A Global Perspective on the Incidence of Monopoly Distortions

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Background and Motivation

Two notable economic trends of recent decades

1. increased globalization
2. rise of markup distortions

Two natural questions

1. has trade modified the overall cost of markup distortions?
2. has the incidence of markup distortions shifted inter-nationally?

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e.g., pro-competitive effects of trade

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1. has trade modified the overall cost of markup distortions?
2. has the incidence of markup distortions shifted inter-nationally?

This paper: we examine the *second* question.

Roadmap

Step 1: we derive semi-parametric formulas for how trade modifies the *deadweight loss* (DWL) of markup distortions in open economies

$$\Delta\text{DWL} = \Delta\text{MLD}\left(\frac{1}{\mu}\right) + \log\frac{\text{average expenditure-side markup}}{\text{average output-side markup}}$$

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What does ***international rent-shifting*** represent?

- markups generate rents (or profits) that are rebated to consumers
- the burden of markups falls disproportionally on nations that specialize in low-markup goods and (on net) pay markup rents to the RoW. Suggestive Evidence

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Step 2: we estimate firm-level markups globally using *demand* and *cost-based* techniques + compile new data on global profit ownership

Step 3: we plug the estimated markups and data into our formulas to measure ΔDWL among 65 major economies.

Preview of Findings

We estimate systematic *rent-shifting* from low-income to high-income countries:

- Trade has raised the DWL of markups by 44% for *low-income* countries.
- Trade has lowered the DWL of markups by 15% for *high-income* countries.

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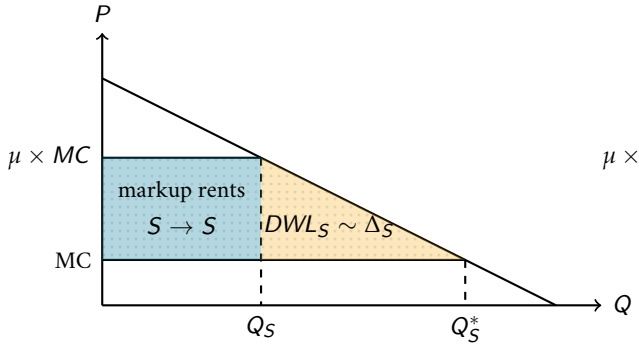
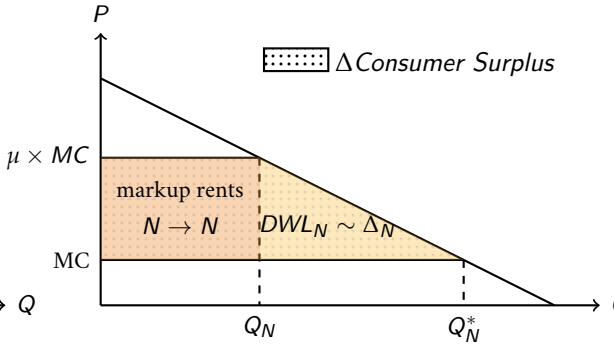
Policy Implication:

- rent-shifting effects are equivalent to a 8% implicit tariff that tilts the ToT in favor of high-income countries $\longrightarrow$ challenges the popular view that high-income countries have made excessive tariff concessions under the WTO (Chow et al., 2018)
- we propose two policy remedies for international rent-shifting externalities

