Development via Administrative Redistricting

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Motivation

- **Classic tension in fiscal federalism:** large administrative units may not serve all its constituent parts equally well, but the parts worse off may not have the scale or resources to self-finance a secession.
- A country may decide to *subsidize voluntary splits* with federal transfers to weaken that trade-off.
  - But doing so introduces a new trade-off: new units receive concentrated benefits at the diffused expense of the rest of the country.
- To what extent such a policy is beneficial is an open empirical question.

This Paper

Study *one side* of this trade-off: **How do administrative splits impact local development in the areas seceding?**

- Identification: restrict attention to areas applying to split, then compare trajectories between those that split and *almost* split.
- Setting: Brazil.
  - By law, municipalities have:
    1. Administrative, fiscal and political decision-making power
    2. Standardized horizontal structure.
  - Rapid growth in number of units during 8-year window of time.
- Rich contextual information and data to explore mechanisms.

Preview of Results

1. Document that splits are **initiated by small, rural, and remote** districts.
2. **Splits cause**:
   - Reallocation of federal transfers. (5.5 p.p.)
   - Growth of local public sector and economic activity.
     - Concentrated in services.
   - Supply-driven improvements in education and public services (3-7%).
   - Luminosity growth exclusively driven by new units.
3. Interpretation
   - Effects driven by forces beyond extra revenues.
   - Adjustments to **administrative remoteness** and **local preferences**.
4. Net effects: positive (suggestive back-of-the-envelopes)

Contribution

- **Decentralization and Size of Nations**: Oates [1972, 1999], Bolton and Roland [1997], Alesina and Spolaore [1997, 2003], Bardhan [2002], Faguet [2004], Treisman [2007], Gadenne and Singhal [2014], Mookherjee [2015]
  - **Design of subnational borders**: Coate and Knight [2007], Weese [2015], Boffa et al. [2016], Gendźwiłł et al. [2020], Grossman and Lewis [2014], Grossman et al. [2017]

  ▷ We study splits, distinguish "initiator" and "abandoned", have an identification strategy and test mechanisms.

- **Effects of Fiscal Spending**: Litschig and Morrison [2013], Gadenne [2017], Lima and Silveira Neto [2018], Corbi et al. [2019]

  ▷ Autonomy modulates the effects of fiscal transfers.

Outline

Background

Empirics
- Setup
- Main Results

Interpretation

Net effects

Conclusion

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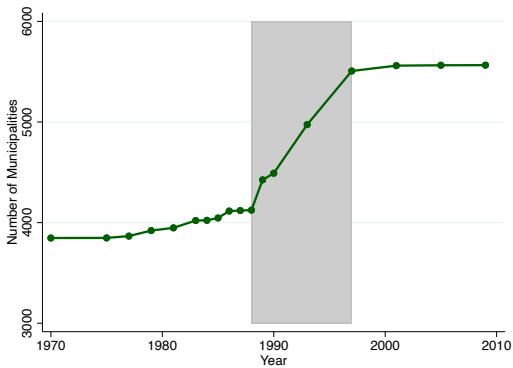
Background

- Three tiers of government: federal (L0), states (L1) and municipalities (L2).
  - Municipality $>$ district.
  - Attributions: education up to 9th grade, basic health, sanitation, security.
  - Revenues from: local taxation, federal transfers (and matching grants).
- New Constitution in 1988: facilitated and essentially subsidized splits.
  1. Low requirements: state legislation, $\approx$5k people, unilateral referendum vote.
  2. Formalized a federal transfers scheme (FPM).
     - Guarantees a revenue floor to municipalities.
     - Step-wise population formula.
     - Zero-sum within state.
     - New municipality $\implies$ others in state lose a bit.

Background

- Effectively led to a large increase in number of municipalities.
  - ↑ 23%, in two waves: 1992 and 1996.
- In 1996, Congress votes almost unanimously and passes amendment halting splits.
  - Impression of inefficiency and patronage.

Figure: Number of Municipalities



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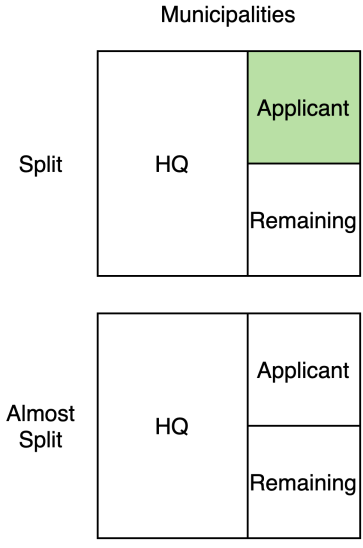
Identification

- Control group: the *almost* split.
  - Rejected and unapproved requests.
  - Part left open because of 1996 Amendment timing. Dates
- Two types of difference-in-differences (DD):
  - Municipality level: split vs. almost split.
  - District level:
    - Three types of districts: *applicants*, *headquarters*, *remaining*.
    - Split vs. almost split.



Applicants Are Worse-Off

	In Estimation Sample						Rest			
	Applicant		Remaining		Headquarters		Periphery		Headquarters	
	Mean (1)	SD (2)	Mean (3)	SD (4)	Mean (5)	SD (6)	Mean (7)	SD (8)	Mean (9)	SD (10)
Population (000's)	5.8	14.1	3.1	5.4	31.6	63.5	3.6	13.1	17.9	48.9
Area (000's km2)	.6	1.8	.3	.6	1	3.3	.3	.9	.6	1.5
% Urban Population	38.9	26.6	27.7	24.6	67.9	22.4	32.4	24.8	61.9	22.6
% Male	51.8	1.3	52.3	1.8	50.3	1.2	52.3	1.9	51	1.3
% Literacy	65.8	11.6	64.9	12.3	70.2	9.6	64.3	11.2	68.9	8.6
% Piped Water	44.9	33	46.3	32	54.1	35.8	47.8	31.7	53	35.6
% Sanitation	60.2	35.1	64.8	31.7	62	36.5	63.2	32.7	60.6	36.5
% Trash Removal	9.9	18.4	7.3	16.3	34.4	28.6	7.1	16.2	29	26.7
Avg. Luminosity	1.9	6.2	1.3	5.2	3.1	6.5	1.9	8.1	2.5	7.3
	N = 560		N = 331		N = 390		N = 916		N = 1783	

