Protectionism Unchained: Determinants and Consequences of Discretionary Trade Policy in Argentina

David Atkin Joaquin Blaum
Pablo Fajgelbaum Augusto Ospital

MIT, BU, Princeton, UCLA

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Background

- Numerous accounts of discretionary trade policies that favor or punish particular firms or sectors
  - Differential enforcement of regulation, subsidies, local content restrictions, import licenses, tariff exemptions (Ederington and Ruta 16)
  - Part of an increasing globalization backlash (Colantone et al. 21)
- Difficult to estimate determinants and consequences of these policies:
  - Governments typically do not publicize them (e.g., illegal under WTO)
  - Even then, hard to measure non-tariff barriers
- Aggregate effects of trade policy depend on terms of trade, yet still little evidence of price effects, particularly
  - Due to (arguably more common) non-tariff barriers
  - From less-developed countries whose firms may have less market power

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Study an episode of discretionary trade policy in Argentina 2012-2015:

1. Unusual policy experiment: every transaction required explicit approval
   - Data on universe of trade transactions requested, denied, and approved
2. Identify both *sector and firm level* determinants of these discretionary trade policies:
   - Macro imbalances further alter the level and dispersion of protection
3. Did these quantitative restrictions improve terms of trade?
   - Restricting trade increases import prices: Argentine firms paid more for less!
   - (Except when Argentinian importers have high bargaining power)
4. Rationalize results through model of import-export bargaining and use it for quantitative assesment:
   - Weak domestic bargaining power:$\beta \approx 0.1$ identified from the price and quantity responses to policy.
   - Impact of trade restrictions depend on bargaining power: price effects become negative for large enough β.

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Related Literature

- Price effects of trade policy
  - Tariffs: Feenstra 89, Hummels and Skiba 04, Romalis 07, De Locker et al. 15, Irwin 19
  - Quotas: Khandelwal et al. 13
  - 2018-2020 Trade War: Amiti et al. 19, Fajgelbaum et al. 20, Flaaen et al. 20, Cavallo et al. 21,...
- Trade models with imperfect competition
  - Oligopoly: Brander and Spencer 84, Eaton and Grossman 86 (Brander 95 literature review)
  - Bargaining: Ornelas and Turner 08, Antras and Staiger 12, Bernard and Dhingra 19, Grossman and Helpman 20, Alviarez et al. 20
- Trade shocks and policies in Argentina
  - Gopinath and Neiman 14, Conconi and Schepel 17, Bernini and Lembergman 20
- Determinants of Protection
  - Large literature, summarized by Rodrik 95, Gawande and Krishna 03

Trade policy in Argentina: 2012-2015

- Stagnating economy, external imbalances, currency controls more
  - Trade restrictions in place since around 2009
- In February of 2012, new regulations to importing (DJAI system):
  - *Applied to all products*
  - Firms had to request authorization in advance
  - Government could block the request, totally or partially
  - Decisions made on a discretionary basis
  - Guidelines for appeals introduced informally to trade associations
- Stated goals of the policy:
  - Trade balance, import substitution, domestic prices, investment more
- System ended when opposition party unexpectedly won presidency in November 2015.

Data

Universe of transactions: Consistency

- Quantities and values **requested** and **approved** (2013-2017)
- Quantities and values **imported** and exported (2011-2017)
- Importing firm identifiers
- Product: 11-digit HS $\times$ origin country $\times$ measurement unit
- Matched to Orbis and D&B for global ultimate owner

Product-level:

- Datamyne and Comtrade for values and quantities (11-digit HS)
- OEDE for labor, wage bill, number of firms (4-digit ISIC)

Policy periods

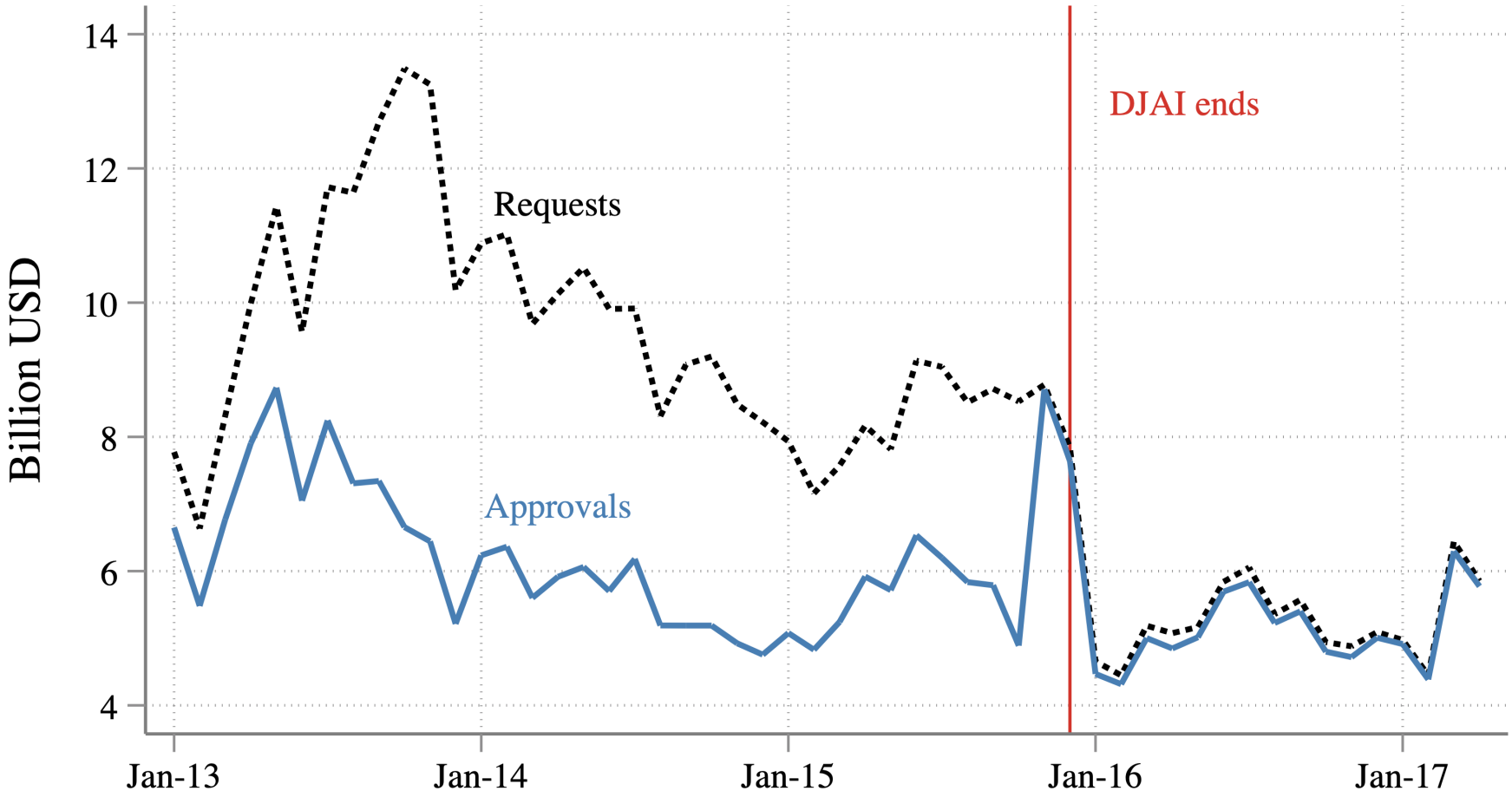
1. 2011 ("Pre"-restrictions)
2. 2012-2015 ("During")
3. 2016-2017 ("Post")

