

Political Connections and Misallocation of Procurement Contracts: Evidence from Ecuador

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Motivation

- Well-established empirical finding that firms benefit from political connections (Goldman et al. 2013, Tahoun 2014, Do et al. 2015)
- Yet welfare effects remain elusive
- Consider these examples documented by an Ecuadorian newspaper (El Universo):

Case A	Case B
Worked at public hospital as office worker Experience working in the pharmacy of hospital Owns an importing firm Assigned a 500K USD contract by the same hospital, beating 2nd cheapest quote by 1-2cents in each of 56 items	Worked at several agencies as technology consultant Experience as expert in procurement process Owns and manages technology firm Assigned a 600K USD contract by Ministry of Transportation and Public Works without contest

- In both cases, allocation could be efficient due to asymmetric information or inefficient if firms are simple rent-seekers
- [This paper](#) → propose method to measure welfare effects of political connections and obtain estimates for Ecuador for 2009-2017

This Paper

1. Propose a **sufficient statistic** to estimate welfare effects for the marginal government contract:
 - Welfare measure considered: *costs of production per utility unit* for final consumer
 - Welfare effects are proportional to the gap in **revenue productivity** and **capital share of revenue** between any arbitrary group of firms
 - Revenue productivity captures both quantity productivity and quality differences between firms
 - Capital share differences are indicative of location in non-constant marginal cost curves
2. Bring it to data using a new dataset for Ecuador (2009-2017):
 - Firm-level political connections
 - Contract-level allocations
 - Firm-level productivity
3. Document **reallocation** of contracts towards politically connected firms:
 - Increase in 10-15% relative to basis probability *after* connection is established
4. Estimate welfare **losses** ranging 2-6% of the budget of marginal contract

Related Literature

- **Political connections and public procurement**

(Goldman et al. 2013, Tahoun 2014, Do et al. 2015, Schoenherr 2019, Brogaard et al. Forthcoming, Szucs 2020, Colonnelli & Prem 2020, Baranek & Titl 2020)

- Confirm political connections → more contracts and less productive
- Provide empirical estimates of the sign and magnitude of the welfare effects

- **Misallocation**

(Hsieh & Klenow 2009, Haltiwanger et al. 2018, Asker et al. 2019, Boehm & Oberfield 2020)

- Allows for welfare comparison across any arbitrary group rather only relative to first-best
- Model considers unobserved quality heterogeneity, productive differences, and non-constant marginal cost curves
- Use first-moments rather than TFPR dispersion

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Ecuadorian Data

Scrape various administrative datasets for the years 2009-2017:

- **Bureaucrats**

The Law Regulating Sworn Declarations of Net Worth (passed in May 2003) mandates all civil servants to submit public financial declarations every time they are appointed or elected to a new position. We create a panel of entries in office for all government agencies detailing national ID, full name, and information on job type. No good coverage of exits.

- **Ownership**

Registry of owners of private firms over time, with national ID, full name, and shares held in each firm. Starting from 2000.

- **Government procurement contracts**

Universe of public contracts with information on type of contract, value of the contract, contract winner and competitors.

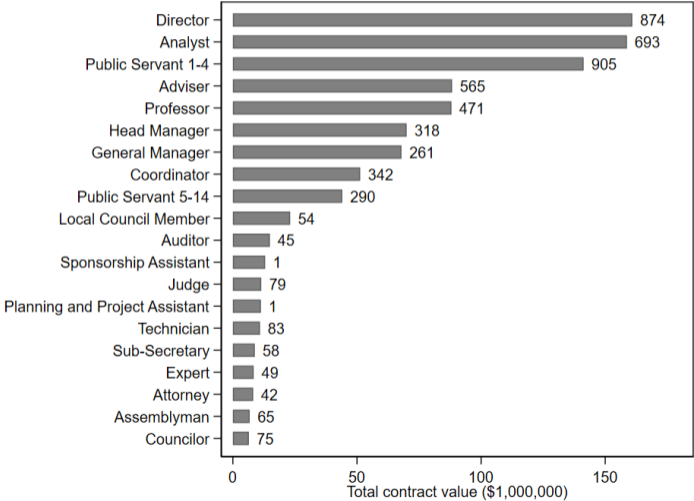
- **Balance sheets**

Information on revenue, capital, wage bills, and material inputs for all Ecuadorian private firms.