Municipality Level | Balance in Levels

Specification: Difference-in-Differences

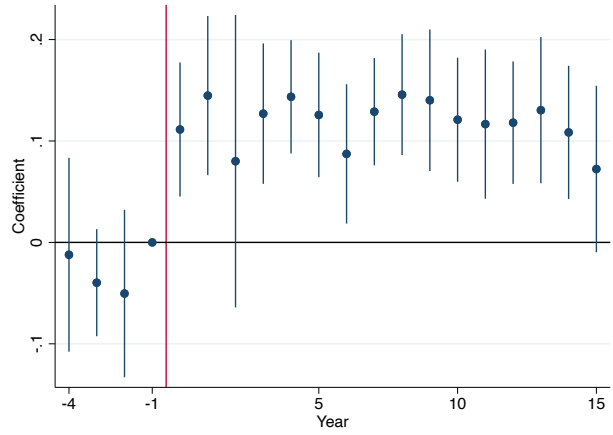
- At the municipality level, estimate a difference-in-differences (DD):

$$y_{mt} = \alpha_m + \alpha_{s(m)t} + X_m^{1991}\alpha_t + \sum_{\tau=-\underline{\tau}}^{\overline{\tau}} \beta_\tau Split_m \mathbf{1}[t - E_{w(m)} = \tau] + \gamma Post_{w(m)} + \varepsilon_{mt}$$

  - y_{mt} outcome for municipality m and year t.
  - α_m and $\alpha_{s(m)t}$: district and state-year fixed effects.
  - $X_m^{1991}\alpha_t$: baseline characteristics $\times$ year FE.
    - e.g. population, area, number of districts, demographics, distance to capital, revenues.
  - $E_{w(m)}$: wave w of split request for municipality m.
  - ε_{mt} clustered at the state-split wave level.

Reallocation of Transfers

- Reallocation of federal transfers from rest of state to new municipalities. (5.5p.p.)
- ln(Revenues) grows $\approx$ 12%.
  - ln(Federal Transfers p.c.) grows $\approx$ 30%.



Change in FPM Composition

A new government is set up

- Investment spikes. Bureaucracy grows by $\approx 40\%$.

Figure: ln(Capital Exp.)

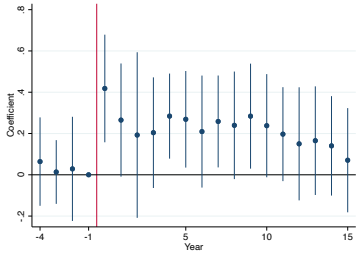


Figure: ln(Current Exp.)

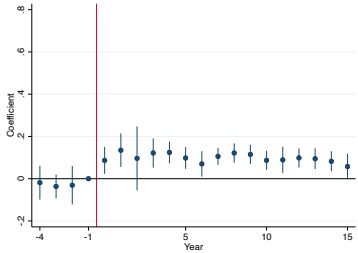
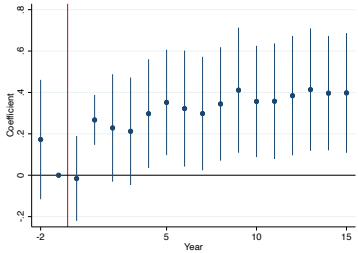


Figure: ln(Public Jobs)



By Function | By Sphere | Wages

Effects on Education Provision

Figure: School Attendance

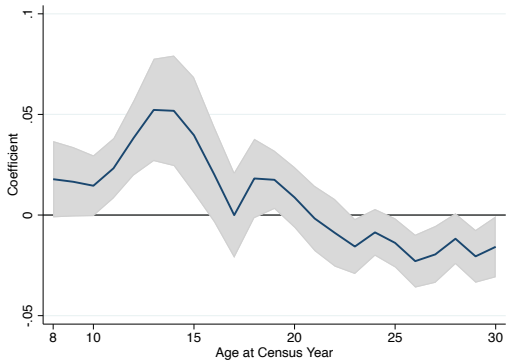
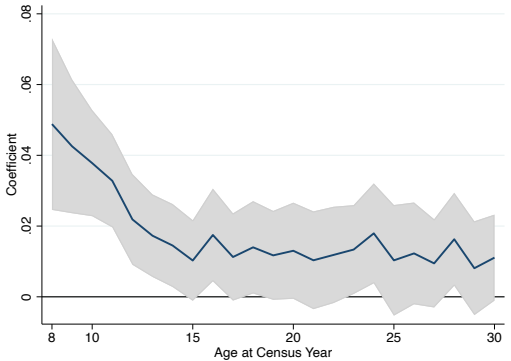


Figure: Literacy



Raw Data | Munic. Level | Nonprofits Crowd-Out | Other Services

Proxying Economic Activity: ln(Nighttime Luminosity)

Figure: Municipality level

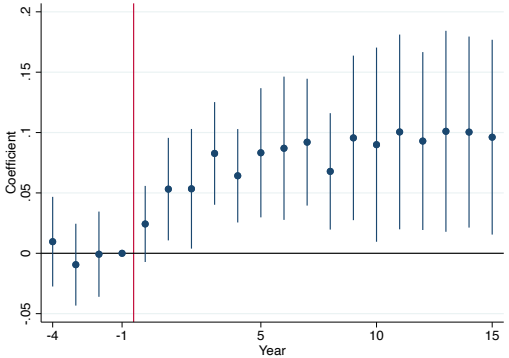
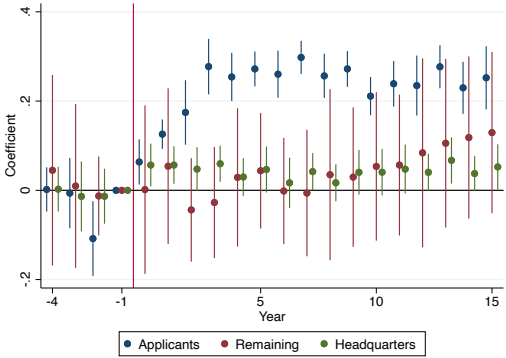