Requests and Approvals

Transaction-Level Descriptive Statistics

	During DJAI (2012-15)	Post DJAI (2016-17)
Requests per year	3,413,878	2,623,489
Mean value	$33,937	$26,277
Requests fully approved	69.5%	98.1%
Requests partially approved	1.3%	0.2%
Requests fully rejected	29.2%	1.7%
Total value approved	63.5%	89.5%

Value Requested and Approved



Values vs requests | Passthrough from approvals to imports | IV

Variance Decomposition of Approval Rates

- Firm identities (rather than sectors) account for substantial fraction variation in approval rates AR (i.e. value approved/value requested):
  - Variance decomposition from regressing

$$AR_{sfi} = \mu_f + \mu_i + \varepsilon_{sfi}$$

  - where f is firm, i is HS11-unit-origin product, s is import request
- Results:

	During DJAI	Post DJAI
Total sum of squares	1,968,648	47,986
Fraction explained by		
Firm IDs (μ_f)	24.56%	10.57%
Product IDs (μ_i)	2.20%	8.46%

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Approval Rates and Firm and Sectoral Characteristics

- Compute AR_{fi}: average approval rate across requests within firm-product **During DJAI**:
  - where f is firm, i is HS11-unit-origin product

- Project on firm and sectoral characteristics measured **Pre DJAI**:

$$AR_{fi} = X_f\beta + Z_h\gamma + \varepsilon_{fi}$$

  - X_f firm characteristics
  - Z_h sectoral characteristics for HS4 h

Approval Rates and Firm and Sectoral Characteristics

$$AR_{fi} = X_f\beta + Z_h\gamma + \varepsilon_{fi}$$

		AR_{fi}
Firm-level	$\mathbb{1}\{$Capital importer$\}$	0.067*** (0.001)
	$\mathbb{1}\{$Exporter$\}$	0.072*** (0.001)
	$\mathbb{1}\{$Domestically owned$\}$	-0.045*** (0.001)
	log(Revenue)	-0.007*** (0.000)
	log(Employees)	0.035*** (0.000)
Sector-level	Fraction of capital importers	0.021*** (0.003)
	Fraction of exporters	0.180*** (0.003)
	Fraction domestically owned	0.012*** (0.002)
	log(Total revenue)	0.022*** (0.001)
	log(Total employment)	-0.018*** (0.001)
Constant		0.225*** (0.012)
		N=809,985, R^2=0.176
		F-stat=13,955.2

Approvals and Pre-DJAI Firm and Sectoral Characteristics

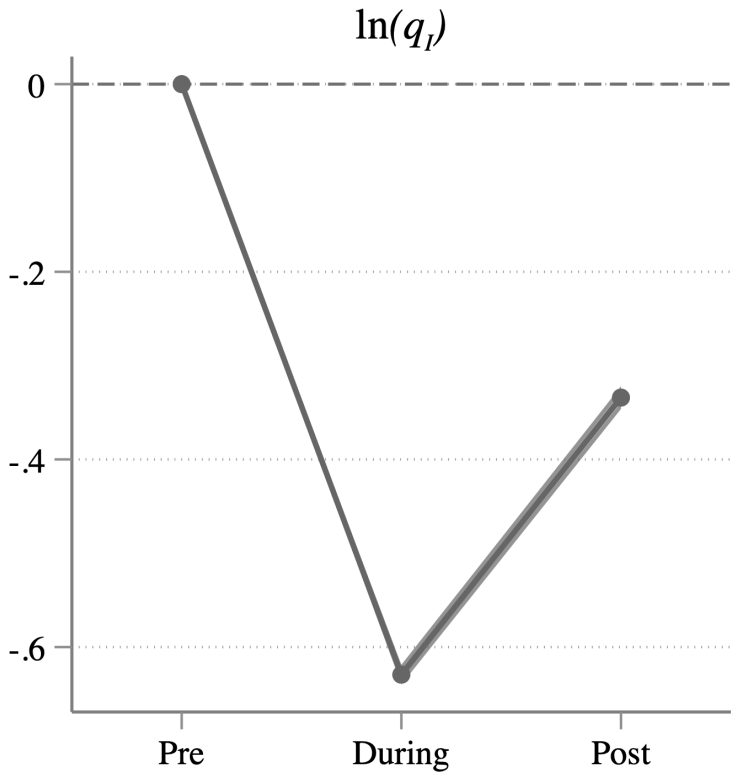
$$AR_{fi}^{\text{H1-13}} = X_f\beta + Z_h\gamma + \varepsilon_{fi}$$

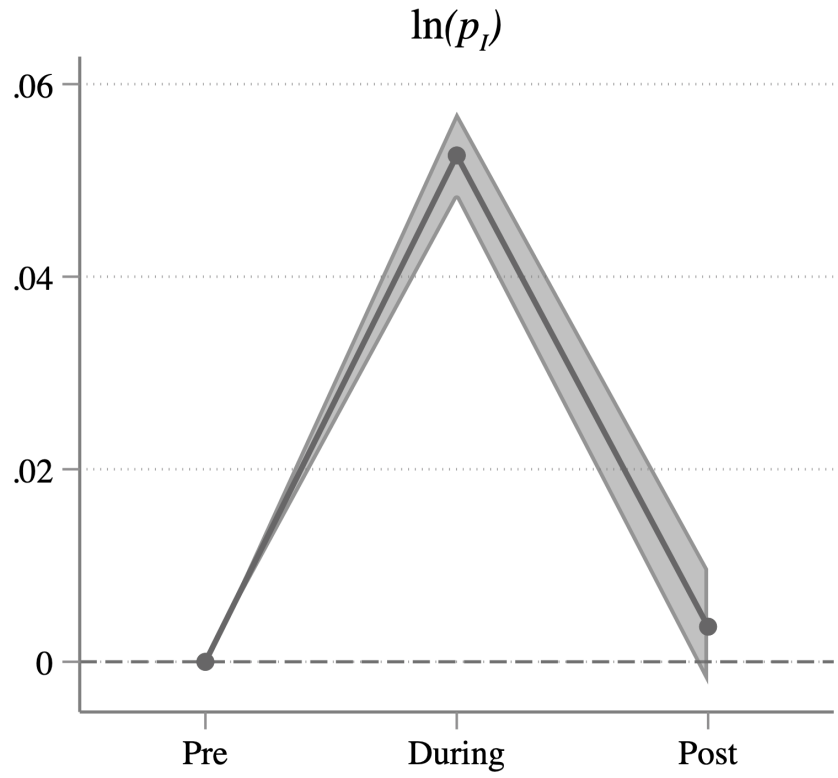
		AR_{fi}	$AR_{fi}^{\text{H1-13}}$
Firm-level	$\mathbb{1}\{$Capital importer$\}$	0.067*** (0.001)	0.091*** (0.002)
	$\mathbb{1}\{$Exporter$\}$	0.072*** (0.001)	0.057*** (0.002)
	$\mathbb{1}\{$Domestically owned$\}$	-0.045*** (0.001)	-0.050*** (0.001)
	log(Revenue)	-0.007*** (0.000)	-0.007*** (0.001)
	log(Employees)	0.035*** (0.000)	0.034*** (0.001)
Sector-level	Fraction of capital importers	0.021*** (0.003)	0.043*** (0.005)
	Fraction of exporters	0.180*** (0.003)	0.188*** (0.006)
	Fraction domestically owned	0.012*** (0.002)	0.011*** (0.003)
	log(Total revenue)	0.022*** (0.001)	0.024*** (0.001)
	log(Total employment)	-0.018*** (0.001)	-0.021*** (0.002)
Constant		0.225*** (0.012)	0.217*** (0.020)
		N=809,985, R^2=0.176	N=281,386, R^2=0.176
		F-stat=13,955.2	F-stat=4,283.4

