Political Agency

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SUPERB
WALLPAPERS

Political Agency

- Public Choice (Virginia) School
  - Conflict between voters and rent-seeking politicians
  - Goverment as a malevolent Leviathan (not a benevolent social planner)
  - Brennan & Buchanan (1980)
- Chicago School
  - Political **competition** can solve the conflict of interests
  - Wittman (1989, 1995)
- Tight connection with Principal-Agent models
  - Voters = Principal
  - Politicians = Agents
  - No contract available, as opposed to other PA applications
  - Role of political institutions, competitions etc

Today: Brollo, Nannicini, Perotti and Tabellini (AER, 2013)

- Theory
  - Very close to Persson & Tabellini, chapter 4.5.1
  - Career-concern model
  - Inspired by Holmström (1982), "Managerial Incentive problems"
  - Derive testable implications
- Empirics
  - Test the implications of the theory
  - Setting: municipal governments in Brazil

Theory

The Politicians

- They maximize their own utility
- They do NOT care about citizens' utility
- They do NOT care about policies per se (no left-right ...)
- They like being in office (so called Ego-rent): R
- They divert money from the public budget: r_t

$$V = \sum_{t=0}^{t=\infty} V_t = \sum_{t=0}^{t=\infty} (r_t + R)$$

The Voters

- The voters are aware that politicians grab rent $r_t \leq \overline{r} = \psi\tau$ if they can
- They dislike this, because it leaves less funding to finance public spending
- They simply care about the quantity of public good g_t
- They vote for the candidate who delivers the higher g_t
- θ is the politicians' productivity in producing the public good
- The total tax revenues is exogenously fixed at τ

$$\text{Voters' utility} \quad W = \sum_{t=0}^{t=\infty} g_t$$

$$\text{Gov. Budget Constraint} \quad g_t = \theta(\tau - r_t)$$

Audit system to fight corruption

- An investigation (audit) takes place randomly after each election
- The probability of an investigation at time t is qr_t
- Audited politicians receive a punishment λ
- A similar system is in place in Brazil

$$\begin{aligned} V_t &= E(r_t) + R \\ &= r_t - qr_t\lambda + R \\ &= (1 - q\lambda)r_t + R \\ &= \alpha r_t + R \end{aligned}$$

- Assume $\alpha > 0$

Two types of politicians

- Politicians differ in education and expected productivity
  - High-educated politicians, H-type: $\theta \sim U[\sigma^H + 1 - \frac{1}{2\xi}, \sigma^H + 1 + \frac{1}{2\xi}]$
  - Low-educated politicians, L-type: $\theta \sim U[\sigma^L + 1 - \frac{1}{2\xi}, \sigma^L + 1 + \frac{1}{2\xi}]$
  - On average, high-educated politicians are more productive, $\sigma^H + 1 > \sigma^L + 1$
- Politicians differ in punishment if an investigation (audit) finds them guilty
  - Punishment is higher for H-type: $\lambda^H > \lambda^L$
  - High-educated have more to lose since their outside option wage on the private market is higher
  - You can think of λ as a reputation cost

Timing

1. First Period
   (a) The incumbent is in office
      - the incumbent's type $I = H, L$ is public information
      - the incumbent's productivity θ is not observable to anybody
   (b) The incumbent decides how much rent r_1 to grab
   (c) One opponent emerges. Opponent is H with probability $1 - \pi$
   (d) Elections: voters decide between incumbent and opponent
   (e) Investigation on the incumbent: if found guilty, he gets punished
2. Second Period
   (a) The winner (either the incumbent, or the opponent) decides r_2
   (b) Investigation on the winner: if found guilty, he gets punished

The incumbent's problem

$$V^I = \alpha^I r_1 + R + p(\alpha^I r_2 + R)$$

- p is the endogenous probability that the incumbent wins the election
- p will, in equilibrium, depends negatively on r_1
- Incumbent: trade-off between stealing today or tomorrow

Backward induction: period 2

$$\max_{r_2} \quad \alpha r_2 + R$$
$$\text{s.t} \quad r_2 \leq \overline{r} = \psi\tau$$

- The politician grabs as much as he can $r_2^* = \overline{r} = \psi\tau$
- No electoral incentives to behave well
- By assumption, auditing technology is not enough to prevent stealing: $\alpha > 0$

Backward induction: election at the end of period 1

- Voters see that whoever they elect, he will steal as much as possible $r_2^* = \overline{r}$
- Both productive and unproductive politicians steal the same, but the productive can provide more public goods with the money left in the budget
- Voters always prefer productive (higher θ) politicians

$$g_2 = \theta(\tau - r_2^*)$$

- Voters re-elect the incumbent iff :

$$\underbrace{E(\theta|g_1, I)}_{\text{Expected productivity of the incumbent}} \geq \underbrace{1 + \sigma^O}_{\text{Expected productivity of the opponent}} \qquad I, O = H, L$$

