Import Firm Concentration and Tariff Incidence Across Countries

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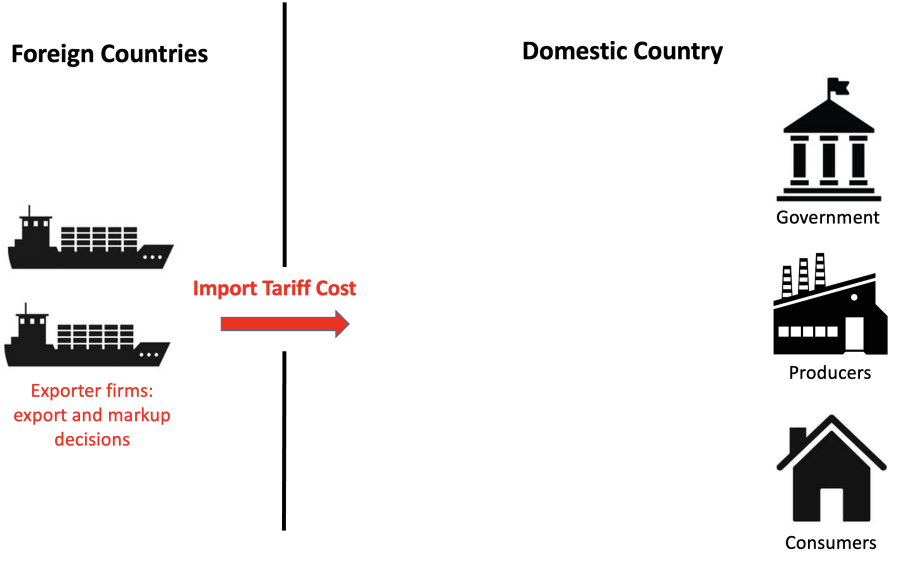
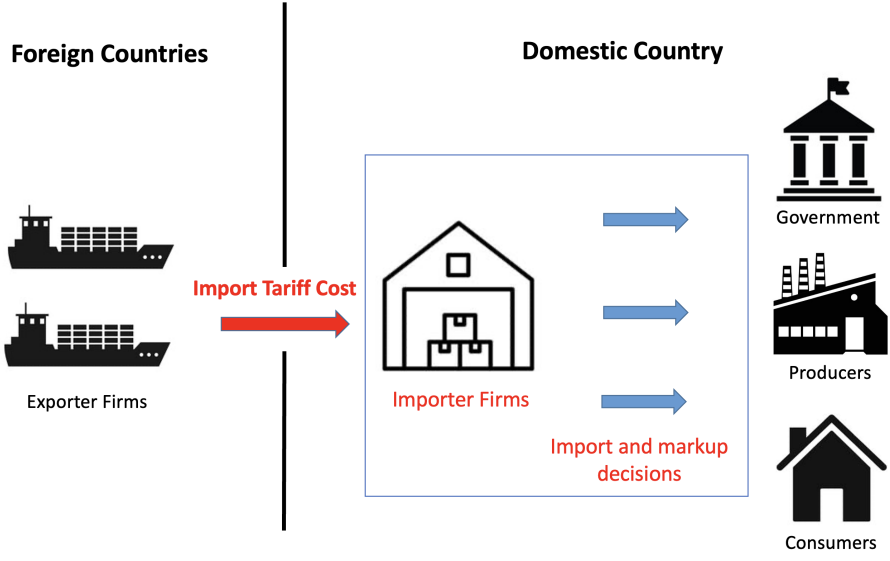
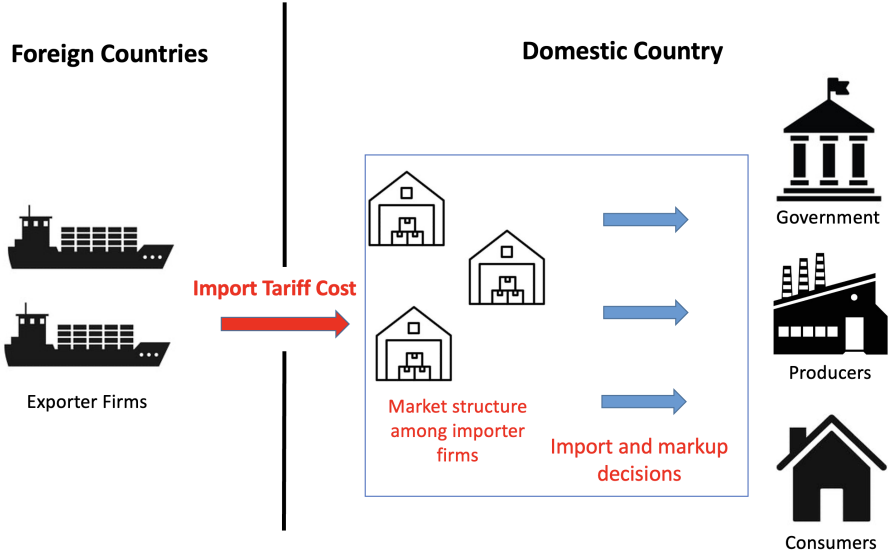
What is the incidence of import tariff changes on the domestic economy?



