Letting Luck Decide: Government Procurement and the Growth of Small Firms

Milenko Fadic

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The core

- **Question:** Estimate the causal effects of demand shocks on the growth of small firms in Ecuador
- **Approach:** Exploit a public procurement clause which allocates contracts exogenously
- **Results:** Short-term growth. Effects only observed during year of the shock. No spill-over effects

State of the art

Theory

- **Lucas** (1978) managerial ability
- **Jovanovic** (1982) productivity
- **Hopenhayn** (1992) experience
- **Syverson** (2004) demand

Empirics

- **Foster** (2008) structure on the dynamics of demand
- **Pozzi,Loecker** (2012) firm level data on prices
- **Ferraz et al.** (2015) Allocation of contracts in Brazil
- **Atking et al.** (2015) RCT on access to foreign markets

Country profile

"...Bid specifications shall contain criteria that encourage and promote local and national participation..."

(Article 25 LOSNCP)

- LOSNCP focused SME inclusion
- 96% of registered companies
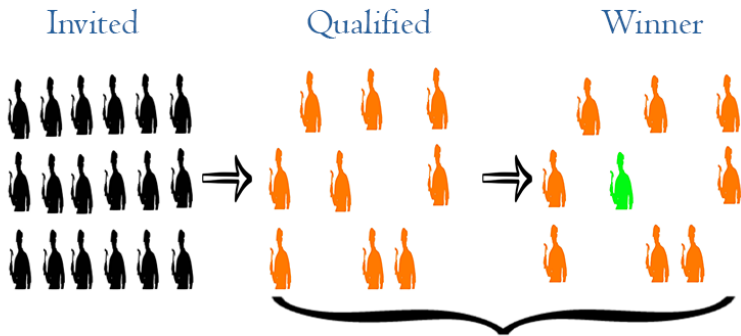
The procurement process

Remodel Bigavi

Institution ➡️ **COMPRAS PÚBLICAS** INSTITUTO NACIONAL DE CONTRATACIÓN PÚBLICA ⬅️ Providers/ Firms

<------------------------Procurement Process------------------------>

- Public works under $150,000 threshold
- Centralized process
- Objective requirements
- Qualified companies enter a random drawing

Contract allocation

- On average, qualified providers and winners should share similar characteristics

Identification

Key Elements of procurement process

- No negotiation
- Objective requirements for each public work
- Limited to small companies
- Random draw among qualified providers

Data

- Information on 5,475 public works performed between 2009-2012 (SERCOP) Search
- Financial information on the 1,179 companies that participated in the process (SUPERINTENDENCIAS) Balance
- Region level data from the census bureau (INEC)

Descriptive statistics
Public works

Descriptive statistics of 5,475 public works by year 2009-2012

	2009	2010	2011	2012	Total
Avg. contract amount (USD)	39,794	46,960	53,468	54,600	50,160
Avg. duration of contract (days)	57	63	69	65	65
Avg. days to submit a bid	8	7	7	7	7
Avg. number of qualified providers per contest	12	19	19	14	17
N. of contracts awarded	468	2034	1626	1347	5475

[1] Descriptive statistics of the 5,475 public works used in this study by year of procurement. Values are arithmetic means of variables. Contract amount is measured in U.S. dollars. Length of contract is measured in days.

Descriptive statistics
Public works
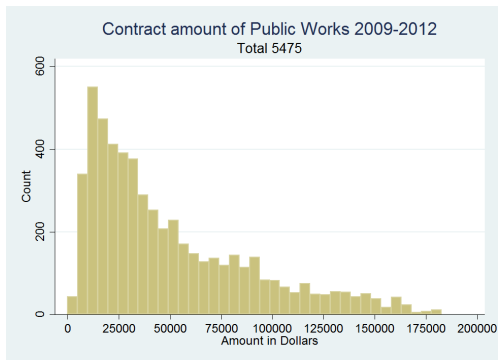
Distribution of the contract amount of the 5,475 contracts in the sample during years 2009-2012. Contract amount are expressed in U.S. dollars.

Providers

	2009	2010	2011	2012	Total
Avg. age (years)	5.41	5.68	4.97	4.69	5.14
Avg. number of qualifications	2.16	6.76	5.68	4.67	5.41
Avg. number of winnings	0.52	0.88	0.82	0.77	0.80
Avg. gross yearly revenue (USD)	255,137	291,232	291,162	233,392	269,230
Avg. total assets(USD)	113,570	133,844	129,358	126,885	128,589
Avg. liabilities (USD)	90,084	105,213	100,211	91,743	98,202
Avg. wage expense (USD)	24,146	22,351	25,508	29,778	25,931

Introduction
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Literature
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Background
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Identification
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Data
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Empirical strategy
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Results
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Is it really random?

- Independence of covariates Test
- Independence of probability Distribution of winners
- Independence of time Time independence

Is it really random?