Prices and Quantities

Pre-During-Post DJAI Effects μ_t (within Firm-Product)

$$\ln y_{fit} = \mu_t + \mu_{fi} + \varepsilon_{fit}$$



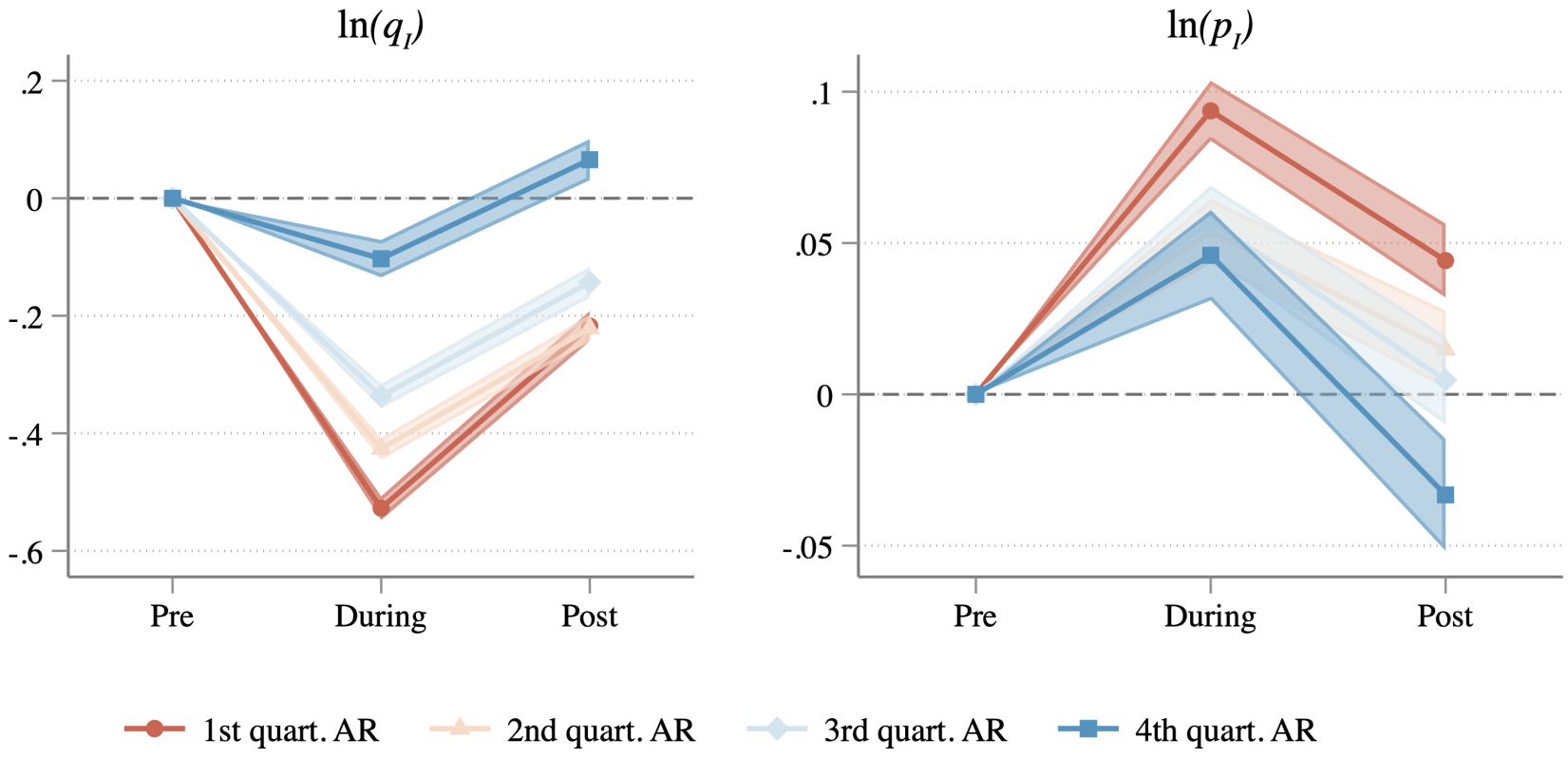


Pretrends ExtensiveM

Prices and Quantities by Approval Rate

More Stringent Policy Associated with Lower Quantities and Higher Prices

$$\ln y_{fit} = \mu_t^{Q1AR} + \mu_t^{Q2AR} + \mu_t^{Q3AR} + \mu_t^{Q4AR} + \mu_{fi} + \varepsilon_{fit}$$