Definition of Political Connections

- Define a firm as **politically connected** if any of its current or past owners *is a bureaucrat or the sibling* of a bureaucrat in office
 - Include past owners but not bureaucrats that actively buy shares into firms while in office (likely violate assumption of exogenous timing).
 - Direct political connections if match between shareholder and bureaucrat IDs
 - Indirect connections rely on the Spanish tradition to keep **both** mother and father last names. Infer sibling ties when firm owner and bureaucrat share the same two last names
 - Family size defined using last names of all individuals in our data, complemented with tax data;
 - Consider only families with 4 or less siblings (75th percentile of the family size distribution)
- Family Size CDF
- Consider only “relevant owners”, defined as those that have control over at least 20% of firm shares

Top 20 Government Positions in Terms of Value of Contracts Won by Connected Firm



Ecuadorian Contractors, 2015

	<i>Panel A</i> Full Sample		<i>Panel B</i> Contractors Sample	
	All firms (1)	All contractors (2)	Not politically connected (3)	Politically connected (4)
Revenue	810,647 (3,317,781)	1,340,678 (4,447,662)	1,677,244 (5,068,397)	815,973 (2,972,394)
Capital	325,902 (1,373,586)	380,484 (1,553,196)	476,583 (1,772,079)	225,226 (1,011,721)
Wage bills	128,916 (460,268)	221,214 (627,813)	263,260 (698,629)	168,925 (499,233)
Intermediate inputs	542,330 (2,361,077)	893,766 (3,135,226)	1,132,297 (3,576,742)	503,149 (2,058,365)
Debt	441,808 (1,714,406)	646,554 (2,186,380)	810,890 (2,486,208)	377,571 (1,444,691)
Revenue-asset ratio	1.689 (3.577)	1.900 (3.329)	1.896 (3.242)	1.867 (3.374)
Age	9.528 (10.112)	9.902 (9.922)	10.593 (10.653)	11.100 (8.373)
Sample size	73,133	27,058	18,585	4,532

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Event-Study Methodology

- Implement Callaway & Sant'Anna (2020) as main-specification and other new approaches as robustness
- **Group-time average treatment effect:**

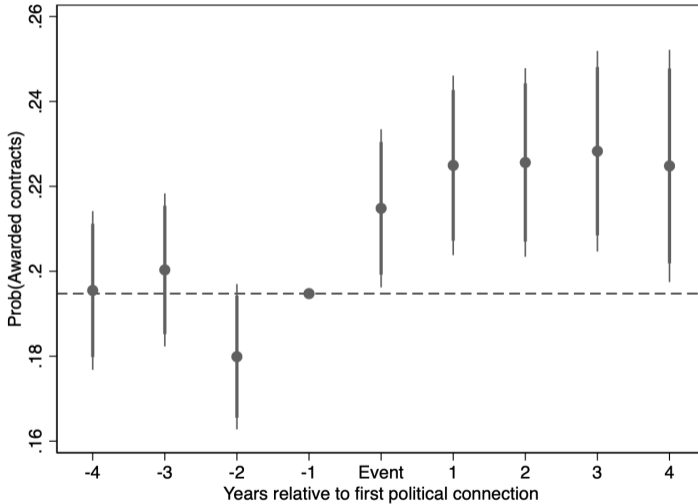
$$ATT(g, t) = E[Y_t(g) - Y_t(0) | G_i = g], \quad (1)$$

- period t
 - group-treatment status G_i
 - firm potential outcome $Y_{it}(g)$ for time t if they become treated at period g
 - untreated potential outcome $Y_{it}(0)$ for time t
- **Parameter of interest:**

$$\beta(e) = \sum_{g \in G} 1\{g + e \leq T\} P(G = g | G + e \leq T) ATT(g, g + e), \quad (2)$$

- time relative to treatment $e = t - g$
 - size of the group $P(G = g | G + e \leq T)$
- **Outcome of interest:** probability of winning contract in year e

Probability of Being Awarded a Contract



Robustness and Falsifications

- Similar results using different event-study estimation methods Robustness I
- Estimates are robust to narrower definitions of political connections Robustness II or alternative dependent variables Value
- Effects are driven by discretionary contracts Categories
- Effects are not found in falsification exercises Falsification

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Framework of Production with Government Demand (1/2)

Final Consumer: Utility from **private** and **government** goods:

$$U_{st} = U_{st}^{pri} + U_{st}^{gov} \quad (3)$$

with CES preferences system over goods i with **heterogenous** quality z_{it} consumed in private/government j in sector s :

$$U_{st}^j = \left(\int_{i \in F_{st}} (\exp(z_{it}) Q_{it}^j)^{(\sigma-1)/\sigma} di \right)^{\sigma/(\sigma-1)}. \quad (4)$$