But importer firms intermediate impact on the domestic country



Importers market structure affects imports and markups



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- **Counterfactual Analysis** (not today): Quantify the extent to which importer market structure affects aggregate and distributional consequences of tariff changes

Roadmap

Data: Import Firm Concentration Across Countries

Theory: A Model of Oligopolistic Importer Firms

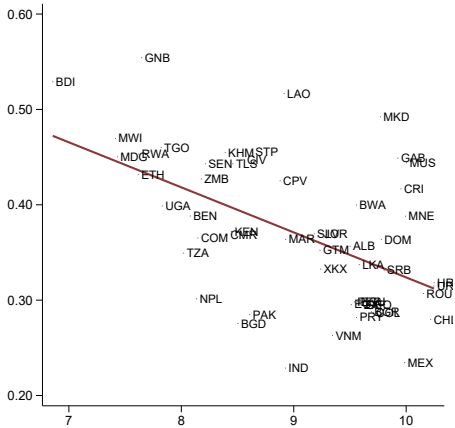
Estimation: Firm Import Responses to Tariff Changes

Conclusion

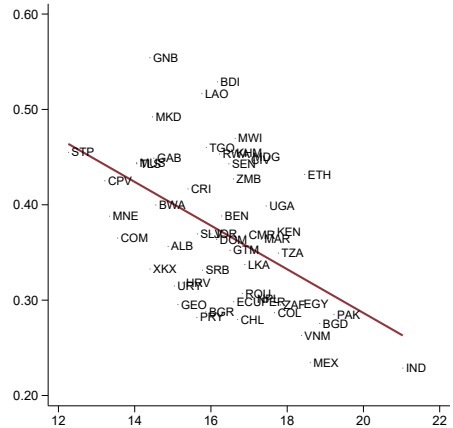
New panel dataset of imports by firm-good for 55 countries

- Build firm-level panel from customs records for 55 countries
  - Harmonize goods identifiers based on the 6-digit HS classification (HS6)
  - Harmonize value and quantity units
  - Create time-consistent firm identifier
- Obtain tariff data from UNCTAD TRAINS as in Teti (2020)
  - Obtain ad-valorem tariffs applied by a destination to each HS6 good and origin
- Build panel dataset Sample
  - Observations: firm-good-origin-destination-year
  - Import variables: value, quantity, and tariff

Largest importer has a high share of country's imports of each good, but share declines with the country's size and development



log of per capita GDP



log of population

Note. Vertical axis is the import-weighted average across 6-digit HS goods (HS6) of the share of the largest importer firm in the country's imports of each HS6 good. Concentration histogram Regressions

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Environment: Small open economy (SOE) with oligopolistic firms