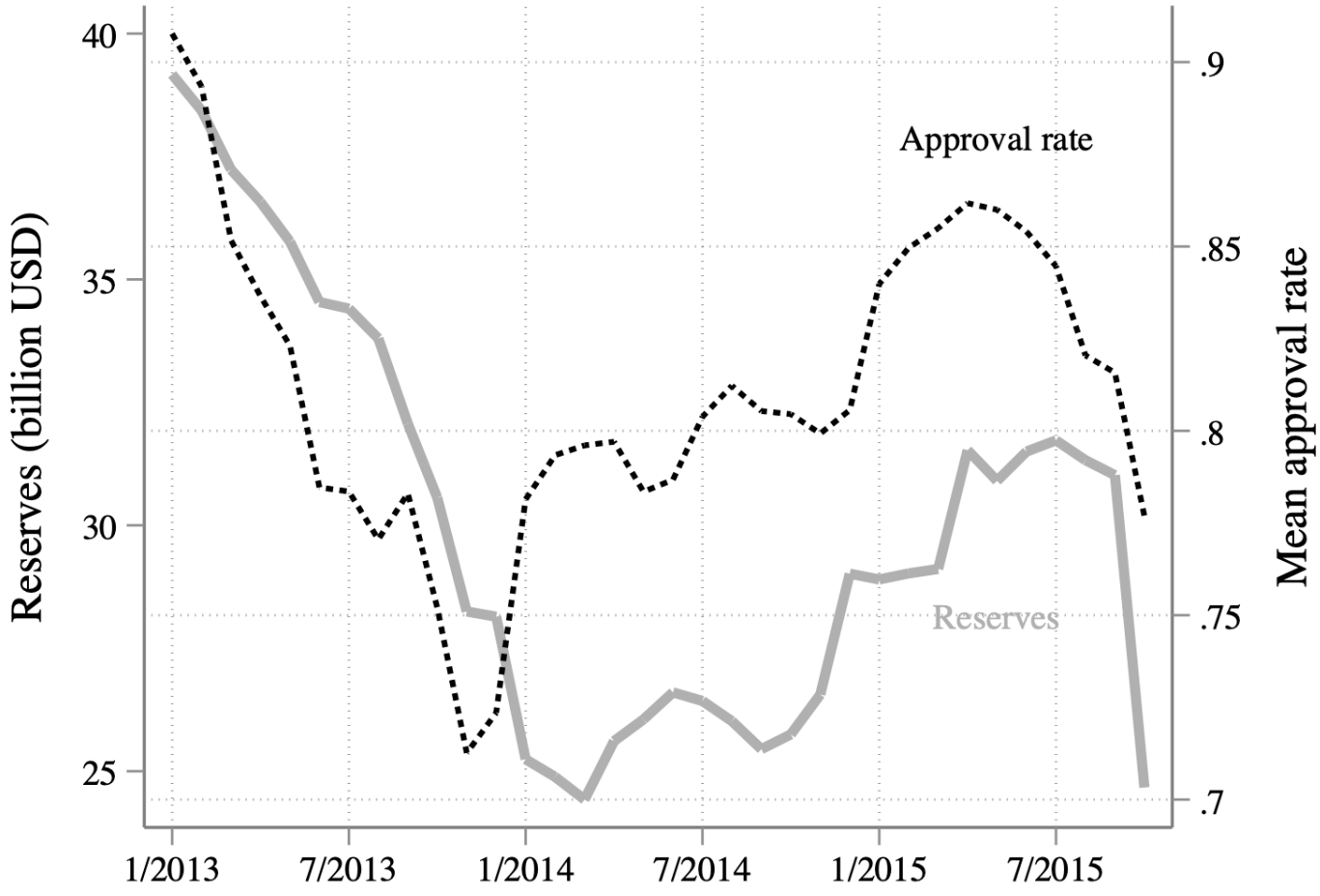


Assessing the Causal Impacts of the DJAI

- Concerns:
  - Three period analysis—types of firms and products targeted may be on different trajectories during DJAI period (spurious trends)
  - Policy adjusted based on import values due to unobserved shocks (reverse causation)
- Approach:
  - Exploit variation within the DJAI period (t = 6-month period)
  - Instrument changes in approval rates (ΔAR)

Instrumenting for Trade Policy through Macro Imbalances

Approval Rates Fell When Foreign Currency Reserves Were Low



"Zeroth" Stage

When Reserves Fell, Government Restricted More Those They Initially Favored

$$\Delta AR_{fit} = \gamma \Delta \ln(Reserves_t) \times \widehat{AR}_{fi}^{H1\text{-}13} + \mu_t + \mu_{fi} + \varepsilon_{fit}$$

	ΔAR
$\Delta \ln(Reserves) \times \widehat{AR}^{H1\text{-}13}$	0.105^{***}
	(0.012)
Half-year FE	Yes
Firm-product FE	Yes
Observations	461,119
F-stat	71.5

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Firm-products with initially higher predicted ARs experience larger drops in approvals when reserves fall.

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  - Policy adjusted based on import values due to unobserved shocks (reverse causation)

- Approach:
  - Exploit variation within the DJAI period (t = 6-month period)
  - Instrument changes in approval rates (ΔAR) with macro imbalances $\times$initial characteristics:

$$\Delta \ln(Reserves_t) \times \widehat{AR}_{fi}^{H1\text{-}13}$$

  - **Identifying assumption**: initially favored sectors and firms are not subsequently on diff trends coinciding with macro shocks
    - ★ Reassuring: bias of opposite sign from 3 period analysis (where initially unfavored saw biggest quantity reduction)

IV Estimates of the Price and Quantity Effects

Prices rise with (plausibly exogenous) quantity restrictions

$$\text{1st Stage:} \quad \Delta \ln(q_I)_{fit} = \gamma_1 \Delta \ln(Reserves_t) \times \widehat{AR}_{fi}^{H1\text{-}13} + \mu_t + \mu_{fi} + u_{fit}$$

$$\text{2nd Stage:} \quad \Delta \ln(p_I)_{fit} = \gamma_2 \widehat{\Delta \ln(q_I)}_{fit} + \mu_t + \mu_{fi} + \varepsilon_{fit}$$

	1^{st}stage $\Delta \ln(q_I)$	OLS $\Delta \ln(p_I)$	Red.form $\Delta \ln(p_I)$	2^{nd}stage $\Delta \ln(p_I)$
$\Delta \ln(Reserves) \times \widehat{AR}^{H1\text{-}13}$	0.156***		-0.167***	
	(0.035)		(0.028)	
$\Delta \ln(q_I)$		-0.245***		-1.067***
		(0.003)		(0.253)
Half-year FE	Yes	Yes	Yes	Yes
Firm-product FE	Yes	Yes	Yes	Yes
Observations	629,818	629,818	629,818	629,818
F-stat	19.4			

Extensive M

Heterogeneous Effects and Buyer Power

- Focus on a measure of buyer market power
- Import share of firm f among Argentine importers of product $hs11$ from country c:

$$m^F_{h11,f,c} = \frac{(f\text{'s imports from } c)_{h11}}{(\text{Total imports from } c)_{h11}}$$

  - Measured in 2011 (before DJAI)
  - $m^F = 1$ means the firm is the sole importer of that product in Argentina
  - $m^F \to 0$ when there are many firms importing that product in Argentina

Heterogeneous Effects and *Buyer* Power: Results

Buyer Power Mitigates Price Increases, and Can *Revert* Them

$$\Delta \ln(p_I)_{fit} = \gamma_1 \Delta \ln(Reserves_t) \times \widehat{AR}_{fi}^{H1\text{-}13} + \gamma_2 \Delta \ln(Reserves_t) \times \widehat{AR}_{fi}^{H1\text{-}13} \times m^F + \mu_t + \mu_i + u_{fit}$$

Reduced form

	$\Delta \ln(p_I)$
$\Delta \ln(Reserves) \times \widehat{AR}^{H1\text{-}13}$	-0.165***
	(0.022)
$\Delta \ln(Reserves) \times \widehat{AR}^{H1\text{-}13} \times m^F$	0.187***
	(0.040)
Half-year FE	Yes
Product FE	Yes
Observations	445,371
Price elasticity, 50% pctile	-0.162
Price elasticity, 90% pctile	0.022

By quartiles

Trade Framework

- We have shown: lower approval rates $\rightarrow$ lower import quantities and higher import prices.
- Next: model of importing with bargaining.
- Goals:
  1. Show that evidence can be rationalized through low domestic bargaining power
  2. Estimate bargaining power to match IV estimates
  3. Measure aggregate effects and importance of bargaining power

Trade Framework: Setup

- Freely traded outside good and multiple products ω (HS4)
  - Log utility over outside good and products ω
  - CES (σ) aggregation of differentiated varieties
  - Free entry of domestic firms
- Technologies and timing:
  - Firms pay fixed cost to enter, then matches with foreign supplier
  - Production uses domestic labor and a foreign input (Cobb-Douglas)
  - A matched pair makes import request q which is fully approved with probability $\alpha_\omega(q)$
  - If approved, firms bargain over the surplus and determine import price
    - ⋆ Domestic power $= \beta$

