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# Tying Your Enemy's Hands in Close Races: The Politics of Federal Transfers in Brazil\*

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## **Abstract**

We apply a regression discontinuity design in close electoral races to identify the effect of political alignment on federal transfers to municipal governments in Brazil. We find that municipalities where the mayor is affiliated with the coalition of the President—in the last two years of the mayoral term—receive larger (discretionary) infrastructure transfers by about one-third. This effect is mainly driven by the fact that the federal government penalizes municipalities run by mayors from the opposition coalition who won by a narrow margin, thereby tying their hands for the next election. Politically motivated transfers are larger for first-term mayors, who have higher reelection incentives; for mayors unaligned with the state governor, who may have a hard time obtaining state transfers; and in small towns without a radio station, where the influence of mayors on local politics is stronger.

**JEL codes:** C21, D72, H77.

**Keywords:** intergovernmental grants, political alignment, regression discontinuity.

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# 1 Introduction

In a federal state, transfers from the central government to lower-tier administrative units are a crucial ingredient both for the efficient provision of public goods and services, and for the political competition between parties (or coalitions) at different levels of government. A large body of research in public finance has investigated the normative justifications of intergovernmental transfers.<sup>1</sup> From a political economy perspective, however, it is hard to believe that central governments—based on either their own preferences or the presence of institutional and political constraints—end up acting as a benevolent social planner would do. Indeed, although federations usually adopt allocation rules that shelter the distribution of intergovernmental grants from political distortions, incumbent politicians at different layers of government still have a lot of discretion in using transfers to tease voters or build alliances with other politicians.

In this paper, we apply a Regression Discontinuity Design (RDD) in close electoral races—in the spirit of Lee (2008)—and identify the impact of political alignment on the amount of federal transfers to municipal governments in Brazil. The intuition behind this identification strategy is simple. If random factors—for example, unexpected breaking news or rain on election day—played even a small role in deciding electoral outcomes, the victory of the mayoral candidate aligned with the Brazilian President would mimic random assignment in those municipal elections decided by a narrow margin. The RDD setup therefore delivers a clean source of exogenous variation in political alignment. Consistently with the Brazilian multi-party system, we measure political alignment with respect to both the government coalition and the political party of the President.

The theoretical literature has provided contrasting explanations for politically motivated transfers, or tactical redistribution. On the one hand, incumbent politicians may use intergovernmental transfers to increase their (or their allies’) reelection probability at the central and local level, therefore allocating larger transfers to localities where swing voters are overrepresented (see Lindbeck and Weibull, 1987; Dixit and Londregan, 1998). On the other hand, they may use transfers to reward their core supporters (see Cox and

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<sup>1</sup>See Oates (1972) or Musgrave and Musgrave (1989) for an overview of the efficiency and equity arguments motivating the use of intergovernmental transfers from a normative point of view.

McCubbins, 1986).<sup>2</sup> Independently of the level of political competition, however, as far as the local government can claim political credit for the received resources, the alignment between the two levels of government—that is, whether they belong to the same coalition or not—should increase the amount of transfers, because the central government has an incentive to favor its (political) friends and penalize its (political) enemies.

Testing the latter hypothesis has proven to be a difficult endeavor. Without a credible source of exogenous variation in political alignment, the empirical correlation between alignment and larger transfers (if any) could be completely driven by (local) socio-economic conditions affecting both electoral outcomes and the allocation of government revenues. Most of the early studies have tackled this issue with a “selection on observables” assumption, controlling for different measures of the normative and political determinants of intergovernmental grants. In the U.S., Grossman (1994) finds that the similarity of party affiliation between federal and state politicians increases grants made to a state; Levitt and Snyder (1995) show that the share of democratic voters is an important predictor of federal transfers to a district, especially in years of democratic control in Congress. In Australia, Worthington and Dollery (1998) also detect some tactical distribution of grants. This approach, however, is likely to suffer from a problem of omitted bias.