Figure: District level [↑ 27% ≈ 0.5 DN]



Specification Table Distribution

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Conceptual Framework

- Simple conceptual framework in paper [Bolton and Roland, 1997, Dur and Staal, 2008].
  - Public good provision under redistricting.
  - Full information, one period.
- Municipality composed of two districts, *A* and *B*. Town hall resides in *A*.
- District A chooses levels of public goods for both districts.
- District B considers splitting off into new municipality.

Conceptual Framework

- **Effects of splits larger if**
  1. Preference heterogeneity [Oates, 1972, Alesina and Spolaore, 1997]
  2. Neglect and elite capture [Bardhan and Mookherjee, 2000]
  3. Costs of administrative remoteness [Bardhan, 2002, Asher et al., 2018]
  4. Fiscal transfers

Model

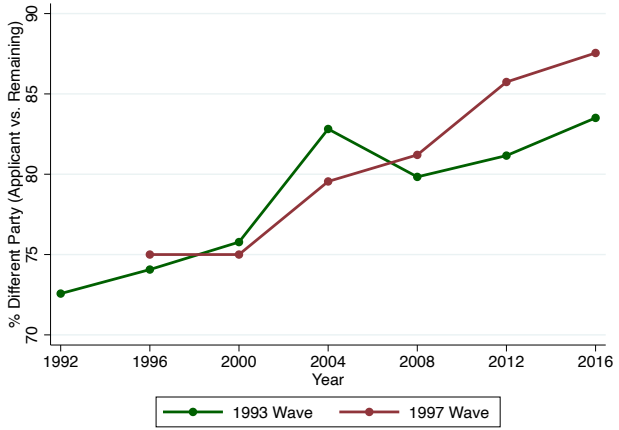
- **Findings point to effect beyond revenue shock.**
  - Mix between 1, 2, and 3.
  - Political fragmentation ex-post.

Heterogeneity: luminosity in districts

	(1)	(2)	(3)	(4)
Post x Split	0.25***	0.20***	1.03***	-0.23
	(0.02)	(0.03)	(0.34)	(0.47)
ln(Expenditures)		0.08**	0.07**	0.08**
		(0.03)	(0.03)	(0.03)
Post x Split x ln(Population 1991)			-0.01	0.06
			(0.06)	(0.05)
Post x Split x ln(Area)			-0.09***	-0.23***
			(0.03)	(0.06)
Post x Split x % Urban 1991			-0.48**	-0.47**
			(0.22)	(0.20)
Post x Split x ln(Dist. Parent Townhall)				0.24
				(0.18)
Post x Split x ln(Dist. State Capital)				0.12**
				(0.05)

Political Fragmentation Ex-Post

- Plot % electing different parties over time.
- Comparing headquarters and new municipality, after split.



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Net Effects

- **Outstanding question**: were subsidized splits worth it, on net?
- Propose two back-of-the-envelope exercises:
  1. At state level, exploit variation in amount of transfers reallocated to new municipalities and estimate effects on non-split.
  2. Weighted benefit-cost analysis.

1. Variation in the Extent of Reallocation of Federal Transfers

	Public Jobs (1)	Private Jobs (2)	Establishments (3)	Luminosity (4)
Change in Federal Transfers	-5.86	-9.73	-4.00**	1.23
	(5.83)	(6.08)	(1.66)	(1.00)
Observations	25	25	25	25
R-squared	0.38	0.48	0.71	0.54
Region FE	✓	✓	✓	✓
Split Wave	1997	1997	1997	1997
Mean	226.7	366.4	189.8	117.4
SD	403.9	442.5	133.7	59.62

2. Weighted Benefit-Cost Analysis

- Back of the envelope accounting: weighted benefits and costs.

$$\begin{aligned}\Delta V &= \Delta V_A + \Delta V_B + \Delta V_2 \\ &= \Delta T_A \times \underbrace{R_A}_{\approx 0} \times \underbrace{\alpha_A}_{\approx 22.2\%} + \underbrace{\Delta T}_{\approx 5.5 p.p.} \Big(\underbrace{R_B}_{\approx 77\% = 24\%/35\%} \times \underbrace{\alpha_B}_{\approx 4.3\%} - R_2 \times \underbrace{\alpha_2}_{\approx 73.4\%} \Big)\end{aligned}$$

where α is % population, and R is return.

  - Notation: headquarters (A), new (B), non-split (2).

- **Aggregate** $\Delta V \geq 0 \iff R_2 \leq 4.5\%$ (i.e. low return on transfers in the rest of the country)
  - From auxiliary exercise on returns with FPM discontinuities [Litschig and Morrison, 2013, Corbi et al., 2019], it seems likely.

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Conclusion

- We provide an empirical account of the medium-term economic effects of a large administrative redistricting event in Brazil.
- Results shine a *broadly positive light* on this type of decentralization reform.
  - No clear evidence of binding scale effects.
  - Net effects potentially positive.
- Maybe Congress should reconsider the 1996 decision to stop splits.

Thank you.

