Multi-destination exporters, market power and the elasticity of markups across destinations

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Short Presentation

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Introduction

- A recent literature has documented that firms have variable markups.

- The fact that firms have variable markups has been proven important in many contexts (Atkeson et al 2008, ACDR,2018, De Loecker et al. 2016, Berman 2012, among others).

- Recent papers have documented that the elasticity of markup with respect to price crucially depends on firms' characteristics.
  - Berman et al (2012): higher performance firms have higher elasticity of markup.
  - Amiti et al. (2015): within a destination, comparing across firms, the elasticity of markup is increasing in firm's size.

- However, less has been done to explore whether a given multi-destination exporter has different elasticity of markup across its destinations.

Introduction

- Although some papers have studied the distribution of markups for a given firm, across its destinations (i.e: Simonovska (2015)).

- There is still no evidence on how a given firm adjusts its markups across destinations in response to shocks.

- In this paper, we study if the markup elasticity of a multi-destination exporter differs across its destinations, depending on the firm's relative size in the destination market.

- Unlike previous papers that use destination-specific shocks (bilateral exchange rate), we exploit variability from firm-level cost shocks in the origin.

- We find that the markup elasticity of a given firm is increasing in its market share in the destination.

Introduction

Why using 1) firm-level cost shocks and 2) studying multi-destination exporters?

1. Measurement: A given product for a given firm, across its destinations is more comparable than a product in a given destination across firms.

2. Milder assumptions to identify whether the elasticity of markup is increasing on firm's size in the destination.

   - Observing the behavior of firms in a destination in response to a bilateral exchange rate shocks requires the assumption that the exchange rate movement in the destination does not modify systematically the relative conditions for larger and smaller exporters to that market (demand, access to credit, competitiveness, etc.).

3. Most of exports of a country are concentrated among multi-destination exporters.

4. Implications for international distribution of gains from input trade liberalization: destinations with more competitive environment will benefit more.

This paper

- Guided by standard trade models with variable markups, we propose an empirical strategy that let us identify:
  1. The average markup elasticity (Γ).
  2. **Whether a firm has different elasticity of markups across its destinations, depending on its relative size in the destination market**

- Our methodology is based on analyzing changes in firm's export values in response to **firm level cost shocks**.

- Implementing this strategy requires 1) firm-level data on exports and imports values; and 2) an exogenous shock to firms' costs.
  1. We use detailed firm-level Argentinian data on exports by destination and imports by source country,
  2. and exploit plausible exogenous variation on firms' import costs coming from the timing in which import barriers were imposed to specific products in Argentina.

Stylized Facts

- We begin by using detailed data at firm-product (12 digits)-destination level for Argentinian exporters to document two patterns that guide our model and motivate our analysis.