Calculus of Monopoly Distortions in Open Economies

Closed Economy Case





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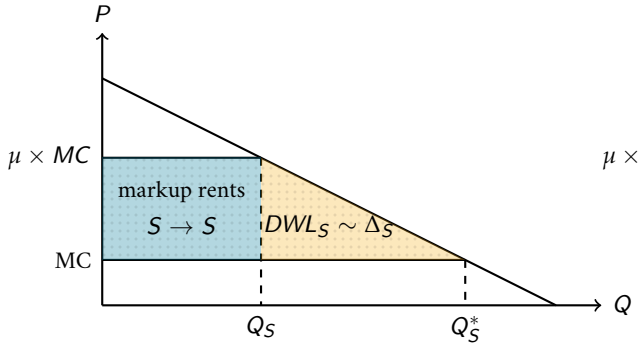
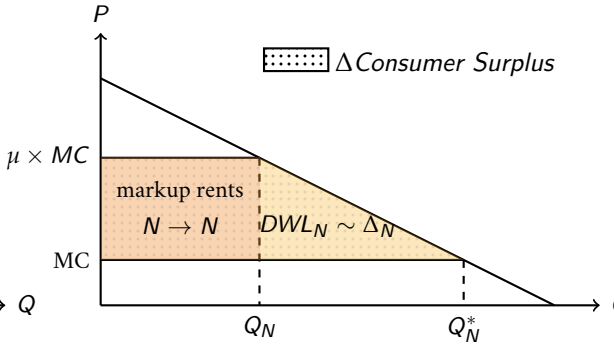
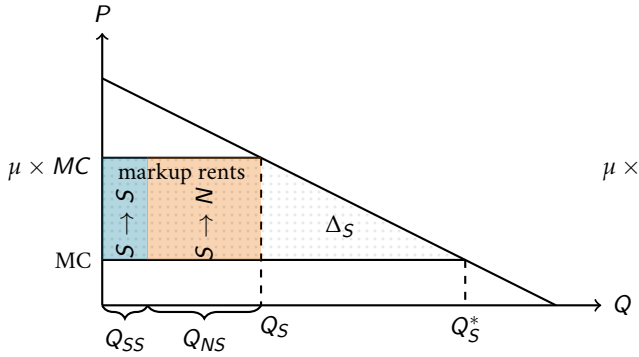
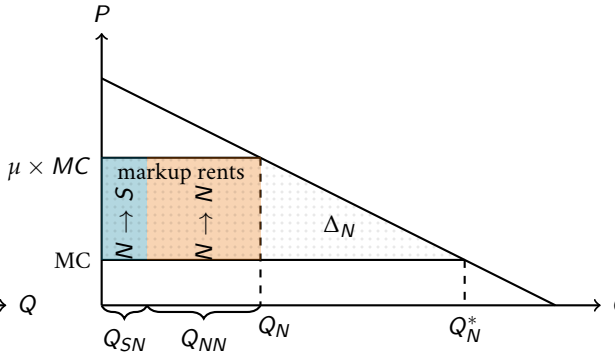




$$\mathcal{D}_i^{(closed)} = \Delta CS_i - \underbrace{\frac{\mu}{\mu - 1} PQ_i}_{\text{markup rents}} \equiv \Delta_i$$

Open Economy Case





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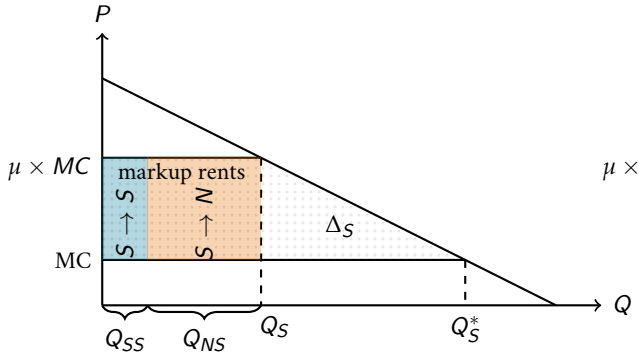

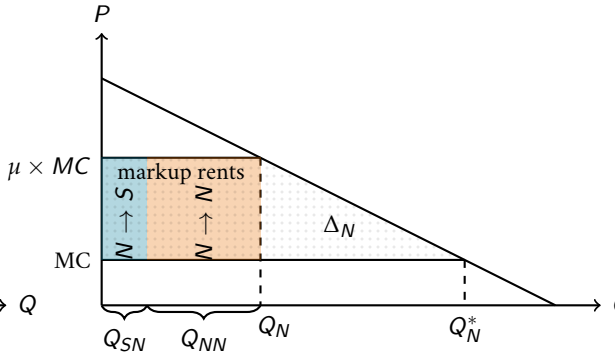

$$\mathcal{D}_S = \Delta_S + \underbrace{\frac{\mu - 1}{\mu} P \left(Q_{NS} - Q_{SN} \right)}_{\text{rent-shifting}} > \Delta_S$$

$$\mathcal{D}_N = \Delta_N - \underbrace{\frac{\mu - 1}{\mu} P \left(Q_{NS} - Q_{SN} \right)}_{\text{rent-shifting}} < \Delta_N$$

Non-Parametric Model of the Global Economy

Demand: The representative consumer in country i purchases firm-level variaties from various countries, deriving an indirect utility

$$W_i = V_i\left(Y_i, \{\mathbf{p}_{ni}\}_n\right)$$

- Y_i is expendable income
- $\mathbf{p}_{ni} \equiv \{p_{ni}(\omega)\}$, where $p_{ni}(\omega)$ is the price of firm ω from country n.

