Does Leaders' Education Matter? Quasi-Experimental Evidence from Brazil

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Motivation

- Recent research in political economy emphasizes the role of political institutions in shaping the identities of political leaders.
- Besley and Reynal-Queirol (2011): 1300 world leaders, 1848-2004
  Democracies tend to **select more highly educated leaders**
- Ferraz and Finan (2011): Municipalities in Brazil, 2004-2008
  Higher salaries tend to **attract more educated candidates**
- Brollo, Nannicini, Perotti, Tabellini (2013): Municipalities in Brazil, 2001-2008
  Larger federal transfers to local governments **decrease the schooling level of candidates for mayor**
- All these studies relate the education of the leader with the quality of her political leadership

Motivation

- But, **Are more educated leaders better politicians?**
- **Does leaders' formal education matter for policy outcomes?**
- We have still little direct evidence to answer these questions, and causal empiricism is far from conclusive.

In this Paper

- We use detailed data on municipalities in Brazil to examine whether and how leaders' education matters for:
  1. Wide range of **policy inputs and outcomes**
  2. **Political outcomes** (incumbency effect)
- Because leaders' education may affect not only the **size and composition of public spending** but also its **effectiveness**, we look at effects on a wide range of policy input and outcomes in the **education and health sectors** (represent about 50% of total spending by local governments in Brazil)
- Mayors have substantial discretion on spending decisions and allocation of public goods

In this Paper

- To deal with **endogeneity of political selection** we focus on **close elections in RD design** (Lee 2008, Ferreira and Gyourko, 2014, Brollo and Troiano, 2016, Dell, 2016)
  - 2-candidates elections, in which only one has a higher education degree
  - **Forcing variable** is the relative share of votes of the highly educated candidate (margin of victory)
    i.e. vote share for the candidate with HE - vote share of the candidate with no HE
  - **Discontinuity** occurs when the relative vote share is equal to zero.
  - **Treatment group** is formed by municipalities where the highly educated candidate barely won the election
    i.e. mayors with higher education
  - **Control group** is formed by municipalities where the highly educated candidate barely lost the election
    i.e. mayors with no higher education

In this Paper

Threats to identification addressed from earlier version:

- Unbalancedness of municipalities' baseline characteristics
  - Restrict to 2-candidates elections, where only one has higher education (Brollo and Troiano, 2016)
- Perform the analysis in a narrower window (bandwidth of 5%)
- Interpretation of the treatment
  Characterization of candidates with and without higher education

Addition from earlier version:

- Incumbency effect

Related Literature

- Besley, Reynal-Querol and Montalvo (2011)
  - Cross-country panel data, national leaders, 1875-2004
  - Random leadership transitions due to natural death or terminal illness
  - Some evidence that more educated leaders foster economic growth
- Ferraz and Finan (2011), Gagliarducci and Nannicini (2013), Brollo et al. (2013)
  - Look at effects of political institutions on both leaders' education and a set of policy inputs and outcomes
  - But it is difficult to disentangle between direct effects of institutions on policy outcomes and effects via political selection
- Bertand and Schoar (2003), Bastos and Monteiro (2011)
  - Evidence that top managers's education matters for their managerial style

Preview of Main Findings

- No effects of highly-educated leaders on policy inputs (composition of public spending, education, and health inputs)
- No effects on measurable policy outcomes (municipal GDP, age-grade distortion rates in municipal primary schools, health outcomes)
- Positive (but not significant) incumbency advantage for highly educated leaders

Data

We link and exploit 4 unusually rich data sets of publicly-available data for Brazilian municipalities for 2000-2008:

1. Mayoral candidates and votes (*Tribunal Superior Eleitoral*)
   1996, 2000, 2004, 2008
2. Size and composition of public spending, GDP, population (*FINBRA,IBGE*)
   2000-2008
3. Education inputs and outcomes of municipal primary schools from the annual census of educational establishments (*Censo Escolar*)
   2000-2008
4. Yearly administrative indicators on health and sanitation inputs and outcomes (*DATASUS*)
   2000-2008

Mayoral elections

Table 1: Elections characteristics and dynamics

	2000	2004
Type of election by candidates' level of education (%)		
no-higher education vs. no-higher education	41.0	37.9
higher education vs. no-higher education	41.0	43.1
higher education vs. higher education	18.0	19.0
Candidates with higher education (%)		
among total candidates	40.2	42.6
among 1st and 2nd places	38.5	40.6
among mayors elected	38.1	41.0
Highly educated candidates victories (%)		
in higher education vs. no-higher education elections	49.8	51.0
in 2-candidates and higher education vs. no-higher education elections	50.9	50.7

Mayoral candidates

Table 2: Candidates characteristics and dynamics

	election year	
	2000	2004
age	51.9	43.8
male	92.4	90.1
single	9.8	12.0
married	80.0	76.9
divorced	7.9	8.9
widowed	1.7	1.7
left wing	37.1	41.8
center/right wing	59.3	51.3
obs	15013	15619