Import Quantity, Price, and Equilibrium

- Problem of matched pair:

$$q_\omega^* = \arg\max \alpha_\omega(q) \underbrace{(R_\omega(q) - \psi_\omega(q))}_{\Pi_\omega(q)}$$

  - FOC shows how policy introduces a distortion:

$$\varepsilon_{\Pi_\omega}(q_\omega^*) + \varepsilon_{\alpha_\omega}(q_\omega^*) = 0,$$

  - Elasticity (not level) of $\alpha_\omega(q)$ is what matters

- Nash Bargaining conditional on approval:

$$p_{I\omega}^* = (1-\beta)\frac{R_\omega(q_\omega^*)}{q_\omega^*} + \beta\frac{\psi_\omega(q_\omega^*)}{q_\omega^*}$$

  - Low $\beta \rightarrow$ price moves along average revenue curve
  - High $\beta \rightarrow$ price moves along average cost curve

- Equilibrium: $(q_\omega^*, p_{I\omega}^*, P_\omega, M_\omega)$ such that import requests and prices are optimal and there is free entry:

$$\mathbb{E}\left[\alpha(q_\omega^*)\beta\Pi_\omega(q_\omega^*)\right] = F_\omega.$$

Bargaining Power and Policy Impact

- Assume:
  - Probability of full approval: $\alpha_\omega(q) = \phi_{0\omega} q^{-\phi_{1\omega}}$
  - Foreign cost: $\psi_\omega(q) = Z_\omega q^{1+\frac{1}{\eta}}$
- Result: An increase in the request size penalty $\phi_{1\omega}$ leads to:
  1. Lower quantity requested, $\frac{\partial q^*_\omega}{\partial \phi_{1\omega}} < 0$.
  2. Higher import price if foreign supplier has enough bargaining power:

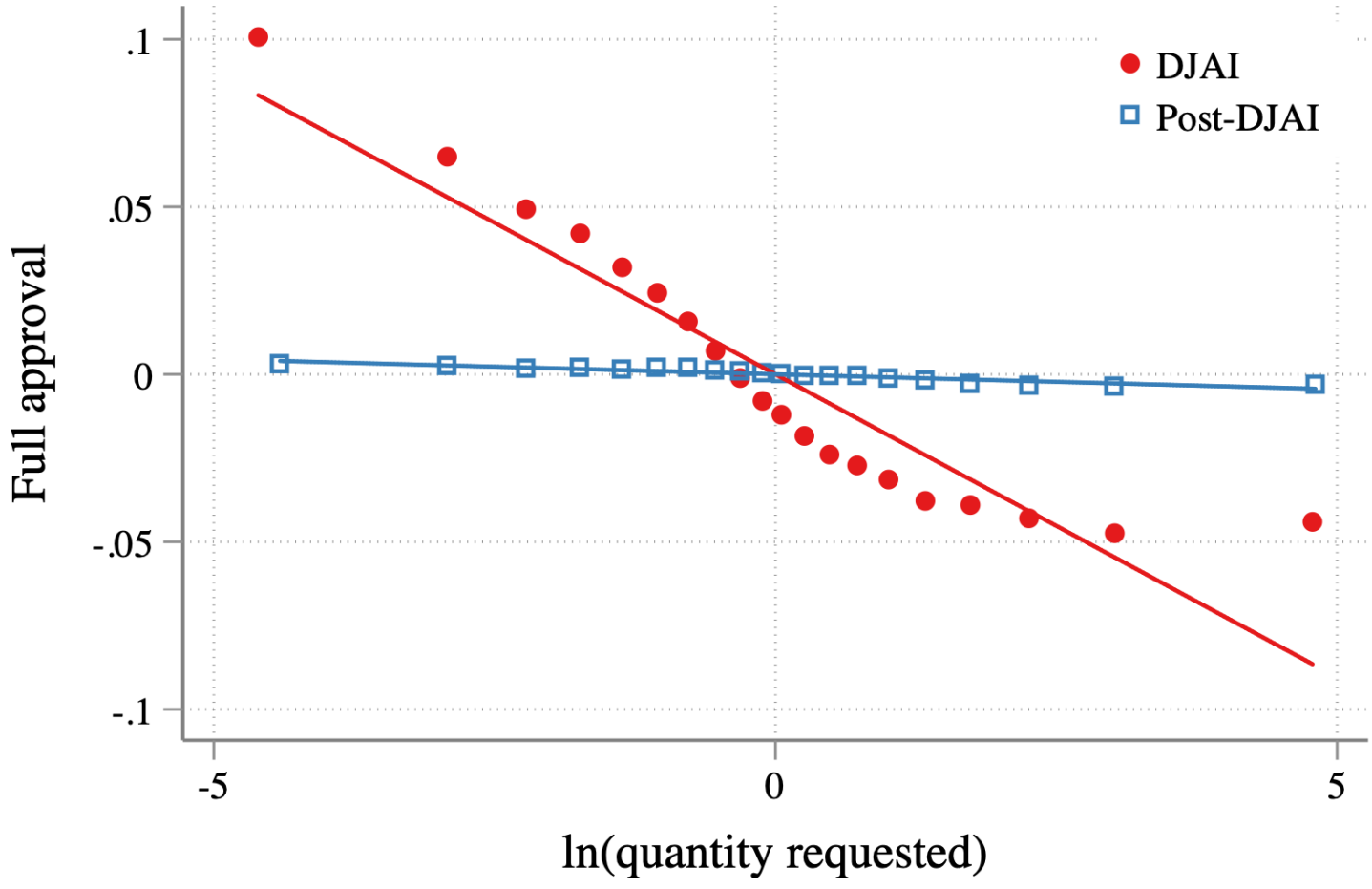
$$\frac{\partial p^*_{I\omega}}{\partial \phi_{1\omega}} > 0 \iff \beta \leq \overline{\beta}(\eta, \sigma, \phi_{1\omega})$$

Quantity solution

Taking Model to Data

1. Estimate the policy parameters $\phi_{0\omega t}, \phi_{1\omega t}$ at product-period level
2. Run similar IV regressions as in reduced form using $\phi_{1\omega t}$ instead of AR
3. Estimate (β, η) to match those IV responses
4. Perform counterfactuals to measure aggregate impacts of policy