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Supply: Country n is populated by fixed set of firms that use labor (with inelastic supply L_n) as the sole primary production input and charge a markup over marginal cost

$$p_{ni}(\omega) = \underbrace{\mu_{ni}(\omega)}_{\text{markup}} \times \frac{\tau_{ni} w_n}{\varphi_n(\omega)}$$

- w_i is the equilibrium wage rate
- τ_{ni} is the trade iceberg cost; $\varphi_n(\omega)$ is labor productivity

General Equilibrium:

- Markup rents are rebated to households in the firms's country of origin
- National-level expenditure is equal to wage income plus rents: $Y_i = w_i L_i + \Pi_i$
- Labor markets clear in each country

Key Equilibrium Outcomes:

- $e_i(\mu)$ is the expenditure share on goods with markup $\mu \in \mathcal{M}$
- $\lambda_{ni}(\mu)$ is the expenditure share on goods from origin n conditional on μ
- $y_i(\mu) = \frac{\lambda_{ni}(\mu) \times e_i(\mu) \times Y_i}{\sum_\ell \lambda_{n\ell}(\mu) \times e_\ell(\mu) \times Y_\ell}$ is sales share of goods with markup μ

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The Deadweight Loss of Markups

Notation: *Arithmetic and Harmonic Mean*

Let $F(.)$ be some generic function:

$$[\text{arithmetic mean}] \qquad \mathbb{E}_{\omega}[F(\mu)] = \int_{\mu} F(\mu)\,\omega(\mu)\,d\mu$$

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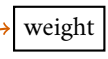

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weight

[harmonic mean] $$\widetilde{\mathbb{E}}_{\omega}[F(\mu)] = \left(\int_{\mu} F(\mu)^{-1}\,\omega(\mu)\,d\mu\right)^{-1}$$

Measuring the Deadweight Loss of Markups

- The welfare gains from correcting monopoly distortions are

$$\Delta W_i = \underbrace{\left(\int_{\mu}^{1} \frac{\partial \log W_i(\boldsymbol{\mu}, \mathbf{w})}{\partial \log \boldsymbol{\mu}} \cdot \mathrm{d} \log \boldsymbol{\mu} \right)}_{\text{DWL of markups} \sim \mathcal{D}_i} + \underbrace{\left(\int_{\mu}^{1} \frac{\partial \log W_i(\boldsymbol{\mu}, \mathbf{w})}{\partial \log \mathbf{w}} \cdot \mathrm{d} \log \mathbf{w} \right)}_{\Delta \text{factoral terms of trade}}$$

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Proposition: The deadweight loss of markups for country i are given by

$$\mathcal{D}_i \approx \underbrace{\left(\log \mathbb{E}_{e_i} \left[\frac{1}{\mu} \right] - \mathbb{E}_{e_i} \left[\log \frac{1}{\mu} \right] \right)}_{\text{markup dispersion}} + \underbrace{\log \left(\frac{\widetilde{\mathbb{E}}_{e_i}[\mu]}{\widetilde{\mathbb{E}}_{y_i}[\mu]} \right)}_{\text{rent-shifting (zero-sum)}}$$

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- ***Sufficient statistics*** for measuring the DWL of markups: $\mathbb{S} = \{ e_i(\mu), y_i(\mu) \}_{\mu \in \mathcal{M}}$

Trade-Induced Change in the DWL of Markups

- In a *closed economy* there is no decoupling between national-level output and expenditure (*i.e.*, $y_i(\mu) = e_i(\mu)$ for all $\mu \in \mathcal{M}$), implying

$$\mathcal{D}_i^{closed} \approx \left(\log \mathbb{E}_{e_i} \left[\frac{1}{\mu} \right] - \mathbb{E}_{e_i} \left[\log \frac{1}{\mu} \right] \right)$$

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- The existing literature has focused primarily on Δdispersion paying much less attention to international rent-shifting externalities.