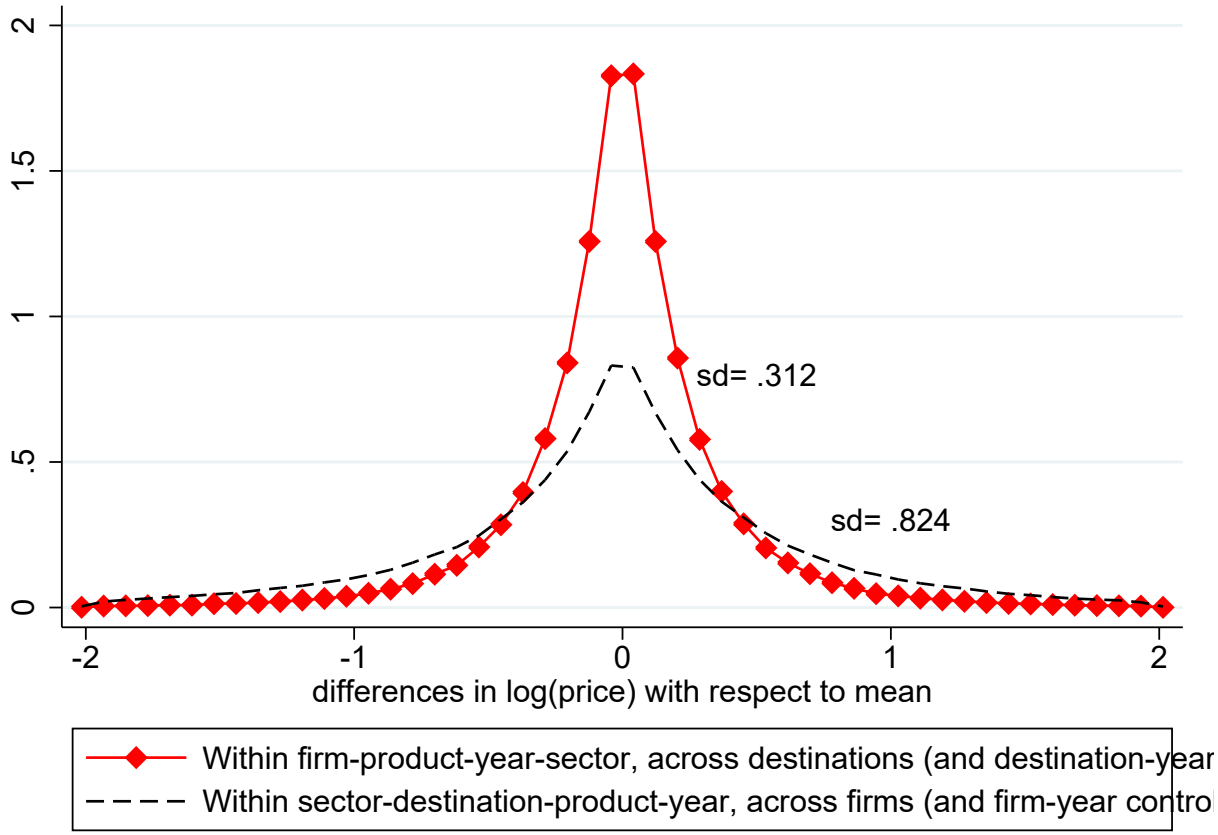
Stylized Fact 1

- **Fact 1**: Substantial dispersion of unit values for a given product, both:
  - within a destination, across ''similar" firms (much more this)

    and,
  - within a firm, across ''similar" destination.

Stylized Fact 1: Much more variation within destination, across firms

Figure: Price dispersion across and within firms



Black: Compares same destination, same product, same sector, across similar firms (includes firm-year level controls).

Red: Compares same firm, same product, same year, across similar destinations (includes destination-sector-year FE)

Fact 2: Multi-destination exporters charge higher prices in markets where they are larger

- **Fact 2** A given multi-destination exporter, selling a given product, set higher prices in destinations where it has higher market share.

- Define market share of:
- firm i,
- belonging to sector s (hs 4),
- in market k,
- at period t as:

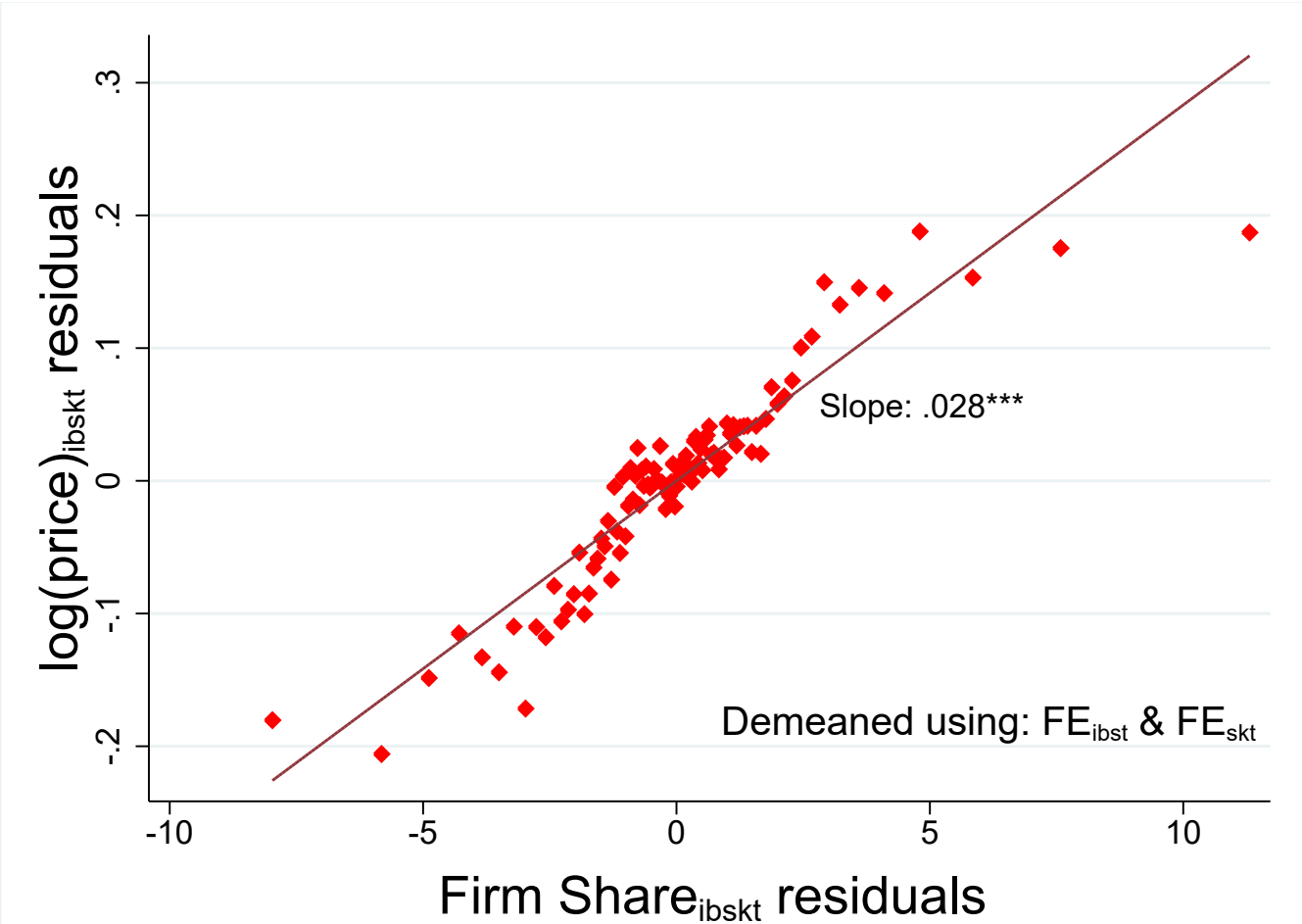
$$S_{iskt} = \frac{ExportValues_{iskt}}{\sum_{i \in s} Exportvalues_{iskt}^{World}} * 100$$

