Trade Liberalization and the Informal-Formal Job Ladder

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October, 2020

Quasi-Experiment: Informality and Transitional Dynamics

- How does the availability of informal contracts affect **transitional dynamics in response to a large negative shock**?

  I exploit two well-documented features for Brazil:

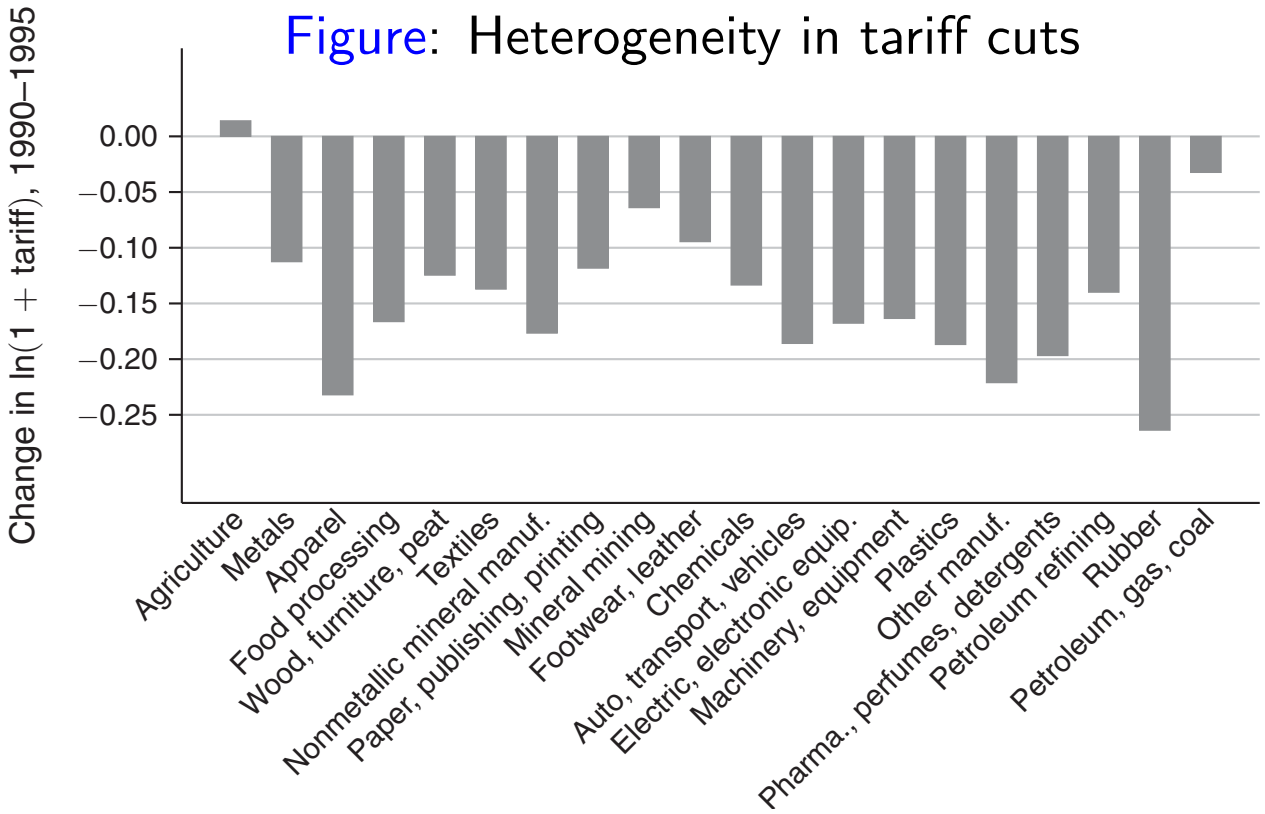
  1. **Heterogeneous enforcement of labor regulations** across municipalities: Almeida and Carneiro (2012), Ulyssea and Ponczek (2018).

  2. **Unilateral trade liberalization** episode: Dix-Carneiro and Kovak (2017, 2019), Ulyssea and Ponczek (2018).

The trade liberalization episode in Brazil (1/2)

Between 1990 and 1995, the **average import tariff in Brazil went from 30.5 to 12.8 percent**; remaining stable afterwards. Correlation between tariff changes and pre-liberalization levels $\sim$ **−0.90** [D-C & K (2017)].

Figure: Heterogeneity in tariff cuts



Source: D-C & K (2017). Industries sorted based on 1991 national employment.

The trade liberalization episode in Brazil (2/2)

- From D-C & K (2017), measures of **labor demand shocks at the micro-region** level induced by trade liberalization.

$$\underbrace{RTR_r}_{\substack{\text{Regional}\\ \text{Tariff}\\ \text{Reductions}}} = -\sum_i \underbrace{\beta_{ri}}_{\substack{\text{Regional We-}\\ \text{ights based on}\\ \text{Industry Mix}}} \underbrace{d\ ln(1+\tau_i)}_{\substack{\text{Tariff Change for}\\ \text{Industry } i \text{ bet-}\\ \text{ween 1990-1995}}} \quad , \quad \beta_{ri} = \frac{\lambda_{ri}\frac{1}{\gamma_i}}{\sum_j \lambda_{rj}\frac{1}{\gamma_j}}$$

where γ_i denotes the cost share of nonlabor factors in industry i, and λ_{ri} the initial share of local employment of industry i in region r .

- **In words:** the higher the initial share of local employment in industries that experienced large tariff declines, the larger the negative shock on labor demand.

Enforcement heterogeneity across regions in Brazil

- Compliance is monitored through surprise visits to firms. "Inspectors are assigned to enforcement offices located in cities across Brazil. They choose which firms to visit ... [and] travel by car from their base city to the city where the inspected firm is located ... [They] face a performance-based pay scheme .. up to 45 percent of their wage is tied to the efficiency of the overall enforcement system [and] their monthly base wage is fairly competitive (between 2,490 and 3,289 dollars in 2004)" [Almeida and Carneiro (2012)].

- Motivated by this, previous work has instrumented the probability of being inspected with **the distance of a firm's municipality to the closest enforcement office** [e.g. Almeida and Carneiro (2012), Ulyssea and Ponczek (2018)].

Preliminary empirical exercise

- Today: Based on the distances computed by Almeida and Carneiro (2012), I divide municipalities **in each state** in two groups: those **closer** than the **state-median** municipality ($I_{far} = 0$) and those **farther away** ($I_{far} = 1$) ▸ Maps

- Consider the following regression, at the municipality-level, run separately for each $t = \{1992, \dots, 2017\}$

$$\underbrace{y_{mt} - y_{m1991}}_{\substack{\text{Change in Labor Market} \\ \text{Outcome Variable}}} = \alpha + \gamma_t \underbrace{RTR_{r(m)}}_{\substack{\text{Regional Tariff} \\ \text{Reductions}}} + \phi_t I_{far} + \beta_t RTR_{r(m)} \times I_{far}$$
$$+ \underbrace{\theta_{s(m)t}}_{\text{State FE}} + \delta_t \underbrace{(y_{m1990} - y_{m1986})}_{\text{Pre-Liberalization Trend}} + \epsilon_{mt}$$

where m indexes municipalities, and $r(m)$ and $s(m)$ the corresponding micro-regions and states. Similar to Dix-Carneiro and Kovak (2017).

Regional Earnings in Formal sector

- Ulyssea and Ponczek (2018): between 1991 and 2000, regions with **weaker** [**stricter**] enforcement observed **a significant** [**no**] increase in informal employment but **no** [**significant**] non-employment effects, among unskilled workers, in response to the trade liberalization shock.

- If indeed **informal jobs facilitate the transition of workers across rungs of the job ladder**: in the long run, weaker enforcement can be associated with better outcomes in the formal sector too $\Longrightarrow$ Today: Earnings.

- **Data:** employer-employee matched annual **administrative data** from Brazilian RAIS for the **1986-2017** period.

- **Earnings premia at the municipality level:** I run, for each $t = \{1986, ..., 2017\}$, the following worker-level regression

$$\underbrace{y_{it}}_{\substack{\text{Worker's Log} \\ \text{Monthly } \textbf{Real} \text{ Earnings}}} = \underbrace{y_{m(i)t}}_{\text{Municipality FE}} + \underbrace{X_{it}}_{\substack{\text{Sex, Age and Education} \\ \text{Groups Dummies}}} \eta_t + \zeta_{it}$$

municipality FE $y_{m(i)t}$ is the measure of earnings premia.