Approval Likelihood Falls with Request Size

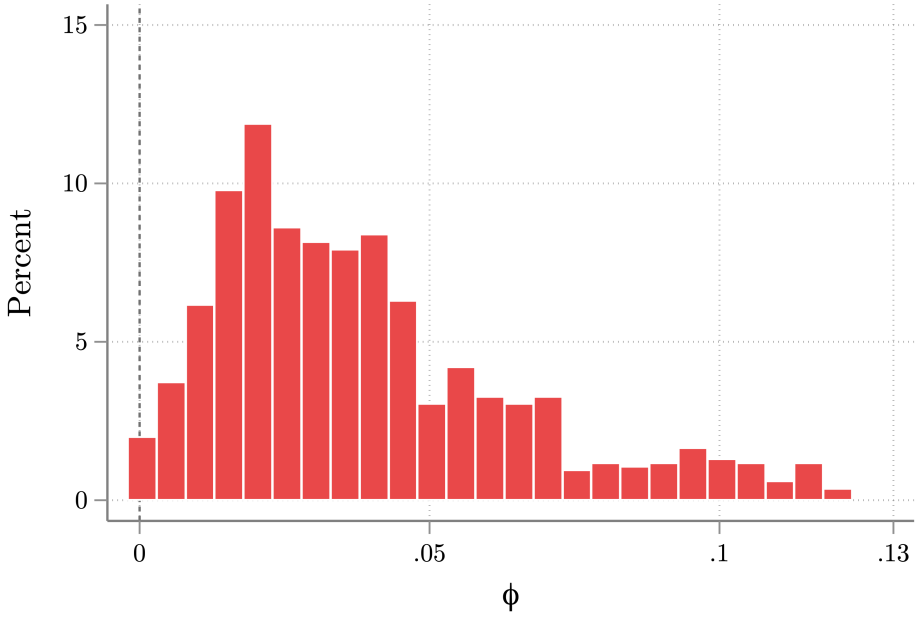


Notes: Binned scatter plot and a linear fit of an indicator of full approval on the log of the quantity requested, after residualizing both variables on product indicators.

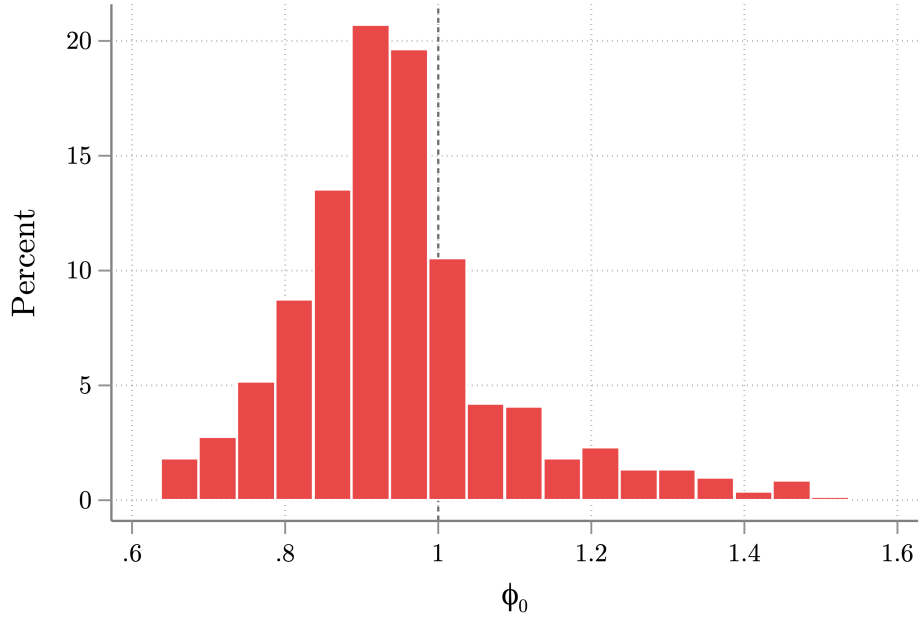
Estimating Policy Parameters

$$\mathbb{1}\{q_{A,fit} = q_{R,fit}\} = \phi_{0,h} - \phi_{1,h} \ln q_{R,fit} + \mu_f + \gamma_t + e_{fit}$$

(a) Size penalty ($\phi_{1,h}$)



(b) Approval level ($\phi_{0,h}$)

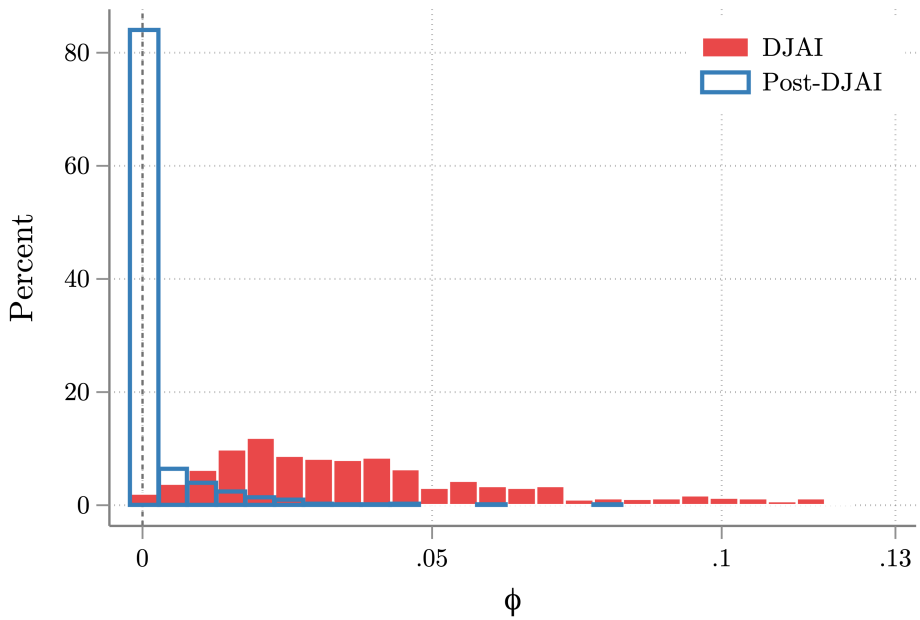


Spec | ϕ vs ϕ_0 | ϕ over time | ϕ_1 with CIs | Other fixed effects

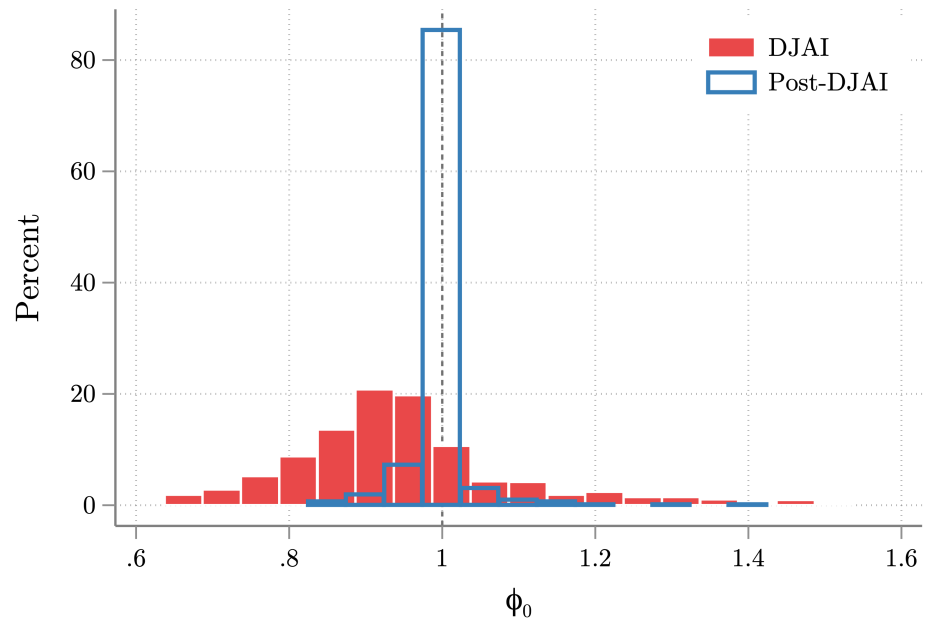
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Responses of Prices and Quantities to ϕ_1