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Dates of Requests and Splits - Sample States

Figure: Year of *Request* for Almost Split-Applicants

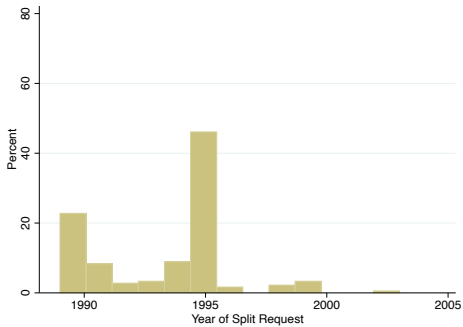

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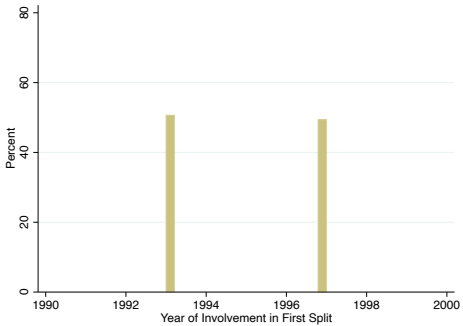
Figure: Year of *Split* for Split-Applicants



Resolução - ALESP nº 762, de 29/07/1994

Ementa	Solicita ao TRE a realização de plebiscito referente à emancipação do Distrito de Jumirim, pertencente ao Município de Tietê.
Projeto/Autoria	PR 15/1993 - Comissão de Assuntos Municipais
Promulgação	Executivo
Publicação	Diário Oficial - Executivo, 30/07/1994, p.73
	Texto Original
	(*) Os textos contidos nesta base de dados têm caráter meramente informativo. Somente os publicados no Diário Oficial estão aptos à produção de efeitos legais.
Situação Atual	Sem revogação expressa
Temas	Desenvolvimento Urbano e Divisão Territorial Poder Legislativo e Tribunal de Contas
Palavras-Chave	PLEBISCITO / EMANCIPAÇÃO / DISTRITO / JURUMIM / TIETÊ

Detalhes da Proposição

Proposição: PL 250 1995

Proponente: Comissão de Constituição e Justiça

» Situação: Sancionado(a) em 12/07/1995

» Tramitação: PROTOCOLO - envio em 07/06/1995

Legislação Tipo: Lei

Número do processo: 20729.01.00/95-0

Assunto: PLEBISCITO VESPASIANO CORREA EMANCIPACAO

Ementa: AUTORIZA A REALIZACAO DE CONSULTA PLEBISCITARIA PARA EMANCIPACAO DA LOCALIDADE DE VESPASIANO CORREA, PERTENCENTE AO MUNCIPIO DE MUCUM.

Votação:

Proposição Referida:

» Texto

» Justificativa

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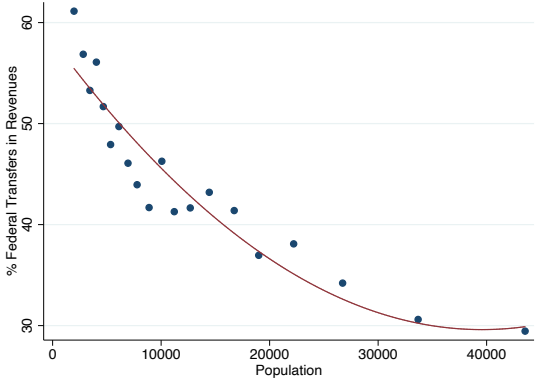
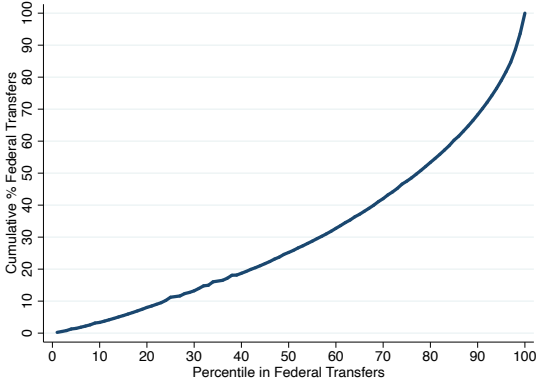
Federal Transfers Allocation





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Setup

- Two districts, A and B, form one municipality.
- Population in A and B are α_A and α_B, respectively.
- Municipality revenues
  - Local taxation τy.
  - Federal transfers $T(\cdot)$ as function of population (fixed and formulaic).
- District A is headquarters and chooses levels of public good provision g.
  - Weighs each district with Pareto weights $1 - \lambda$ and λ.

Public Goods Provision

- When united, district A solves

$$\max_{g_A, g_B, \tau} (1-\lambda)\alpha_A U_A + \lambda \alpha_B U_B \quad \text{s.t.} \quad g_A + g_B \leq \tau y + T(\alpha_A + \alpha_B) \tag{1}$$

where $y \equiv \alpha_A y_A + \alpha_B y_B$ and $U_i(g, y) = \theta_i \ln(g) + (1-\tau)y$.

- District B considers splitting off into a new municipality.
- If split, district B solves

$$\max_{g_B, \tau} \alpha_B U_B \quad \text{s.t.} \quad g_B \leq \tau \alpha_B y_B + T(\alpha_B) \tag{2}$$

Splitting

Proposition 1

District B is more likely to split with:

1. ***(Neglect)*** *More neglect to its welfare by the headquarters (lower λ);*
2. ***(Fiscal Incentives)*** *Smaller population size (lower α_B) if there are*
   - (A1) *a high comparative gain in transfers if split; and*
   - (A2) *a high comparative tax base.*

Math

Welfare After a Split

- Second municipality of size α_2, not involved in splits.
- Changes in indirect utilities after a split: $\Delta V_i = V_i(T_i^S) - V_i(T_i^U)$.
- Aggregate effect of split: $\Delta V_A + \Delta V_B + \Delta V_2$

Proposition 2

If district B is relatively small and neglected by district A, and if municipality 2 is relatively large, then

1. ΔV_A *is small;*
2. ΔV_B *is positive;*
3. ΔV_2 *is negative.*

Math

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A Simple Conceptual Framework

Proposition 1

District B is more likely to split with:

1. ***(Neglect)*** *More neglect to its welfare by the headquarters (lower λ);*
2. ***(Fiscal Incentives)*** *Smaller population size (lower α_B) if there are*
   - (A1) *a high comparative gain in transfers if split* $\left(\frac{T(\alpha_A+\alpha_B)}{y} \leq \frac{T(\alpha_B)}{\alpha_B y_B}\right)$*; and*
   - (A2) *a high comparative tax base* $\left(\frac{\theta_B}{y_B} \leq \frac{\theta_A}{y_A}\right)$.