Fact 2. Multi-destination firms charge higher prices in markets where there are larger

- Same Firm-Sector-product-Year FE: comparing across *similar* destinations.

$$log(price)_{ibskt} - AVGlog(price)_{ibst} = \beta\left(S_{ibskt} - AVGS_{ibst}\right) + FE_{skt} + \Delta\left(\epsilon_{ibskt}\right)$$

Figure: Binscatter: Market share & price dispersion within firms, across *similar* destinations



The model: Demand

- On the demand side we follow the Atkeson & Burstein model (2008) model of endogenous variable markups in the context of oligopolistic competition.

- Demand for firm i in market k is given by,

$$Q_{ik} = \gamma_{ik} P_{ik}^{-\rho} P_k^{\rho-\eta} D_k,$$

- where γ_{ik} is a taste shock, P_{ik} is the price of the firm in market k, P_k is the price index in the sector for which the firm belongs and D_k is the size of market k.

- ρ: elasticity of substitution across the varieties within sectors

- η stands for the elasticity of substitution across sectoral aggregates. We assume $\rho > \eta > 1$.

- Define S_{ik} as the firm's market share in k and is defined as,

$$S_{i,k} = \frac{P_{i,k} Q_{i,k}}{\sum_{i'} P_{i',k} Q_{i',k}}$$

- The implied elasticity faced by firm in k is,

$$\sigma_{ik} = \rho(1 - S_{ik}) + \eta S_{ik}.$$

Key variables: Markups, elasticity of markups and relation with market share

- **Markup** $\mathcal{M}_{ik}$ is defined as:

$$\mathcal{M}_{ik} = \frac{\sigma_{i,k}}{\sigma_{i,k} - 1}$$

- **The negative of the elasticity of markup** with respect to prices is given by,

$$\Gamma_{ik} = -\frac{\partial log \mathcal{M}_{ik}}{\partial log P_{ik}} = \frac{S_{ik}}{\left(\frac{\rho}{\rho-\eta} - S_{ik}\right)\left(1 - \frac{\rho-\eta}{\rho-1} S_{ik}\right)} \geq 0$$

- **Markup elasticity increasing in market share**:

$$\S = \frac{\partial log \Gamma_{ik}}{\partial S_{ik}} \geq 0$$

Supply:

- To be concrete, assume no Labor, no capital (easy to add). Firms combine intermediate inputs with the following production function.

$$Q = q(w) = \varphi \left[\sum_v (w_v)^{\frac{\theta-1}{\theta}} \right]^{(\theta/\theta-1)}, \tag{1}$$

- w_v denotes the quantities of variety v (input-source).
- $\theta > 1$ is the elasticity of substitution across inputs.
- Perfect competition in input markets.

$$p_v = \frac{\tau_v}{A_v}$$

- τ_v is the trade cost for intermediate variety v.
- Assume heterogeneous fixed costs of importing each variety κ_{iv}.
- Define the set Ω_i: Sourcing strategy of the firm.

Imports: key parameters, conditional on sourcing strategy

- Conditional on the sourcing strategy Ω_i, we can obtain:

- Expenditure share of firm i on imported variety v is given by,:

$$m_{iv} = \frac{\left(\frac{A_v}{\tau_v}\right)^{\theta-1}}{\left[\sum_{v\in\Omega_i}\left(\frac{A_v}{\tau_v}\right)^{\theta-1}\right]} \qquad \forall v \in \Omega_i;$$

$$m_{iv} = 0 \qquad \forall v \notin \Omega_i$$

- Unit cost of firm i:

$$c_i = \frac{1}{\varphi}\left[\sum_{v\in\Omega_i}\left(\frac{A_v}{\tau_v}\right)^{\theta-1}\right]^{-\frac{1}{\theta-1}} \tag{2}$$

- and, by Shepard's Lemma:

$$\frac{\partial log c_i}{\partial log \tau_v} = m_{iv}$$

Price setting and exports

- Given the sourcing strategy (and its corresponding unit cost c_i),

$$P_{ik} = \frac{\sigma_{ik}}{\sigma_{ik} - 1} c_i = \mathcal{M}_{ik} c_i(\varphi, \tau_v)$$