City Characteristics: all elections

Table 3: City characteristics by participation of candidates with higher education degree

	elections with highly educated candidates		elections without highly educated candidates		differences in means	
	avg	sd	avg	sd	diff	se
population	43066	235256	10513	14326	32553	4140
gdp (R$1,000)	395550	3874911	48717	149551	346832	68163
gdp per capita (R$)	6016.5	7233.5	4751.8	5812.3	1264.7	144.7
agriculture (% of gdp)	22.17	15.93	30.20	15.79	-8.03	0.34
services (% of gdp)	55.14	14.36	53.7	14.12	1.44	0.30
industry (% of gdp)	16.63	13.59	11.98	10.11	4.64	0.27
mun. public exp. per capita	665.0	684.9	732.6	1170.3	-67.58	18.67
surface area (km^2)	1518.1	5918.5	1384.2	4464.8	134.0	116.8
population density	140.1	680.5	34.6	147.2	105.6	12.1
distance to state capital	242.5	159.5	265.3	165.4	-22.8	4.8
distance to federal capital	1074.3	434.6	1058.6	465.0	15.7	13.1
no. observations	7114		3236			

Notes: 2000 and 2004 elections years.

Research Design

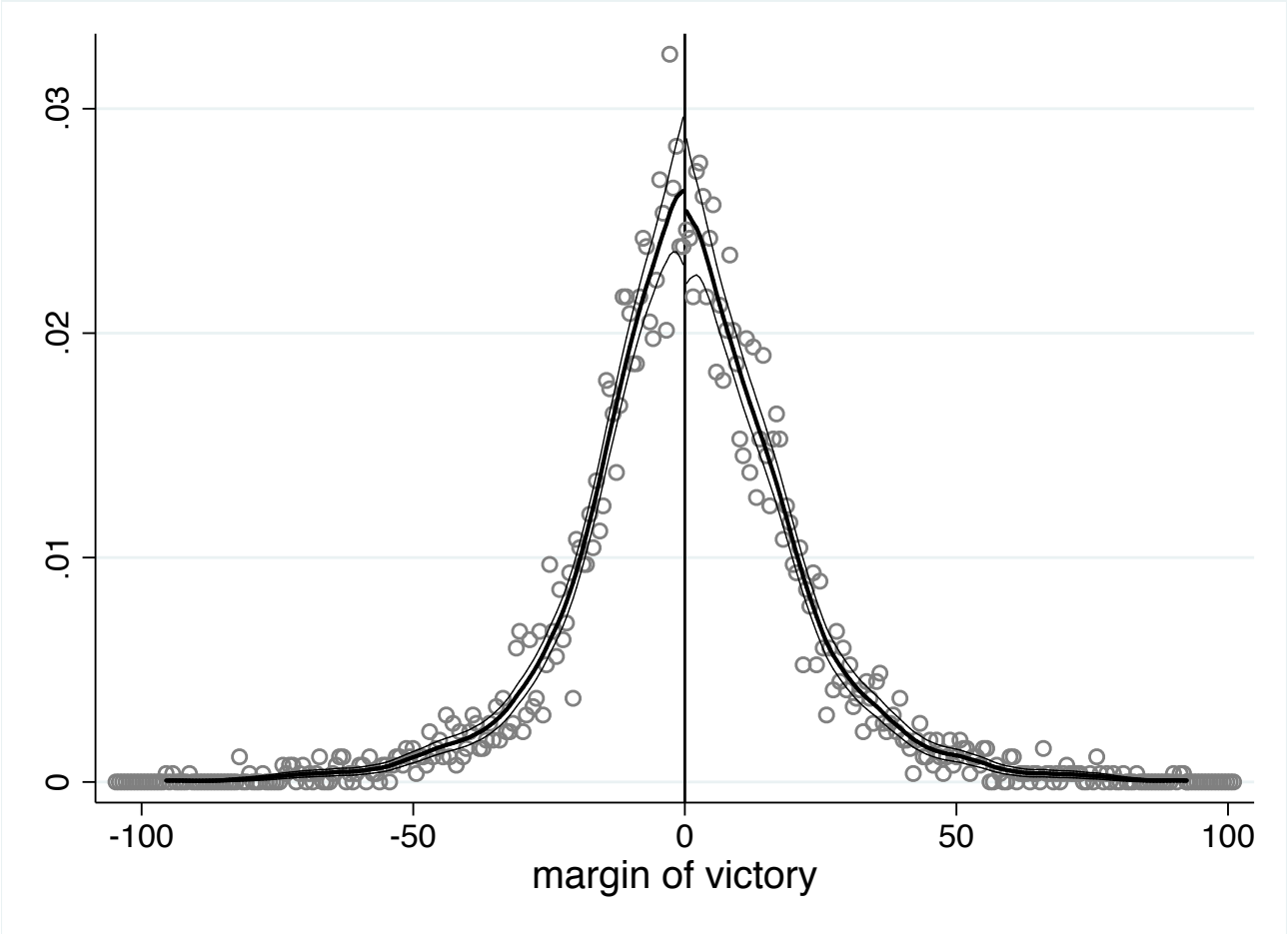
- Data on **2-candidates elections in which only one had a college degree**
- RD design on close elections:

$$Y_{ct} = \alpha + \beta HE_{ct} + \gamma' f(\textit{margin of victory}_{ct}, HE_{ct}) + \varepsilon_{ct}$$