Variation within the policy period

	0^{th}stage		1^{st}stage	OLS	Red.form	2^{nd}stage
	$\Delta\phi_1$	$\Delta\ln(q_I)$	$\Delta\ln(q_I)$	$\Delta\ln(p_I)$	$\Delta\ln(p_I)$	$\Delta\ln(p_I)$
$\Delta\ln(Reserves) \times \widehat{AR}^{\text{H1-13}}$	-0.015***		0.204***		-0.181***	
	(0.002)		(0.041)		(0.022)	
Predicted $\Delta\phi_1$		-9.336**				
		(3.525)				
$\Delta\ln(q_I)$				-0.236***		-0.883***
				(0.009)		(0.180)
Half-year FE	Yes		Yes	Yes	Yes	Yes
Firm-product FE	Yes		Yes	Yes	Yes	Yes
Observations	772,206	772,206	832,848	832,848	832,848	832,848
F-stat	41.4	7.0	24.6			

Notes: The sample is from the 1st half of 2014 to the 2nd half of 2015. The standard errors are one-way clustered by HS4-period and shown in parentheses. Asterisks indicate 10% (*), 5% (**), and 1% (***) significance.

Buyer Power

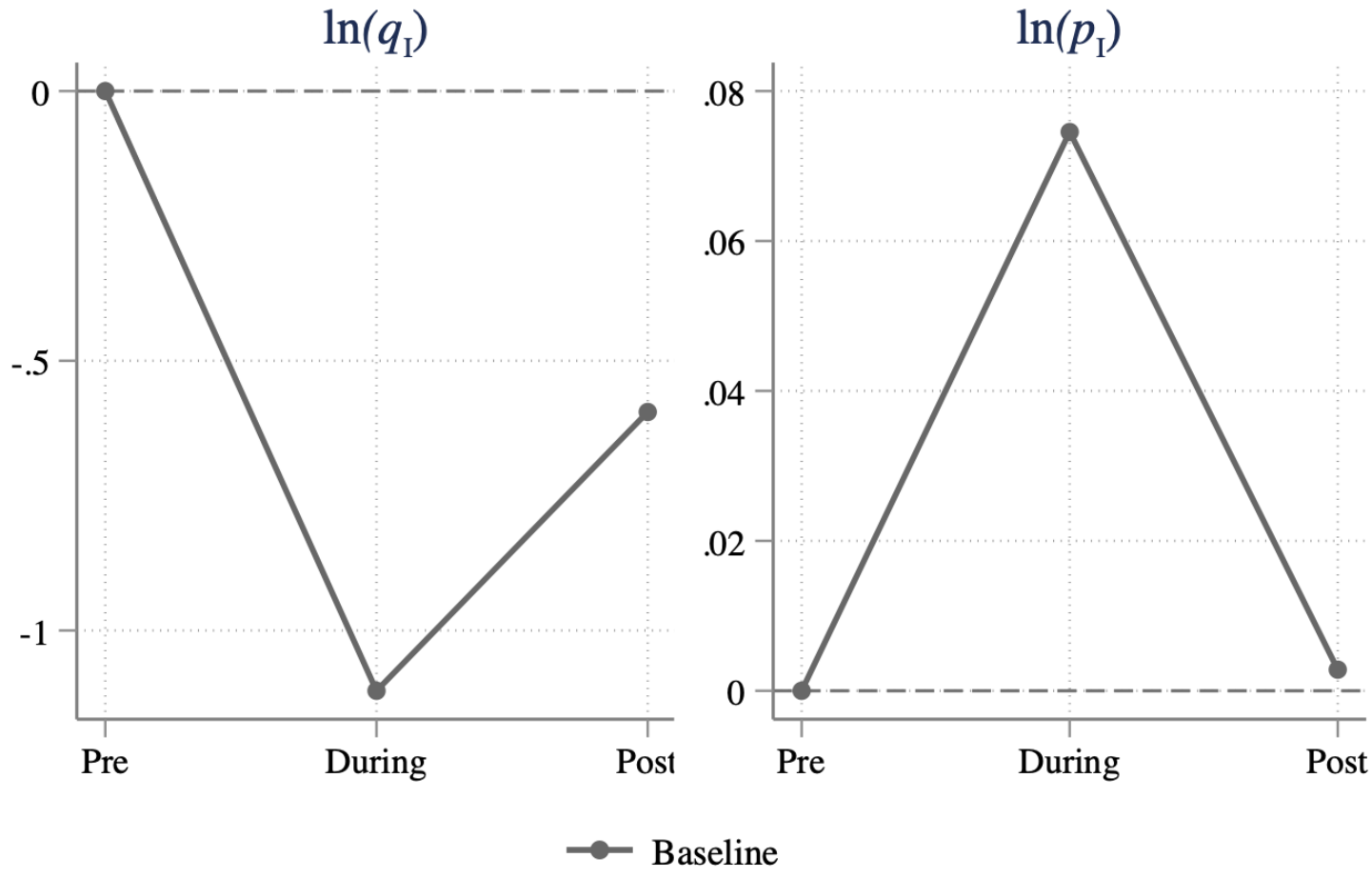
Calibration: Bargaining Power and Supply Elasticity

- Feed estimated policy shocks $\{\phi_{0,\omega t}, \phi_{1,\omega t}\}$ for each 4-digit HS product and half-year period
- Choose (β, η) to match our IV regression estimates of:
  - $\Delta \ln(p_{I\omega t})$ on $\Delta \ln(q_{\omega t})$
  - $\Delta \ln(q_{\omega t})$ on $\Delta \ln(\phi_{1\omega t})$

Parameter		Targeted Moment		
Description	Value	Description	Model	Data
Home bargaining power (β)	0.12	Reg. coeff prices on quant.	-0.88	-0.88
Foreign cost elasticity (η)	2.06	Reg. coeff quant. on ϕ_1	-9.33	-9.33