Descriptive Stats

	$I_{far} = 0$				$I_{far} = 1$			
Variable	**Mean**	**SD**	**P25**	**P75**	**Mean**	**SD**	**P25**	**P75**
Distance (minutes)	47	32	27	63	130	74	85	153
Audits per 100 firms	4.6	5.2	1.1	6.5	3.1	4.4	0.2	4.1
RTR * 100 ▸ Dens.	6.7	4.2	3.1	10.0	4.4	3.2	2.2	6.4
% Female 1991	27	11	20	33	26	11	19	33
% 18 to 24 y-o 1991	26	7	22	30	24	8	20	29
% 18 to 29 y-o 1991	46	8	42	51	45	9	41	50
% HS Graduates 1991	21	11	14	27	23	13	14	31
$\text{dln(EarnPremia)}_{2017}$*100	84	31	66	105	88	27	72	106
# Municipalities	1313				1307			
# Microregions: 390 **# States:** 16								
dln(EarnPremia)*100	49	36	25	73	51	36	27	76
# *m* x *t* obs. ▸ Dens.	34,138 (1313 * 26)				33,982 (1307 * 26)			

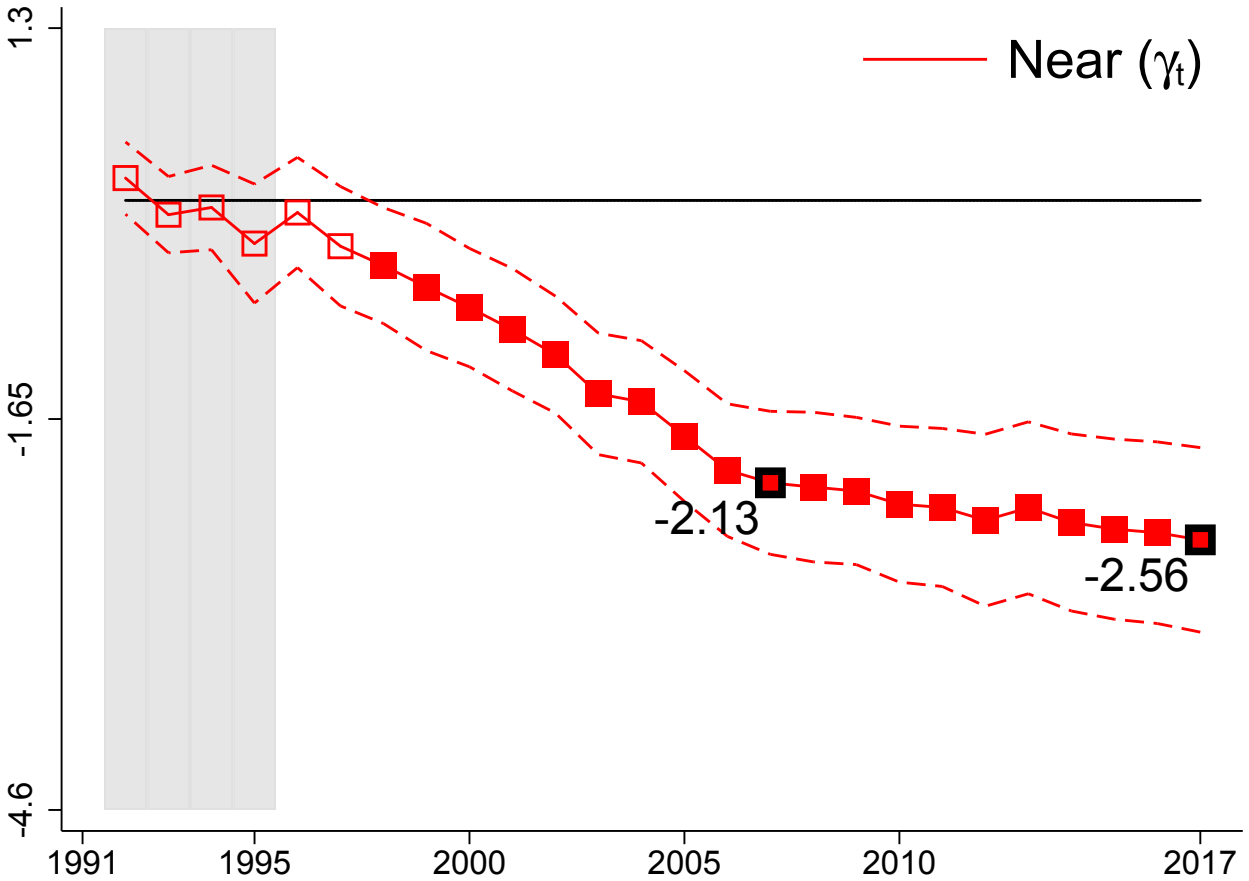
Source: Distance (driving time in minutes) and audits per 100 firms in the municipality (for 2002) from A&C(2012); RTR at the micro-region level from D-C&K(2017); all other variables from RAIS 1991-2017.

Effect of TL shock on Formal Earnings Premia by $I_{far} = \{0, 1\}$

$dln(\text{EarnP})_{t,1991}$	2000	2005	2010	2015
RTR	$-0{\cdot}8^{***}$	$-1{\cdot}8^{***}$	$-2{\cdot}3^{***}$	$-2{\cdot}5^{***}$
	$(-3{\cdot}6)$	$(-7{\cdot}1)$	$(-7{\cdot}7)$	$(-7{\cdot}2)$
Ifar=1	$-0{\cdot}0$	$-0{\cdot}0$	$-0{\cdot}0$	$-0{\cdot}0$
	$(-0{\cdot}5)$	$(-0{\cdot}8)$	$(-0{\cdot}9)$	$(-1{\cdot}2)$
Ifar=1 $\times$ RTR	$0{\cdot}4$	$0{\cdot}8^{***}$	$1{\cdot}2^{***}$	$1{\cdot}3^{***}$
	$(1{\cdot}3)$	$(2{\cdot}7)$	$(3{\cdot}1)$	$(3{\cdot}1)$
Pre-Trend	$-0{\cdot}3^{***}$	$-0{\cdot}3^{***}$	$-0{\cdot}3^{***}$	$-0{\cdot}3^{***}$
	$(-4{\cdot}8)$	$(-3{\cdot}6)$	$(-3{\cdot}9)$	$(-4{\cdot}5)$
DSC	$-0{\cdot}0$	$-0{\cdot}0$	$-0{\cdot}0^{*}$	$-0{\cdot}0$
	$(-0{\cdot}4)$	$(-1{\cdot}6)$	$(-1{\cdot}7)$	$(-0{\cdot}9)$
RTR $\times$ DSC	$0{\cdot}0$	$0{\cdot}1^{**}$	$0{\cdot}2^{***}$	$0{\cdot}2^{**}$
	$(0{\cdot}3)$	$(2{\cdot}2)$	$(2{\cdot}7)$	$(2{\cdot}3)$
N	2620	2620	2620	2620
Adj. R^2	$0{\cdot}187$	$0{\cdot}471$	$0{\cdot}573$	$0{\cdot}607$

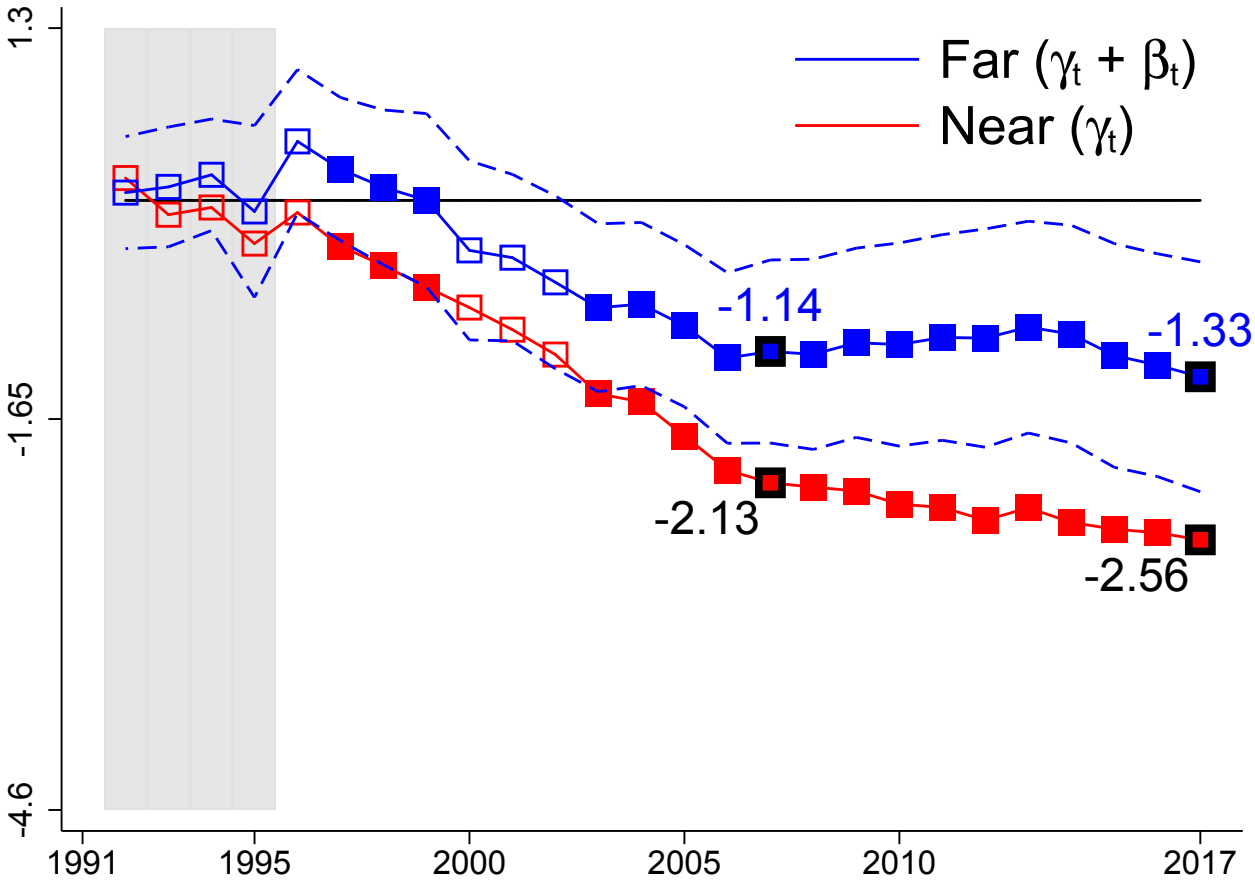
t stats in parentheses; "DSC" is the Distance to State Capital (i.e. a control); All regressions include state FE.