- Holding constant P_{kst}, one can derive the elasticity of price in market k with respect to trade costs for input variety v for firm i:

$$\frac{dlnP_{ik}}{dln\tau_v} = \frac{1}{1 + \Gamma_{ik}} m_{iv}$$

- Then, revenues in market k are given by,

$$R_{ik} = \gamma_{ik} P_{ik}^{1-\rho} P_k^{\rho-\eta} D_k$$

Reduced form: Increase on import costs on exports

Proposition (Reduced form: The effect of import barriers on firms' exports)

Provided $\rho > \eta > 1$,

A. *Revenues in any market k are weakly decreasing in the costs of importing variety v. (strictly decreasing if* $m_{iv} > 0$*).*

$$\frac{\partial lnR_{ik}}{\partial ln\tau_v} = (1-\rho)\left[\frac{1}{1+\Gamma_{ik}} m_{iv}\right] = (1-\rho)\frac{\partial lnP_{ik}}{\partial ln\tau_v} \leq 0$$

B. *The negative effect of increasing import costs on exports in a market is attenuated with higher elasticity of markup* Γ_{ik} *in the market.*

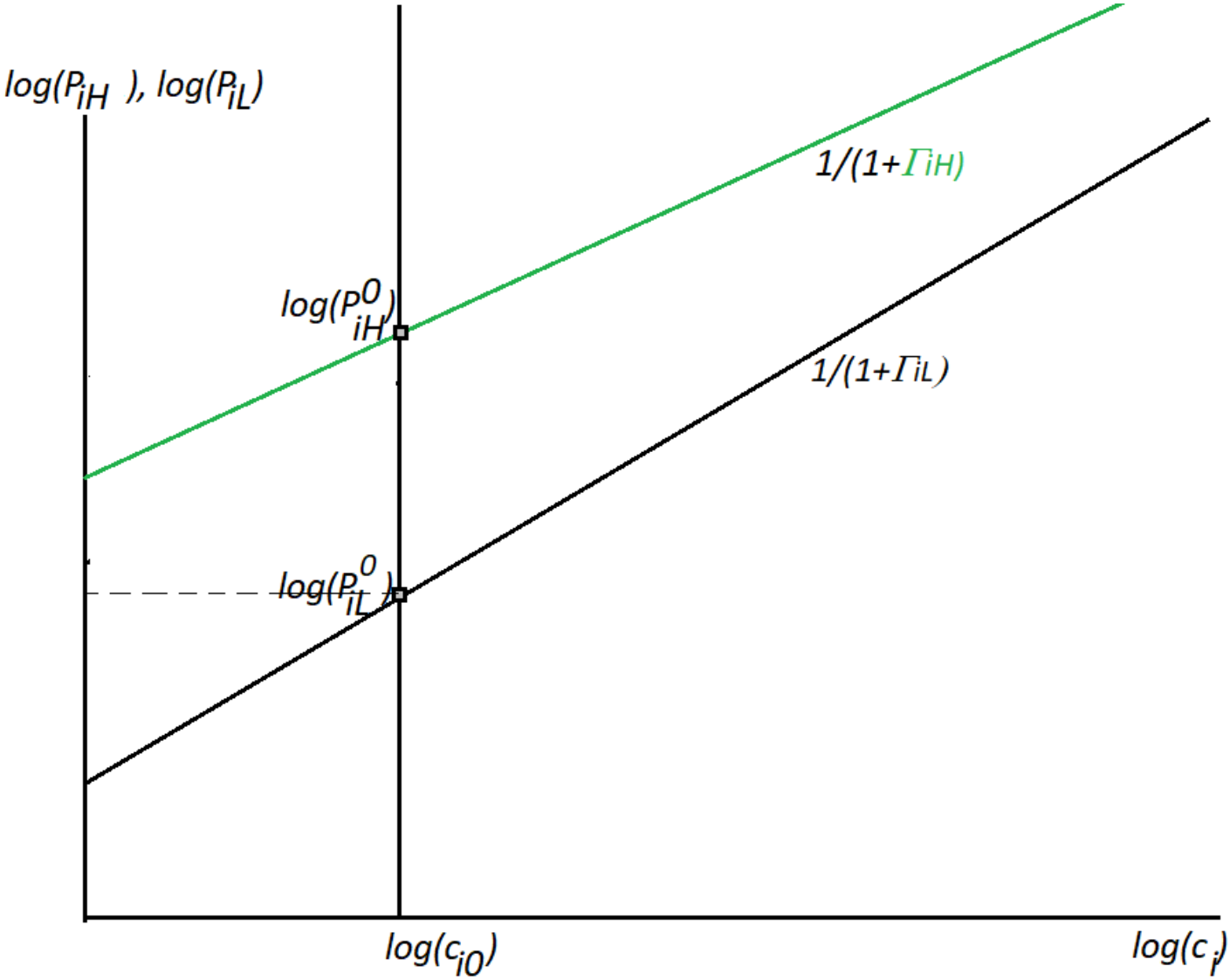
$$\frac{\partial^2 lnR_{ik}}{\partial ln\tau_v \partial \Gamma_{ik}} \geq 0$$