A Closer Look at International Rent-shifting Externalities

Exposure to ***international rent-shifting*** is determined by specialization patterns

$$\log\left(\frac{\widetilde{\mathbb{E}}_{e_i}[\mu]}{\widetilde{\mathbb{E}}_{y_i}[\mu]}\right) \approx \text{Cov}\left(\frac{y_i(\mu)}{e_i(\mu)}, \frac{1}{\mu}\right) \times \widetilde{\mathbb{E}}_{e_i}[\mu]$$

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- **Two Possible Outcomes:**
  (a) RCA in high-markup goods $\longrightarrow Cov\left(\frac{y_i(\mu)}{e_i(\mu)}, \frac{1}{\mu}\right) > 0$
  (b) RCA in low-markup goods $\longrightarrow Cov\left(\frac{y_i(\mu)}{e_i(\mu)}, \frac{1}{\mu}\right) < 0$

- **Verbal summary:** Countries that specialize in high-markup goods benefit from rent-shifting at the expense of others $\Longrightarrow$ the incidence of markup distortions shifts inter-nationally.

Data and Measurment

Data Requirements

- The *non-parametric* formulas require international data on expenditure and output by markup level, which is unavailable.
- For measurement, we impose two parametric assumptions:
  1. homothetic ACDR (*e.g.*, Kimball) or single aggregator (Matsuyama-Ushchev) preferences
  2. firm-level productivity distribution is Pareto
- The DWL of markup distortions under the above parameterization is *exactly* determined by industry-level sufficient statistics ($k \sim$ industry):

$$\mathbb{S} = \left\{ \underbrace{\widetilde{\mathbb{E}}_{\rho_k}[\mu]}_{\text{avg. markup}}, \underbrace{e_{i,k}}_{\text{exp. share}}, \underbrace{y_{i,k}}_{\text{output share}} \right\}.$$

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Estimation + Data Sources

- **Observable shares:** OECD Inter-Country Input-Output Tables, covering 64 major countries and 36 industries during 2005-2015.

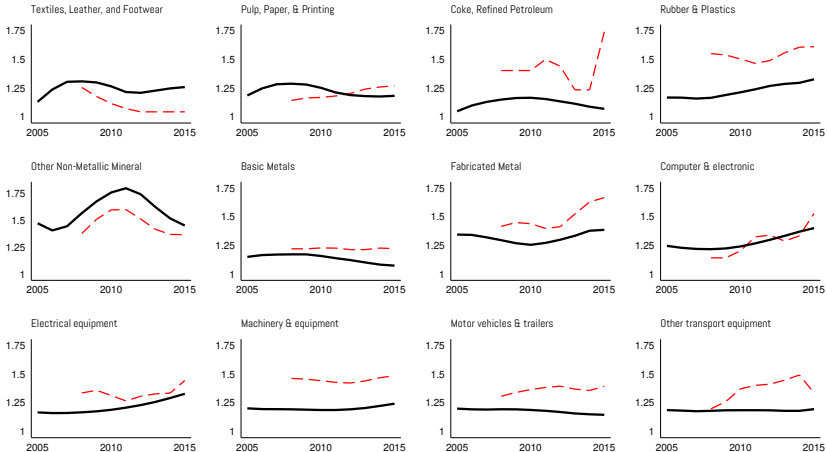
- We compile new data on global profit ownership using Orbis

- **Markups:** We estimate markups globally using two techniques

  - **cost-based:** we apply *De loecker-Warzynski's* estimation technique to Worldscope data, covering 71,546 firms in 134 countries

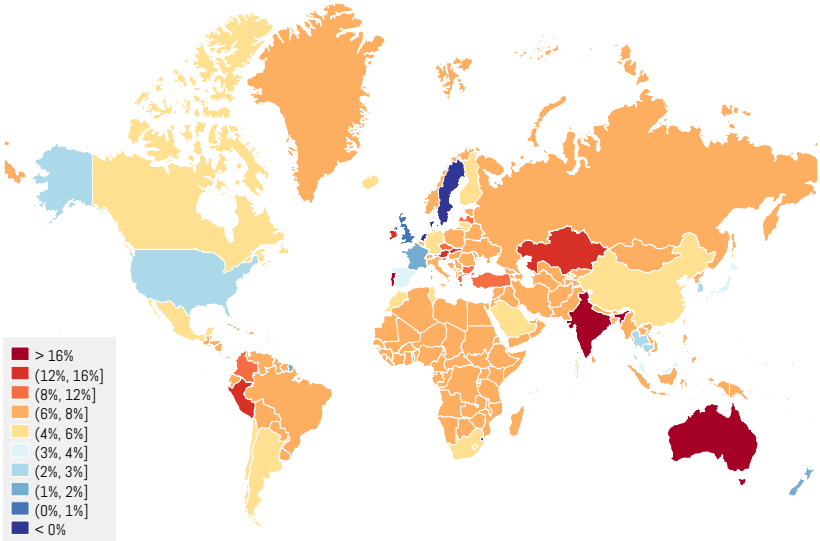
  - **demand-based:** we estimate a linear approximation of BLP using high-frequency transaction-level import data from Colombia, covering 226,288 firms from 251 countries