Backward induction: probability of re-election

- Denote r_1^{eI} as the expected rent predicted by the voters. Then the GBC implies:

$$E(\theta|g_1, I) = \frac{g_1}{\tau - r_1^{eI}}$$

- From the point of view of the incumbent, using again the GBC:

$$E(\theta|g_1, I) = \theta\frac{\tau - r_1^{I}}{\tau - r_1^{eI}}$$

- The probability of re-election, as predicted by the incumbent, is:

$$\begin{aligned} p^I &= Prob\Big(E(\theta|g_1, I) \geq 1 + \sigma^O\Big) \\ &= Prob\Big(\theta\frac{\tau - r_1^{I}}{\tau - r_1^{eI}} \geq 1 + \sigma^O\Big) \\ &= Prob\Big(\theta \geq \frac{\tau - r_1^{eI}}{\tau - r_1^{I}}(1 + \sigma^O)\Big) \\ &= \frac{1}{2} + \xi(1 + \sigma^I) - \xi\frac{\tau - r_1^{eI}}{\tau - r_1^{I}}(1 + \sigma^O) \end{aligned}$$

Backward induction: period 1

The incumbent takes as given r_1^{eI} and $\sigma^O = \pi(\sigma^L) + (1-\pi)(\sigma^H)$

$$\max_{r_1^I} \quad V^I = \alpha^I r_1^I + R + p^I(\alpha^I r_2^* + R)$$
$$\text{s.t} \quad r_1^I \leq \overline{r}$$

$$\begin{aligned} 0 \quad &= \alpha + \frac{\partial p^I}{\partial r_1^I}(\alpha\overline{r} + R) \\ &= \alpha - \xi\frac{\tau - r_1^{eI}}{(\tau - r_1^I)^2}(1+\sigma^O)(\alpha\overline{r} + R) \end{aligned}$$

now we impose the equilibrium condition $r_1^I = r_1^{eI}$

$$= \alpha - \xi\frac{1}{\tau - r_1^I}(1+\sigma^O)(\alpha\overline{r} + R)$$

Equilibrium rents: comparative statics

$$r_1^{I*} = \tau - \xi(1+\sigma^O)(\psi\tau + R/\alpha^I)$$
$$r_2^* = \overline{r}$$

- **Prediction -1**: $r_1^I \leq r_2^I$
- **Prediction 0**: $\frac{\partial p^I}{\partial r_1} < 0$
- **Prediction 1**: $\frac{\partial^2 p^I}{\partial r_1 \partial \tau} > 0 \rightarrow \frac{\partial r_1^I}{\partial \tau} > 0$
- **Prediction 2**: $r_1^H < r_1^L$ and $\frac{\partial r_1^I}{\partial \sigma^O} < 0$
- **Prediction 3**: $\frac{\partial^2 r_1^I}{\partial \tau \partial \sigma^O} < 0$

Empirics

Institutional framework

- Municipal governments in Brazil
  - Mayors are directly elected
  - Mayors face a two-term limit
- Brazil is a federal republic (like the US)
  - System of federal transfer from the central government to municipalities
  - Tax revenues are only a small part of the municipal budget
- Political corruption is a widespread phenomenon in Brazil
  - Anti-corruption program: random audits