- 2000 and 2004 municipal elections (take office in Jan 2001 and Jan 2005)
- Y_{ct} : average over electoral terms 2001-2004 and 2005-2008
- Results using a **quadratic polynomial and a 5% bandwidth**. Also tried linear polynomial, and 4%, 3% bandwidths, and LLR with IK bandwidth
- Include electoral period dummy, and federal states dummies

Validity Tests: McCrary's Density Test

Figure 1: Density of 2-candidates elections with participation of highly educated candidates



Validity Tests: No Discontinuity in Baseline Characteristics

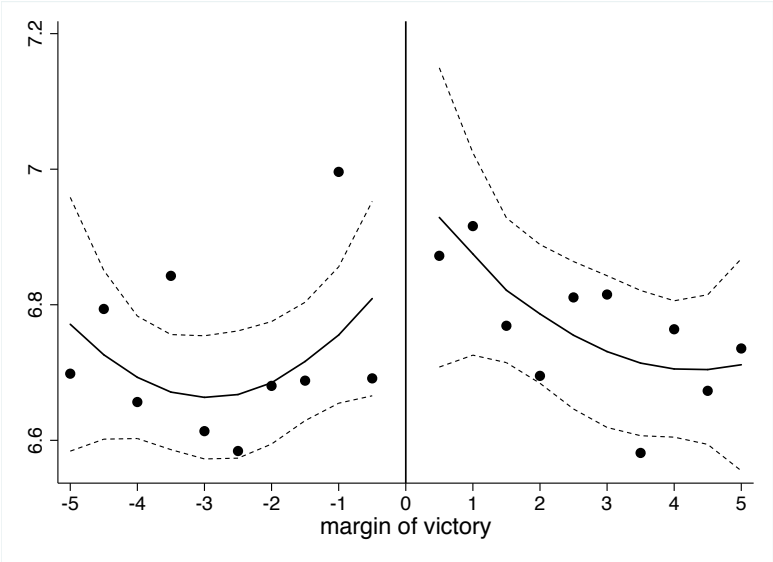
Dependent variable	avg (1)	RD coeff (2)
log population	9.1	-0.230
		(0.253)
log gdp per capita	8.2	0.265
		(0.257)
agriculture (% of gdp)	27.7	1.181
		(5.186)
services (% of gdp)	54.4	-6.245
		(4.925)
industry (% of gdp)	13.4	4.411
		(3.729)
log mun. public expenditure per capita	6.4	0.047
		(0.163)
log turnout	7.9	-0.153
		(0.225)
distance to state capital	271.9	3.379
		(46.247)
distance to federal capital	1153.0	20.76
		(114.763)
elevation	408.5	27.918
		(77.744)
population density	36.6	-6.027
		(13.006)
obs		385

Candidates' characteristics: highly educated vs. not highly educated

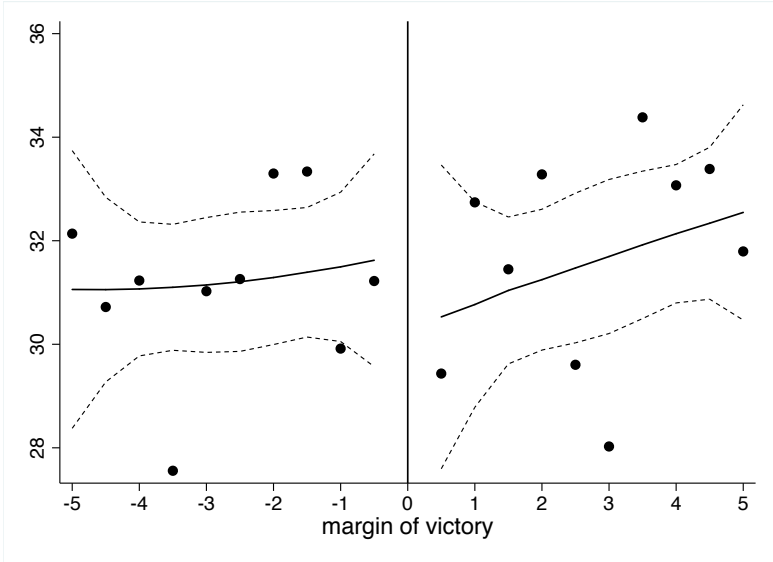
	not higher ed	higher ed	diff	*p*-value
age	49.17	47.31	1.85	0.07
male	0.93	0.90	0.02	0.40
single	0.10	0.10	0.00	0.95
married	0.82	0.79	0.03	0.51
divorced	0.06	0.09	-0.03	0.29
widowed	0.02	0.02	0.00	0.97
left wing	0.32	0.33	-0.01	0.80
center/right wing	0.68	0.67	0.01	0.80
obs		385		