Markup Estimation Results

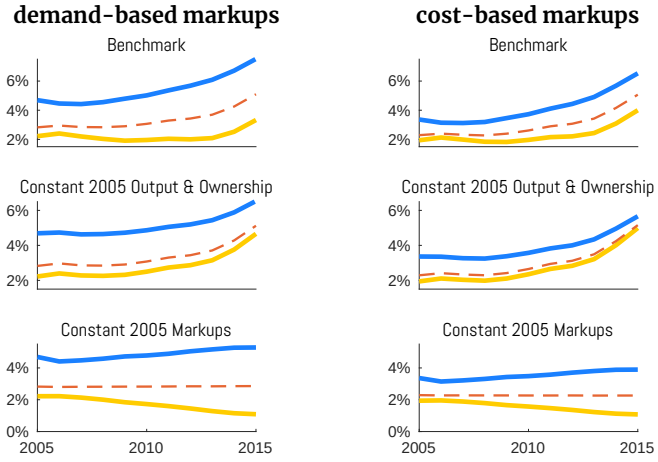


Quantitative Results

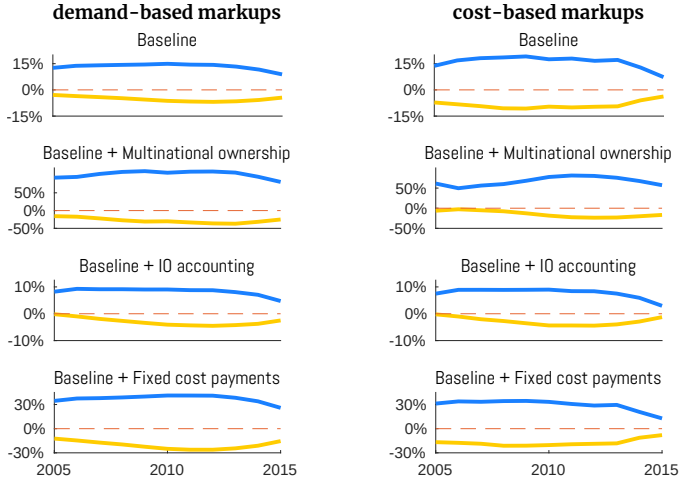
The DWL of Markups = markup dispersion + International rent-shifting



The DWL of Markups has Risen Over Time



Trade-Induced Change in the DWL of Markups ($\Delta\mathcal{D}$)



decomposition

Discussion of Findings

(a) Trade has caused systematic rent-shifting from low- to high-income countries $\longrightarrow$ the burden of markups falls disproportionately on low-income countries anatomy of rent-shifting

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- **Why?** high-income countries have a revealed comparative advantage in high-markup goods
- income is a proxy for institutions that lead to this kind of comparative advantage. details

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- income is a proxy for institutions that lead to this kind of comparative advantage. details

(b) *Demand-* and *cost-based* markup estimates yield starkly similar aggregate predictions

- This is encouraging news for the methodological debate regarding markup estimation.

Implications for International Policy

Duality between Tariffs & Rent-Shifting Externalities

- International rent-shifting redistributes from low- to -high-income countries $\longrightarrow$ is akin to a hidden tariff collected by high-income countries