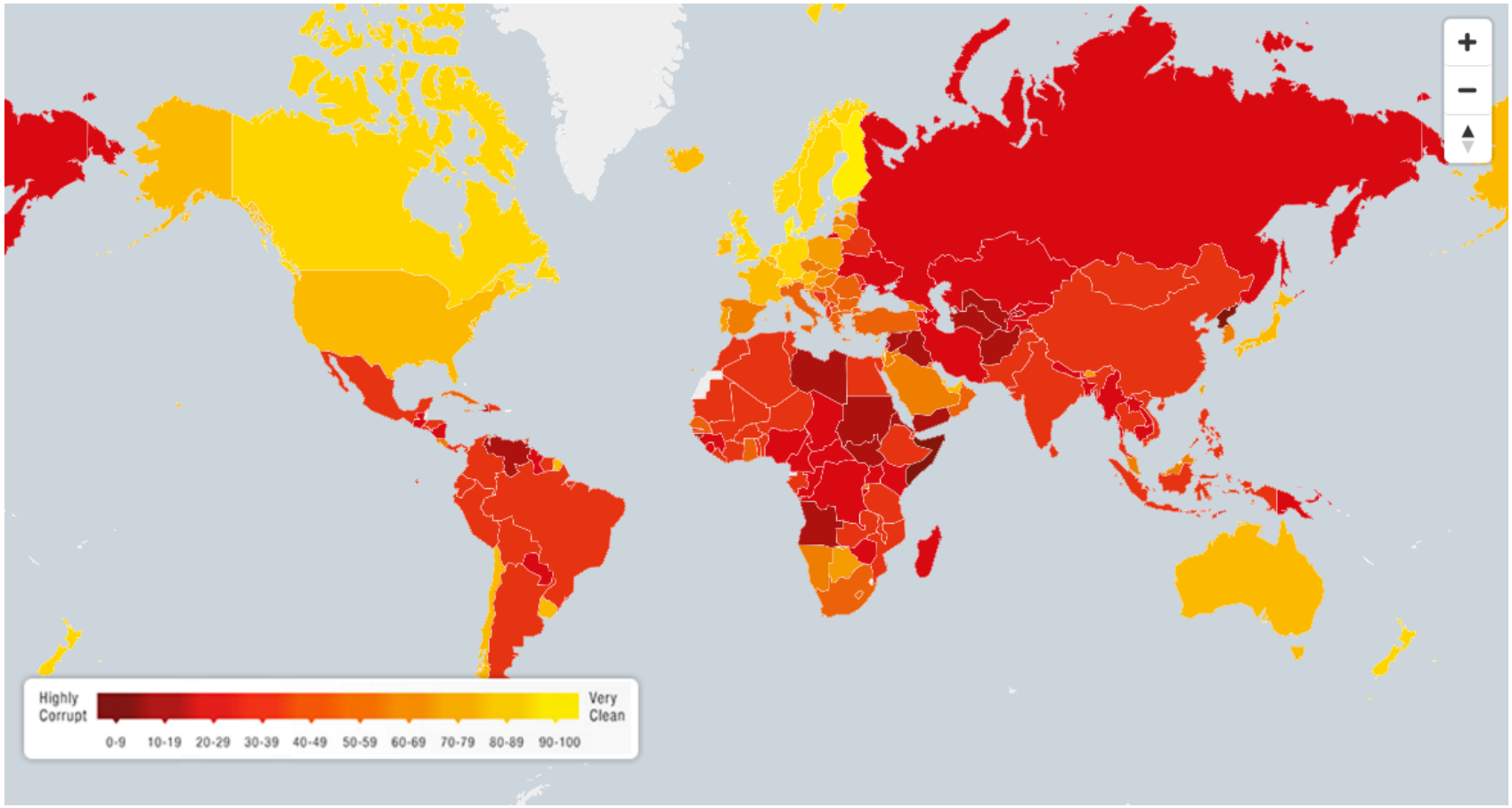
Highly Corrupt
Very Clean
0-9
10-19
20-29
30-39
40-49
50-59
60-69
70-79
80-89
90-100

TABLE 1—FPM COEFFICIENTS

Population interval	FPM coefficient
Below 10,189	0.6
10,189–13,584	0.8
13,585–16,980	1
16,981–23,772	1.2
23,773–30,564	1.4
30,565–37,356	1.6
37,357–44,148	1.8
44,149–50,940	2
Above 50,940	from 2.2 to 4

Note: FPM coefficient is the coefficient used in the FPM revenue-sharing mechanism described in Section IIA.

- Federal transfers (FPM) to municipalities depends on population size
- The allocation rule is a step-function
- The transfers change discontinuosly at different population thresholds
- Ideal set up for a (Fuzzy) Regression Discontinuity Design (RDD)

Fund in municipality i in state k: $\quad FPM_i^k = \dfrac{FPM_k \nu_i}{\sum_{i \in k} \nu_i}$