Results: Effect on public expenditure and economic performance

i. log mun. public expenditure per capita

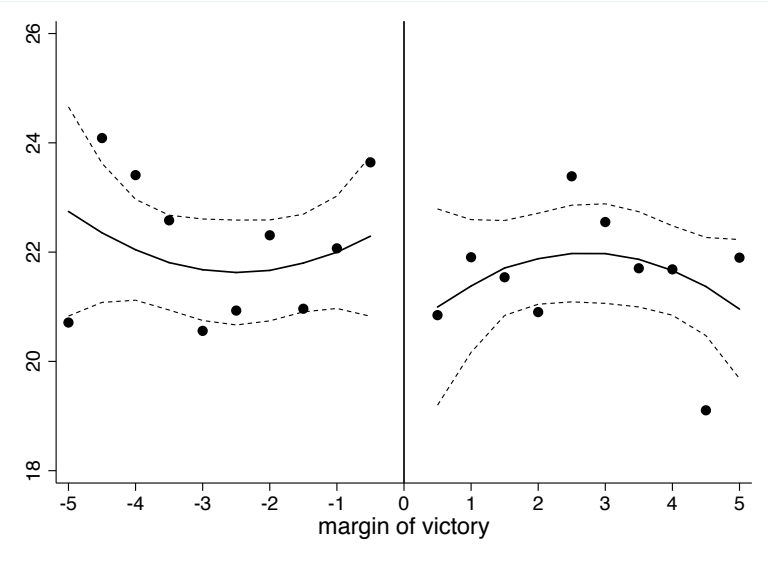


ii. education and culture

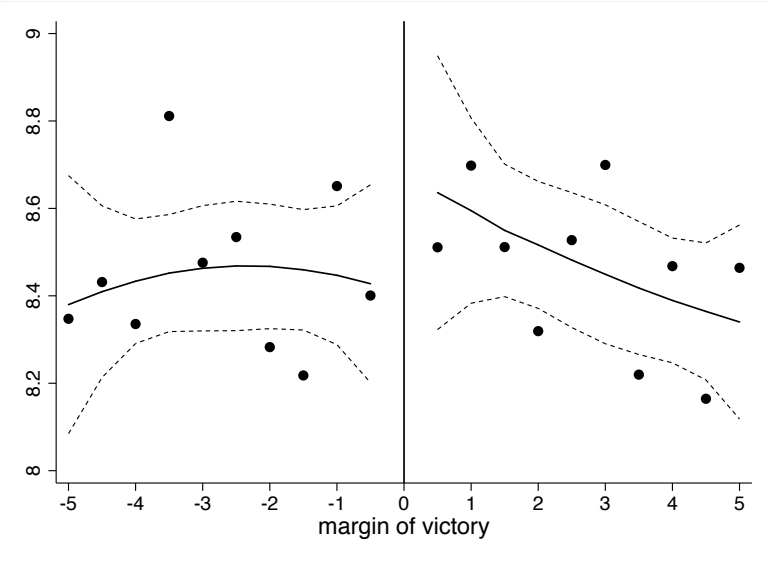


Results: Effect on public expenditure and economic performance

iii. health and sanitation



iv. log gdp per capita

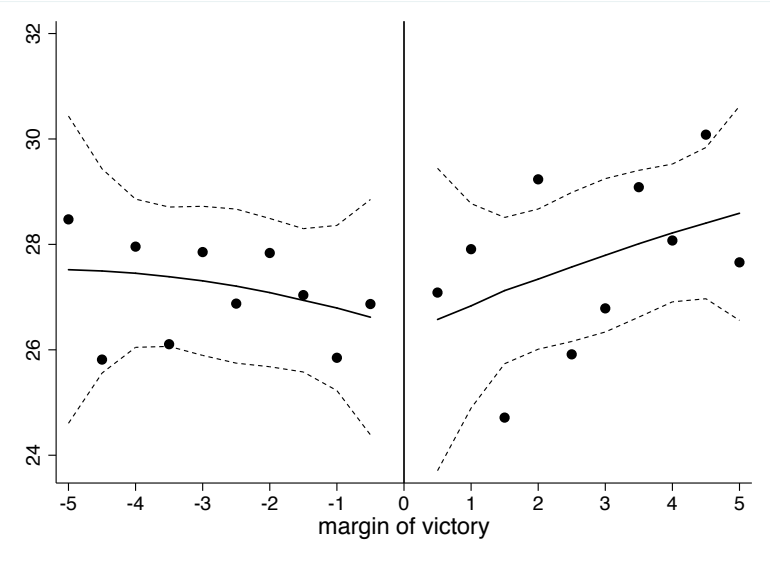


Results: Effect on public expenditure and economic performance

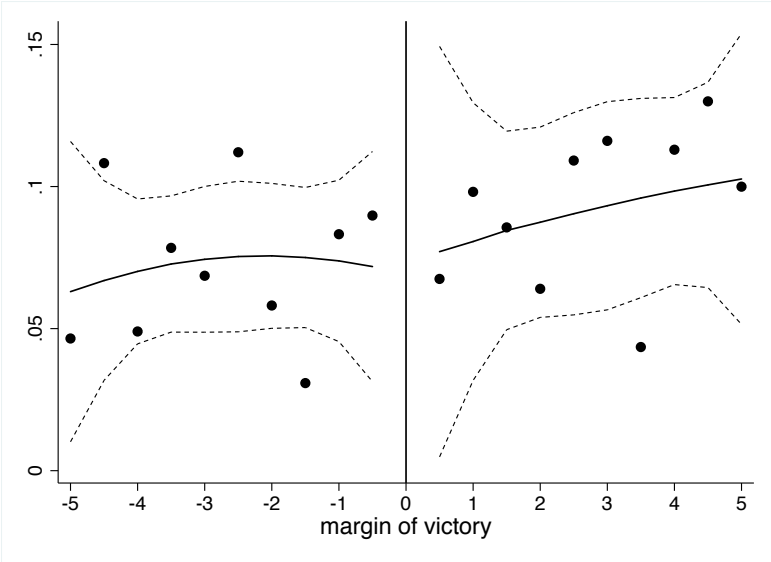
Dependent variable	avg (1)	RD coeff (2)
Size and composition of public expenditure		
log mun. public expenditure per capita	6.7	0.108
		(0.115)
education and culture (%)	31.5	-0.680
		(1.678)
health and sanitation (%)	21.8	-0.780
		(1.290)
planning (%)	18.5	-0.211
		(2.040)
social security (%)	5.7	-0.550
		(0.798)
transportation (%)	5.8	-0.612
		(1.177)
security (%)	0.1	0.076
		(0.087)
Economic performance		
log gdp	10.6	0.037
		(0.295)
log gdp per capita	8.5	0.202
		(0.137)
obs		385