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Welfare

- Second type of municipality of size α_2.
- Changes in indirect utilities after a split: $\Delta V_i = V_i(T_i^S) - V_i(T_i^U)$.
- Aggregate effect of split: $\Delta V_A + \Delta V_B + \Delta V_2$.

Proposition 2

If district B is relatively small $\left(\frac{\alpha_B}{\alpha_A} \to 0\right)$ *and neglected by district A* ($\lambda \to 0$), *and if municipality 2 is relatively large* $\left(\frac{\alpha_2}{\alpha_A+\alpha_B} \to \infty\right)$, *then*

1. ΔV_A *is small;*
2. ΔV_B *is positive and large;*
3. ΔV_2 *is negative and small.*

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Selection into Splitting - Municipality Level, Baseline

	Contains Applicant		Rest	
	Mean (1)	SD (2)	Mean (3)	SD (4)
Number of Districts	3	1.8	1.6	1
Population (000's)	40.5	71.8	21.7	75.3
Area (000's km2)	2.5	10.3	.9	2.7
% Urban	58.5	23.8	59.2	22.8
Years of Education	8.8	1.4	8.8	1.4
% Literacy 11-14	91.6	8.9	92.3	8
% Literacy 25+	74.7	12.9	74.2	10.6
Preschool Attnd.	13.1	9.7	17.4	14
Middleschool Attnd.	88.1	10.7	89.7	11.5
% Piped Water	71.2	24.2	74.9	21.8
% Trash Collection	63.5	27.3	67.3	29.4
% Electricity	81.3	20	83.8	18.9
% Sewage	96.1	7.7	96.8	8
HHI Race	64.3	13.9	62.2	14.9
HHI Religion	75.8	12.2	79.3	12
% Federal Transfers	37.2	17	43.6	18.5
	N = 448		N = 1925	

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Balance in Levels

	Applicants	Remaining	
		Headquarters	Periphery
	(1)	(2)	(3)
ln(Population)	0.068**	-0.014	-0.030
	(0.034)	(0.038)	(0.040)
% Urban Population	0.001	-0.002	0.001
	(0.001)	(0.002)	(0.001)
% Male	-0.026*	-0.045	-0.013
	(0.014)	(0.029)	(0.017)
% Literacy	-0.003	-0.004	0.002
	(0.003)	(0.005)	(0.003)
% Piped Water	0.002	0.006*	0.001
	(0.001)	(0.003)	(0.002)
% Sanitation	0.004***	-0.002	0.000
	(0.002)	(0.003)	(0.002)
% Trash Removal	-0.001	0.000	-0.002
	(0.001)	(0.002)	(0.002)
ln(Avg. Luminosity)	-0.014**	-0.015	-0.011
	(0.007)	(0.019)	(0.009)
ln(Area)	0.097***	0.042	0.026
	(0.028)	(0.040)	(0.037)
ln(Distance to Parent Townhall)	0.072	-0.023	0.071
	(0.045)	(0.030)	(0.068)
ln(Distance to State Capital)	0.043	0.005	0.101**
	(0.032)	(0.041)	(0.046)
Observations	560	389	326

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Specification: Difference-in-Differences

- Estimate difference-in-differences (DD):

$$y_{dt} = \alpha_d + \alpha_{s(d)t} + \sum_{\tau=-\underline{\tau}}^{\overline{\tau}} \beta_\tau \mathbf{1}[t - E_{m(d)} = \tau] + X_d^{1991}\alpha_t + \varepsilon_{dt}$$

  - y_{dt} outcome for district d and year t.
  - α_d and $\alpha_{s(d)t}$: district and state-year fixed effects.
  - $E_{m(d)}$: term-year of split request for municipality m.
  - $X_d^{1991}\alpha_t$: all baseline char. $\times$ year FE.

- Separately for *applicants*, *headquarters*, and *remaining*.

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Results: ln(Luminosity)

	Applicants			Remaining		
	(1)	(2)	(3)	(4)	(5)	(6)
Post x Split	1.07***	0.34***	0.24***	0.58***	0.04	0.02
	(0.04)	(0.05)	(0.05)	(0.03)	(0.03)	(0.02)
Observations	9,760	9,760	9,760	7,072	7,072	7,072
R-squared	0.91	0.95	0.96	0.96	0.98	0.99
State-Year FE	-	✓	✓	-	✓	✓
Controls-Time FE	-	-	✓	-	-	✓
Mean Pre-Split	-0.99	-0.99	-0.99	-0.0045	-0.0045	-0.0045
SD Pre-Split	2.11	2.11	2.11	1.73	1.73	1.73

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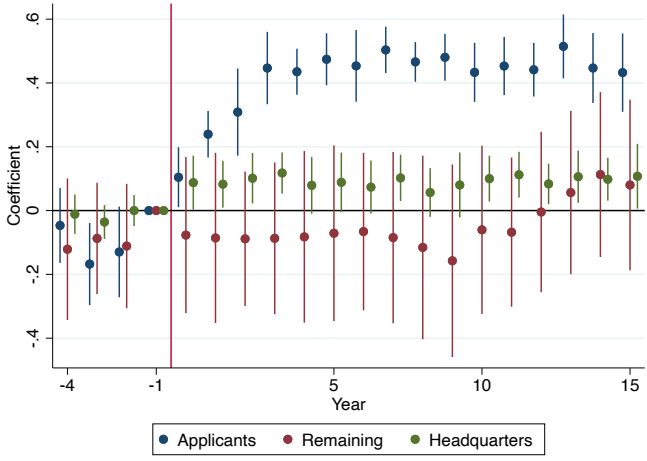
Results: ln(Luminosity) - District level (unbalanced)