Solé-Ollé and Sorribas-Navarro (2008) improve upon the early literature with a diff-in-diff strategy, both across time (exploiting the within-municipality variation in political alignment induced by subsequent elections) and across grantors (exploiting the within-municipality variation in political alignment with different layers of government). They use data on Spain and find that municipalities aligned with the two upper-tier governments receive over 40% more grants than unaligned municipalities. Other studies also control for (time-invariant) confounding factors in a fixed-effect setup. In India, Arulampalam et al. (2009) find that aligned states receive larger grants, especially if they are swing states. Larcinese, Rizzo, and Testa (2006) study the allocation of the U.S. federal budget and show that states whose governors belong to the same party of the President receive

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<sup>2</sup>The “swing voters” hypothesis with respect to intergovernmental grants has received empirical support for Albania (Case, 2001) and Sweden (Johansson, 2003). Looking at different outcomes, the share of unaligned voters has been shown to be positively correlated with presidential campaigning in the US (Stromberg, 2008) and the quality of political candidates in Italy (Galasso and Nannicini, 2009). On the contrary, Larcinese, Rizzo, and Testa (2006) find support for the “core supporters” hypothesis in the allocation of the U.S. federal budget, as states that heavily supported the President receive more funds.

more funds. In Portugal, Veiga and Pinho (2007) find evidence of distortions favoring municipalities ruled by the Prime Minister’s party during the early years of democracy, but not in the period of established democracy.

Yet, unobservable confounding factors might be time-varying as well. For example, the occurrence of an international economic crisis could swing a large fraction of voters in export-oriented regions toward a given political party, and at the central level the same party could decide to favor these regions because of its policy preferences rather than tactical motivations. In this respect, our RDD setup improves internal validity, because it can accommodate for both time-invariant and time-varying confounding factors.

Our econometric strategy has not only a comparative advantage in terms of internal validity, but also addresses another relevant question, namely the interaction between the degree of political competition and political alignment in shaping the tactical allocation of federal transfers. By contrasting close versus safe electoral races, we can shed light on how the effect of political alignment varies along this dimension. The only limitation of the close-race RDD setup is due to the fact that, in order to ensure internal validity in the Brazilian multi-party system, we must restrict the sample to electoral races where there are only two (or at most three) candidates, and one of them is affiliated with the coalition or party of the President.<sup>3</sup> Although this restriction only affects external validity, we address the limitation by comparing our RDD sample with all the rest. We also present benchmark estimation results with OLS and diff-in-diff specifications both in the all sample and in two-candidate (or three-candidate) races only.

We frame the above issues into a simple model where the central government allocates transfers to municipalities in order to maximize both the citizens’ goodwill toward itself and the political capital represented by aligned mayors, who are influential opinion leaders at the local level and may turn to be important supporters at the next federal election. If the central government were able to obtain full political credit for the transferred resources, it would only care about the citizens’ goodwill and would be indifferent between benefiting aligned versus unaligned mayors. On the contrary, if voters were partly unable to distinguish the source of the money and there were some *political credit spillovers* in

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<sup>3</sup>When we measure political alignment by looking at the President’s coalition, two-candidate (three-candidate) races of this kind amount to about 42% (55%) of all electoral races. See Section 3.3 for more details on the sample selection procedure.

favor of local governments, aligned municipalities should end up receiving more transfers, as the central government would try either to help aligned mayors to get reelected or to hamper the reelection prospects of unaligned mayors.<sup>4</sup> Furthermore, among aligned municipalities, those where the incumbent won by a narrow margin should receive more, because it is especially there that larger municipal revenues will make a difference in the next electoral race. By the same token, among unaligned municipalities, those where the incumbent won by a narrow margin should receive less, because the federal government wants to tie the hands of its (political) enemies in the next election. Finally, all of these effects should be stronger where (i) the impact of transfers on reelection is higher (for instance, where the mayor faces no term limit and puts more effort in the electoral campaign), and (ii) the value of political capital is higher (for instance, in small towns where local politicians have strong influence on the public opinion).

The close-race RDD setup is particularly suited to test the above predictions. According to our empirical results, in races decided by a narrow margin, municipalities where the mayor is affiliated with the political coalition of the Brazilian President receive larger (discretionary) transfers in infrastructure by about one-third in the *last* two years of the mayoral mandate, that is, when the next municipal elections are approaching. During the *first* two years of the mandate—when instead federal elections are approaching—we find no evidence of political distortions in the allocation of federal transfers. This is consistent with the hypothesis of “political credit spillovers” discussed above, as it seems that opportunistic grants take place in proximity of municipal rather than federal elections. Consistently with our model, the effect of political alignment is driven by a sizable cut in transfers to unaligned municipalities close to the discontinuity of zero margin of victory. In other words, there is evidence that the federal government penalizes municipalities ruled by mayors who belong to the opposition coalition and won by a narrow margin (the “tying hands” effect). On the other side of the discontinuity, however, we find no evidence that the federal government mostly targets those aligned municipalities where the mayor won by a narrow margin; on the contrary, the political strongholds of the President’s coalition tend to receive larger transfers.