Table 3: Difference in means Student t-test results by year

Variable	Runner	Winner	P value
2010			
Log total assets (USD)	10.00	10.16	0.43
Log total liabilities (USD)	10.03	10.38	0.12
Log current assets (USD)	9.39	9.73	0.11
Log fixed assets (USD)	9.43	9.71	0.20
Log current liabilites (USD)	9.64	10.05	0.13
Log fixed liabilites (USD)	10.38	10.35	0.92
Log revenue (USD)	11.66	11.70	0.82
Log wage expenditure (USD)	9.19	9.49	0.14
Firm age (years)	5.57	5.82	0.60

Reduced form equation

Reduced form

$$\dot{y}_{it} = \alpha + \beta_1 demand_{it} + \beta_2 x_{it} + \beta_3 w_t + \epsilon_t$$

- $\dot{y}_{it}$ Growth (revenue, labor expense, fixed assets) at time t
- $demand_{it}^{ext}$ Dummy if company won a contract at time t
- $demand_{it}^{int}$ Log value from mc at time t
- x_i Firm level controls (age, age squared, number of investors, initial levels)
- w_i Controls including geographical location and GDP

Extensive Margin

Effects of demand shocks on growth

Dependent Variable	Revenue Growth		Wage Growth		Fixed Assets Growth		Current Assets Growth	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Winner	0.245***	0.202***	0.048*	0.043	0.081**	0.068*	0.254***	0.200***
	(0.062)	(0.064)	(0.029)	(0.028)	(0.037)	(0.038)	(0.068)	(0.071)
Age of Firm		-0.016		0.004		-0.001		-0.076***
		(0.012)		(0.006)		(0.009)		(0.013)
Contests participated		0.005**		0.002		0.002		0.006**
		(0.002)		(0.001)		(0.003)		(0.003)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size of firm	No	Yes	No	Yes	No	Yes	No	Yes
Regional controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1778	1771	1778	1771	1778	1771	1778	1771
R^2	0.014	0.023	0.025	0.044	0.005	0.013	0.029	0.050

[1] The variable winner is a dummy variable that takes value 1 if a firm won during year t and 0 otherwise. Robust standard errors in parenthesis. P values $*p < .1, **p < .05, ***p < .01$

Intensive Margin

Effects of demand shocks on growth

Dependent Variable	Revenue Growth		Wage Growth		Fixed Assets Growth		Current Assets Growth	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Revenue from Menor Cuantia	0.11***	0.09***	0.05***	0.04**	0.05**	0.05**	0.20***	0.21***
	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.04)	(0.04)
Age of firm		-0.00		-0.00		0.00		-0.00***
		(0.00)		(0.00)		(0.00)		(0.00)
Contests participated		0.00*		0.00		0.00		0.00
		(0.00)		(0.00)		(0.00)		(0.00)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Size of firm	No	Yes	No	Yes	No	Yes	No	Yes
Regional controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1380	1380	1380	1380	1380	1380	1380	1380
R^2	0.017	0.025	0.029	0.058	0.006	0.012	0.050	0.060

[1] Notes: Robust standard errors in parenthesis. P values $*p < .1, **p < .05, ***p < .01$

Duration of effects
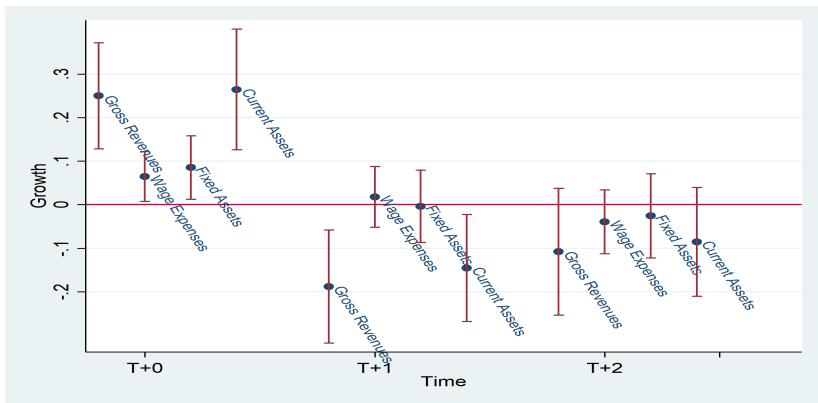
Robustness

- Diverse definitions of growth
- Various measures of the ratio of fixed assets, labor, and credits
- First time participants only
- Inclusion of lagged dependent variable

Conclusion

- Small firms are highly reactive to demand shocks
- A shock with a magnitude of 10% of a firm's past revenues will cause a labor cost and fixed asset growth of 5 percent
- No effects beyond the year of the shock

Milenko.fadic2@unibo.it

Sample search results of public works

Sample digital financial statement

Sample manual financial statement