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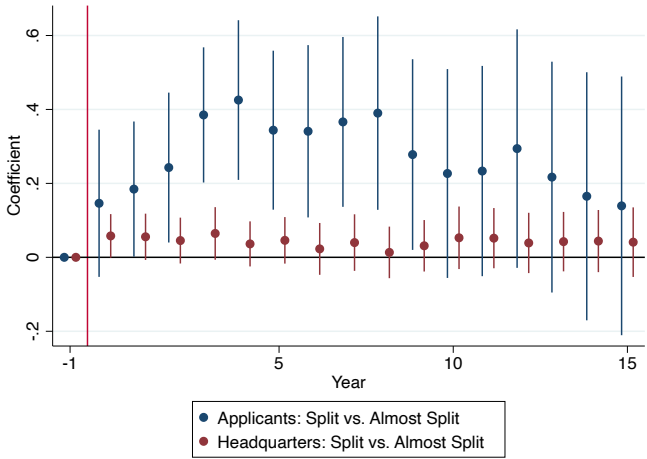
Results: ln(Luminosity) - District level



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Robustness Table

VARIABLES	(1) Baseline	(2) No Controls	(3) ln(Luminosity)	(4) Only 97 Wave	(5) More FEs	(6) Cluster at State
Post x Split	0.33***	0.34***	0.33***	0.34**	0.23***	0.33***
	(0.07)	(0.05)	(0.10)	(0.13)	(0.07)	(0.08)
Observations	10,122	10,122	9,616	4,920	10,122	10,122
R-squared	0.97	0.96	0.96	0.97	0.98	0.97
State-Year FE	✓	✓	✓	✓	-	✓
Controls-Time FE	✓	-	✓	✓	✓	✓
Microregion-Year FE	-	-	-	-	✓	-
Mean Pre-Split	-0.760	-0.760	-1.020	-0.690	-0.760	-0.760
SD Pre-Split	1.520	1.520	2.090	1.510	1.520	1.520

Notes: Robust standard errors in parentheses. Regressions include district and state-year fixed effects.

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Luminosity - Distribution Over Space

Figure: Luminosity Gini

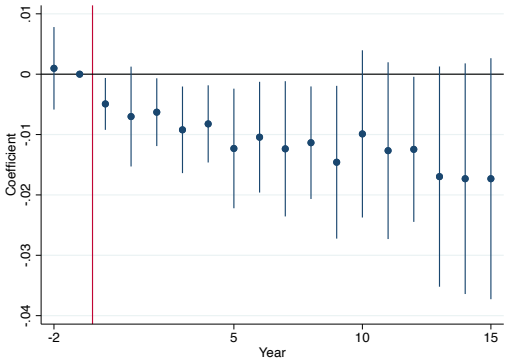
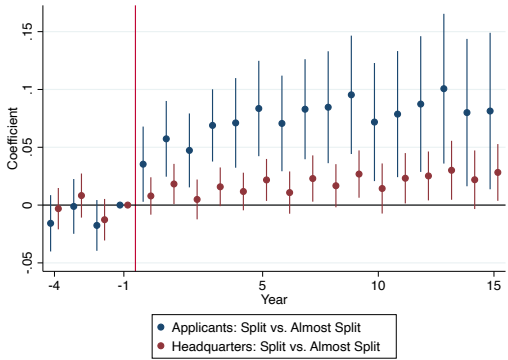


Figure: % Lit (pixel $>$ 0)



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Regression Discontinuity - Details

Figure: 1st Stage

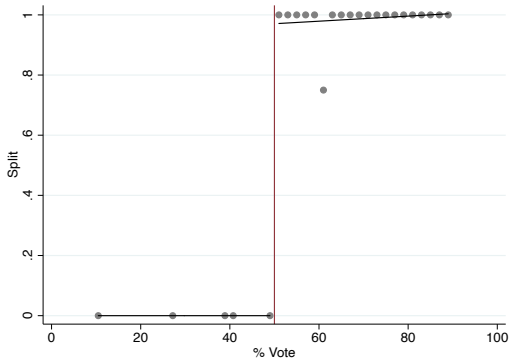
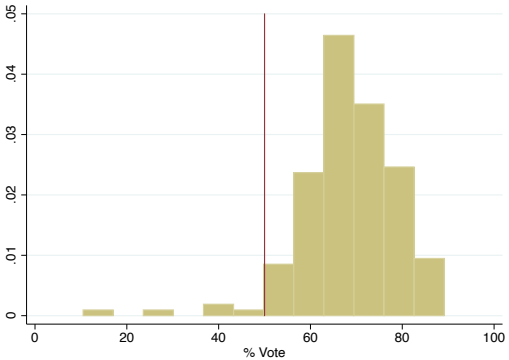


Figure: Histogram



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Regression Discontinuity - Covariates

Table: Discontinuity Test on Covariates

VARIABLES	(1) ln(Population)	(2) ln(Area)	(3) ln(Luminosity)	(4) ln(Dist. Parent Town Hall)
Referendum Vote $\geq$ 50%	-0.38	0.62	-1.34	0.18
	(0.33)	(0.68)	(0.91)	(0.41)
Observations	114	114	114	114
R-squared	0.40	0.11	0.27	0.11
Mean	3.090	5.623	-1.126	3.090
SD	0.674	1.125	1.654	0.674

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

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Fuzzy Difference-in-Discontinuities

VARIABLES	(1) First Stage	(2) Reduced Form	(3) Second Stage	(4) DD
Referendum Vote $\geq$ 50%	0.96***			
	(0.08)			
Post x Referendum Vote $\geq$ 50%		0.04		
		(0.03)		
Post x Split			0.07***	0.17***
			(0.03)	(0.02)
Observations	114	2,202	2,202	2,422
R-squared	0.76	0.98	0.98	0.98
District FE	-	✓	✓	✓
Controls-Year FE	-	✓	✓	✓
Mean	0.921	-0.540	-0.540	-0.601
SD	0.271	1.920	1.920	1.943

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Public Services

- Analogous DD at the municipality level.

$$y_{mt} = \alpha_m + \alpha_{s(m)t} + X_m^{1991}\alpha_t + \beta Post_{mt} + \varepsilon_{mt}$$

- Results stronger where attribution is easier (trash collection).