- **Workers:** inelastically supply labor
- **Owners:** profit from discrete set of firms $f \in \mathcal{F}_g$, with production function:
  - For $g \in \mathcal{G}^D$, linear in domestic labor
  - For $g \in \mathcal{G}^M$, CES on imported varieties across origins o of good g, $m_{of,g}$

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- **Domestic demand,** $g \in \mathcal{G}^D \cup \mathcal{G}^M$**.** Given price $p_{f,g}$ and shifter $B = P^\eta Q$, firm f perceives domestic demand as

$$q_{f,g} = a_{f,g}(p_{f,g})^{-\sigma}(P_g)^{\sigma-\eta}B \quad \text{with} \quad P_g^{1-\sigma} \equiv \sum_{f' \in \mathcal{F}_g} a_{f',g}(p_{f',g})^{1-\sigma}$$

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- **Government.** Sets tariffs $\{\tau_{o,g}\}$ and rebates revenue
- **Market structure** (Atkeson-Burstein, 2008). Firms set prices acknowledging their demand curve (given B), but take as given domestic wage and foreign prices

Firm effects: Import concentration matters

Comparative Statics: Consider an exogenous change in import tariffs, $d\log(1+\tau_{o,g})$.

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- **Importers** $g \in \mathcal{G}^M$. Given f's tariff cost change ($d\log\bar{\tau}_{f,g}$) and g import share ($S_{f,g}$),

$$d\log q^M_{f,g} = -\beta^q(S_{f,g})\left(d\log\bar{\tau}_{f,g} - d\log\bar{\tau}_g\right) \quad + (-\eta d\log\bar{\tau}_g + d\log B)$$
$$d\log \mu^M_{f,g} = -\beta^\mu(S_{f,g})\left(d\log\bar{\tau}_{f,g} - d\log\bar{\tau}_g\right)$$

  where

$$\frac{\partial\beta^q(S)}{\partial S} < 0, \qquad \beta^q(0) = \sigma, \qquad \beta^\mu(S) = 1 - \beta^q(S)/\sigma$$

- Firm-level import elasticity identifies its markup: $\mu_{f,g} = \mu(\beta^q(S_{f,g}))$

Distributional effects: Markup changes have a first-order impact

Markup changes are a transfer from consumers to importer firms, which matter for profit changes (and relative impact on owners of importer firms):

$$d\Pi^M = \sum_{f,g} M_{f,g} \left(\mu_{f,g} d \log \mu_{f,g} + (\mu_{f,g} - 1)(d \log \bar{\tau}_{f,g} + d \log q^M_{f,g}) \right)$$

- First term: change in profit margin given initial imports
- Second term: change in sales given initial profit margin

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Proposition: For any tariff change, measure with (i) firm import elasticity $(\beta^q(S))$, (ii) firm import records $(M_{of,g}, T_{of,g})$, (iii) national exports, spending, payroll Fundamentals

- Markup elasticity is a function of import elasticity

Aggregate effects: Markup dispersion creates reallocative efficiency

In our SOE, aggregate welfare change comes from **allocative efficiency** from initial level of tariffs (first row) and markups (second row)

$$dQ = \sum_{o,f,g} T_{of,g} d\log m_{of,g} + D(\bar{\mu}^D - 1) d\log q^D + \sum_{f,g} M_{f,g}(\mu_{f,g} - 1) d\log q^M_{f,g}$$

with $T_{of,g}$ tariff payments, D domestic sales, and $M_{f,g}$ imports

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with $T_{of,g}$ tariff payments, D domestic sales, and $M_{f,g}$ imports

Aggregate effects: Heterogeneity in shock exposure across firms with different markup levels and import elasticities.