Effect of TL shock on Formal Earnings Premia by $I_{far} = \{0, 1\}$



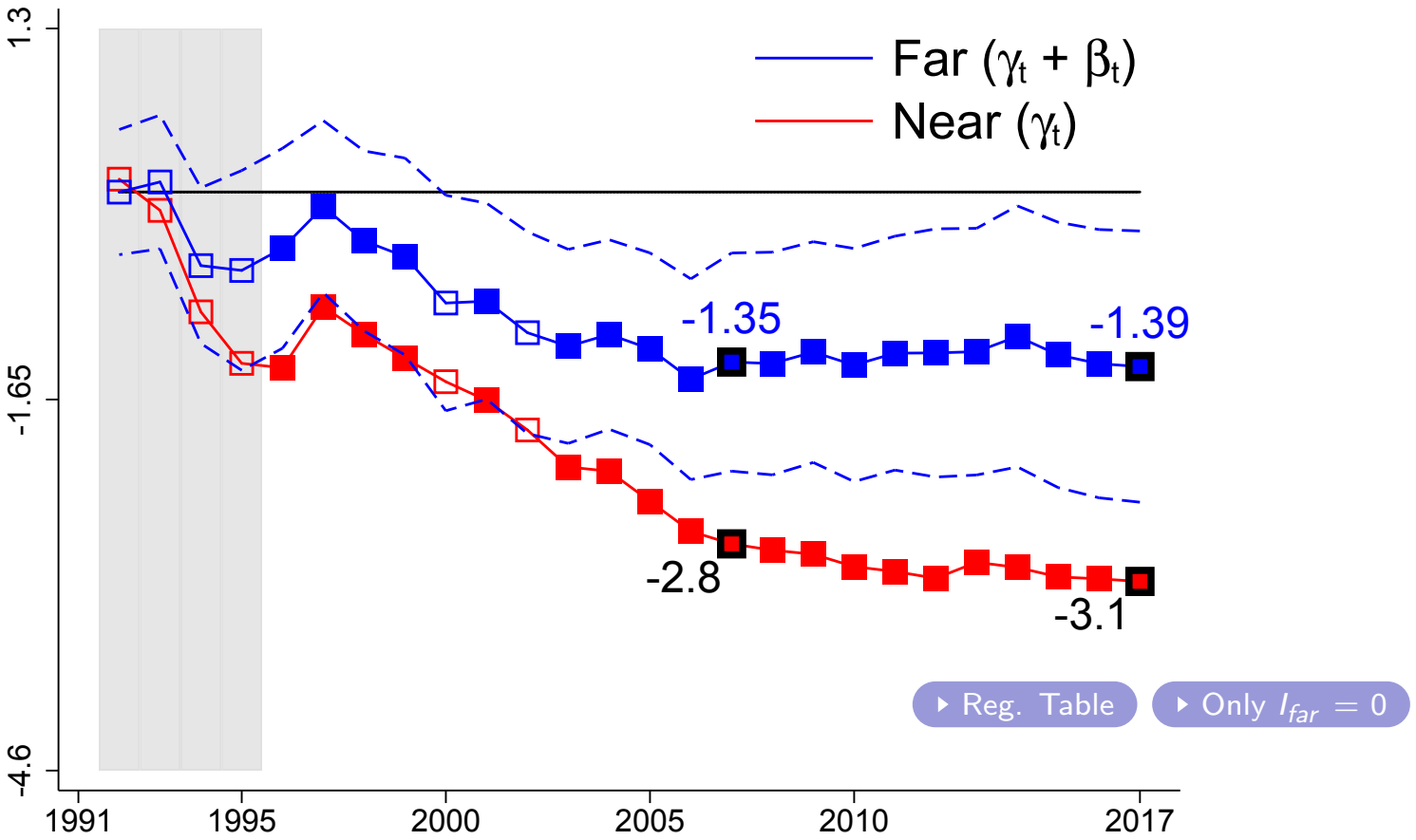
Among local labor markets **near** to an enforcement office: **an increase of 10 p.p. in RTR** (i.e. our negative shock measure) induces, **by 2017**, an average decrease of **26 p.p.** in the cumulative growth rate of formal earnings premia.

Effect of TL shock on Formal Earnings Premia by $I_{far} = \{0, 1\}$



Among local labor markets **far** from an enforcement office: **an increase of 10 p.p. in RTR** (i.e. our negative shock measure) induces, **by 2017**, an average decrease of **13 p.p.** in the cumulative growth rate of formal earnings premia.

Effect of TL shock on Earnings Premia [**Young**] by $I_{far} = \{0, 1\}$



Considering only the cohort of workers that were **less than 30 years-old** by 1991: the **gap between both groups increases**.

Robustness Checks

Main concern: according to the descriptive stats, **"weak enforcement" municipalities experienced SMALLER negative TL shocks**.

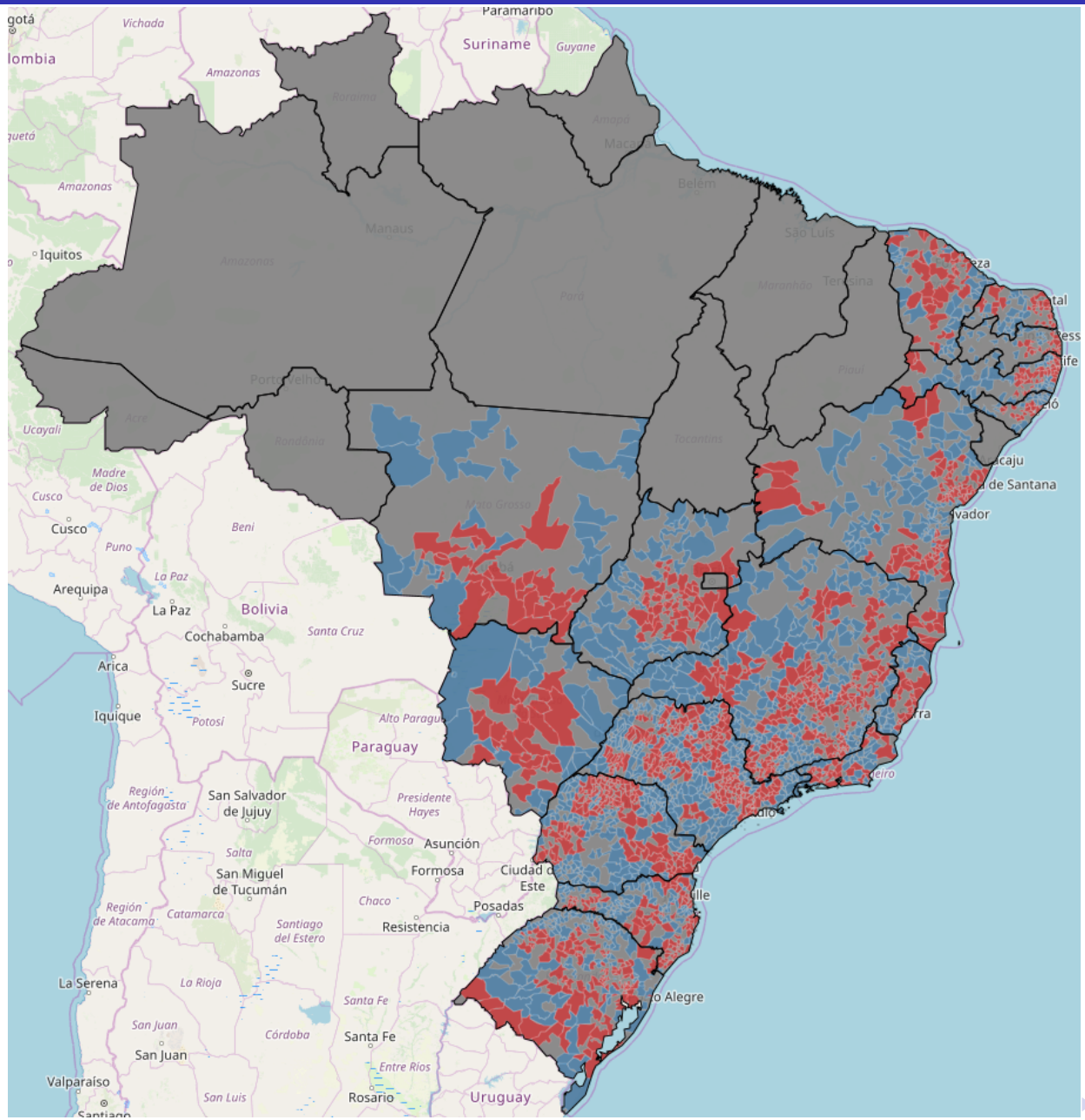
So far, three pieces of evidence suggest this is **NOT what drives our results**:

