNE} - \bar{\Pi}_{-m}^{MNE}$$

Under Perfect Competition

$$t_{jm} = \underbrace{\left(1 + \frac{1}{\bar{\theta}_m}\right)}_{\text{ToT manipulation}} \qquad \forall j \neq m$$

where $\bar{\theta}_m$ is given by:

$$\bar{\theta}_m = \sum_{j \neq m} \frac{Ex_{mj}}{Ex_m} \theta_{mj},$$

$$\theta_{mj} = (\sigma - 1) + (\varepsilon - \sigma)\left(1 - \lambda_{m,mj}\right),$$

$\lambda_{m,mj}$: j's expenditure share from m of m's goods

Note:

- Homogeneity constraint is redundant.
- Tariff manipulate Terms-of-Trade.
- The planner is limited by domestic MNEs relocating abroad, $\lambda_{m,mj}$.

Under Imperfect Competition, and No Foreign MP

$$t_{jm} = \left(1 + \frac{1}{\bar{\theta}_m}\right) \overbrace{\frac{Ex_m \bar{\theta}_m}{Ex_m \bar{\theta}_m - \bar{\Pi}_m^{MNE} \tilde{\theta}_m}}^{\text{New form of Profit-Shifting}} \qquad \forall j \neq m$$

where $\tilde{\theta}_m$ is given by:

$$\tilde{\theta}_m = \sum_{j \neq m} \frac{\Pi_{m,j}^{MNE}}{\Pi_m^{MNE}} \tilde{\theta}_{m,j},$$

$$\tilde{\theta}_{m,j} = (\varepsilon - \sigma)(1 - \lambda_{m,mj}),$$

Note:

- Homogeneity constraint is redundant.
- The planner is further limited by domestic MNEs shifting profits abroad.
- Profit-shifting aggravates trade imbalances.

Under Imperfect Competition, and Foreign MP

$$t_{jm} = \left(1 + \frac{1}{\bar{\theta}_m}\right) \frac{Ex_m \bar{\theta}_m}{Ex_m \bar{\theta}_m - \bar{\Pi}_m^{MNE} \tilde{\theta}_m} \underbrace{\Upsilon_m}_{\text{Missing export taxes}} \quad \forall j \neq m$$

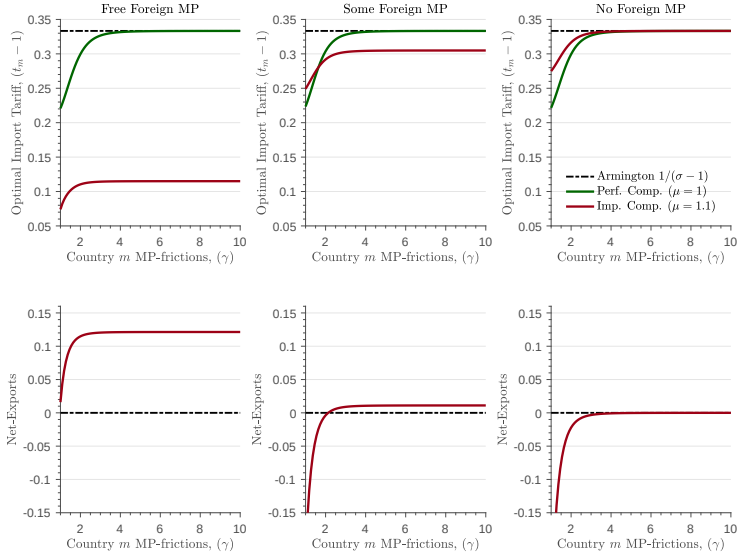
where

- $\Upsilon_m \leq 1$ an equilibrium object.
- It depends mainly on $\bar{\Pi}_{-m}^{MNE}$.

Note:

- We lose Lerner Symmetry.
- Homogeneity constraint binds
- Tariff imperfectly mimic missing export taxes.