C. *If* $\S = \frac{\partial \Gamma_{ik}}{\partial S_{ik}} > 0$*, then a firm reduces less their exports (increase less their price) in markets where it has higher market share.*

$$\frac{\partial^2 lnR_{ik}}{\partial ln\tau_v \partial S_{ik}} \geq 0$$

Graphical example of our strategy to get § (recall that $\frac{dlnP_{ik}}{dlnc_i} = \frac{1}{1+\Gamma_{ik}}$)

Figure: Cost shock, elasticity and super-elasticity



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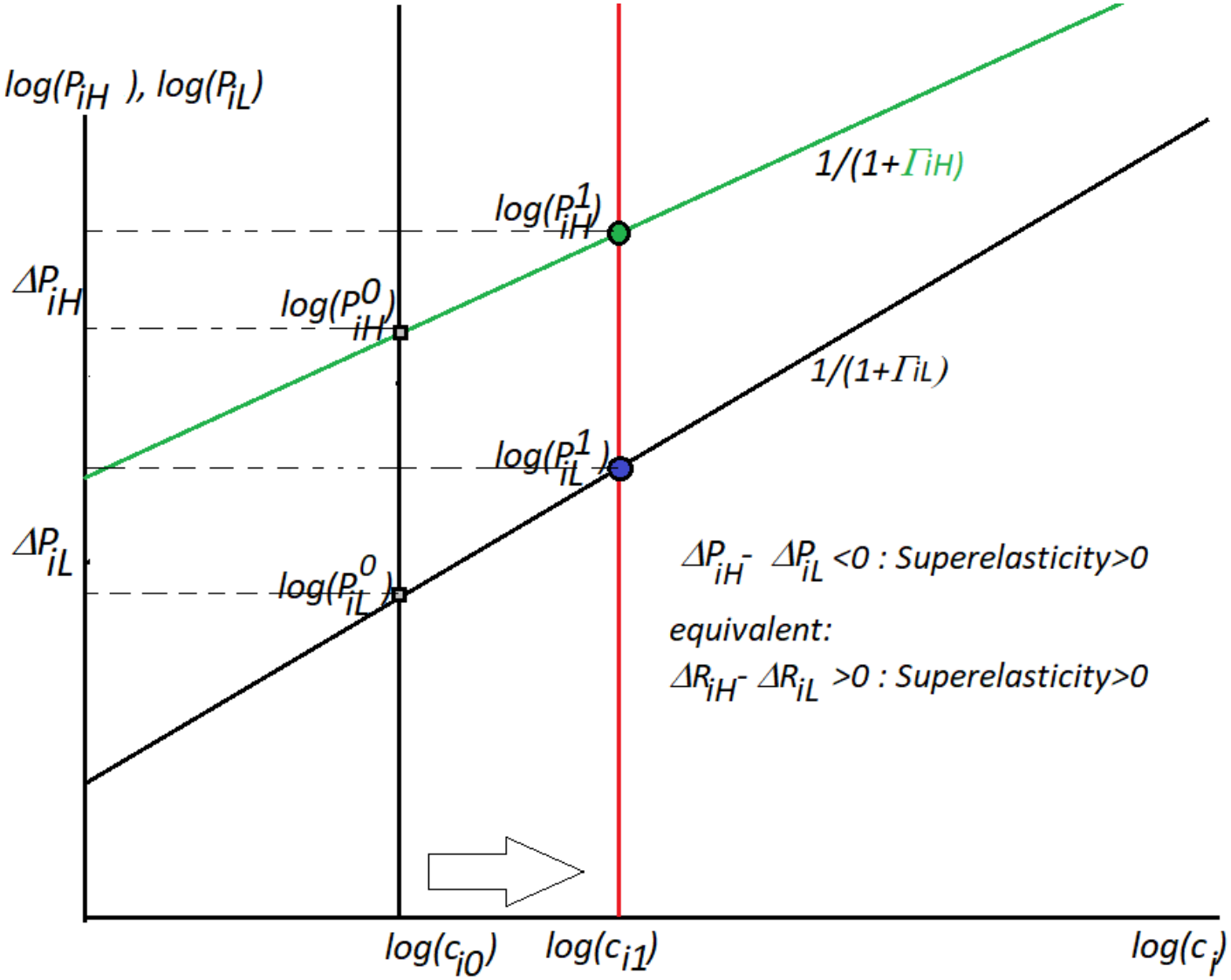
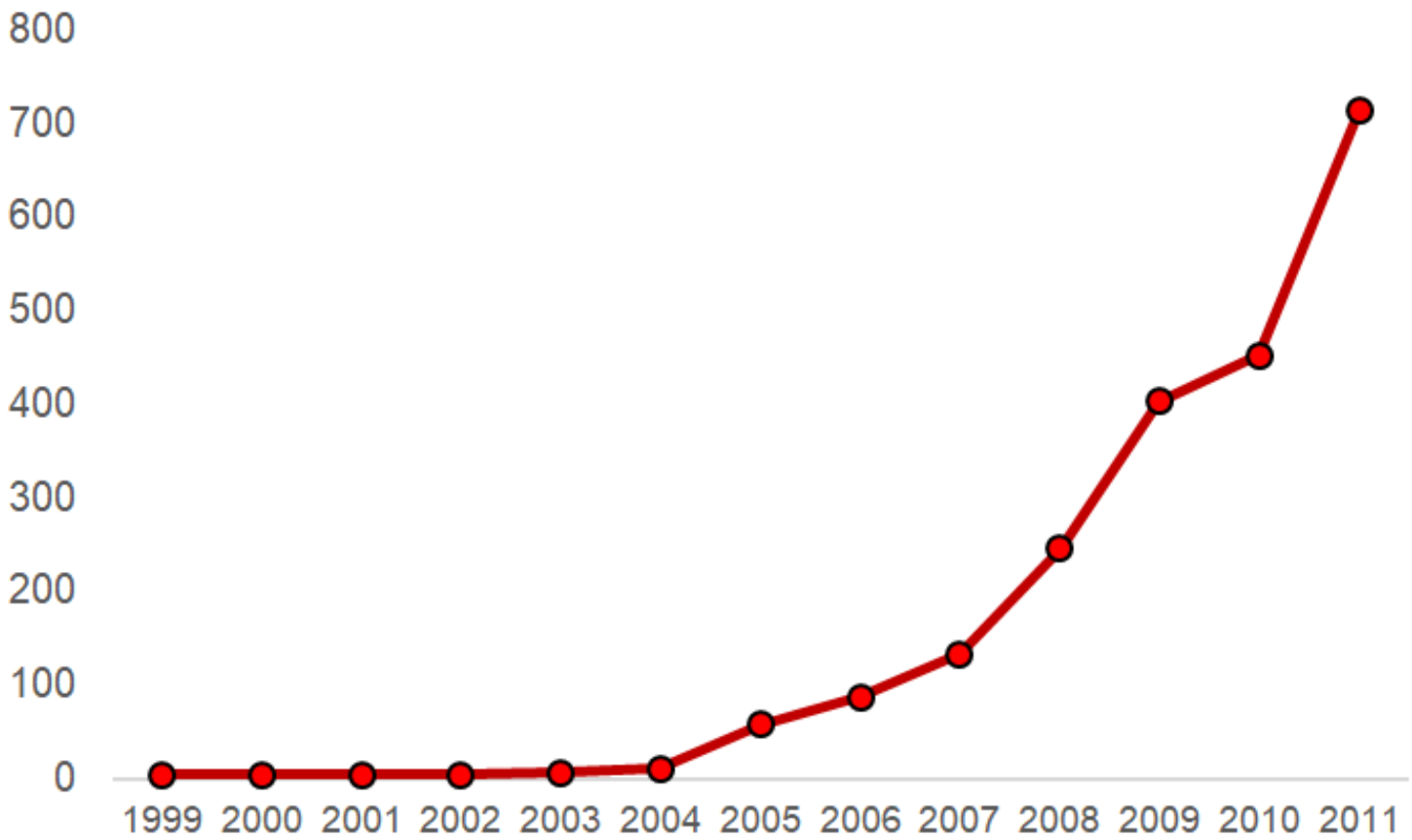