1. The coefficient for the I_{far} dummy in our main regression is **not significant**. ▸ Main Reg. Table

2. Conditional on controls, the observation is reversed: "weak enforcement" municipalities experienced **LARGER** negative TL shocks. Important to control for **distance to state capital** (DSC). ▸ RTR *conditional* densities

3. Running our main regression considering only **municipality pairs** (one from each enforcement group) **with comparable RTR shocks**, the main effect (β_t) remains significant. ▸ Main Figure - paired municipalities ▸ RTR densities - paired municipalities

Enforcement heterogeneity - Brazil



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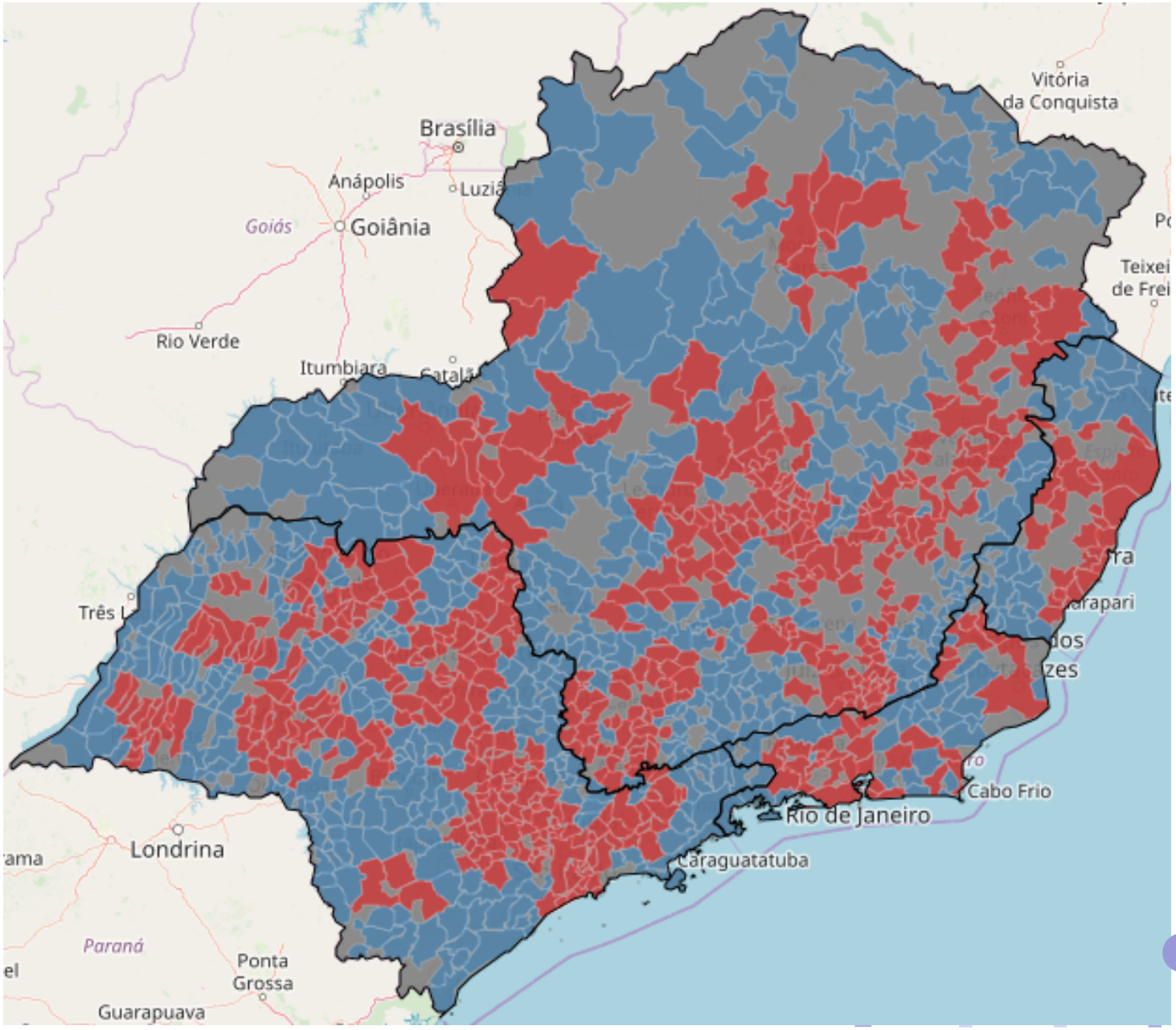
Enforcement heterogeneity - Brazil, South East



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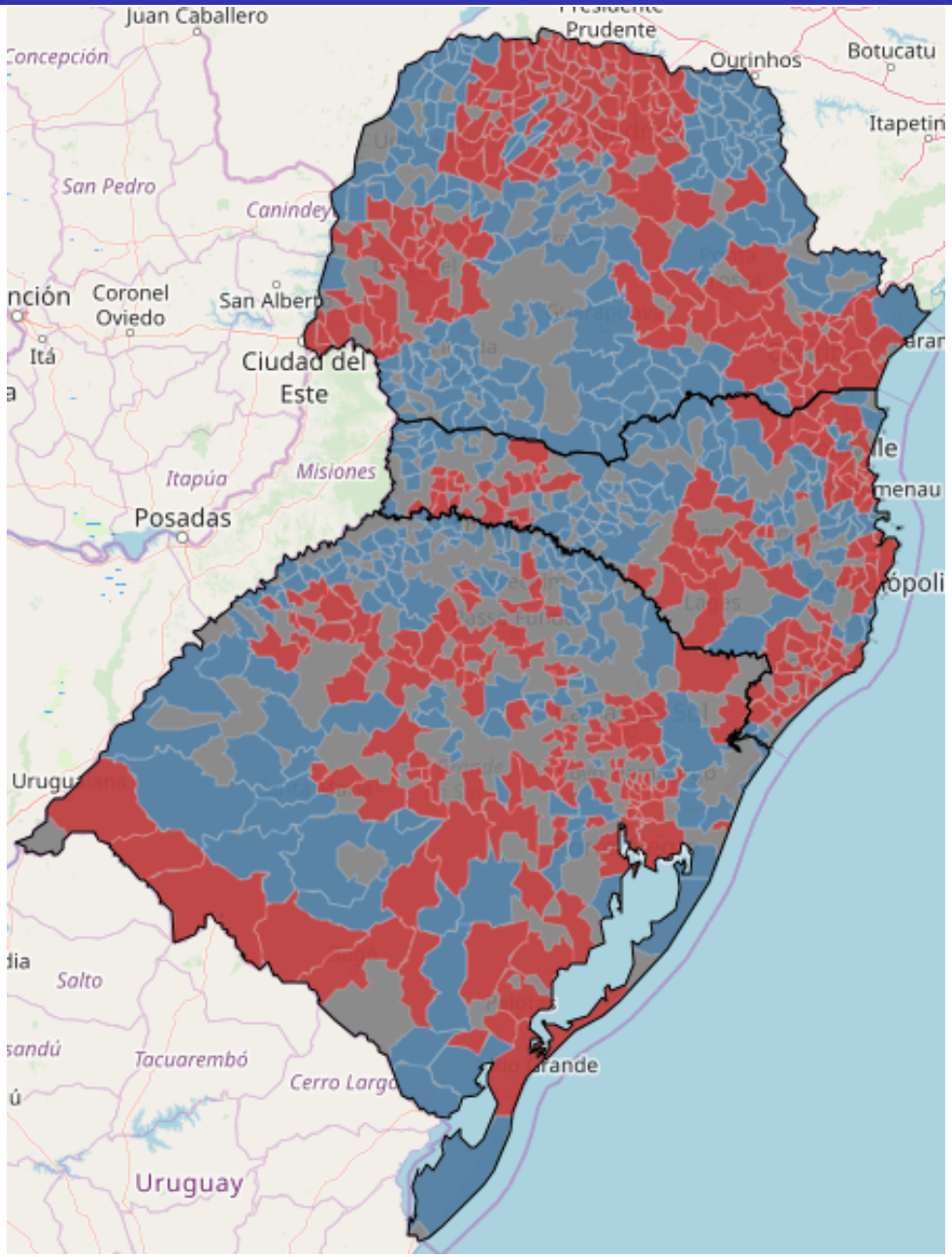
Enforcement heterogeneity - Brazil, South