- Intuition: Sum of the dead-weight loss triangles across origins, firms, and goods
- Conditional on $d\log q$, markup changes to not matter

Proposition: (cont.) Measurement of aggregate effect requires same ingredients

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Model-implied empirical specification

Specification: For importer firm f of HS6 good g in destination d in year t,

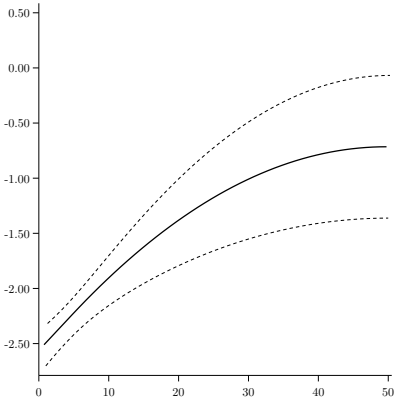
$$d \log Y_{f,gd,t} = \beta(S_{f,gd,t-1})(d \log \bar{\tau}_{f,gd,t} - \zeta_{gd,t}) + \delta_{gd,t} + \phi_{f,d,t} + \epsilon_{f,gd,t}$$

- $d \log Y_{f,gd,t}$: Annual change in import outcome
- $\Delta \log \bar{\tau}_{f,gd,t} \equiv \sum_o s^m_{of,gd,t-1} \Delta \log(1 + \tau_{o,gd,t})$: Annual change in average tariff cost
- $S_{f,gd,t-1}$: Share of firm f in imports of good g by country d at $t-1$
- $(\zeta_{gd,t}, \delta_{gd,t})$ and $\phi_{f,d,t}$: good-destination-year and firm-destination-year fixed effects

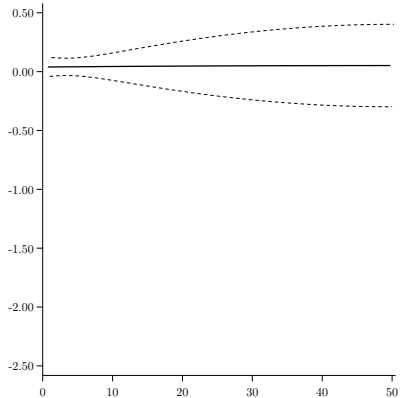
Identification: Given good and firm fixed effects, shocks to imports of a firm-good are orthogonal to changes in tariffs applied to different origins of the good.

Larger firms reduce less imports, but don't have foreign price reductions

(a) Elasticity of Import Value



(b) Elasticity of Unit Import Value

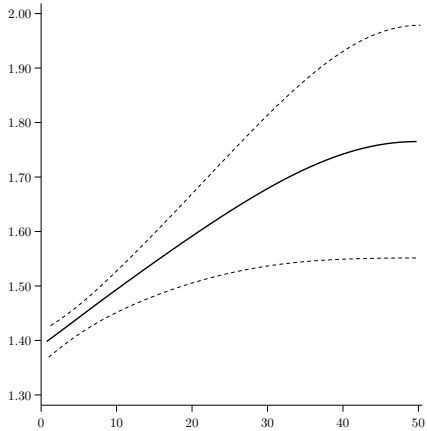


Firm Good Import Share, $S_{f,gd,t-1}$

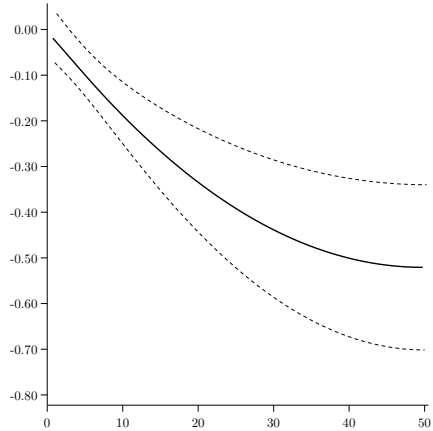
Shock distribution | Robustness: MFN IV, Small partner IV, firm-good-destination FE, Functional form