Firms: Sell to private and government sector:

$$Q_{it} = Q_{it}^{pri} + Q_{it}^{gov}, \quad (5)$$

using Cobb-Douglas production function

$$Q_{it} = L_{it}^{\alpha_l} M_{it}^{\alpha_m} K_{it}^{\alpha_k} \exp(\omega_{it} + u_{it}), \quad (6)$$

Framework of Production with Government Demand (2/2)

Private Demand:

$$Q_{it}^{pri} = \exp(z_{it})^{\sigma-1} \left(\frac{P_{it}}{P_{st}} \right)^{-\sigma} \frac{E_{st}}{P_{st}}, \quad (7)$$

Private Prices:

$$P_{it}^{pri} = \frac{\sigma}{\sigma-1} C'(Q_{it}), \quad (8)$$

Government Demand: Firm-level demand is random for the firm (as in Kroft et al. 2020)

$$Q_{it}^{gov} = \tilde{D}(Post_{it}^{PC}) G(C'(Q_{it}), z_{it}) \exp(\xi_{it}) = D(Post_{it}^{PC}) \exp(\xi_{it}) Q_{it}^{pri}, \quad (9)$$

Government Prices:

$$P_{it}^{gov} = \begin{cases} P_{it}^{pri} & \text{if } Post_{it}^{PC} = 0, \\ P_{it}^{pri} (1 + \mu_s) & \text{if } Post_{it}^{PC} = 1. \end{cases} \quad (10)$$

Revenue Production Function Estimation

- Revenue of the firm $R_{it} = P_{it}^{priv} Q_{it}^{pri} + P_{it}^{gov} Q_{it}^{gov}$:

$$R_{it} = \exp(z_{it}) \frac{\sigma-1}{\sigma} Q_{it}^{\frac{\sigma-1}{\sigma}} X(Post_{it}^{PC}, \xi_{it}) \kappa_{st}, \quad (11)$$

- After plugging in production function technology, obtain estimating equation:

$$r_{it} = \beta_l \bar{l}_{it} + \beta_m \bar{m}_{it} + \beta_k \bar{k}_{it} + \omega_{it}^* + \psi_{st}^* + \xi_{it}^* + \varepsilon_{it}, \quad (12)$$

- $\omega_{it}^* = \frac{\sigma-1}{\sigma} (\omega_{it} + z_{it})$: TFP, captures quantity productivity, quality, and markup
- $\beta_j = \frac{\sigma-1}{\sigma} \alpha_j$: revenue-elasticity for input j
- ξ_{it}^* : government demand-shock, parametrized as $\xi_{st}^{PC} Post_{it}^{PC} \cdot Contractor_{it} + \phi_{it}$
- ψ_{st}^* : sectoral time-varying component (input prices)
- Estimate $\{\beta_l, \beta_m, \beta_k, \omega_{it}^*\}$ following production function literature to deal with simultaneity and selection bias (Levinsohn & Petrin 2003, Wooldridge 2009)

Social Excess Costs

Definition: The social excess cost (SOEC) of obtaining the same marginal utility from firm-type c rather than firm-type u is defined as the ratio in quality-embedded marginal costs:

$$SOEC = \frac{C'(\tilde{Q}^c)}{C'(\tilde{Q}^u)}.$$

By considering the cost-minimization problem of the firm, we obtain the following proposition.

Proposition: With CRST in production, constant elasticity of substitution, and **fixed capital**, the SOEC of procuring from a politically connected contractor rather than a non-connected contractor is given by

$$SOEC_{fixed} = \exp\left(\frac{\beta_k}{\beta_l + \beta_m + \beta_k} [\ln(S_{it}^{k,unc}) - \ln(S_{it}^{k,con})] + \frac{\omega_{it}^{*unc} - \omega_{it}^{*con}}{\beta_l + \beta_m + \beta_k}\right), \quad (13)$$

where $S_{it}^k = \bar{K}_{it}/R_{it}$ is the capital-revenue share, with $\bar{K}_{it} = r_{st}K_{it}$