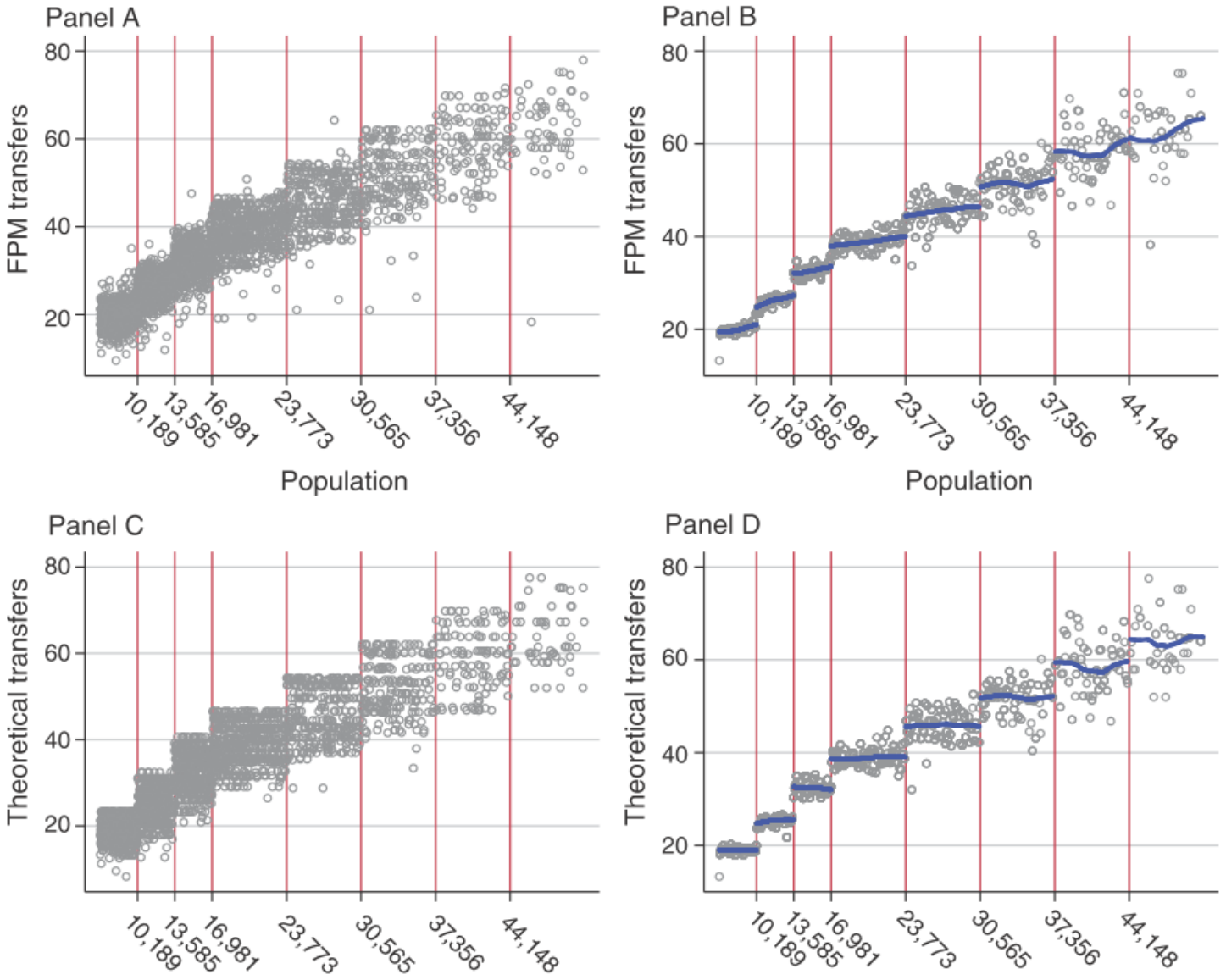

FIGURE 1. ACTUAL AND THEORETICAL FPM TRANSFERS

Notes: Panel A: scatterplot of actual FPM transfers versus population size; Panel B: scatterplot averaged over 100-inhabitant bins plus running-mean smoothing performed separately in each interval between two thresholds. Panel C: scatterplot of theoretical transfers versus population size; Panel D: scatterplot averaged over 100-inhabitant bins plus running-mean smoothing performed separately in each interval between two thresholds (right). Mayoral terms 2001–2005 and 2005–2009.

Anti-corruption lotteries

- Each month a lottery draws a random sample of municipalities
- Government officials implement deep investigation on the budget of those
- Results of the investigation are made public
- Based on these data the authors calculate four variables:
  - *Broad*: dummy for at least one corruption episode - broadly defined
  - *Narrow*: dummy for at least one severe corruption episode
  - *Broad fraction amount*: fund (broadly) violated / total fund audited
  - *Narrow fraction amount*: fund (severly) violated / total fund audited
- Sample of 1202 municipalities (all those ever drawn in a lottery)

TABLE 3—OUTCOME MEASURES

Population	Broad corruption	Narrow corruption	Broad fraction amount	Narrow fraction amount	College	Years of schooling	Incumbent reelection
6,793–10,188	0.79	0.37	5.65	2.19	0.38	11.39	0.58
10,189–13,584	0.80	0.50	5.72	1.96	0.39	11.57	0.58
13,585–16,980	0.77	0.44	4.13	1.60	0.43	11.86	0.58
16,981–23,772	0.83	0.55	5.78	2.62	0.48	12.08	0.62
23,773–30,564	0.75	0.48	5.72	2.08	0.49	12.48	0.57
30,565–37,356	0.75	0.43	5.37	1.96	0.52	12.60	0.57
37,357–44,148	0.78	0.40	5.58	2.29	0.52	12.69	0.68
44,148–50,940	0.74	0.52	2.15	1.00	0.67	13.42	0.65
Total	0.79	0.46	5.35	2.07	0.44	11.92	0.59

Testing prediction 1.b: $\frac{\partial r_1^I}{\partial \tau} > 0$

Reduced form: $r = g(P_i) + \beta_\tau \overline{\tau} + \delta_t + \gamma_k + \epsilon_i$

- $\overline{\tau}$: theoretical tranfers (based on the allocation rule), i.e. the instrument
- $g(P_i)$: high-order polynomial in the population, i.e. the running variable
- r: measure of corruption rent, i.e. the outcome
- δ_t: time fixed-effect
- γ_k: state fixed-effect