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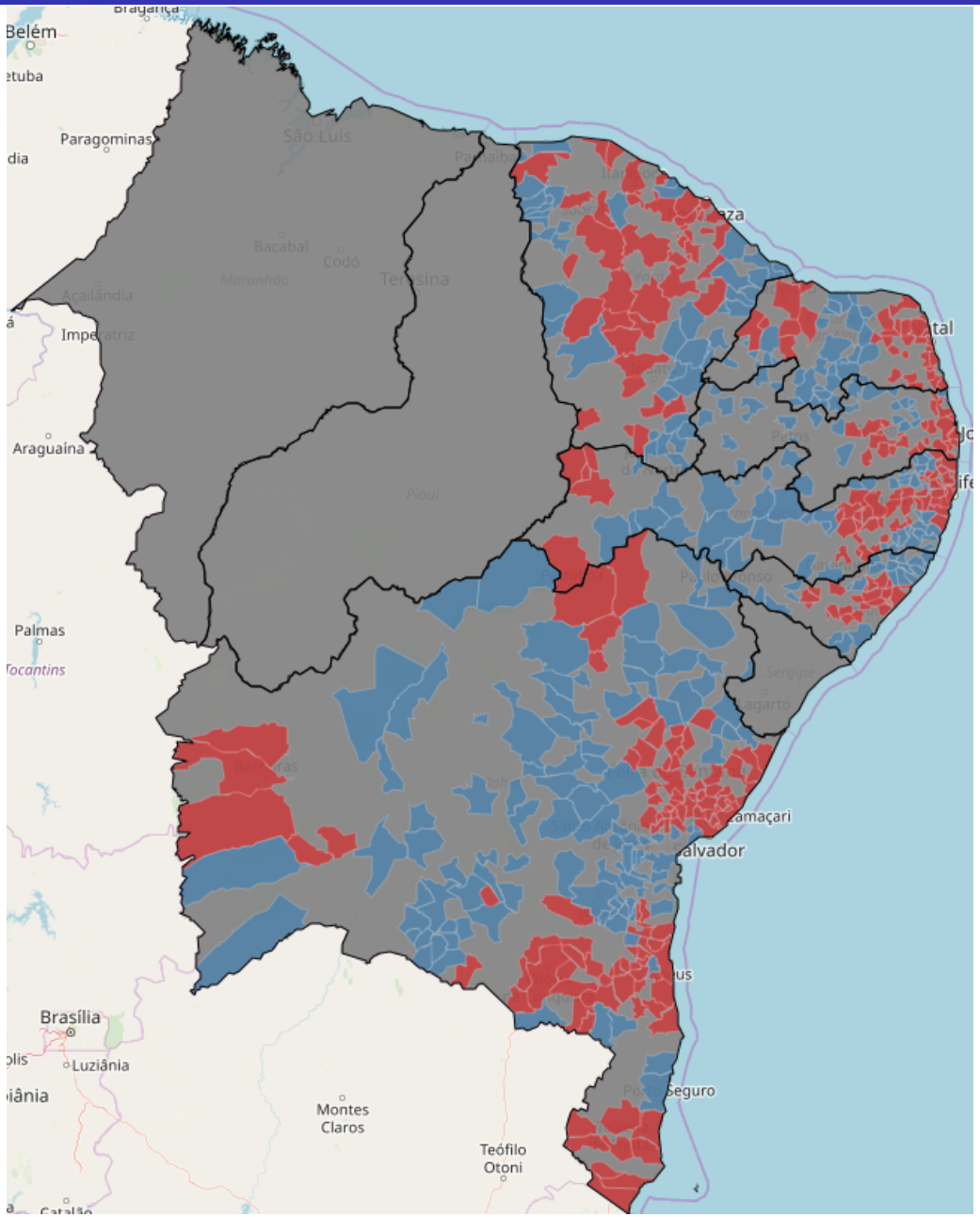
Enforcement heterogeneity - Brazil, North East



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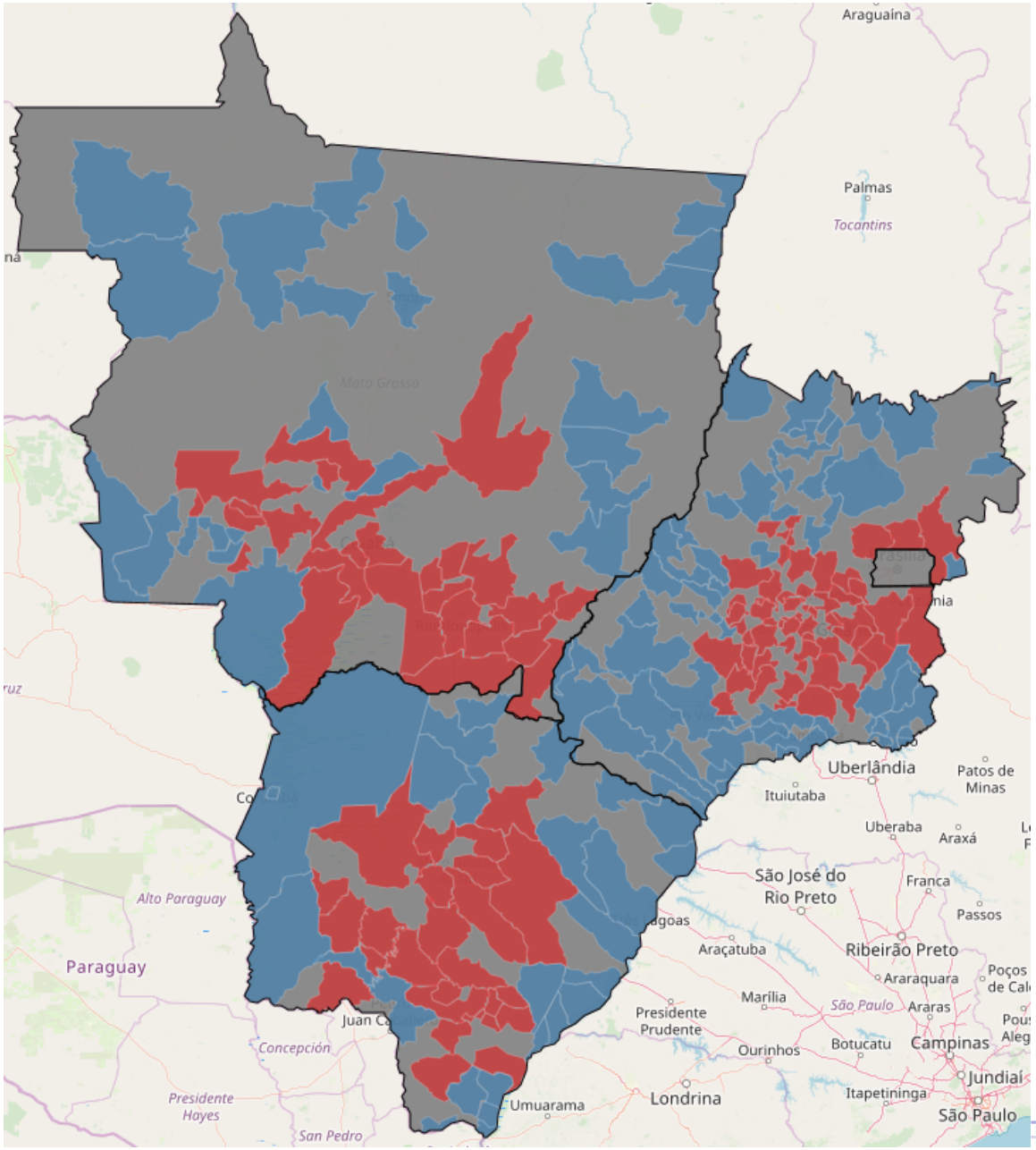
Enforcement heterogeneity - Brazil, Central-West