- To see this, express welfare as an explicit function of tariffs ($\mathbf{t}$) and markups ($\boldsymbol{\mu}$):

$$W_i = \mathbb{W}_i\left(\mathbf{t}\,,\ \boldsymbol{\mu}\right), \qquad \text{where} \qquad \begin{cases} \mathbf{t} = \{t_1, \ldots, t_N\} \\ \boldsymbol{\mu} = \{\mu_1, \ldots, \mu_K\} \end{cases}$$

where t_i is the uniform tariff applied by i on all trading partners

Duality between Tariffs & Rent-Shifting Externalities

Proposition—Suppose applied tariffs ($\mathbf{t}$) and trade elasticities are sufficiently small. The rent-shifting effects associated with $\boldsymbol{\mu}$ are observationally equivalent to an implicit tariff, $\tilde{\mathbf{t}}$:

$$\mathbb{W}_i\left(\mathbf{t}+\tilde{\mathbf{t}},\,1\right)=\mathbb{W}_i\underbrace{\left(\mathbf{t},\,\boldsymbol{\mu}\right)}_{\text{status quo}};\qquad\forall i=1,\ldots,N$$

where $\tilde{t}_n$ is increasing in the net rents collected by country n from the rest of the world.

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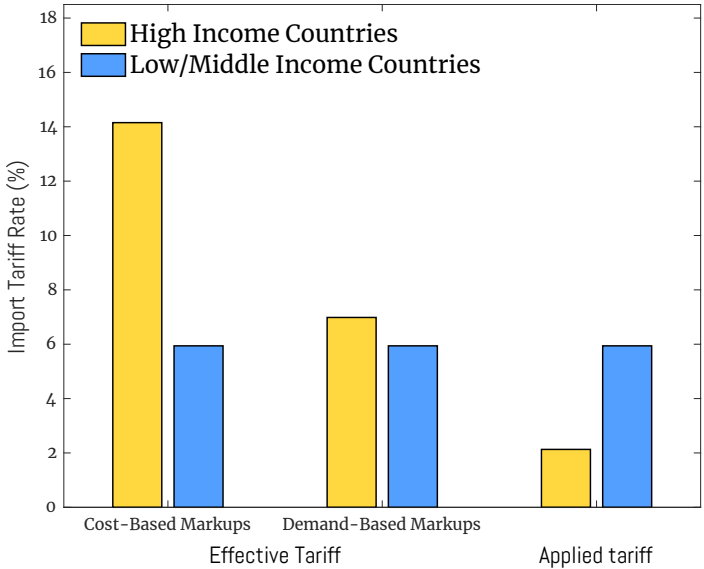
The Implicit Tariff Implied by Rent-Shifting Externalities



Policy Remedies for Rent-Sifting Externalities

- International rent-shifting is a *decentralized* from of terms of trade manipulation $\longrightarrow$ requires internationally-coordinated policy remedies

- Two policies potential policy solutions:

  1. unilateral tariff concessions by high-income countries under the WTO's GSP mechanism

  2. destination tax on profits on Lever 1 of Global Minimum Tax Agreement

Policy Remedies for Rent-Sifting Externalities

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- Two policies potential policy solutions:

  1. unilateral tariff concessions by high-income countries under the WTO's GSP mechanism

  2. destination tax on profits on Lever 1 of Global Minimum Tax Agreement (partially effective)

	no global tax	$\tau^{global} = 15\%$	$\tau^{global} = 30\%$	$\tau^{global} = 45\%$
$\Delta\mathcal{D}$ **(low-income)**	43.9%	39.0%	33.7%	27.9%
$\Delta\mathcal{D}$ **(high-income)**	-14.8%	-12.3%	-9.9%	-7.7%

Conclusions

Main Finding: systematic *rent-shifting* from low-income to high-income countries:

- Trade has raised the DWL of markups by 44% for *low-income* countries.
- Trade has lowered the DWL of markups by 15% for *high-income* countries.
- Finding is robust across different models and markup estimation techniques.

Conclusions

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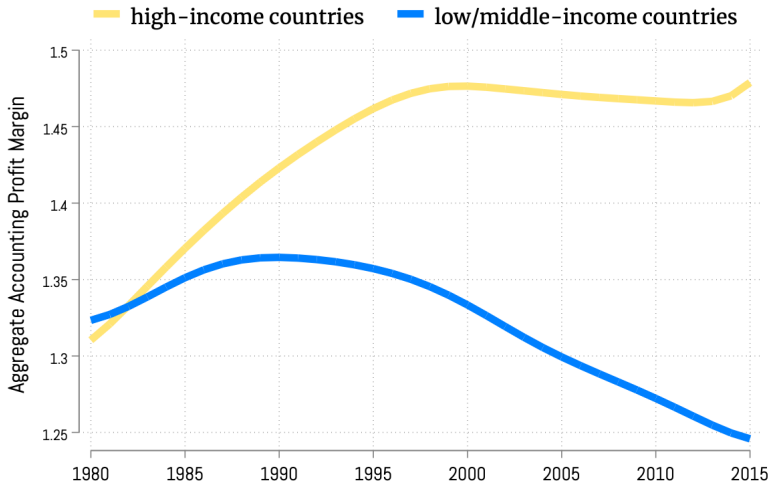
- Finding is robust across different models and markup estimation techniques.