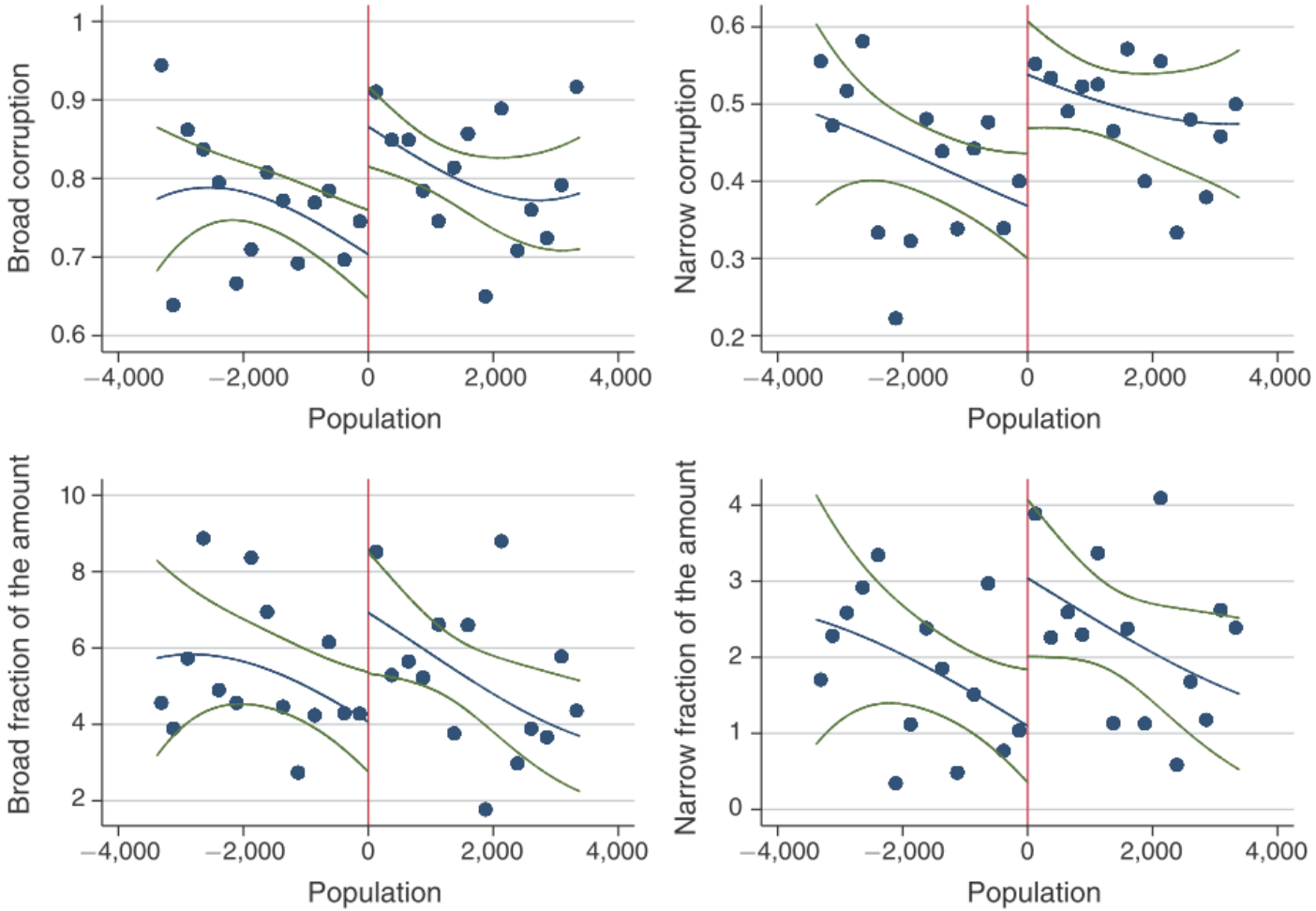

FIGURE 2. INTENTION-TO-TREAT DISCONTINUITIES: CORRUPTION MEASURES

Notes: The central line is a spline third-order polynomial in population size, fitted separately on each side of the pooled FPM threshold at zero (population size is normalized as the distance from the above or below threshold; symmetric intervals with no municipality in more than one interval). The lateral lines are the 95 percent confidence interval. Scatter points are averaged over 250-unit intervals. The four measures of corruption are only available for the small sample (random audit reports): Broad corruption and Narrow corruption are dummy variables capturing whether general or serious violations, respectively, were detected in the audit report (1,134 obs.); Broad fraction amount and Narrow fraction amount are expressed in percentage points and measure the amount of the audited budget (when available) that is related to the detected general or serious violations, respectively (1,072 observations). Terms 2001–2005 and 2005–2009.