The policy: Non-Automatic Licences to imports (NAILs)

- Since 2005, Argentinian government started requiring non-automatic licenses to the imports of certain products (NAILs, from now on).
- These licenses could delay imports of the product up to two months and approval was not even granted.
- Importantly, different products entered to the NAILs system at different points in time. By 2012, every product ended up being added to the NAILs system.
- Even within sectors, different firms were exposed to the barriers in different moments in time.
- We will argue that a firm's unit cost (c_i) increases when the firm was already importing inputs that were affected by the policy (τ_v).

NAILs: evolution of number of products in the NAILs system

Figure: Number of products in the NAILs system



Data

- Argentinian firm-level customs data 2002-2012 containing the universe of exporters-importers.
- Import and Export data by firm-product-country at HS 8-digit.
- Merged with Tax authority data containing employment and main sector of activity NACE 6 digits.
- We focus on manufacturing firms and firms that exported at least one year previous to the policy. We end up with a total of 12615 firms.
- We focus on the global core export product of the firm at HS 8 digits.
- We define a product at 8 digits as intermediate input if the firm does not export the product.

Firm's exposure to NAILs

- Define $NAIL_{vt}$ as an indicator that takes value 1 if input v is in the NAILs system in year t.

- Key variable: We define the exposure of a firm to a unit cost shock as,

$$NAILexposure_{it} = \sum_v m_{iv} NAIL_{vt},$$

- where,

$$m_{iv} = \left[\frac{imports_{iv}}{\sum_v imports_{iv}} \right]^{pre-policy} \quad \text{if} \quad \left(\sum_v imports_{iv} \right)^{pre-policy} > 0$$

$$m_{iv} = 0 \quad \text{if} \quad \left(\sum_v imports_{iv} \right)^{pre-policy} = 0$$

- Hence, a firm is more exposted to the cost shock, the more it was using inputs added to the NAILs list.

- Note that $NAILexposure_{it} \in [0, 1]$. Being 1 a firm that is affected in all its imported

Effect of the shock at the firm level

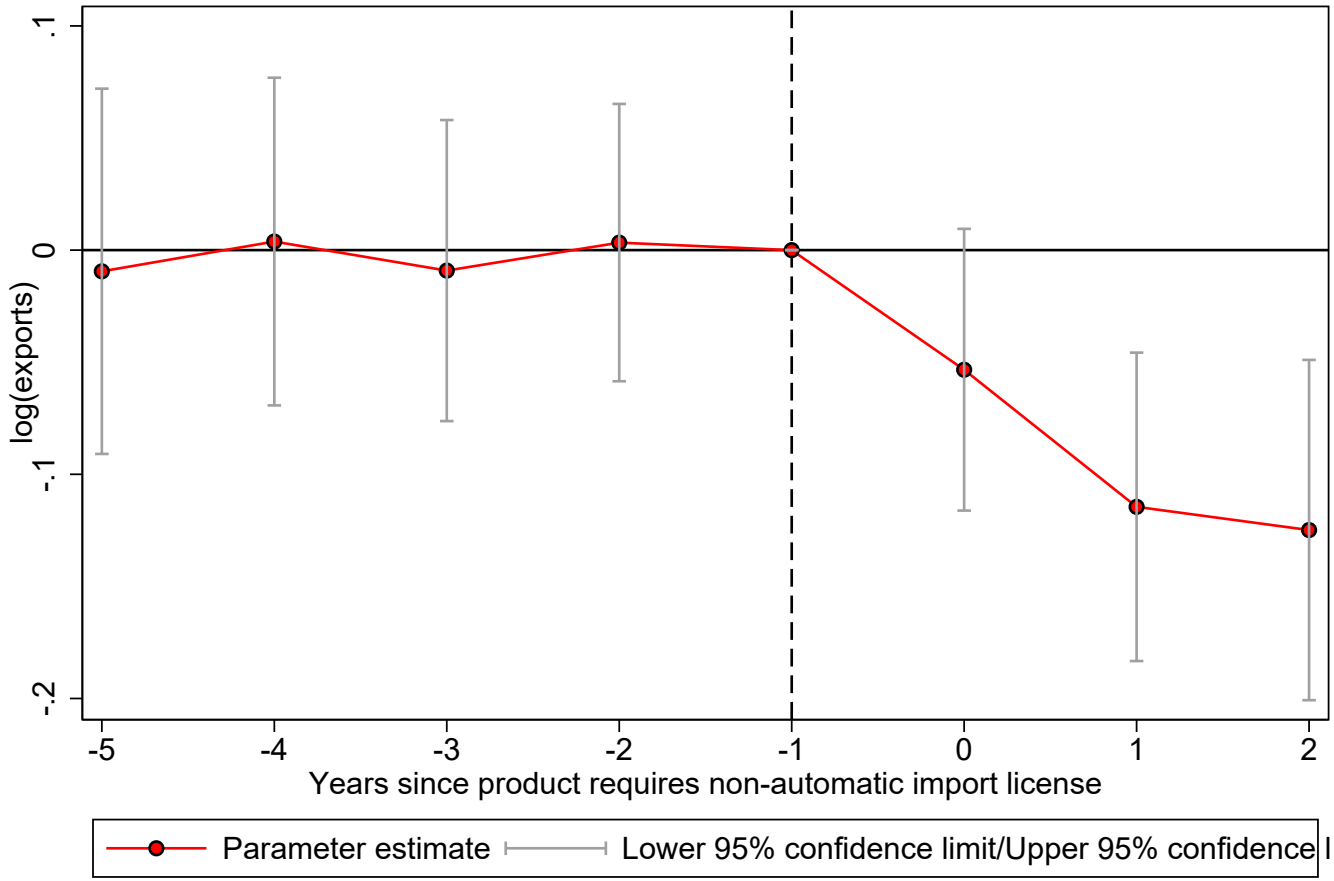
- We test whether the shock actually affected firms performance by estimating a full set of yearly treatment effects beginning in the years before the product was added to the NAILs.

$$log(exports_{it}) = \sum_{j=-5}^{2} \beta_j 1[YearsSinceFirstExposureToNAILs_{it} = j] + \alpha_i + \gamma_t + \gamma_{st} + u_{it}.$$

- where $1[YearsSinceFirstExposureToNAILs_{it} = j]$ counts years since first exposure of the firm.

The shock at the firm level

Figure: Event study. The impact NAILs on firms' log(exports): firm-level (yearly)



Note: include Sector-by-time FE.