The role of MNEs constraining Trade Policy



Some Extensions

1. Import Tariff Formulas generalize to models with:

- Two-country, one-sector, and Large Open Economies with perfect competition. Details
- Multi-country, multi-sector SOE with perfect competition. Details

2. SOE – Optimal Export taxes:

- Previous decomposition requires computing optimal export taxes.
- We compute Optimal Export Taxes for the SOE in all the previous cases. Details

3. SOE - First-best Allocation and Optimal Trade Policy:

- First-best allocation requires a full set of trade instruments, specially when Lerner Symmetry fails.
- We compute Optimal Import and Export Taxes for the SOE in all the previous cases. Details

Quantification

(LOE, Selection into MNEs, and Transfer-Pricing)

To calibrate the full model

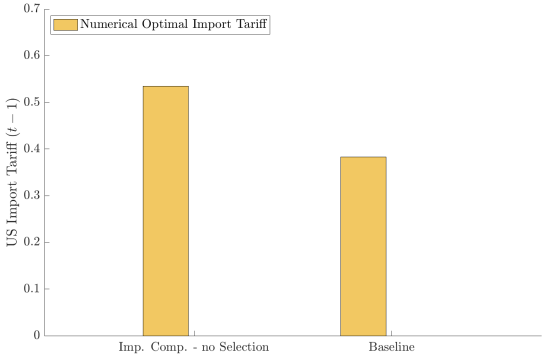
- We divide the world into 11 regions.
- We map HS6 codes to 4-digit NAICS, and classify them into two sectors: above or below median RP-share.
- Trade- and MP-frictions are parametrized as functions of distance and calibrated, along with fixed costs and productivities, to match data moments.
- We impose $\mu = \frac{\sigma}{\sigma-1}$ and $\rho_{tp} = \rho_c$, and consider cases with and without transfer pricing.
- We convert our 24-month estimates into long-run elasticities by scalling them by 2.78 (Boehm et al. ,2023), and impose $\sigma = 2.31$ and $\varepsilon = 3.64$ at the baseline with $\rho_c = 0$.

Data sources, Country, and Industry classification Data Moments and Model's Fit

Optimal Tariffs for Large Open Economies without Transfer Pricing

1. **Imperfect Competition, no Selection**:
   Tariffs depends on *Profit-shifting motives* and *ToT manipulation*.

2. **Baseline, adds selection into MP**
   More firms become global restricting the planner's ability to conduct trade policy.



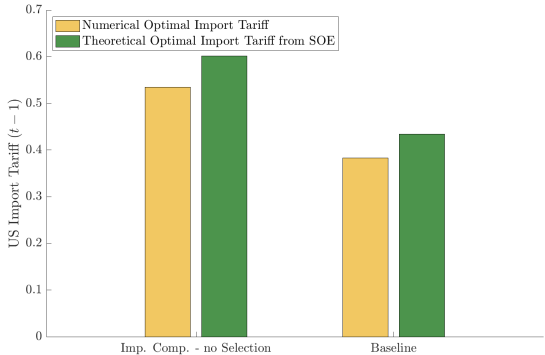
Optimal Tariffs for Large Open Economies without Transfer Pricing

1. **SOE *vs.* LOE, no Selection**:

   SOE formulas approximate well LOE results for the calibrated parameters.

2. **SOE *vs.* LOE, with Selection:**

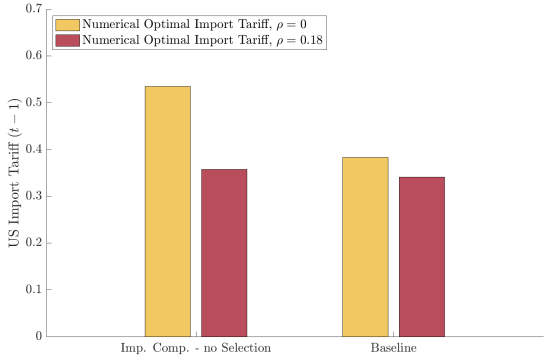
   Formulas do not explicitly include selection but capture most of its effects via the endogenous variables.



Optimal Tariffs for Large Open Economies with Transfer Pricing

- We use 24 month RP-price responses to set $\rho_{tp} = \rho_c = 0.179$.

- **Transfer-pricing leads to lower tariffs:**
  Global firms pass tariffs to consumers and evade payment, further constraining the planner's trade policy.



Conclusion

- We explore the design and welfare consequences of import tariffs in the presence of MNEs
- **Three empirical regularities on intra-firm trade**
  1. Share of trade that is under RP is low for China and varies across industries.
  2. Quantity declines more strongly in RP than in AL relationships in response to tariffs
  3. Import prices (excl. tariffs) decline in AL and RP relationships.
- **We provide sufficient statistics formulas for optimal tariff in MP models**

  MNEs restrict governments ability to conduct trade policy through four channels:
  1. Relocation effects that make trade flows more elastic.
  2. Transfer price manipulation that makes tariff less efective.
  3. Profit-shifting of domestic and foreign MNEs.
  4. Tariffs only imperfectly replace policies that directly address foreign MNE profits.