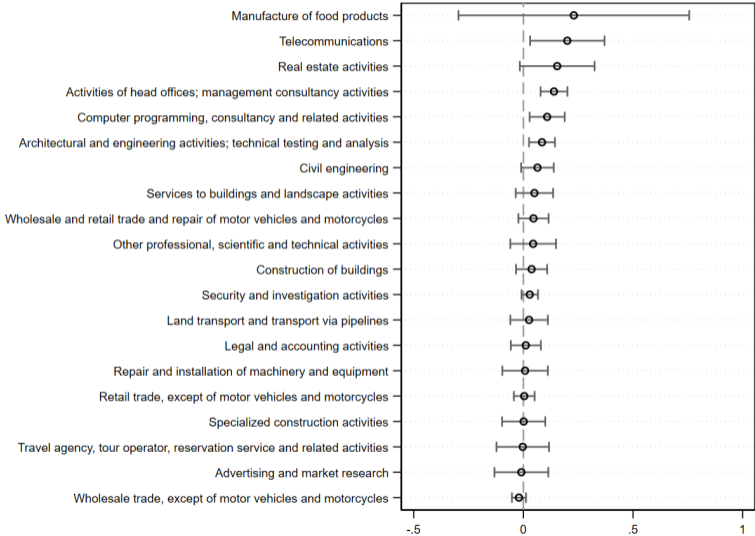
Social Excess Costs Estimates

	Main Specification		Exclude political connection years	
	OLS (1)	LP- Wooldridge (2)	OLS (3)	LP- Wooldridge (4)
SOEC - 1	0.008 (0.007)	0.038*** (0.009)	0.010* (.006)	0.043*** (.011)
Welfare cost (% of proc. budget)	0.571 (0.589)	2.975*** (0.777)	0.782 (0.492)	3.439*** (0.893)
Sample size	118,057	75,791	134,579	89,837

Social Excess Costs Estimates: Contract-level

	Fixed capital and LP-Wooldridge		
	(1)	(2)	(3)
<i>Panel A: Connected</i>			
Excess Costs - 1	.068*** (.024)	.06*** (.024)	.073* (.041)
Welfare cost (% of proc. budget)	5.723*** (2.093)	4.95*** (2.027)	6.225* (3.556)
Sample Size	74,955	69,487	30,044
<i>Panel B: Winner</i>			
Excess Costs - 1	-.021*** (.008)	-.019*** (.007)	-.022 (.019)
Welfare cost (% of proc. budget)	-1.718*** (.694)	-1.589*** (.566)	-1.839 (1.612)
Sample size	74,955	69,487	30,044
Sector FE	Yes	Yes	Yes
Year FE	Yes	Yes	No
Agency FE	No	Yes	No
Province FE	No	Yes	No
Contract-Category FE	No	Yes	No
Contract FE	No	No	Yes

Social Excess Costs Estimates, Largest Sectors



Extensions

- We show that results are robust to comparing only within specialized/non-specialized contractors Specialized
- Model can easily be adapted to multi-product firms when datasets with product-level information are available Multi

Conclusion

- Stylized framework to think about welfare losses through **social excess costs**
- Framework allows comparing allocations between **any arbitrary** groups
- Build new dataset for Ecuador to establish that political connections:
 - Generate **reallocation** of procurement contracts
 - Create significant **losses** through social excess cost margin

Thank you!

Outline

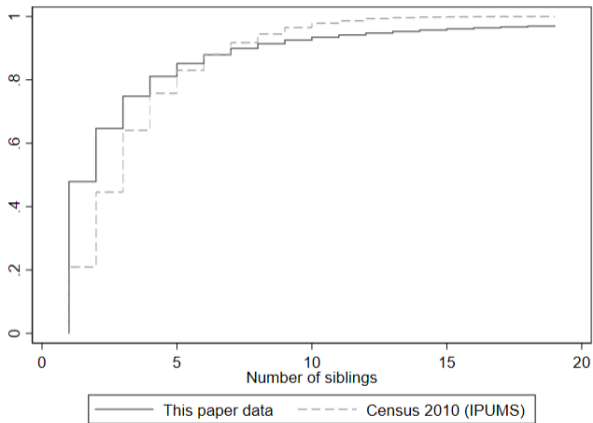
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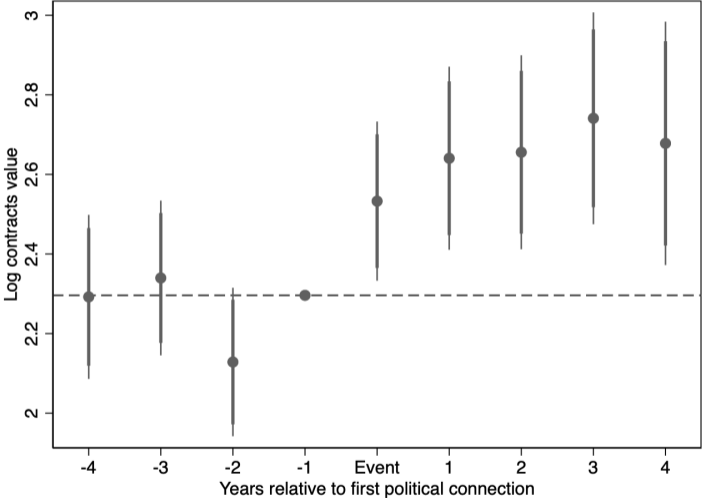
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Family Size CDF