Results: Effect on educational inputs

i. avg. class size 1st-8th grades

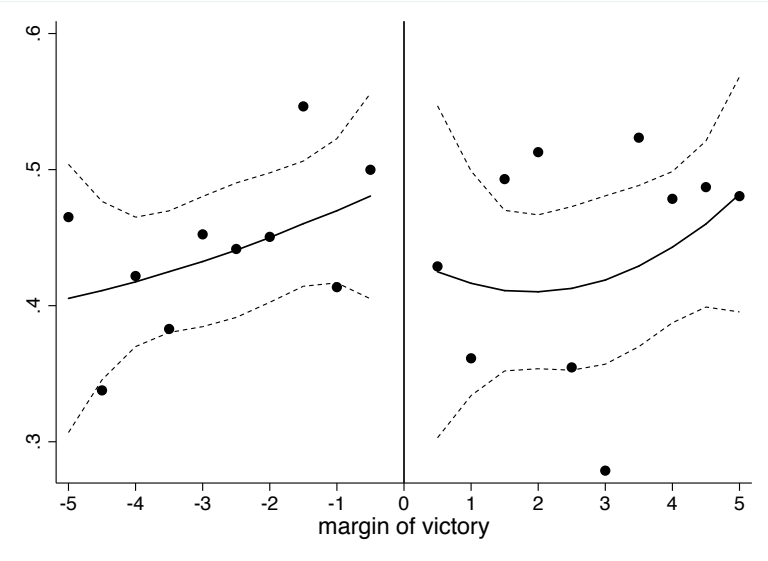


ii. sciences lab

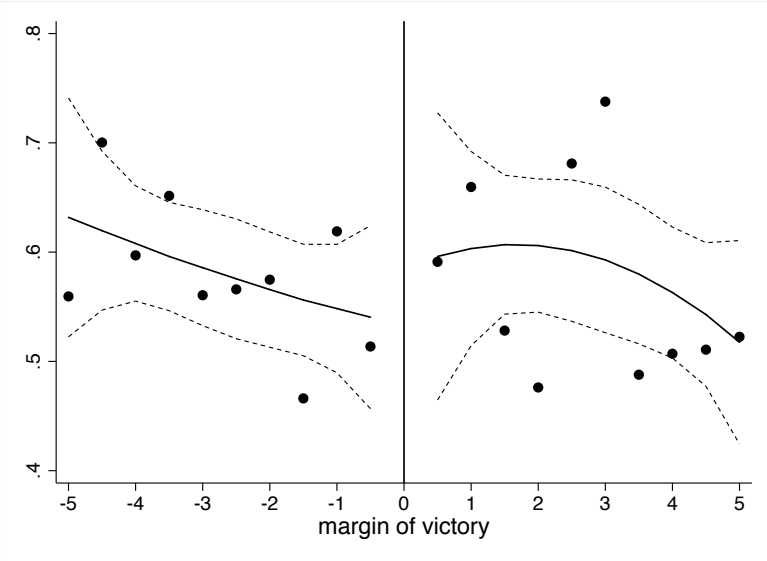


Results: Effect on educational inputs

iii. teachers' education: high school

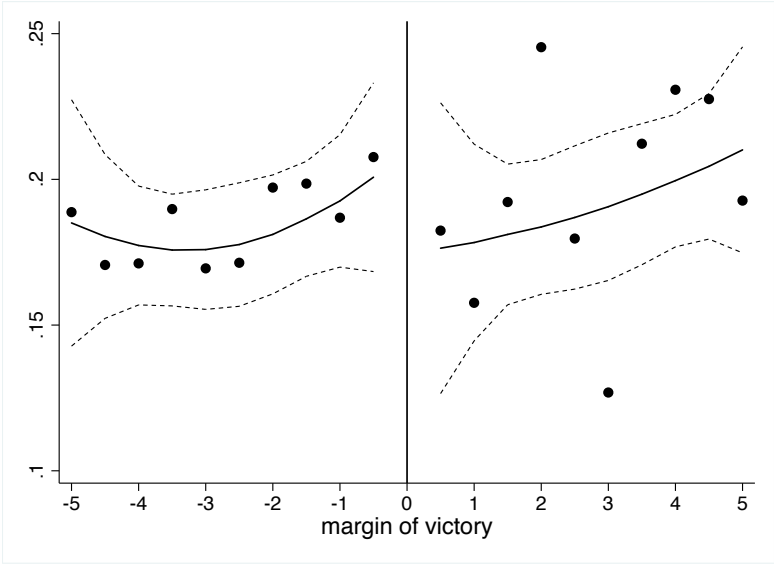


iv. teachers' education: college

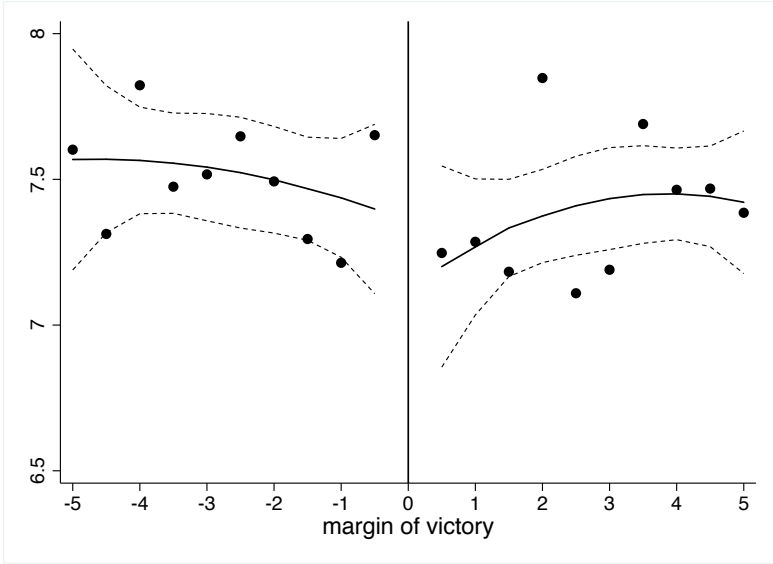


Results: Effect on education outcomes

i. age-grade distortion 1st-8th grades



ii. log enrollment 1st-8th grades

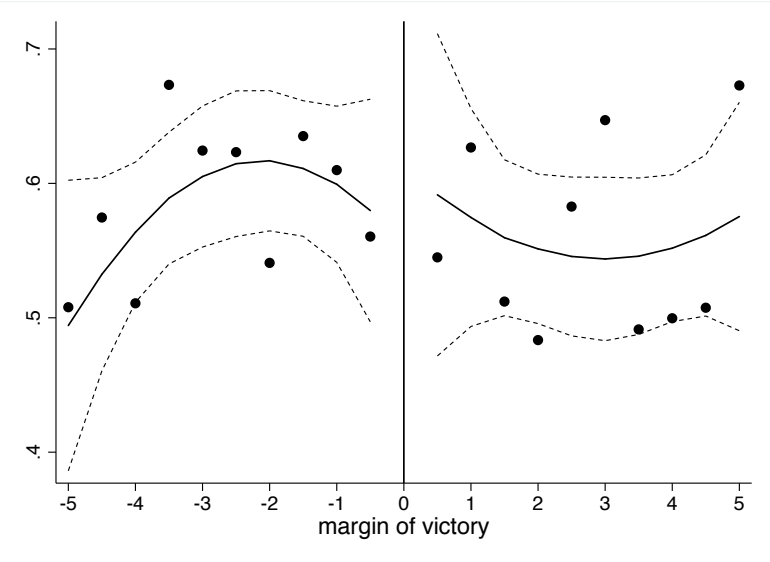


Results: Effect on education

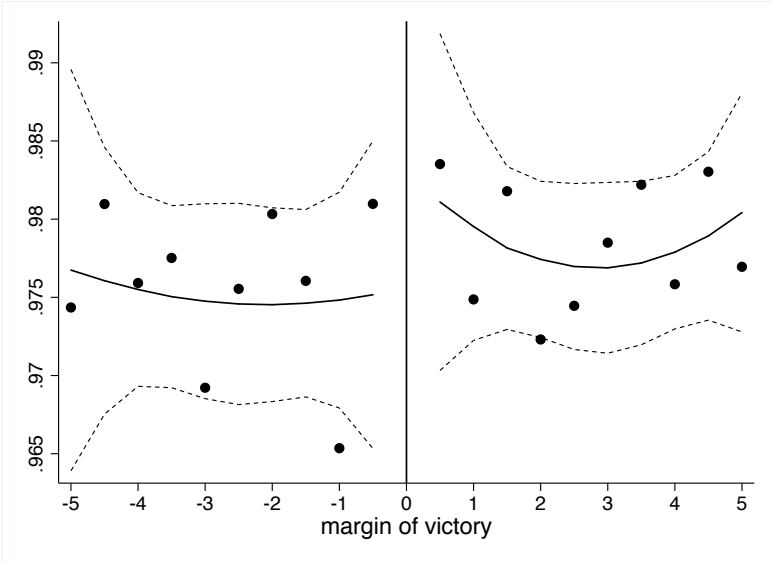
Dependent variable	avg (1)	RD coeff (2)
Education inputs		
avg. class size 1st-8th grades	27.45	0.316
		(1.583)
teachers' room	41.99	-0.636
		(7.798)
library	33.57	-4.323
		(7.450)
sciences lab	8.22	-1.112
		(3.859)
computer lab	15.93	0.166
		(5.904)
no. of computers per student	0.01	-0.001
		(0.005)
teachers' education: middle school	1.73	-0.474
		(0.865)
teachers' education: high school	43.76	-7.652
		(5.199)
teachers' education: college	57.85	8.068
		(5.443)
Education outcomes		
age-grade distortion 1st-8th grades	18.78	-1.354
		(1.384)
log enrollment 1st-8th grades	7.45	-0.102
		(0.226)
obs		385

Results: Effect on health inputs and sanitation

i. trash destination: collected



ii. monitored pregnant women (% of total)