Policy Implication: Unilateral tariff liberalization by high-income countries is an effective remedy for international rent-shifting.

Thank you.

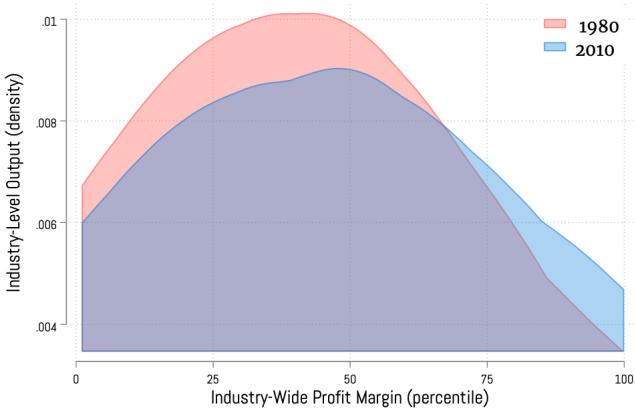
International Divergence in Accounting Profit Margins

Source: UNIDO-INDSTAT covering 196 countries and 23 ISIC rev.3. industries



Trade Openness Coincides with US Specialization in High-Profit Industries

Source: Compustat data on publicly-trade US firms



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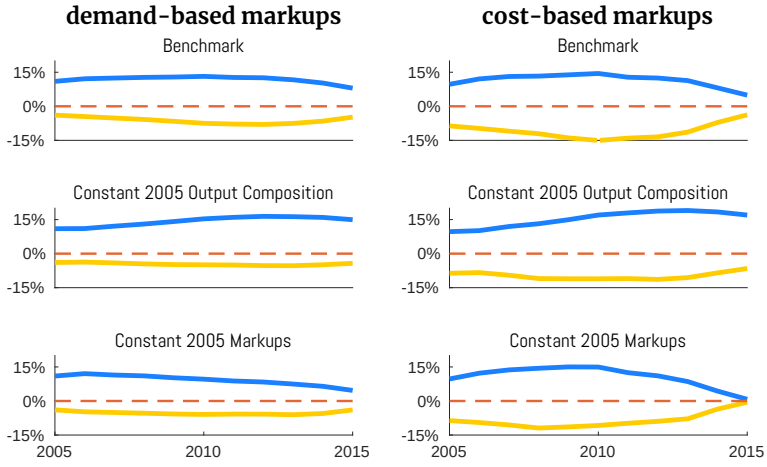
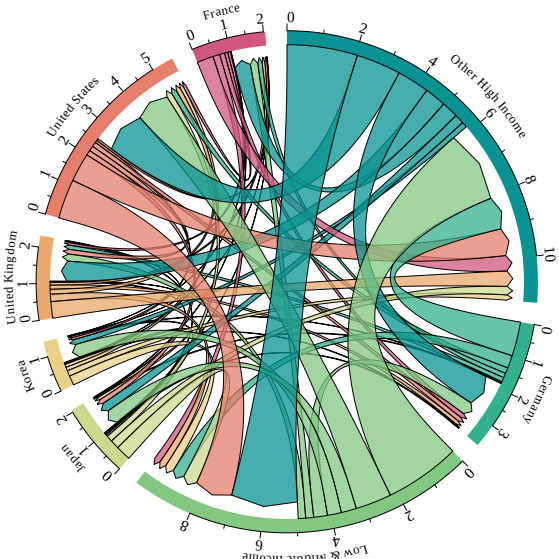

demand-based markups
cost-based markups
Benchmark
Benchmark
Constant 2005 Output Composition
Constant 2005 Output Composition
Constant 2005 Markups
Constant 2005 Markups
15%
0%
-15%
2005
2010
2015
Low/Middle Income Countries
High Income Countries

return

The Anatomy of International Rent-Shifting

return



Determinants of RCA in High-Markup Industries

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