Thank you!

Appendix

Appendix: Empirics

Country-Product-Level Tariff Regressions

Back

	1 mo	3 mo	12 mo	24 mo
Quantity				
- AL	-0.5191***	-0.1789**	-1.865***	-2.151***
	(0.0942)	(0.0735)	(0.0658)	(0.0793)
- RP	-0.5646***	-0.3314***	-1.218***	-1.574***
	(0.1447)	(0.1135)	(0.1185)	(0.1452)
Value				
- AL	-0.6551***	-0.3593***	-1.935***	-2.307***
	(0.0821)	(0.0639)	(0.0606)	(0.0733)
- RP	-0.4900***	-0.4241***	-1.258***	-1.738***
	(0.1267)	(0.0983)	(0.1031)	(0.1267)
Observations - AL	4,371,000	4,092,000	3,221,000	2,228,000
Observations - RP	2,396,000	2,221,000	1,704,000	1,157,000

- Aggregated to the country-product level, AL trade declines more strongly (RP share ↑)

Appendix: Theory

Asm 3. Small Open Economy (SOE)

- We extend the methods in Demidova, Naito, Rodriguez-Clare (2024) and Caliendo, Feenstra (2024) to construct a *limiting* SOE with meaningful MP
- We consider the following parameterization for population, trade costs, and MP-frictions:

$$\tilde{L}_m = n^{\frac{\sigma-1}{\varepsilon-1}} \times L_m,$$
$$\tilde{\tau}_{ml} = n^{-1/(\varepsilon-1)} \times \tau_{ml},$$
$$\tilde{\gamma}_{m,l} = n^{-1/(\varepsilon-1)} \times \gamma_{m,l}.$$

- We focus on a sequence of equilibria indexed by n, with $n \to 0$.
- Operationalize the SOE limit in Alvarez and Lucas (2007) ($L_m/L_i \to 0$) with non-zero trade- and MP-shares for quantitative work.

Return

Optimal Tariff – LOE, two-countries, one-sector, under Perf. Comp.

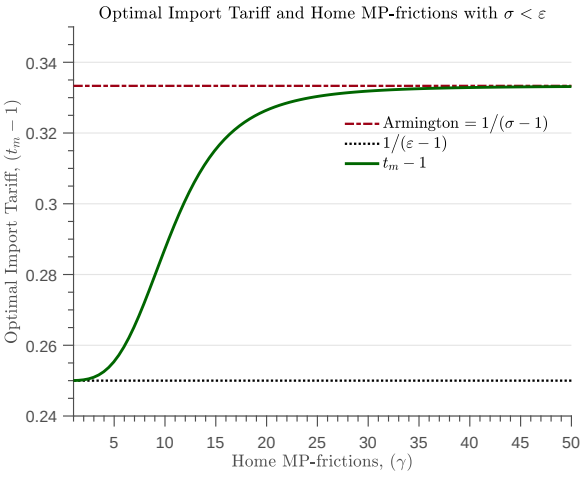
Proposition 1.

The optimal import tariff in a Two-country one-sector economy is equal to,

$$t_m - 1 = 1/\lambda_{ll}\theta_{ml},$$

with θ_{ml}:

$$\theta_{ml} = (\varepsilon - 1) - (\varepsilon - \sigma)\times \sum_{i=1}^{N}\left(\lambda_{i,ml} \times \lambda_{i,l}\right) \times \left(\frac{\lambda_{i,ml}}{\lambda_{ml}} - \frac{\lambda_{i,ll}}{\lambda_{ll}}\right).$$



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Optimal Tariffs – Multi-country, multi-sector, SOE under Perf. Comp.

Proposition 2.