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<sup>4</sup>On contested credit claiming in distributive politics, see Shepsle et al. (2009), who show that the members of the U.S. House and Senate delegations within each state must share the credit for appropriations that originate in their chamber with the delegation members in the other chamber.

We also detect significant heterogeneity results in line with our theoretical framework. First, the effect of political alignment on federal transfers is higher for first-term mayors, and for mayors who are not aligned with the state governor. From the central government’s point of view, in fact, the impact of politically motivated transfers is magnified when the mayor has stronger reelection incentives and is therefore going to exert more effort in claiming credit for the additional revenues, as well as when the mayor may have a hard time obtaining transfers from other sources, such as the state government. Second, the effect of partisan alignment is higher in small municipalities and in municipalities without a local radio station.<sup>5</sup> From the central government’s point of view, the absence of a radio station and the small population size—two features that are difficult to disentangle in the Brazilian data—increase the value of the political capital associated with aligned mayors. In small towns, in fact, municipal institutions are the main source of political information for citizens, while the presence of a radio station increases the ability of the President or congressmen to campaign independently of local politicians.

The remainder of the paper is organized as follows. In Section 2, we present our theoretical framework. In particular, in Section 2.1 we introduce a simple model setting the stage for the empirical analysis, while in Section 2.2 we derive our identification strategy. In Section 3, we discuss the relevant Brazilian institutions and describe our data. In Section 4, we present the empirical results and validity tests. We conclude with Section 5.

## 2 Theoretical Preliminaries

### 2.1 A simple model

Consider the (political) maximization problem of a central government (or President) that must choose the amount of federal transfers  $\tau_i$  to allocate to each local government  $i$ , with  $i = 1, \dots, N$ . The President’s objective function is made up of two (political) benefits. On the one hand, he will try to increase the general goodwill of the citizens in every municipality  $i$  toward the central government; and this is assumed to be a positive function of the amount of transferred resources:  $U(\tau_i)$ , with  $U' > 0, U'' < 0$ . On the other

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<sup>5</sup>Ferraz and Finan (2008) show that corruption disclosure in Brazilian municipalities—following independent audit reports—has a negative impact on the incumbent mayor’s reelection, and that this effect is more pronounced where a local radio is present, making the electorate more informed.

hand, he will try to increase the likelihood that municipality  $i$  is run by a mayor aligned with the central government, either because local politicians are important opinion leaders and they may turn to be useful allies in the next presidential campaign, or because they may engage in rent-seeking activities for the President. If the future margin of victory of the mayoral candidate aligned with the President is positive (that is, if the President's coalition wins in municipality  $i$ ), the central government increases its political capital by a positive (fixed) amount  $R$ . The relative weight of the two benefits, however, depends on whether voters give political credit for the increased municipal revenues to the central government or to the mayor. We define  $\theta \in [0, 1]$  as the political credit spillovers accruing to the incumbent mayor. In other words, if  $\theta = 0$  the central government can claim full credit for  $\tau_i$ , while if  $\theta = 1$  all the credit is going to the municipal government.

Following the above setup, the President's objective function can be expressed as:

$$\max_{\tau_i} \left\{ (1 - \theta) \sum_i U(\tau_i) + \sum_i R \cdot Pr[MVP_i > 0] - \sum_i C(\tau_i) \right\}, \quad (1)$$

where  $MVP_i$  is the future margin of victory of the mayoral candidate aligned with the central government in municipality  $i$ , and  $C(\tau_i)$  captures the opportunity cost of allocating a certain amount of transfers, with  $C' > 0, C'' < 0$ . We assume the cost function of municipality  $i$  to be independent of what happens in municipality  $j \neq i$ . This is in line with the Brazilian institutions that we describe below, because the discretionary transfers of our empirical analysis are a very small fraction of the federal budget. In other words, the central government could easily meet the requests of every municipality independently of each other, but meeting each individual request comes with an opportunity cost  $C(\tau_i)$ , either in terms of taxation or decreased expenditure on other items of the budget. From an econometric point of view, this is equivalent to assuming that the Stable Unit Treatment Value Assumption (SUTVA) holds, as the outcome (federal transfers) of  $i$  depends on the treatment (political alignment) of  $i$  but not on the treatment of  $j \neq i$ .