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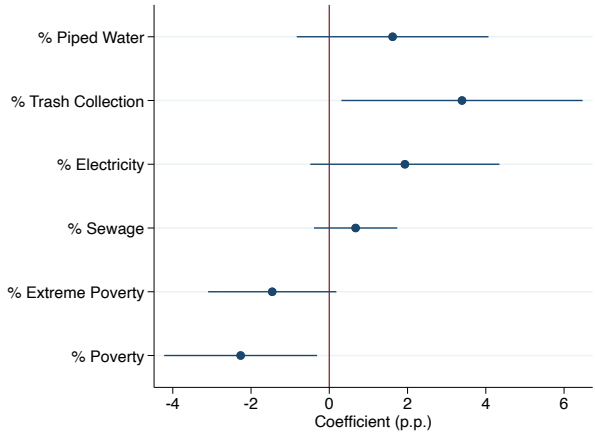
Figure: Households in groups:



Validation with Aggregate Data

- Complement with simple DD at municipality-level.

$$y_{mt} = \alpha_m + \alpha_{s(m)t} + X_m^{1991}\alpha_t + \beta Post_{mt} + \varepsilon_{mt}$$

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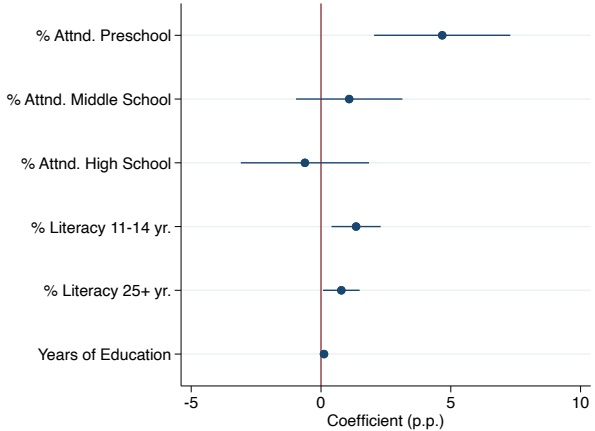
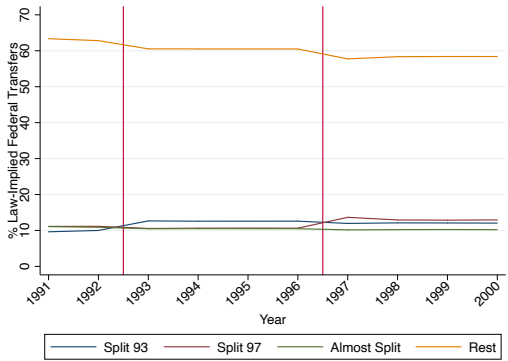


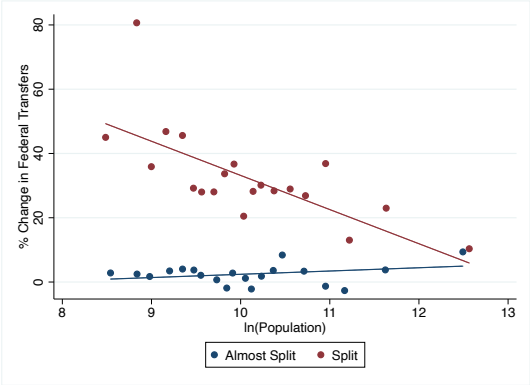
% Federal Transfers Composition [5.5p.p. $\equiv$ 4.6 billion (BRL 2019)]

Figure: Federal Transfers: Composition



Back to Reallocation
Back to More Money

Figure: % Gains in FPM from $\tau = -1$ to $\tau = 0$



Structural Transformation (Municipality level)

Figure: ln(Establishments)

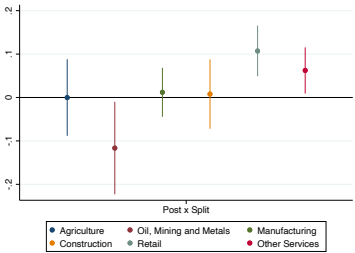


Figure: ln(Jobs)

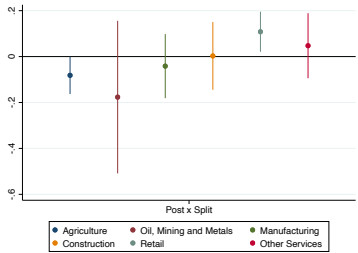
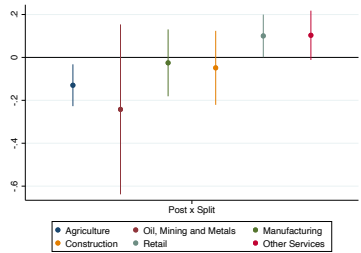


Figure: ln(Wage)



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Wages

- Some wage growth, driven by municipal public sector.