Testing prediction 1.b: $\frac{\partial r_1^I}{\partial \tau} > 0$

$$\begin{aligned} \text{First-stage:} \quad & \tau = g(P_i) + \beta_\tau \overline{\tau} + \delta_t + \gamma_k + \epsilon_i \\ \text{Second-stage:} \quad & r = g(P_i) + \beta_\tau \hat{\tau} + \delta_t + \gamma_k + \epsilon_i \end{aligned}$$

- $\overline{\tau}$: theoretical tranfers (based on the allocation rule), i.e. the instrument
- $g(P_i)$: high-order polynomial in the population, i.e. the running variable
- τ: actual transfers, i.e. the variable of interest
- $\hat{\tau}$: fitted values of the first stage
- r: measure of corruption rent, i.e. the outcome
- δ_t: time fixed-effect
- γ_k: state fixed-effect

TABLE 5—IV ESTIMATES: CORRUPTION MEASURES

	Broad corruption	Narrow corruption	Broad fraction amount	Narrow fraction amount
Overall effect	0.014**	0.022***	0.220	0.265**
	(0.007)	(0.008)	(0.207)	(0.118)
Thresholds 1–3	0.018**	0.031***	0.447**	0.342***
	(0.008)	(0.010)	(0.211)	(0.117)
Thresholds 4–7	0.014**	0.023***	0.276	0.260*
	(0.007)	(0.008)	(0.245)	(0.135)
Threshold 1	0.005	0.019	0.905**	0.294*
	(0.014)	(0.018)	(0.412)	(0.177)
Threshold 2	0.003	0.017	0.397	0.309**
	(0.010)	(0.013)	(0.265)	(0.133)
Threshold 3	0.022**	0.026**	0.380*	0.208*
	(0.009)	(0.011)	(0.221)	(0.114)
Threshold 4	0.004	0.007	−0.066	−0.030
	(0.010)	(0.015)	(0.504)	(0.202)
Threshold 5	0.012	0.018*	0.362*	0.242**
	(0.010)	(0.010)	(0.210)	(0.105)
Threshold 6	0.016	0.030***	0.540	0.489
	(0.010)	(0.011)	(0.433)	(0.317)
Threshold 7	0.012	0.020	0.666*	0.174*
	(0.011)	(0.014)	(0.361)	(0.090)
Observations	1,202	1,202	1,140	1,140

Notes: Effects of FPM transfers on corruption measures. Each cell reports the estimated coefficient of actual FPM transfers (instrumented with theoretical FPM transfers)—controlling for a third-order polynomial in normalized population size, term dummies, and macro-region dummies as in equation (7)—in a regression where the dependent variable corresponds to each column heading. Robust standard errors clustered at the municipality level are in parentheses. See notes to Table 4 for a description of the variables.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

Testing Prediction 3: $\frac{\partial^2 r_1^I}{\partial \tau \partial \sigma^O} < 0$

- Interact the previous specification with two measures of education of the opponents:
  - dummy for college
  - years of schooling
- Include controls potentially correlated with education of the opponents

TABLE 7—OPPONENTS' EDUCATION AND IMPACT OF TRANSFERS ON CORRUPTION

	Broad corruption	Narrow corruption	Broad fraction amount	Narrow fraction amount
Panel A. Overall effect				
FPM	0.052**	0.054**	1.048	0.792*
	(0.022)	(0.024)	(0.649)	(0.409)
FPM × college	−0.006**	−0.006*	−0.068	−0.103*
	(0.003)	(0.003)	(0.081)	(0.053)
Observations	1,202	1,202	1,140	1,140
Panel D. Overall effect				
FPM	0.076**	0.077**	1.391	1.198**
	(0.032)	(0.036)	(0.934)	(0.602)
FPM × years of schooling	−0.002**	−0.002*	−0.031	−0.037**
	(0.001)	(0.001)	(0.028)	(0.018)
Observations	1,202	1,202	1,140	1,140

Testing prediction 0: $\frac{\partial p^I}{\partial r_1} < 0$*; and prediction 1.a:* $\frac{\partial^2 p^I}{\partial r_1 \partial \tau} > 0$

- The timing of the release of the audit result to the public is random
- Some audits are released before elections, some others later
- Identification strategy: compare the following two groups
  - treatment group: municipalities whose audits have been released *before*
  - control group: municipalities whose audits have been released *after*
- Important to control for the level of detected corruption
- This strategy was originally developed by Ferraz & Finnan (QJE, 2008)

Testing prediction 0: $\frac{\partial p^I}{\partial r_1} < 0$; *and prediction 1.a:* $\frac{\partial^2 p^I}{\partial r_1 \partial \tau} < 0$

$$E_i = \beta_1(\overline{\tau_i} \times before_i \times r_i) + \beta_2(before_i \times r_i)$$

$$+ \beta_3(before_i \times \overline{\tau_i}) + \beta_4(\overline{\tau_i} \times r_i)$$

$$+ \alpha_1 \overline{\tau_i} + \alpha_2 r_i + \alpha_3 before_i$$

$$+ g(P_i) + g(P_i) \times before_i \times r_i + g(P_i) \times before_i + g(P_i) \times r_i$$

$$+ \delta_t + \gamma_k + \epsilon_i$$

- $before_i$: dummy =1 if the audit report has been released before an election

TABLE 6—IMPACT OF FPM TRANSFERS ON THE PUNISHMENT OF CORRUPTION
(*millions 2000R$*)