Model $\Longrightarrow$ Larger importers have higher and more sensitive markups

(a) Markup

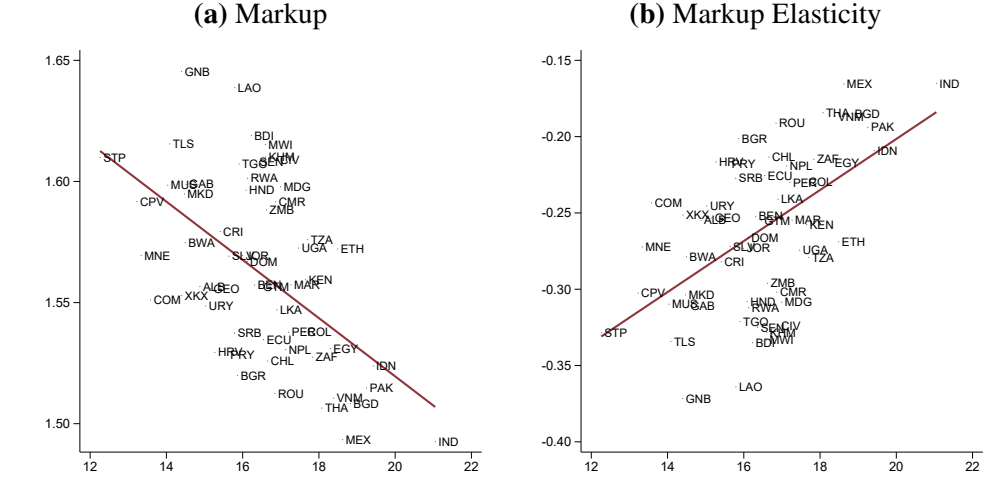


(b) Markup Elasticity



Firm Good Import Share, $S_{f,gd,t-1}$

Domestic markups on imports vary with country size and income



Scatter with population

Roadmap

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- Import firm concentration is high and varies across countries
- Import firm concentration determines incidence of tariff changes
  - Measurement: distribution of shock exposure across firms
  - Estimation: markup level and import elasticity across firms
- Larger importers respond less to tariff changes and have higher markups
- Next steps: Implement quantitative analysis for realistic changes in trade policy (PTA/MFN) and optimal tariffs

Appendix

Import Firm Concentration Across Countries

Country	Years	Country	Years
Albania	2007 - 2021	Sri Lanka	2016 - 2021
Burundi	2010 - 2022	Morocco	2002 - 2013
Benin	2016 - 2021	Madagascar	2007 - 2021
Bangladesh	2005 - 2016	Mexico	2011 - 2021
Bulgaria	2001 - 2006	Macedonia	2008 - 2018
Botswana	2004 - 2010	Montenegro	2004 - 2020
Chile	1997 - 2021	Mauritius	2000 - 2021
Cote d'Ivoire	2000 - 2021	Malawi	2005 - 2021
Cameroon	2007 - 2017	Nepal	2011 - 2014
Colombia	1997 - 2023	Pakistan	2019 - 2022
Comoros	2016 - 2022	Peru	2000 - 2021
Cabo Verde	2010 - 2021	Paraguay	2000 - 2023
Costa Rica	2010 - 2021	Romania	2005 - 2011
Dominican Republic	2002 - 2021	Rwanda	2002 - 2016
Ecuador	2002 - 2021	Senegal	2000 - 2020
Egypt	2005 - 2016	El Salvador	2006 - 2021
Ethiopia	2012 - 2021	Serbia	2006 - 2019
Gabon	2009 - 2021	Sao Tome and Principe	2017 - 2019
Georgia	2000 - 2022	Togo	2015 - 2021
Guinea Bissau	2012 - 2018	Timor-Leste	2018 - 2023
Guatemala	2005 - 2013	Tanzania	2003 - 2021
Croatia	2007 - 2015	Uganda	2011 - 2020
Indonesia	2020 - 2020	Uruguay	2001 - 2021
India	2016 - 2023	Viet Nam	2018 - 2022
Jordan	2008 - 2021	Kosovo	2013 - 2019
Kenya	2006 - 2022	South Africa	2010 - 2021
Cambodia	2016 - 2022	Zambia	2010 - 2021
Lao PDR	2015 - 2023		