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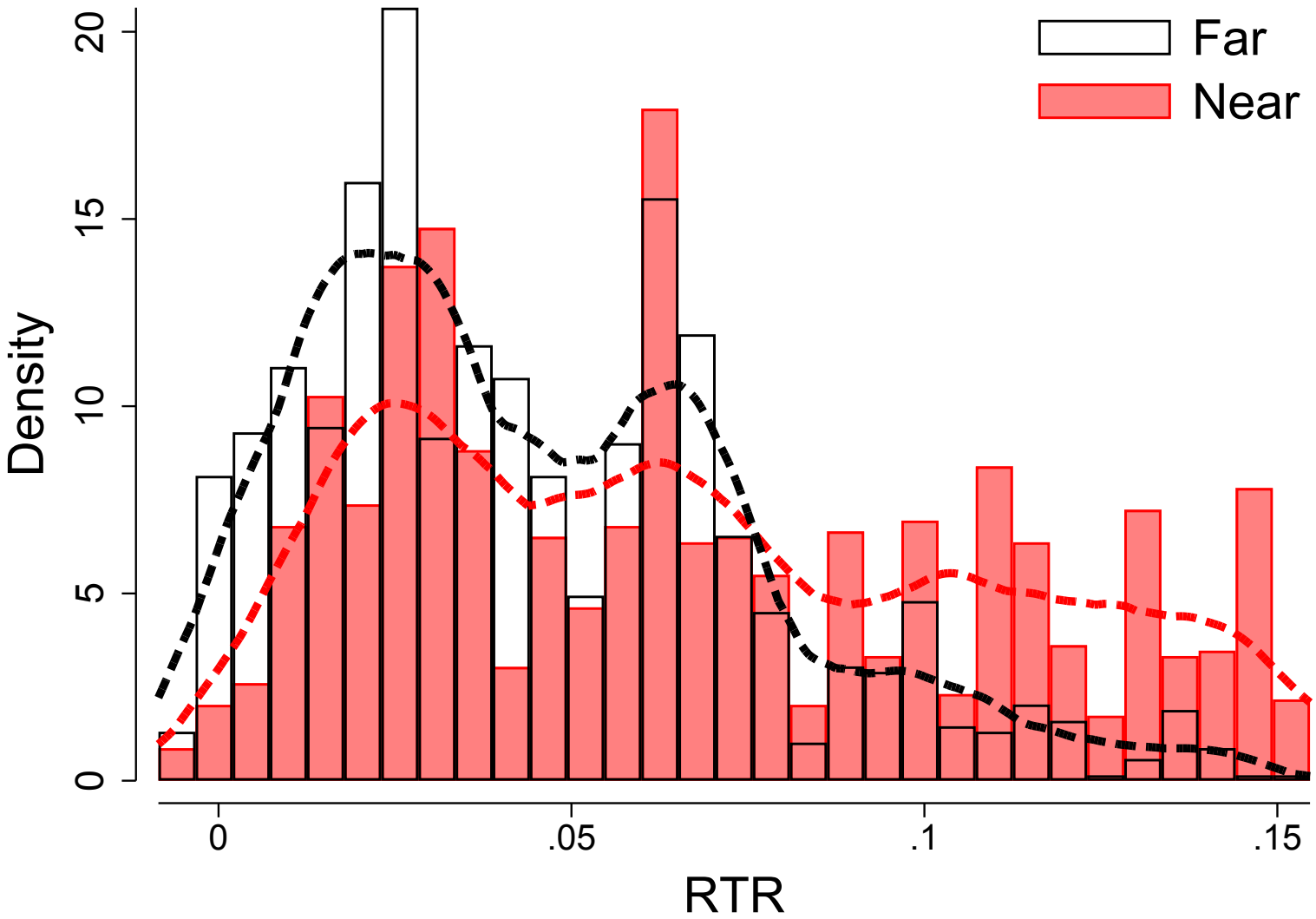
Regional Tariff Reductions densities by $I_{far} = \{0, 1\}$



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I_{far} fixed effect not significant

$dln(\text{EarnP})_{t,1991}$	2000	2005	2010	2015
RTR	$-0{\cdot}8^{***}$	$-1{\cdot}8^{***}$	$-2{\cdot}3^{***}$	$-2{\cdot}5^{***}$
	$(-3{\cdot}6)$	$(-7{\cdot}1)$	$(-7{\cdot}7)$	$(-7{\cdot}2)$
Ifar=1	**-0·0**	**-0·0**	**-0·0**	**-0·0**
	(-0·5)	**(-0·8)**	**(-0·9)**	**(-1·2)**
Ifar=1 × RTR	$0{\cdot}4$	$0{\cdot}8^{***}$	$1{\cdot}2^{***}$	$1{\cdot}3^{***}$
	$(1{\cdot}3)$	$(2{\cdot}7)$	$(3{\cdot}1)$	$(3{\cdot}1)$
Pre-Trend	$-0{\cdot}3^{***}$	$-0{\cdot}3^{***}$	$-0{\cdot}3^{***}$	$-0{\cdot}3^{***}$
	$(-4{\cdot}8)$	$(-3{\cdot}6)$	$(-3{\cdot}9)$	$(-4{\cdot}5)$
DSC	$-0{\cdot}0$	$-0{\cdot}0$	$-0{\cdot}0^{*}$	$-0{\cdot}0$
	$(-0{\cdot}4)$	$(-1{\cdot}6)$	$(-1{\cdot}7)$	$(-0{\cdot}9)$
RTR × DSC	$0{\cdot}0$	$0{\cdot}1^{**}$	$0{\cdot}2^{***}$	$0{\cdot}2^{**}$
	$(0{\cdot}3)$	$(2{\cdot}2)$	$(2{\cdot}7)$	$(2{\cdot}3)$
N	2620	2620	2620	2620
Adj. R^2	$0{\cdot}187$	$0{\cdot}471$	$0{\cdot}573$	$0{\cdot}607$

t stats in parentheses; "DSC" is the Distance to State Capital (i.e. a control); All regressions include state FE.

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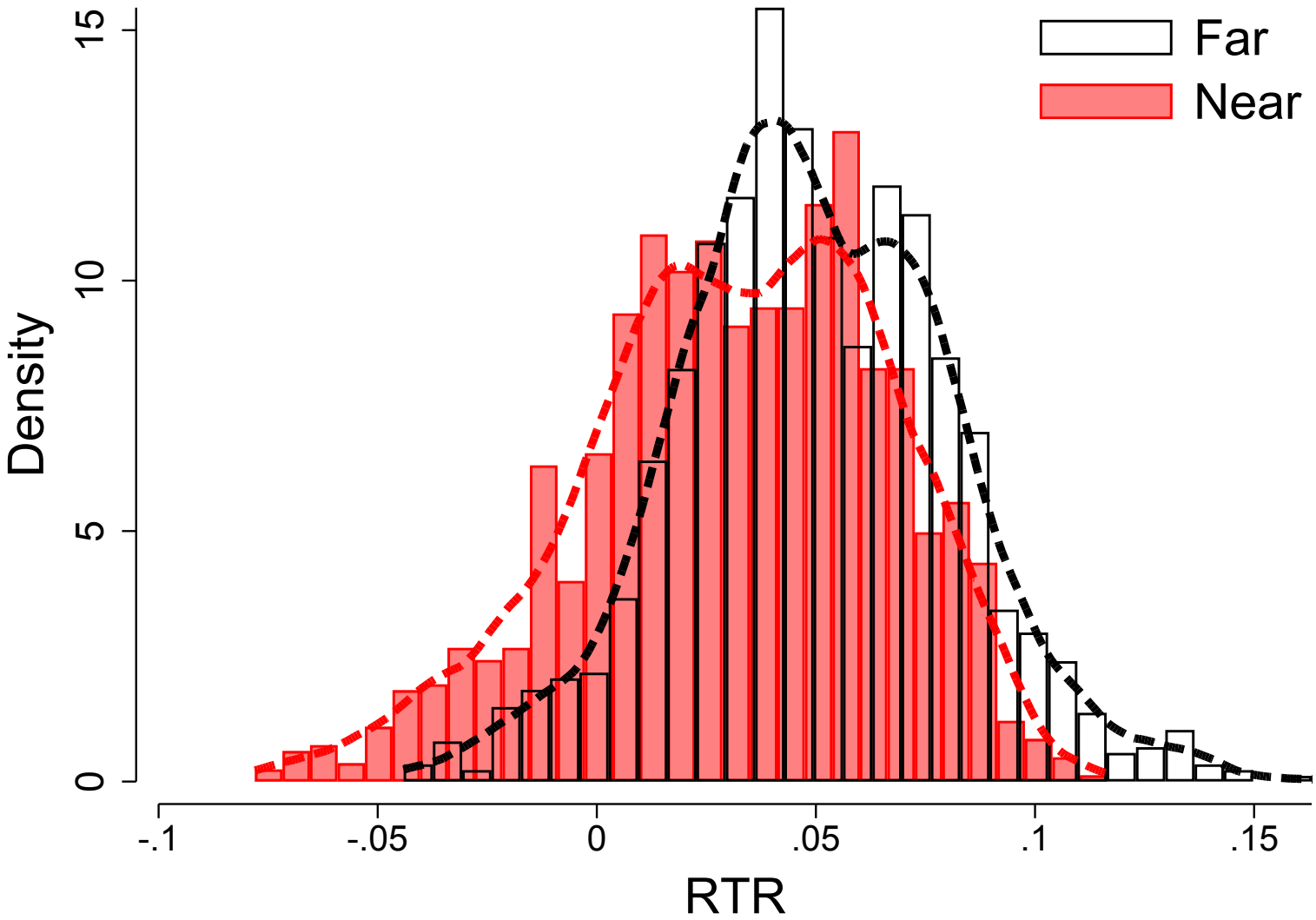
RTR densities, after controls, by $I_{far} = \{0, 1\}$