	Broad corruption	Narrow corruption	Broad fraction amount	Narrow fraction amount
Panel A. Incumbent runs for reelection				
	All eligible incumbents			
Before × corruption × FPM	0.007	0.163	0.008*	0.026*
	(0.122)	(0.110)	(0.004)	(0.015)
Before × corruption	−2.337***	−1.556***	−0.052*	−0.088
	(0.735)	(0.594)	(0.030)	(0.090)
Before × FPM	0.119	−0.001	0.081	0.076
	(0.111)	(0.081)	(0.066)	(0.064)
Observations	816	816	766	766
Panel B. Incumbent reelection				
	Eligible incumbents who run for reelection			
Before × corruption × FPM	0.230	0.113	0.007	0.019
	(0.185)	(0.151)	(0.007)	(0.016)
Before × corruption	−1.996*	−1.047	−0.085**	−0.111
	(1.098)	(0.741)	(0.040)	(0.125)
Before × FPM	−0.216	−0.089	−0.048	−0.031
	(0.177)	(0.122)	(0.095)	(0.090)
Observations	564	564	529	529
Panel C. Incumbent reelection				
	All eligible incumbents			
Before × corruption × FPM	0.123	0.218*	0.007	0.027**
	(0.126)	(0.111)	(0.005)	(0.011)
Before × corruption	−2.163***	−1.458**	−0.097***	−0.095
	(0.778)	(0.655)	(0.036)	(0.062)
Before × FPM	−0.035	−0.082	0.019	0.021
	(0.118)	(0.084)	(0.074)	(0.070)
Observations	816	816	766	766

Testing Prediction -1: $r_1^I \leq r_2^I$

- This prediction is tested in Ferraz & Finnan (AER, 2008)
- In Brazil 2-terms limit for majors
- Confounding factors at the politicians level
  - experience
  - ability
- Confounding factors at the municipal level

Testing Prediction -1: $r_1^I \leq r_2^I$

$$r_{i,t} = \beta FirstTerm_{i,t} + X_{i,t}\phi + W_{i,t}\gamma + \epsilon_{i,t}$$

- $FirstTerm_{i,t}$ is a dummy for a major in his first term
- $X_{i,t}$ municipal-level variables
- $W_{i,t}$ politician-level variables

How to address omitted variables bias:

- at the municipal level, use RDD close-elections (see Petterson-Lidbom, 2008)

$$r_{i,t} = \beta FirstTerm_{i,t} + g(VoteShare_{i,t}) + X_{i,t}\phi + W_{i,t}\gamma + \epsilon_{i,t}$$

- at the politician level
  - ability: include only first-term majors whi will get re-elected
  - experience: control for past experience

TABLE 4—THE EFFECTS OF REELECTION INCENTIVES ON CORRUPTION

Dependent variable	Share of audited resources involving corruption							
	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	OLS (6)	Matching (7)	Tobit (8)
Mayor in first term	−0.019	−0.020	−0.020	−0.024	−0.026	−0.027	−0.028	−0.042
	[0.009]**	[0.010]**	[0.010]**	[0.011]**	[0.011]**	[0.011]**	[0.010]**	[0.012]**
R^2	0.01	0.08	0.10	0.12	0.14	0.20	n/a	n/a
Observations	476	476	476	476	476	476	476	476
Mayor characteristics	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal characteristics	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Political and judicial institutions	No	No	No	Yes	Yes	Yes	Yes	Yes
Lottery intercepts	No	No	No	No	Yes	Yes	Yes	Yes
State intercepts	No	No	No	No	No	Yes	Yes	Yes

TABLE 6— THE EFFECT OF REELECTION INCENTIVES ON CORRUPTION, CONTROLLING FOR UNOBSERVED MUNICIPAL CHARACTERISTICS

Dependent variable	Share of audited resources involving corruption						
	Incumbents who run for reelection in 2000 (1)	Linear (2)	Quadratic (3)	Cubic (4)	Linear spline (5)	Quadratic spline (6)	Cubic spline (7)
Mayor in first term	−0.031	−0.039	−0.040	−0.038	−0.043	−0.047	−0.028
	[0.014]**	[0.019]**	[0.019]**	[0.022]*	[0.019]**	[0.024]*	[0.029]
Observations	328	328	328	328	328	328	328
R^2	0.27	0.27	0.27	0.27	0.27	0.28	0.28
Mayor characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Political and judicial institutions	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lottery intercepts	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State intercepts	Yes	Yes	Yes	Yes	Yes	Yes	Yes