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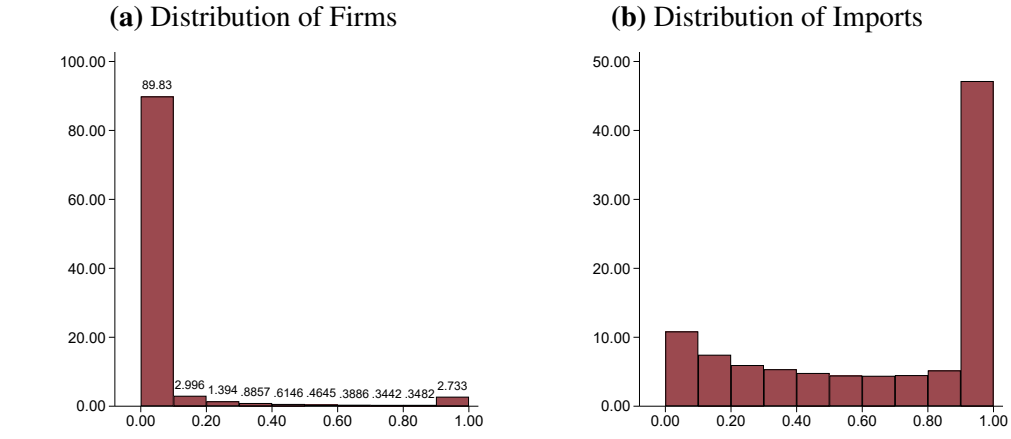
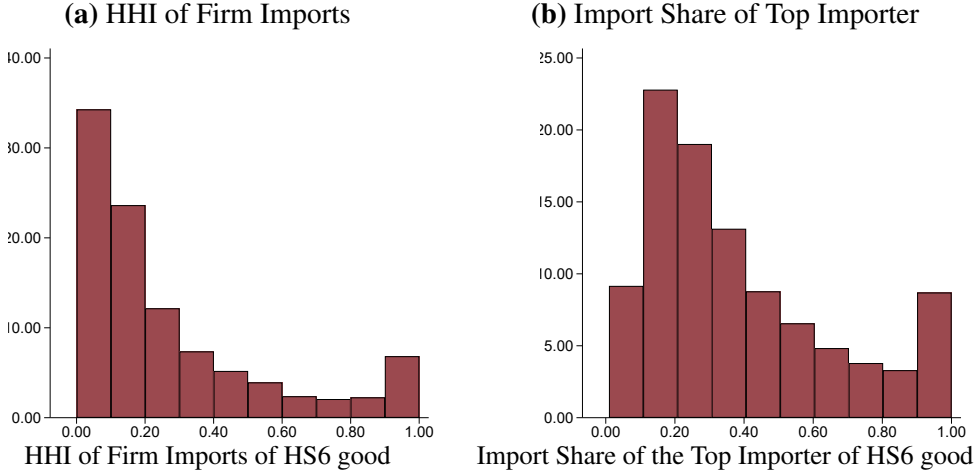
Distribution of Firms and Imports by Firm Import Share



Notes: Sample of 166,384,728 firm-good-country-year observations. Left panel reports the fraction of observations by bracket of the firm's good import share. The right panel reports the share of a country's total imports associated with firms in different brackets of the firm's good import share. back

Distribution of import firm concentration across good-country-year



Note: Sample of 2,416,606 good-country-year observations. Each panel reports the fraction of good-country-year observations by bracket of the import firm concentration measure. back