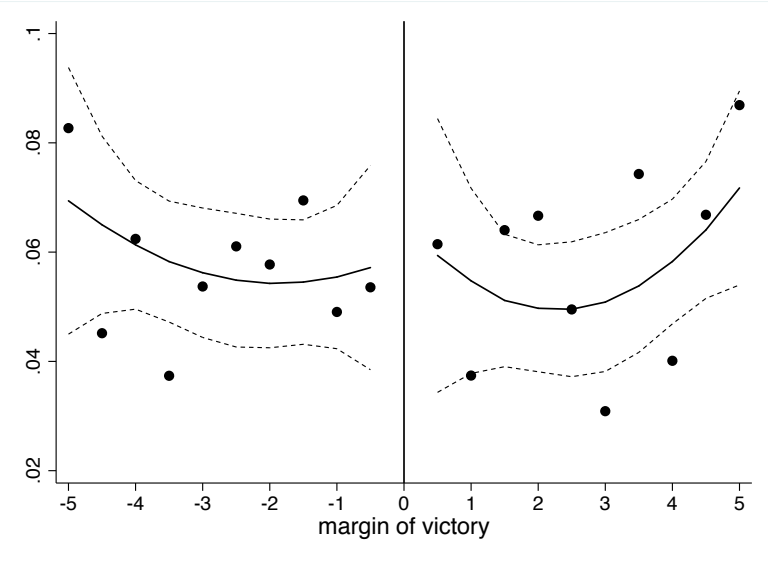


Results: Effect on health inputs and sanitation

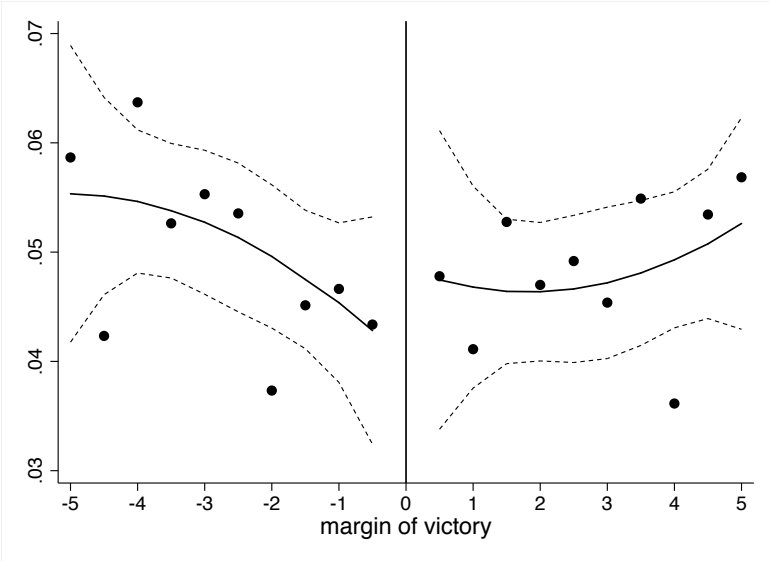
Dependent variable	avg (1)	RD coeff (2)
Health inputs and sanitation		
water supply: well	29.8	-2.22
		(5.77)
water supply: public system	61.2	1.56
		(6.51)
trash destination: thrown open	19.3	-3.68
		(3.76)
trash destination: collected	57.2	9.69
		(6.48)
trash destination: burned or buried	23.5	-6.01
		(5.15)
children <1y with immunization (% of total)	94.3	-0.01
		(1.48)
children 1-2y with immunization (% of total)	87.9	-2.17
		(3.08)
log no. of monitored families	10.1	-0.22
		(0.21)
monitored pregnant women (% of total)	97.7	1.10
		(0.93)
pregnant women with immunization (% of total)	92.0	-1.19
		(1.84)
obs		385

Results: Effect on health outcomes

i. malnourished children <1yo (%)



ii. children <2yo with diarrhea (%)



Results: Effect on health outcomes

Dependent variable	avg (1)	RD coeff (2)
Health outcomes		
live births <2500g (% of total)	9.8	1.84
		(1.67)
malnourished children <1y (% of total)	2.8	-0.38
		(0.60)
malnourished children 1-2y (% of total)	5.8	-0.25
		(1.12)
children <2y with diarrhea (% of total)	5.0	0.95
		(0.71)
children <2y with IRA (% of total)	5.2	1.75
		(1.84)
obs		385

Higher education and the **incumbency effect**: Research design

- Analysis at the candidate level
- Candidates in 2-candidates elections in which only one had a college degree in $t-1$; follow them until t
- Restrict the analysis to municipalities where the incumbent is eligible for reelection (since 2000, mayors can be in office for max. 2 terms)
- RD design on close elections.
  1. Incumbency effect:

$$W_{it} = \alpha + \beta W_{it-1} + \gamma' f(\textit{margin of victory}_{it-1}, W_{it-1}) + \nu_{it}$$

  2. Incumbency effect and highly-educated candidate:

$$\begin{aligned} W_{it} = {} & \alpha + \beta_1 W_{it-1} \times HE_i + \beta_2 W_{it-1} \times (1 - HE_i) \\ & + \gamma' f(\textit{margin of victory}_{it-1}, W_{it-1}, HE_i) + \eta_{it} \end{aligned}$$

  Test $H_0 : \beta_1 = \beta_2$

Results: Higher education and the incumbency effect

Dependent variable: elected in t	RD coeff (1)
All elections in $t-1$	
elected_{t-1}	0.044
	(0.035)
$\text{elected}_{t-1} \times$ higher education	0.109**
	(0.050)
$\text{elected}_{t-1} \times$ no-higher education	0.020
	(0.036)
p-value $H_0: \beta_1 = \beta_2$	0.075
Higher education vs. no-higher education elections in $t-1$	
elected_{t-1}	0.113*
	(0.060)
$\text{elected}_{t-1} \times$ higher education	0.196**
	(0.087)
$\text{elected}_{t-1} \times$ no-higher education	0.064
	(0.062)
p-value $H_0: \beta_1 = \beta_2$	0.123

Conclusions

- Using rich panel data for Brazilian municipalities, we have adopted an RD design to examine whether and how leaders' education matters for:
  - Wide range of policy inputs and outcomes
  - Political outcomes
- No evidence of effects of highly-educated leaders on policy inputs (composition of spending, educational and health inputs)
- No effects on measurable policy outcomes
  (gdp, age-grade distortion rates in municipal primary schools, health outcomes)
- Positive (but not significant) incumbency advantage for highly educated leaders