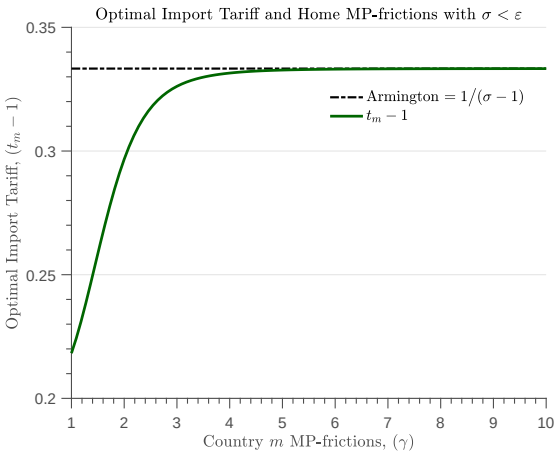
Country m's optimal tariffs are homogenous across countries and sectors, and equal to:

$$t_{jm}^{k} - 1 = 1 \Big/ \sum_{k=1}^{k} \sum_{l \neq m} \frac{Ex_{ml}^{k}}{Ex_{m}} \theta_{ml}^{k},$$

with θ_{ml}^{k} the trade elasticity, given by:

$$\theta_{ml}^{k} = (\sigma - 1) + (\varepsilon - \sigma)\left(1 - \lambda_{m,ml}^{k}\right),$$

and $\lambda_{m,ml}^{k}$ the share of l's total purchases from m of m's goods.



Return

Optimal Export Taxes – Multi-country, one-sector, SOE

Country m's optimal export taxes are *heterogeneous* across countries, and equal to:

$$x_{mj} = \left(1 + \frac{1}{\theta_{mj}}\right) \frac{\theta_{mj} E x_{mj}}{\theta_{mj} E x_{mj} - \tilde{\theta}_{m,j} \Pi_{m,j}^{MNE}} \chi_m,$$

where

- $\theta_{m,j}$ and $\tilde{\theta}_{m,j}$ are the trade elasticities for exports and MNE activity described before.
- $\chi_m \leq 1$, with equality when Foreign firms do not have MP technology.

Return

First-best – Multi-country, one-sector, SOE

- In the full model, with aggregate imbalances we lose Lerner Symmetry.
  [Blanchard, 2009; Costinot and Werning, 2019]

- When the planner is constrained to choose tariff satisfying $t_{jm} \geq \underline{t}$ optimal taxes are:

$$t_{jm} = \underline{t}, \qquad x_{mj} = \left(1 + \frac{1}{\theta_{mj}}\right) \frac{\theta_{mj} E x_{mj}}{\theta_{mj} E x_{mj} - \tilde{\theta}_{mj} \bar{\Pi}_{m,j}^{MNE}} \chi_m$$

- Export taxes are better equipped to manipulate imbalances, but when combined with unrestricted import taxes:
  - The planner is able to engeneer a pure transfer from Foreign, $x_{mj} \to \infty$
  - Without additional costs in its Terms-of-Trade manipulation, $t_{jm} \to 0$.
    [see for example Itskhoki and Mukhin, 2025]

Return

Appendix: Quantification

Data sources

- **OECD AMNE Database**, 2016
  - **Matrix of Bilateral Output**: value of output by country of ownership and industry
  - **AMNE ICIO** table: industry trade shares λ_{lm}^{k}, by domestic vs foreign-owned; industry-level expenditures on intermediates and final goods, $e_{m}^{k}E_{m}$.
  - **Analytical AMNE** - Domestic MNEs: value of gross output and exports by MNEs vs non-MNEs
- **ORBIS Historical Data**: share of global firms (i.e., firms with at least one foreign affiliate) and local firms, by industry
- **UNCTAD - TRAINS + WTO - IDB**: ad-valorem tariff rates, by 6-digit HS Code
- **CEPII**: distance (import-weighted)
- **ILO**: manufacturing employment by country

Return

Country Classification

We divide countries based on: i) geography; ii) share of output produced by US affiliates.