Import Firm Concentration Across Countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel (a): HHI of Firm Imports							
log GDP/capita	-0.053*** (0.009)	-0.046*** (0.008)			-0.061*** (0.005)	-0.064*** (0.006)	-0.186*** (0.036)
log Population			-0.020*** (0.005)	-0.027*** (0.004)	-0.037*** (0.003)	-0.039*** (0.004)	-0.165*** (0.046)
log Imports						0.003 (0.003)	0.055*** (0.004)
R^2	0.033	0.559	0.014	0.559	0.587	0.587	0.833
Panel (b): Import Share of Top Importer Firm							
log GDP/capita	-0.053*** (0.009)	-0.047*** (0.008)			-0.062*** (0.004)	-0.063*** (0.005)	-0.188*** (0.039)
log Population			-0.021*** (0.006)	-0.028*** (0.004)	-0.037*** (0.003)	-0.038*** (0.004)	-0.170*** (0.050)
log Imports						0.001 (0.003)	0.055*** (0.004)
R^2	0.034	0.524	0.016	0.523	0.553	0.553	0.857
Panel (c): Pr(Import Share of Top Importer) > 90%							
log GDP/capita	-0.032*** (0.007)	-0.027*** (0.006)			-0.035*** (0.004)	-0.047*** (0.005)	-0.110*** (0.023)
log Population			-0.010*** (0.004)	-0.016*** (0.002)	-0.022*** (0.002)	-0.030*** (0.003)	-0.115*** (0.027)
log Imports						0.010*** (0.002)	0.041*** (0.004)
R^2	0.012	0.482	0.005	0.483	0.491	0.492	0.786
HS6-Year FE	N	Y	N	Y	Y	Y	Y
HS6-Country FE	N	N	N	N	N	N	Y

back

Note: Sample of 2,416,606 good-country-year observations. For the import firm concentration measure indicated in each panel's heading, columns report estimates of regressing the concentration measure on the variables listed on the rows. Concentration measures are: (i) the Herfindahl Index of firm imports for each HS6 in panel (a); (ii) the share of the largest importer firm in the country's imports of each HS6 in panel (b); and (iii) a dummy that the import share of the largest importer firm of each HS6 exceeds 90% in panel (c). We weight each observation by its share of the country's imports in a given year divided by the number of good-year observations for each country in the database. Standard errors clustered by country.

Aggregate effects: Heterogeneity in shock exposure across firms with different markup levels and import elasticities

In terms of fundamentals, each inefficiency source creates an allocative response to tariffs

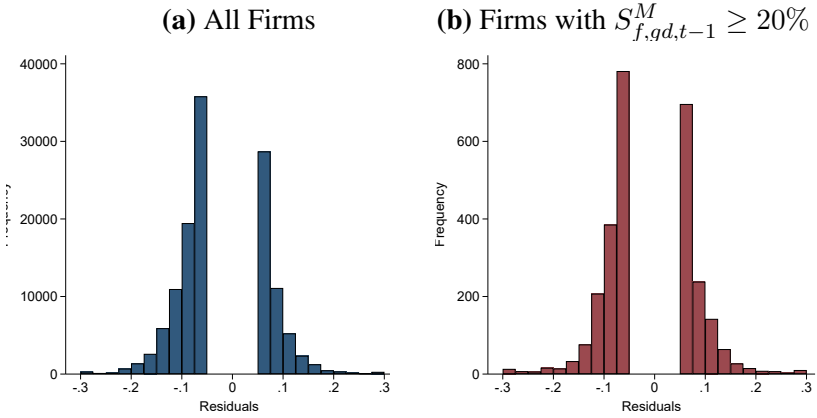
$$
\begin{aligned}
dQ = \quad & - \quad \chi \textstyle\sum_{o,f,g} T_{f,g} \theta (d\log(1+\tau_{o,g}) - d\log \bar{\tau}_{f,g}) \\
& - \quad \chi \textstyle\sum_{f,g} (M_{f,g}(\mu_{f,g}-1) + T_{f,g}) \beta^q(S_{f,g}) (d\log \bar{\tau}_{f,g} - d\log \bar{\tau}_g) \\
& - \quad \chi \textstyle\sum_{g} (M_{f,g}(\mu_{f,g}-1) + T_{f,g}) \eta (d\log \bar{\tau}_g - d\log \bar{\tau}) \\
& - \quad (\chi^M (M(\bar{\mu}^D - 1) + T) - \chi^D (\bar{\mu}^D - 1)) d\log \bar{\tau}
\end{aligned}
$$

with (χ, χ^M, χ^D) multiplier created by wage response to the shock.