Probability of Being Awarded a Contract: Log Value



Probability of Being Awarded a Contract: Falsification

	Fake treatment years (1)	Families with 15+ siblings (2)	Low rank and low shares (3)
After first political connection	0.0034 (0.0113)	0.0099 (0.0145)	-0.0110 (0.0155)
Sample Size	111,741	95,275	134,605
Number contractors	16,919	14,352	20,853
Connected contractors	2,205	1,282	1,023
Mean before connection	0.213	0.227	0.225

Probability of Being Awarded a Contract: Specifications

	Callaway- Sant'Anna (1)	Sun-Abraham (2)	De Chaisemartin- D'Haultfoeuille (3)	Two-way Fixed Effects (4)
After first political connection	0.0259*** (0.0096)	0.0262*** (0.0096)	0.0179*** (0.0065)	0.0268*** (0.0054)

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Probability of Being Awarded a Contract: Robustness

	Large reshuffles (1)	Single entry year (2)	No strategic exits (3)
After first political connection	0.0300** (0.0144)	0.0296** (0.0117)	0.0413*** (0.0114)
Sample Size	161,536	169,883	170,473
Number contractors	24,750	2,6029	26,184
Connected contractors	1,753	3,032	3,187
Mean before connection	0.193	0.196	0.184

Probability of Being Awarded a Contract: Categories

	Auction (1)	Discretionary (2)	Lottery (3)
After first political connection	0.0105* (0.0062)	0.0354*** (0.0088)	-0.0001 (0.0032)
Sample Size	181,790	181,790	181,790
Number contractors	27,838	27,838	27,838
Connected contractors	4,841	4,841	4,841
Mean before connection	0.063	0.138	0.032

Government Contracts Descriptives, by Contract Category

	Contract value (\$)	Contract budget (\$)	Contract length (days)	Number of contracts	Number of competitors	
	(1)	(2)	(3)	(4)	(5)	
Overall	41,286 (80,086)	103,418 (252,887)	70 (151)	199,727	1.671 (1.484)	
Auctions	48,859 (81,845)	127,285 (216,014)	90 (179)	90,272	2.240 (1.832)	
Discretionary	Publication	15,316 (51,074)	32,537 (110,066)	26 (85)	65,093	1.000 (0.008)
	Direct contracting	21,914 (15,238)	50,081 (35,391)	97 (122)	8,607	1.000 (0.000)
	Quotations	198,800 (126,892)	481,793 (330,293)	156 (230)	6,440	1.392 (0.916)
	Other discretionary	214,282 (154,315)	631,661 (1,266,095)	210 (287)	2,954	1.437 (1.267)
	Lower value (goods and services)	16,198 (13,450)	35,831 (30,221)	63 (110)	16,462	1.130 (0.604)
Lotteries	Lower value (public works)	47,474 (40,602)	106,844 (93,029)	63 (35)	9,899	1.333 (1.482)

Quality-Adjusted Excess Costs - Flexible Capital

- **Proposition:** With *CRST* in production, constant elasticity of substitution, and **flexible capital**, the **SOEC** of procuring from a politically connected contractor rather than a non-connected contractor is given by

$$SOEC_{flex} = \exp\left(\frac{\omega_{it}^{*unc} - \omega_{it}^{*con}}{\beta_l + \beta_m + \beta_k}\right). \quad (14)$$

Return

Quality-Adjusted Excess Costs - Multi-product Firms

$$SOEC_{fixed}^{multi} = \exp\left(\frac{\beta_k^j}{\beta_l^j + \beta_m^j + \beta_k^j} [\ln(S_{ijt}^{k,unc}) - \ln(S_{ijt}^{k,con})] + \frac{\omega_{ijt}^{*unc} - \omega_{ijt}^{*con}}{\beta_l^j + \beta_m^j + \beta_k^j}\right), \quad (15)$$

for input shares ρ_{ijt} and where $S_{ijt} = \rho_{ijt} \bar{K}_{it} / R_{ij}$ for firm-level capital \bar{K}_{it} and revenue R_{ij}

Return

Excess Costs - Specialization

	Dynamic		Static	
	Non-specialized (1)	Specialized (2)	Non-specialized (3)	Specialized (4)
Excess Costs - 1	.038** (.01)	.114 (.153)	.035*** (.01)	.089*** (.022)
Welfare cost (% of proc. budget)	2.98*** (.786)	9.579 (12.762)	2.704*** (.809)	6.999*** (1.696)
Sample size	75352	216	72066	3435

Return