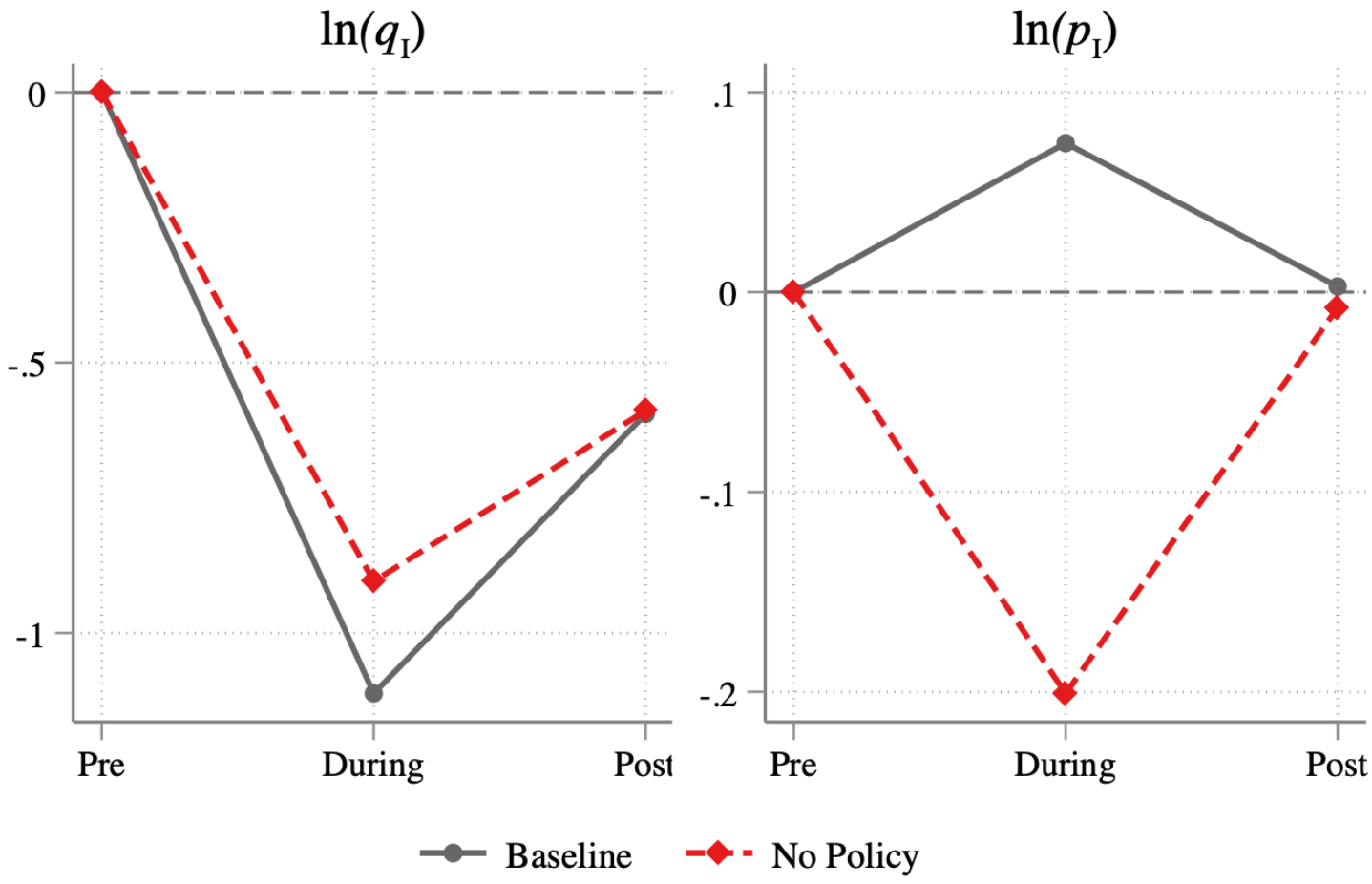
Effect of Policy on Prices and Quantities

Baseline model: using observed policy, calibrate foreign cost shifter $Z_{\omega t}$ and fixed cost of entry $F_{\omega t}$ to match observed import quantity $\bar{q}_{\omega t}$ and price $\bar{p}_{I\omega t}$



Effect of Removing the Policy

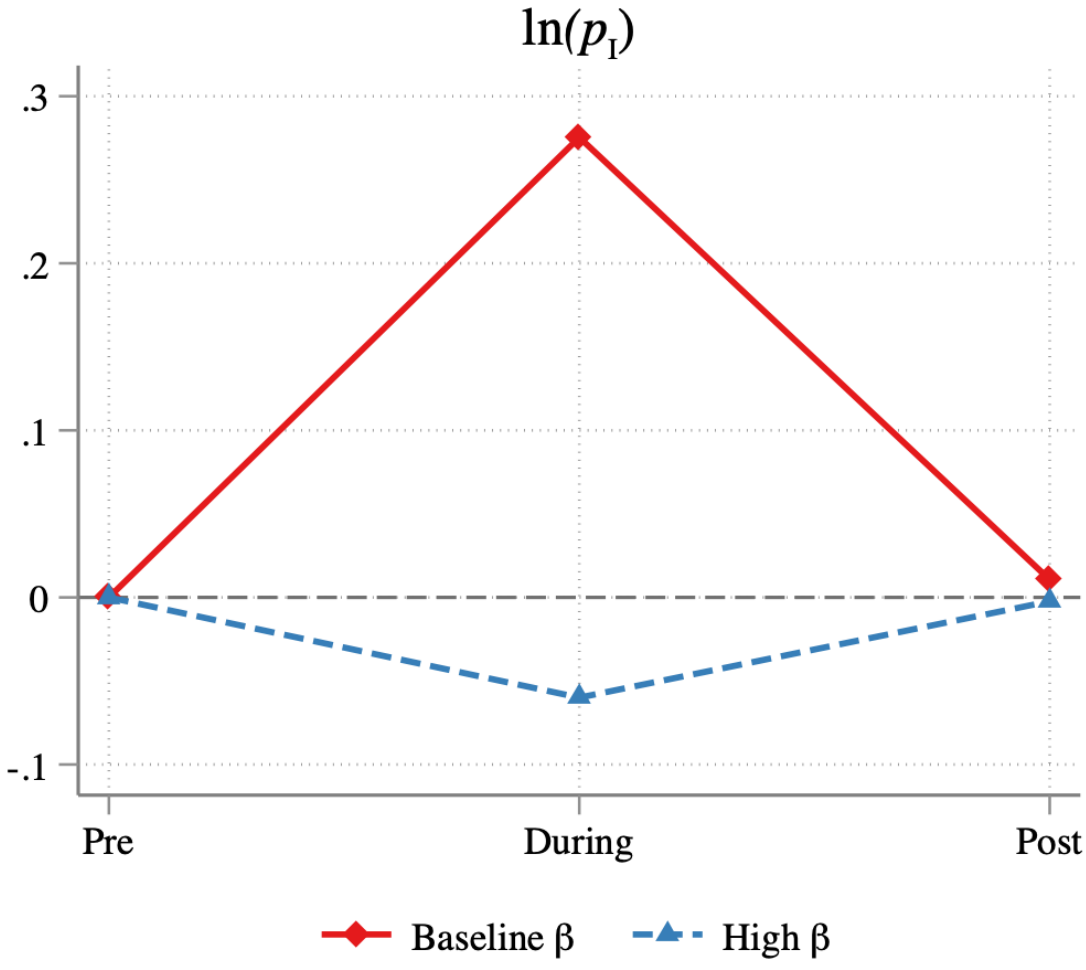
Counterfactual with $\phi_{0\omega t} = 1$ and $\phi_{1\omega t} = 0$



Without policy: quantities fall by less (7.6 pp difference) and prices fall instead of increase (26 pp difference).

The Role of β

Difference Baseline - No Policy



Higher domestic market power: prices fall with policy.

Conclusion

- Study episode of discretionary trade policy in Argentina 2012-2015
  - Data on universe of import requets and Government approvals
  - Identify firm and sector level determinants of trade policy
  - Surprising result: restrictions lead to deterioration of terms of trade
- Trade model with importer-exporter bargaining:
  - Can rationalize the evidence as long as home firms have low bargaining power
  - Used to identify bargaing power from empirical estimates
  - Implies large effect of the policy on import prices and quantities
    - ⋆ and important role of market power