Figure: ln(Wages)

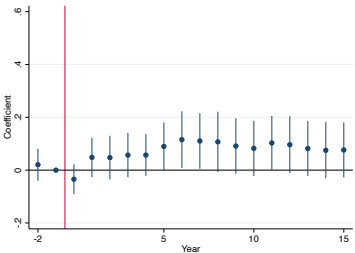


Figure: ln(Public Wages)

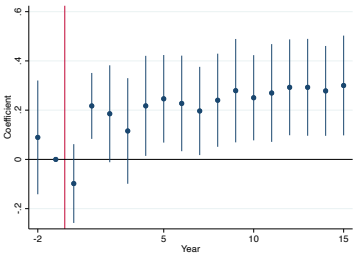
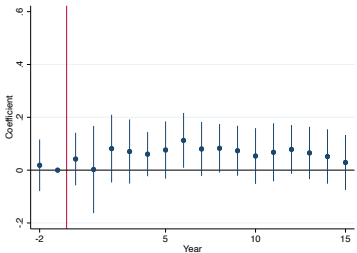


Figure: ln(Private Wages)



Back Public Back Local Economy

Horse-Race Between Splitting and Federal Transfers

	ln(Public Jobs)		ln(Establishments)		ln(Private Jobs)		ln(Luminosity)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post x Split	0.25***	0.23***	0.05**	0.04*	-0.03	-0.03	0.06**	0.06**
	(0.08)	(0.08)	(0.02)	(0.02)	(0.06)	(0.06)	(0.03)	(0.03)
ln(Revenues p.c.)		0.15***		0.03		0.04		0.03*
		(0.04)		(0.02)		(0.04)		(0.02)
Observations	7,033	6,922	7,086	6,970	7,086	6,970	7,583	7,464
R-squared	0.87	0.87	0.99	0.99	0.98	0.98	0.99	0.99
State-Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Controls-Time FE	✓	✓	✓	✓	✓	✓	✓	✓
Mean Pre-Split	5.98	5.99	5.40	5.40	7.17	7.16	-0.08	-0.08
SD Pre-Split	1.35	1.35	1.5	1.5	2.02	2.04	1.65	1.65

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Effects of Federal Transfers - Regression Discontinuity

- Leverage 1st discontinuity in allocation mechanism of federal transfers.
- Estimate a fuzzy RD design.

VARIABLES	(1) Transfers (mm)	(2) ln(Public Jobs)	(3) ln(Establishments)	(4) ln(Private Jobs)	(5) ln(Luminosity)
RD_Estimate	0.13***	0.06	-0.04	-0.15	-0.00
	(0.03)	(0.10)	(0.11)	(0.15)	(0.16)
Observations	1,741	1,964	2,044	2,042	2,357
State-Year FE	✓	✓	✓	✓	✓
Optimal Bandwidth %	5.300	4.900	6.200	3.500	3.800

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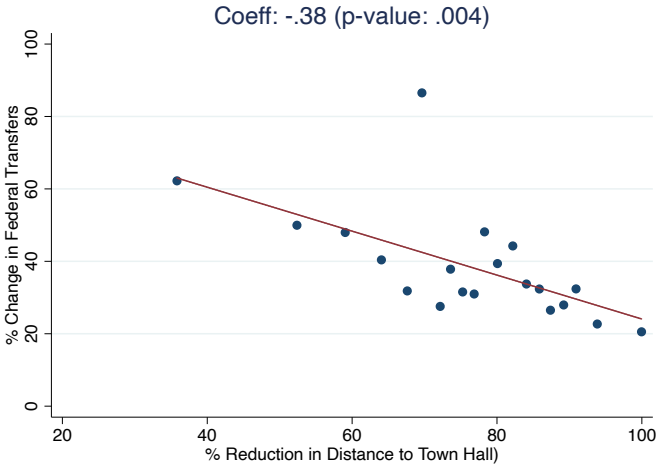
Change in Federal Transfers x Distance to Town Hall



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Post x Split	0.24***	0.64	-0.43	0.30
	(0.05)	(0.48)	(0.65)	(0.89)
Post x Split x ln(Pop. 1991)		-0.03	0.02	-0.06
		(0.06)	(0.07)	(0.07)
Post x Split x ln(Area)		0.04	-0.12	-0.10
		(0.05)	(0.09)	(0.09)
Post x Split x % Urban 1991		-0.01**	-0.01**	-0.00
		(0.00)	(0.00)	(0.00)
Post x Split x ln(Dist. Parent Townhall)			0.27*	0.29**
			(0.14)	(0.14)
Post x Split x ln(Dist. State Capital)			0.14*	0.00
			(0.07)	(0.08)
Post x Split x % Literacy 1991				-0.01
				(0.01)
Post x Split x % Piped Water 1991				0.01*
				(0.01)
Post x Split x % Sanitation 1991				0.01
				(0.01)
Post x Split x % Trash Collection 1991				-0.01**
				(0.00)
Observations	9,760	9,760	9,760	9,760

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Migration - Municipality level

- Our findings could partly explained by net positive migration.
- Test: Census 2000 asks where person was 5 years before.
- Cross-section comparison between split vs. almost split.
  $\Longrightarrow$ No strong evidence of migration.

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Table: % From Different Municipality 5 Years Prior

VARIABLES	(1)	(2)
Split	1.00*	0.75
	(0.59)	(0.59)
Observations	220	220
R-squared	0.33	0.45
State FE	-	✓
Controls	Yes	Yes
Mean	9.800	9.800
SD	4.400	4.400

Mechanism: Preference Heterogeneity

$$y_{dt} = \alpha_d + \alpha_{s(d)t} + X_d^{1991}\alpha_t + \sum_{q=1}^{5} \beta_q Post_{w(d)} V_d^q + \gamma Post_{w(d)} + \lambda \ln(T)_{m(d)t} + \varepsilon_{dt}, \quad (3)$$

- Coefficients of interest: β_q

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Mechanism: Local Preferences

VARIABLES	(1)	(2)	(3)
Post	0.17***	-0.28	
	(0.05)	(0.53)	
Post x % In Favor		0.00	
		(0.01)	
Post x % In Favor Q1			0.09
			(0.10)
Post x % In Favor Q2			0.09
			(0.07)
Post x % In Favor Q3			0.15**
			(0.07)
Post x % In Favor Q4			0.19**
			(0.08)
Post x % In Favor Q5			0.30***
			(0.08)
Observations	2,069	2,069	2,069
R-squared	0.98	0.98	0.98
District FE	✓	✓	✓
State-Time FE	✓	✓	✓
Baseline Chars. x Time FE	✓	✓	✓

Back

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