Identification of the elasticity of markups across destinations

- Following propostition C. of the model, we test if, for a given firm-year, the elasticity of markup is increasing in the firm's market share in the destination.

- In particular, we take differences and estimate:

$$\Delta lnExpo_{iskt} = \beta_1 \Delta Nailexposure_{it} + \beta_2 \Delta Nailexposure_{it} * S_{ikt-1} + \gamma S_{ikt-1} + \gamma_{it} + \gamma_{skt} + \Delta e_{iskt}.$$

- where

$$S_{ikt} = \frac{ExportValues_{ikt}}{\sum_{i \in s} ExportValues_{iskt}} * 100$$

- Assumption:
  1. The government did not target inputs used intensively by firms that were going to reduce their sales in their low market- share destinations.
  2. The cost shock does not affect the product across destinations differently.

- We expect:
  1. $\beta_1 < 0$.
  2. $\beta_2 > 0$ if the elasticity of markup is increasing in market share

Testing whether the elasticity of markup is increasing in firm's market share

Table: Elasticity of markup and relation with market share

	(1)	(2)	(3)	(4)
			$\Delta log(Exports_{iskt})$	
$\Delta Nailexposure_{it}$	-0.2306***			
	(0.0544)			
$\Delta Nailexposure_{it}$*	0.0197***	0.0238***	0.0245***	0.0190***
$*S_{iskt-1}$	(0.0034)	(0.0058)	(0.0058)	(0.0063)
Observations	104,532	76,707	76,707	76,707
R-squared	0.1412	0.3375	0.3401	0.4725
Firm FE	yes	yes	yes	yes
Sector-Year FE	yes	yes	yes	yes
Sector-Destination FE	yes	yes	yes	yes
Firm-Year FE	no	yes	yes	yes
Sector-destination-year FE	yes	no	no	yes
$log(gdppc)_{kt-1}$ control	no	no	yes	no
S_{ikt-1} control	yes	yes	yes	yes

Standard errors clustered at the firm-year level in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Conditional on firm-markets with positive values of exports.

- Firm exposed 100%,
  - Reduces exports 23% in destinations where it has $S_{ikt-1} = 0\%$ market share.
  - Reduces exports 11% in destinations where it has $S_{ikt-1} = 6\%$ of market share.

Robustness checks:

Table: Robustness Check: Elasticity of markup and relation with market share

	(1)	(2)	(3)	(4)	(5)
		$\Delta log(Exports_{iskt})$			
$\Delta Nailexposure_{it}$	0.0190***	0.0185***	0.0172***	0.0171***	0.0187***
$*S_{iskt-1}$	(0.0063)	(0.0058)	(0.0065)	(0.0062)	(0.0063)
$\Delta Nailexposure_{it}$		0.0354			
$*log(gdppc)_{kt-1}$		(0.0478)			
$\Delta Nailexposure_{it}$			0.0026**		
$*ShareWithinFirm_{iskt-1}$			(0.0012)		
Observations	76,707	76,707	76,707	76,707	76,707
R-squared	0.4725	0.3509	0.4773	0.4725	0.4751
Firm-Year FE	yes	yes	yes	yes	yes
Sector-destination-year FE	yes	yes	yes	yes	yes
imports from k	no	no	no	yes	no
Exc China	no	no	no	no	yes

Standard errors clustered at the firm-year level in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Conditional on firm-markets with positive values of exports two consecutive years.

Disentangling the effects: Revenues, Quantities, and Prices

	(1) $\Delta log(Exports_{iskt})$	(2) $\Delta log(Q_{iskt})$	(3) $\Delta log(UnitValues_{iskt})$
Panel A: Direct effect			
$\Delta Nailexposure_{it}$	-0.2789***	-0.3325***	0.0617**
	(0.0442)	(0.0455)	(0.0297)
Firm-Unit FE	yes	yes	yes
Sector-Destination-Unit-Year FE	yes	yes	yes
Panel B: Interaction			
$\Delta Nailexposure_{it}$	0.0205***	0.0234***	-0.0030*
$*S_{ikt-1}$	(0.0066)	(0.0066)	(0.0017)
Firm-Unit FE	yes	yes	yes
Sector-Destination-Unit-Year FE	yes	yes	yes
Firm-Unit-Year FE	yes	yes	yes

Clustered standard errors at the firm-year level. *** p<0.01, ** p<0.05, * p<0.1
Firm-markets with positive values of exports two consecutive years.
We drop all unit value changes of 200 percent or minus 200 percent

- A firm exposed 100%, increases prices 6% in destination with $S_{ikt-1} = 0$.
- A firm exposed 100%, increases prices 4% in destination with $S_{ikt-1} = 6$.

Concluding remarks

- We have explored whether firm's adjust differently their markup across destinations in response to a cost shock.
- We find that an exporter that exports to multiple destinations, reduce less their exports in those destinations where it has higher market share.
- This suggests that the elasticity of markup for a given exporter is increasing in its market share in a destination.
- Implying that prices and revenues are more stable in markets where the firm has higher market share.

THANKS!