Proposition: For any tariff change, we can measure all terms with (i) firm import elasticity $(\theta, \beta^q(S))$, (ii) firm import records $(M_{of,g}, T_{of,g})$, (iii) national exports, spending, payroll

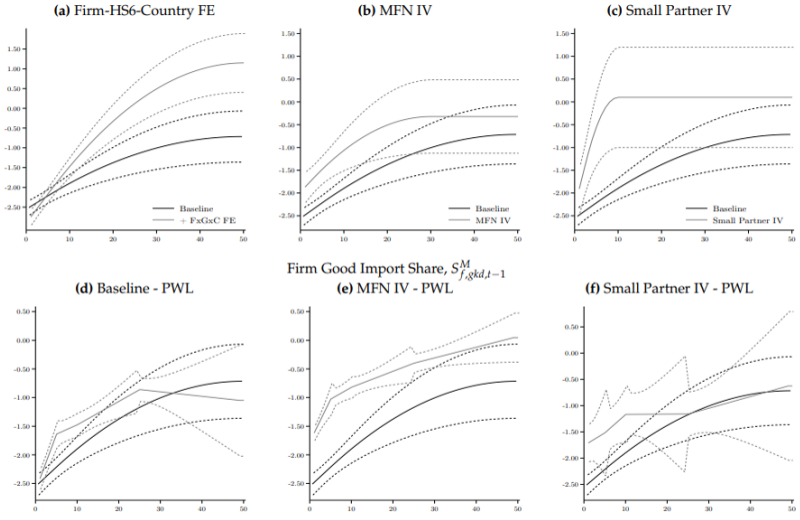
Back

Frequency Distribution of Changes in Average Tariff Costs, $d \log \bar{\tau}_{f,gd,t}$



Note: Figure shows the frequency distribution of $d \log \bar{\tau}_{f,gkd,t}$ residualized from good-destination-year fixed effects among firm-good-destination-year observations whose residualized $d \log \bar{\tau}_{f,gd,t}$ is greater than 5% or smaller than -5%. back

Firm Elasticity of Imports to Tariff Changes



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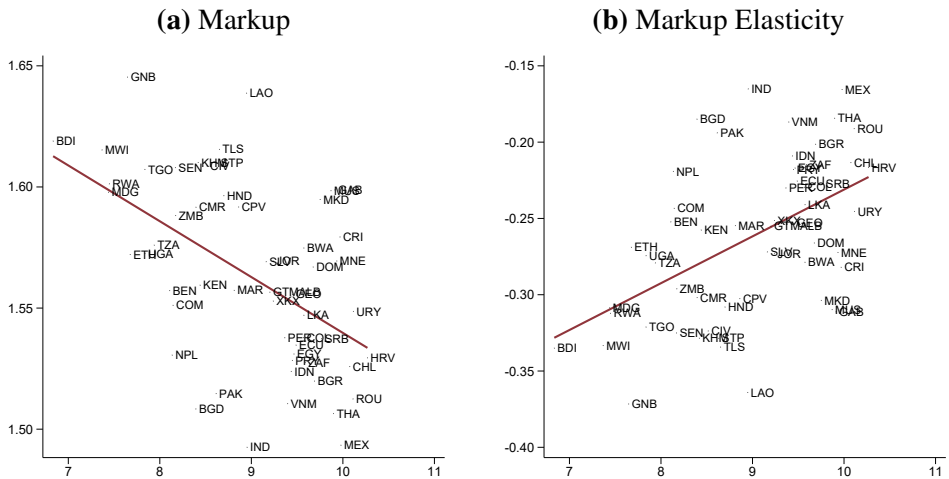
Domestic markups on imports vary with country size and income



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