The crucial point is that—in equation (1)—the margin of victory of the aligned candidate in municipality  $i$  is going to be affected by federal transfers too. In particular, we assume that the transferred resources are going to increase the electoral prospects of the incumbent mayor, or of his political party. Therefore, if the incumbent is aligned with the President ( $P_i = 1$ ),  $\tau_i$  will increase the future margin of victory of the politically aligned

candidate, and vice versa if the incumbent is not aligned ( $P_i = 0$ ). The future margin of victory of the aligned candidate can be expressed as:

$$MVP_i = \rho MVP_i^0 + \epsilon_i + \theta(2P_i - 1)f(\tau_i), \quad (2)$$

where  $MVP_i^0$  is the margin of victory of the aligned candidate in the previous election,  $\epsilon \sim N(0, \sigma^2)$  is a normally distributed random shock, and  $f(\tau_i)$  is a function that translates transfers into votes for the incumbent, with  $f' > 0$ ,  $f'' < 0$ .

The persistence of the past margin of victory (captured by  $\rho$ ) means that the future electoral outcome depends on the past electoral outcome, either because of the ideological bias of voters in municipality  $i$  or because of an incumbency advantage. The normal shock  $\epsilon_i$  accommodates for the presence of random events.<sup>6</sup> The last term on the right-hand side of equation (2) captures the impact of transfers on the next municipal election. As long as there are some political credit spillovers ( $\theta > 0$ ), the additional municipal revenues are going to help either the aligned candidate if  $P_i = 1$ , or the unaligned candidate if  $P_i = 0$ .<sup>7</sup> Indeed, the assumption that higher transfers from the central government increase the reelection probability of the incumbent mayor or party has been corroborated by many empirical studies, also on Brazil.<sup>8</sup> It follows that:

$$Pr[MVP_i > 0] = \Phi \left[ \frac{\rho MVP_i^0 + \theta(2P_i - 1)f(\tau_i)}{\sigma} \right], \quad (3)$$

where  $\Phi[\cdot]$  is the cumulative distribution function of the standard normal.

**Equilibrium transfers.** Substituting the last expression into equation (1), the first-order condition of the President's maximization problem can be written as:

$$(1 - \theta)U'(\tau_i) + \frac{R\theta(2P_i - 1)f'(\tau_i)}{\sigma} \phi \left[ \frac{\rho MVP_i^0 + \theta(2P_i - 1)f(\tau_i)}{\sigma} \right] - C'(\tau_i) = 0, \quad (4)$$

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<sup>6</sup>The normality assumption simplifies notation, but it is not required by our results; all we need is a random shock that is distributed with a decreasing density on either side of zero.

<sup>7</sup>We are implicitly assuming that the impact of more municipal resources on the electoral outcome of the incumbent party is the same for aligned and unaligned incumbents. This simplifies notation and introduces symmetry, but it comes with no loss of generality with respect to the predictions derived below.

<sup>8</sup>For Brazil, Brollo et al. (2009) and Litschig and Morrison (2009) apply a regression discontinuity design in population size to estimate the impact of larger transfers on the reelection of the incumbent mayor; both studies detect a positive effect in different sample periods. Brollo (2008) finds that the Brazilian federal government reduces transfers to corrupt municipalities, but it helps its (political) friends to get rid of the punishment faster. For Uruguay, Manacorda et al. (2009) apply a regression discontinuity design in the assignment criterion of an anti-poverty program and find a positive impact on the recipients' support for the government. For Spain, Solé-Ollé and Sorribas-Navarro (2008) find that grants allocated to local governments of the same party buy more political support than the others.

where  $\phi[\cdot]$  is the density function of the standard normal. Also note that, by definition,  $P_i = 1$  if  $MVP_i^0 > 0$ , and  $P_i = 0$  if  $MVP_i^0 < 0$ .

From this simple first-order condition, we can derive a set of testable predictions on the direction and size of politically motivated central transfers. Assume that the past margin of victory tends to either  $+\infty$  or  $-\infty$ , or that there are no political credit spillovers ( $\theta = 0$ ): in both cases, transfers do not influence the future margin of victory. As a result, the central government simply weighs the marginal benefit of increasing citizens' goodwill against the marginal cost of  $\tau_i$ : this gives the (politically) optimal amount of transfers  $\tau^*$  in absence of tactical redistribution, such that  $(1 - \theta)U'(\tau_i^*) = C'(\tau_i^*)$ .