Table 1: MNE and Trade Shares by Country Group - 11 regions

Country Group	MNE Share GO (%)	MNE Share EXGR (%)	US Output Share (%)	China Output Share (%)	Domestic Output Share (%)	Exports to US (%)	Share US imports (%)	M^G Share
EU(Low)	40.68	56.56	6.10	0.54	82.46	17.24	14.19	5.56
EU(High)	37.07	49.80	18.47	0.46	62.40	18.51	7.44	5.02
Canada	30.25	42.24	23.65	0.10	57.27	69.33	9.56	12.46
US	53.95	62.99	75.34	0.28	75.34	0	0	1.49
S Am	26.48	33.97	7.91	0.44	79.35	23.66	2.32	0.23
Mexico	38.68	57.88	14.23	0.50	70.69	78.84	13.71	1.51
Jap, Kor	51.13	67.71	1.83	0.17	95.34	19.35	10.79	1.90
Asia(High)	37.73	51.91	9.09	3.21	69.69	12.22	4.54	8.65
Asia(Low)	29.34	46.54	1.52	1.35	88.27	25.61	6.56	6.33
China	52.12	67.41	1.29	91.96	91.96	26.75	27.53	0.53
ROW	28.11	39.24	3.57	0.74	83.36	13.45	3.36	1.43

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Industry Classification

We follow Fajgelbaum et al (2024) and map HS Codes into 9 industries:

Table 2: US Industry Model Summary Statistics

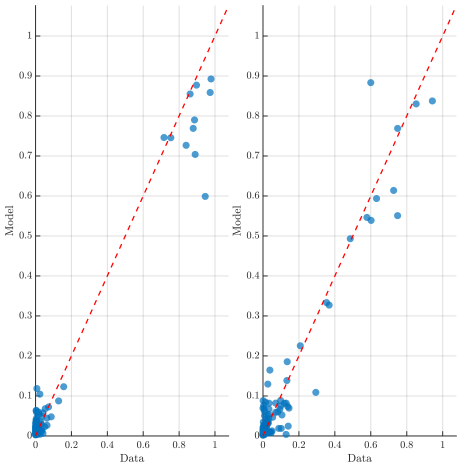
Industry	Exp/Y	Imp/Y	Imp China (%)	RP Share	RP Share China	MNE Out. Share	MNE Exp Share	Average Tariff	Import Tariff China
Agriculture	8.07	9.34	0.78	27.15	12.56	45.03	69.03	5.19	10.72
Apparel	6.59	158.10	32.33	19.49	6.25	91.03	96.55	4.66	8.73
Chemicals	12.50	24.54	2.02	63.38	21.38	76.80	82.85	1.02	2.23
Machinery	23.41	35.71	12.39	38.93	18.53	90.53	94.23	0.65	0.60
Materials	8.76	11.51	3.04	40.74	15.86	63.77	87.52	1.90	3.31
Metals	21.98	26.00	7.14	40.77	18.55	62.84	79.47	1.19	2.14
Minerals	16.74	14.07	1.17	47.62	20.86	50.60	73.17	2.49	1.63
Transport	20.93	37.39	2.04	74.28	28.86	79.86	76.17	1.46	1.68
Misc.	21.21	65.80	23.65	54.02	36.88	85.53	88.03	0.74	1.11

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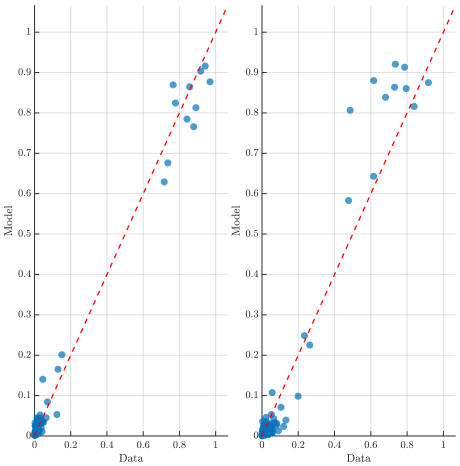
Model's fit the data well...

Return

Bilateral MNEs output share, by sector



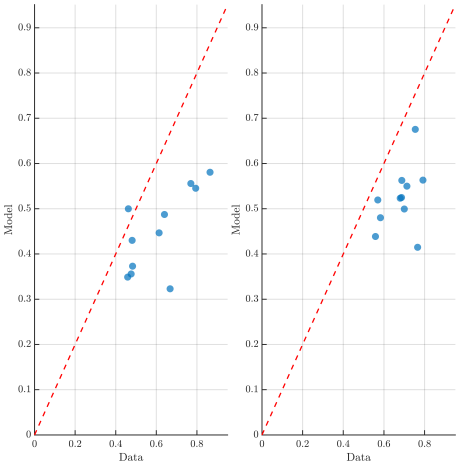
Trade shares, by sector



Model's fit the data well, but not in all dimensions

Return

MNE's share of total output, by sector



Share of global firms, by sector