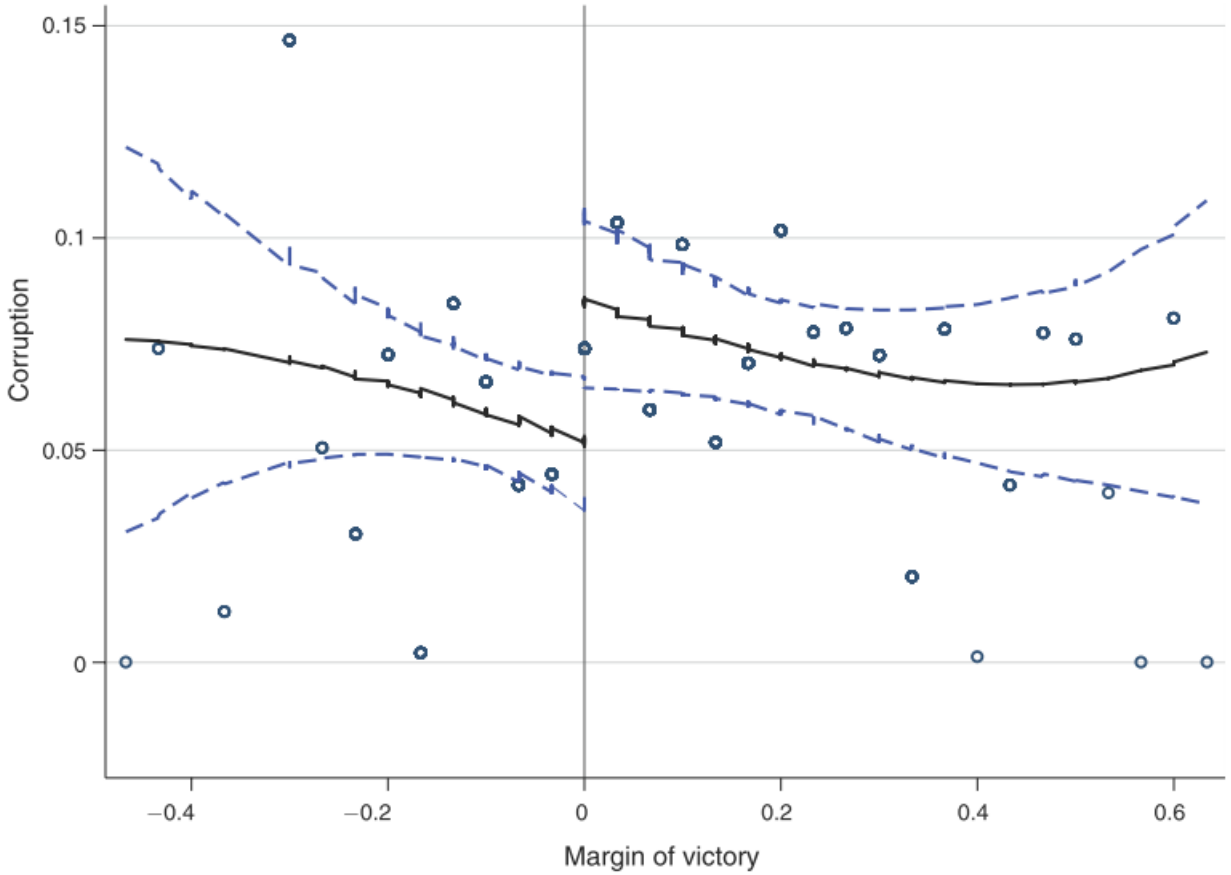

FIGURE 2. THE EFFECTS OF REELECTION INCENTIVES ON CORRUPTION

TABLE 7—THE EFFECT OF REELECTION INCENTIVES ON CORRUPTION CONTROLLING FOR ABILITY AND EXPERIENCE

Dependent variable	Share of audited resources involving corruption					
	Second-term and first-term later reelected (1)	Second-term and first-term later reelected *predicted* (2)	Full sample (3)	Full sample (4)	Second-term and first-term that served as previous mayors (5)	Second-term and first-term that served as mayor or legislator in past (6)
Mayor in first-term	−0.04 [0.013]***	−0.034 [0.018]*	−0.027 [0.012]**	−0.030 [0.012]**	−0.038 [0.014]***	−0.027 [0.017]
Mayor with political experience			−0.007 [0.011]			
Number of years in political office				0.008 [0.007]		
Number of years in political office^2				−0.002 [0.001]		
R^2	0.27	0.29	0.21	0.21	0.30	0.29
Observations	313	294	476	476	287	311
Mayor characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Municipal characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Political and judicial institutions	Yes	Yes	Yes	Yes	Yes	Yes
Lottery intercepts	Yes	Yes	Yes	Yes	Yes	Yes
State intercepts	Yes	Yes	Yes	Yes	Yes	Yes

Conclusions

- Political Resource Curse
- More money is not always good
- Additional funding increases corruption
- Audit system has some positive effects
- Electoral accountability can alleviate corruption
- External validity?

References

- Models of political agency
  - Barro (Public Choice, 1973)
  - Ferejohn (Public Choice, 1986)
  - Chapter 4 of Persson & Tabellini
- Papers reviewed in today's lecture
  - Brollo, Nannicini, Perotti & Tabellini (AER, 2013)
  - Ferraz & Finnan (AER, 2008)
  - Ferraz & Finnan (QJE, 2008)
- Interested in corruption? Literature review:
  - Olken & Pande (Annual Review of Econ, 2012)