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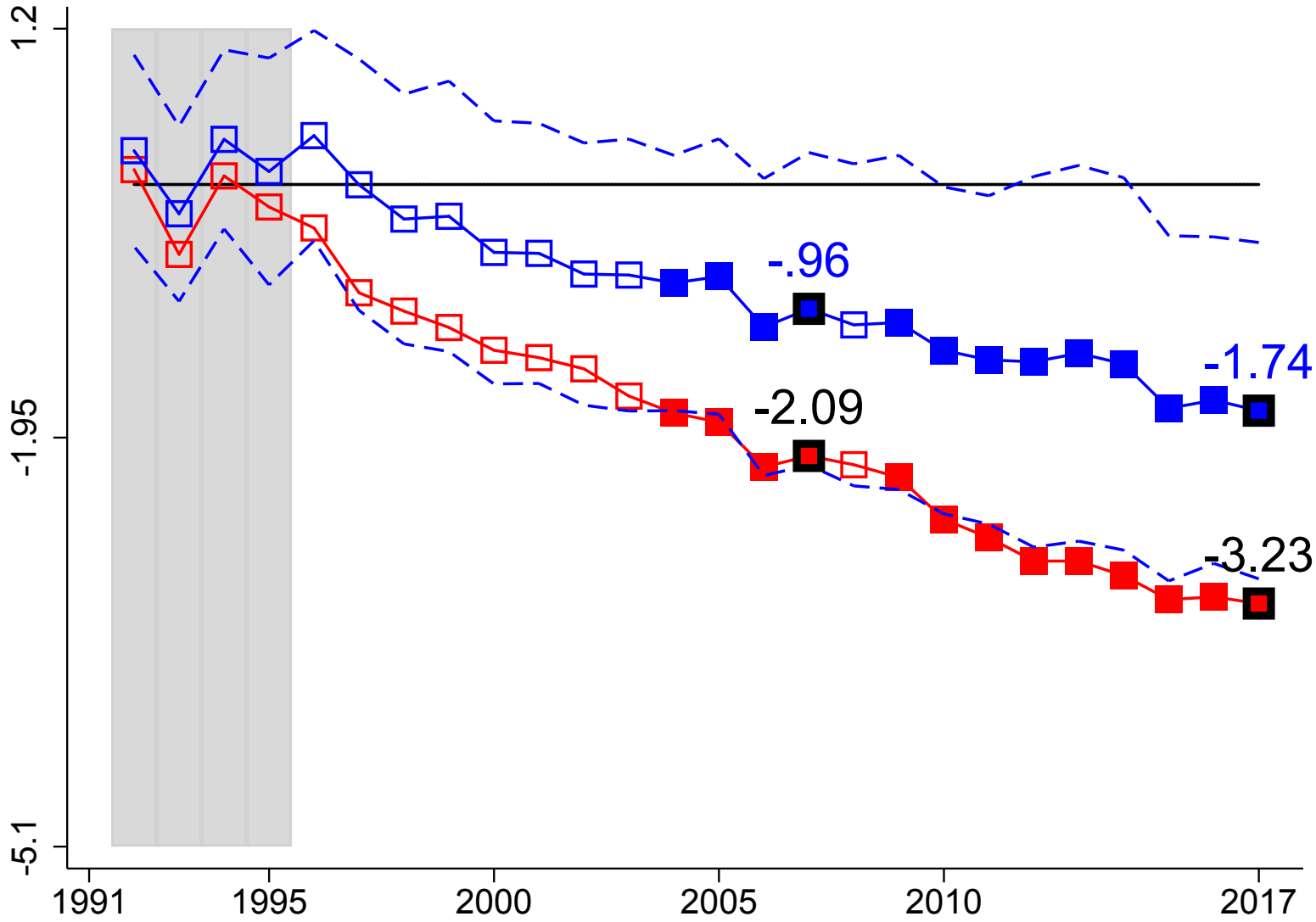
Main Figure for Municipality Pairs based on RTR



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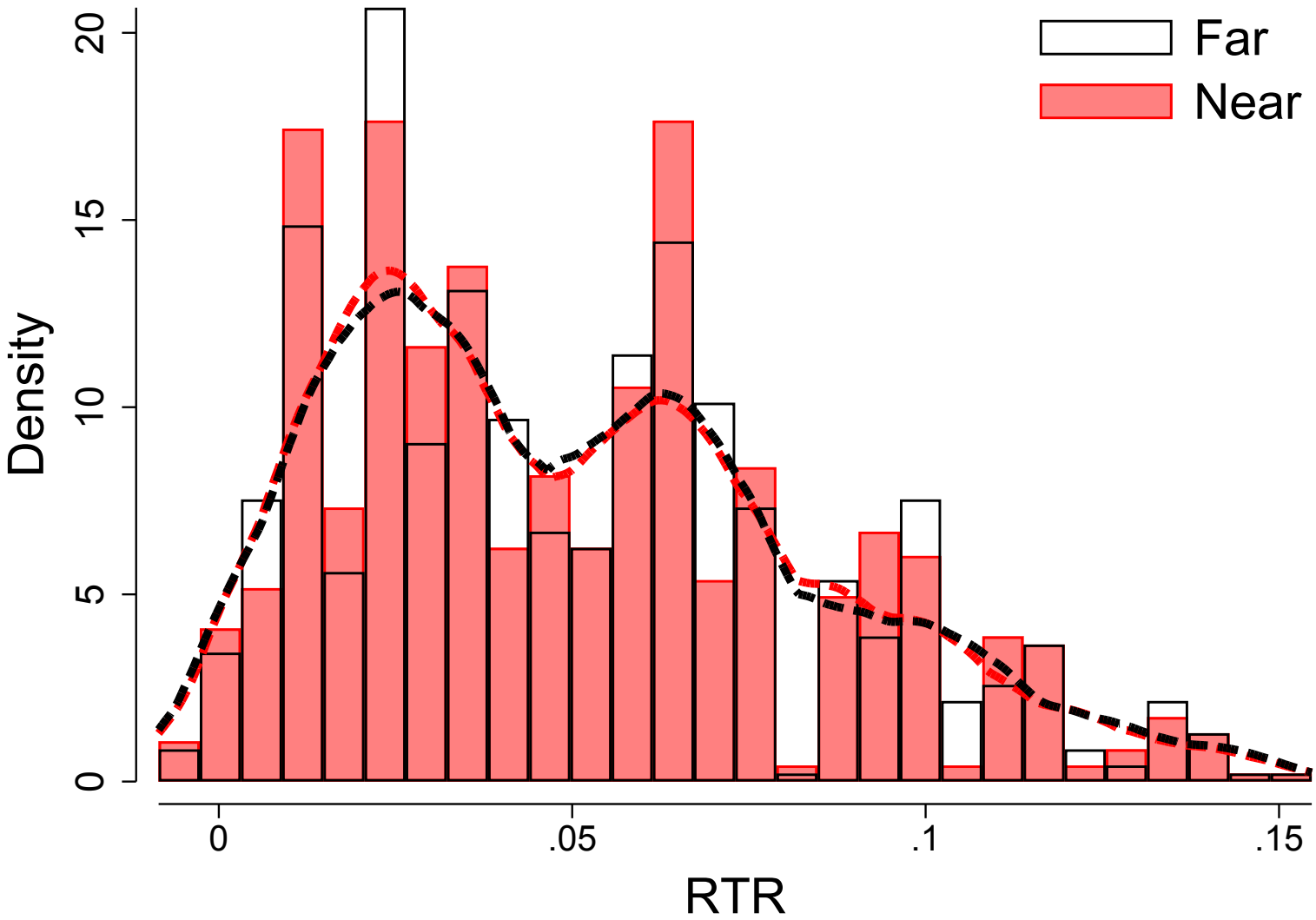
RTR densities under Municipality-Pairs approach



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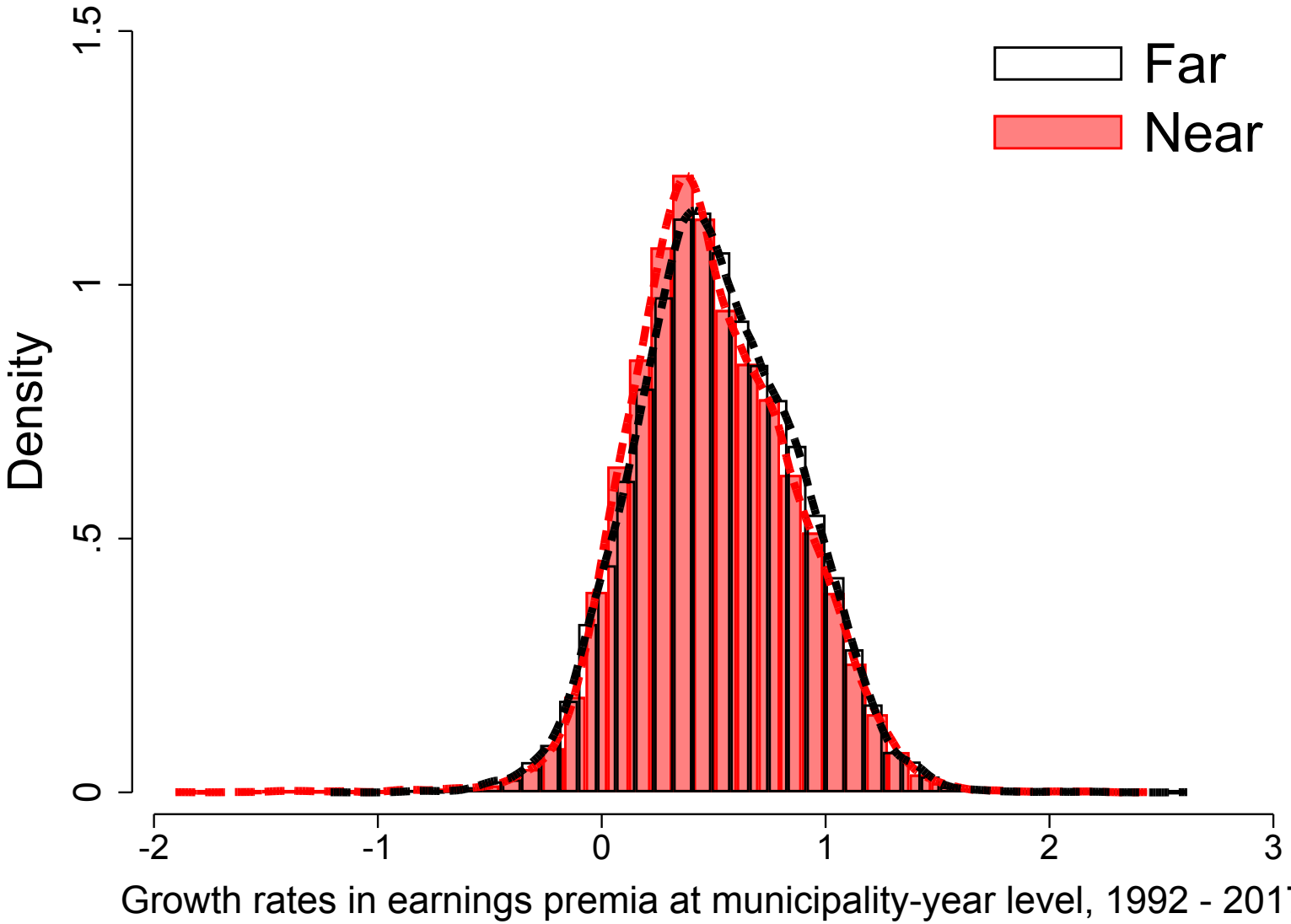
$dln(EarningsPremia)$ densities by $I_{far} = \{0, 1\}$



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Effect on Earnings Premia [**Young**] by $I_{far} = \{0, 1\}$

$dln(\text{EarnP})_{t,1991}$	2000	2005	2010	2015
RTR	$-1{\cdot}5^{***}$	$-2{\cdot}5^{***}$	$-3{\cdot}0^{***}$	$-3{\cdot}1^{***}$
	$(-4{\cdot}4)$	$(-6{\cdot}6)$	$(-7{\cdot}1)$	$(-6{\cdot}5)$
Ifar=1	$-0{\cdot}0$	$-0{\cdot}0$	$-0{\cdot}1$	$-0{\cdot}1^{*}$
	$(-0{\cdot}6)$	$(-1{\cdot}4)$	$(-1{\cdot}5)$	$(-1{\cdot}7)$
Ifar=1 $\times$ RTR	$0{\cdot}6$	$1{\cdot}2^{***}$	$1{\cdot}6^{***}$	$1{\cdot}8^{***}$
	$(1{\cdot}4)$	$(3{\cdot}1)$	$(3{\cdot}4)$	$(3{\cdot}3)$
Pre-Trend	$-0{\cdot}3^{***}$	$-0{\cdot}3^{***}$	$-0{\cdot}3^{***}$	$-0{\cdot}3^{***}$
	$(-4{\cdot}8)$	$(-3{\cdot}9)$	$(-4{\cdot}0)$	$(-3{\cdot}4)$
DSC	$-0{\cdot}0$	$-0{\cdot}0$	$-0{\cdot}0$	$-0{\cdot}0$
	$(-0{\cdot}8)$	$(-1{\cdot}2)$	$(-1{\cdot}3)$	$(-0{\cdot}4)$
RTR $\times$ DSC	$0{\cdot}1^{*}$	$0{\cdot}2^{***}$	$0{\cdot}3^{***}$	$0{\cdot}2^{***}$
	$(1{\cdot}7)$	$(2{\cdot}9)$	$(3{\cdot}4)$	$(2{\cdot}6)$
N	2571	2571	2571	2571
Adj. R^2	0·312	0·509	0·584	0·605

t stats in parentheses. DSC stands for Distance to State Capital.

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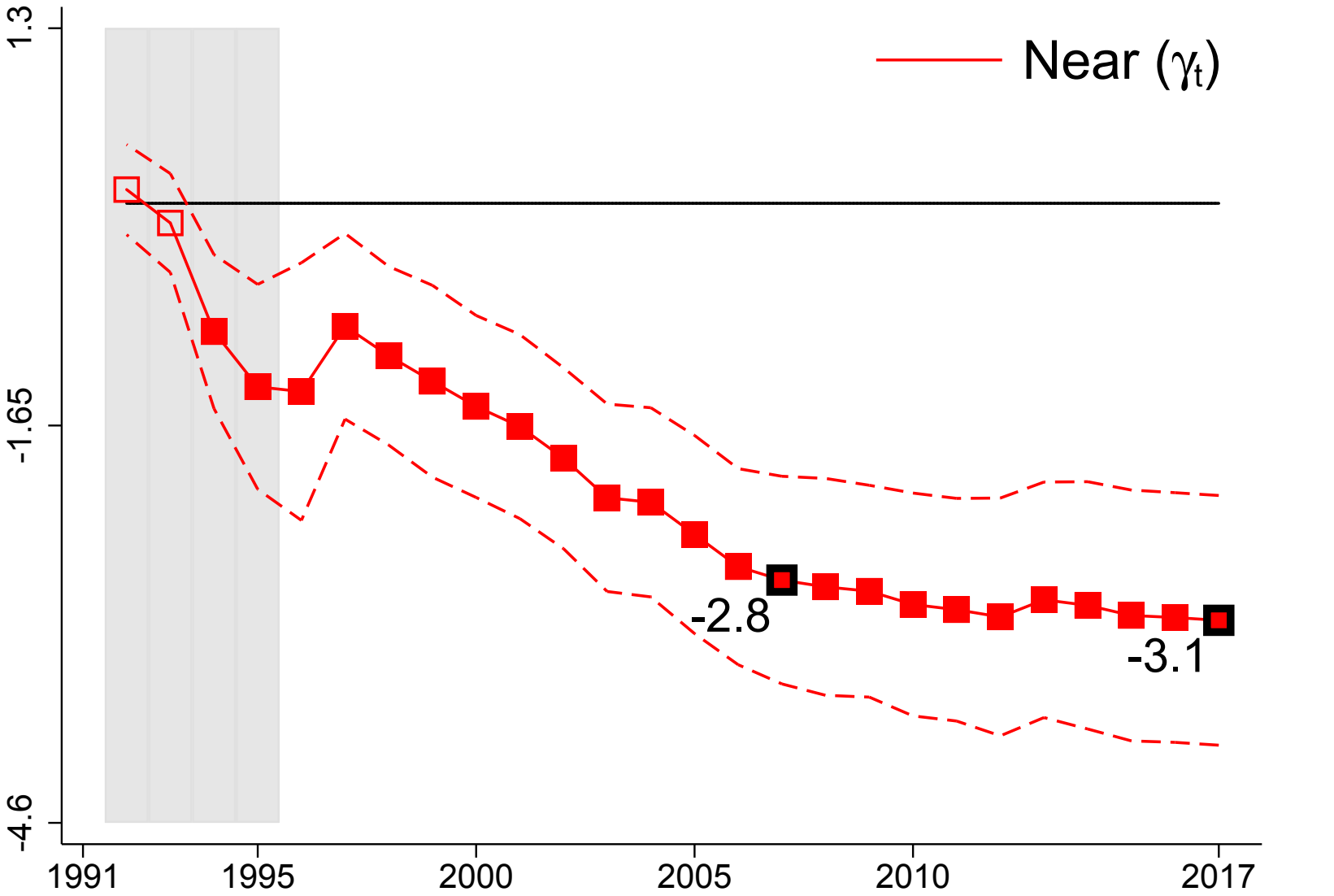
Effect on Earnings Premia [**Young**] by $I_{far} = \{0, 1\}$



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