Things change, of course, if  $\theta > 0$  and  $MVP_i^0 \in [-1, 1]$ . In this case, the central government chooses  $\tau_i$  by looking at the additional marginal benefit or cost of influencing the next municipal election. Indeed, from equation (4), it is evident that the second term in the left-hand side is either positive if  $P_i = 1$  or negative if  $P_i = 0$ . In other words, at the zero threshold ( $MVP_i^0 = 0$ ), there is a sharp jump in the maximization problem of the President, as the marginal cost of sending money to an unaligned incumbent suddenly becomes the marginal benefit of sending money to an aligned incumbent. This implies a strong and positive impact of political alignment on transfers in close electoral races, as summarized by the following proposition.<sup>9</sup>

**Proposition 1** *The (local) Average Treatment Effect (ATE) of political alignment on transfers is positive at  $MVP_i^0 = 0$ . That is:  $\lim_{MVP_i^0 \downarrow 0} \tau_i - \lim_{MVP_i^0 \uparrow 0} \tau_i > 0$ .*

Furthermore, it is straightforward to show that—given the assumptions of the model's setup and the second-order condition of the President's maximization problem—politically motivated transfers are a decreasing function of the past margin of victory of the aligned candidate on both sides of the zero threshold. In fact,  $\partial\tau_i/\partial MVP_i^0 < 0$  both if  $P_i = 1$  and if  $P_i = 0$ . The intuition for this result is simple and follows from the persistence of the electoral outcome: on the left of the zero threshold ( $MVP_i^0 < 0$ ), the central government wants to penalize unaligned municipalities lost by a narrow margin, because especially

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<sup>9</sup>Formally, define  $\underline{\tau} = E[\tau \mid P_i = 0, MVP_i^0 = 0] = \lim_{MVP_i^0 \uparrow 0} \tau_i$  as the optimal transfers to unaligned municipalities in close races, and  $\bar{\tau} = E[\tau \mid P_i = 1, MVP_i^0 = 0] = \lim_{MVP_i^0 \downarrow 0} \tau_i$  as the optimal transfers to aligned municipalities in close races. These quantities are derived from the following first-order conditions, respectively:  $(1 - \theta)U'(\underline{\tau}) - \frac{R\theta f'(\underline{\tau})}{\sigma} \phi\left[\frac{-\theta f(\underline{\tau})}{\sigma}\right] - C'(\underline{\tau}) = 0$ ;  $(1 - \theta)U'(\bar{\tau}) + \frac{R\theta f'(\bar{\tau})}{\sigma} \phi\left[\frac{\theta f(\bar{\tau})}{\sigma}\right] - C'(\bar{\tau}) = 0$ . It follows that:  $\underline{\tau} = \tau^* - z < \tau^* < \bar{\tau} = \tau^* + k$ , with  $z, k > 0$ , which proves Proposition 1.

there transfers are going to make a difference in the next election; by the same token, on the right of the zero threshold ( $MVP_i^0 > 0$ ), the central government wants to favor aligned municipalities won by a narrow margin.<sup>10</sup>

**Proposition 2** *The amount of politically motivated transfers is a decreasing function of  $MVP_i^0$  on either side of the threshold  $MVP_i^0 = 0$ . That is:  $\partial\tau_i/\partial MVP_i^0 < 0$ .*

These theoretical results are graphically shown in Figure 1, where the optimal amount of politically motivated transfers to municipality  $i$  is expressed as a function of the past margin of victory. There, the dashed horizontal line represents  $\tau^*$ , while the solid lines on the two sides of the zero threshold are the optimal transfers decided by the central government on the basis of the ex-ante level of political competition in unaligned (on the left of zero) versus aligned municipalities (on the right of zero). The sharp jump at zero is the local treatment effect of political alignment in close electoral races.

**Comparative statics.** Our theoretical framework also delivers predictions of comparative statics. In particular, the size of the causal impact of political alignment on transfers in close races is going to depend on some of the model's parameters. The ATE of political alignment on transfers at  $MVP_i^0 = 0$  increases if the value of political capital ( $R$ ) increases. In fact, by the implicit function theorem:  $\partial\tau_i/\partial R > 0$  if  $P_i = 1$ ; and  $\partial\tau_i/\partial R < 0$  if  $P_i = 0$ . This means that in Figure 1, as  $R$  increases, the curve on the right of zero shifts upward and the curve on the left of zero shifts downward, thereby increasing the jump in optimal transfers at  $MVP_i^0 = 0$ . By the same token, it is easy to see that the local ATE increases if the variance of the random shock ( $\sigma^2$ ) decreases. In fact, in this case:  $\partial\tau_i/\partial\sigma < 0$  if  $P_i = 1$ ;  $\partial\tau_i/\partial\sigma > 0$  if  $P_i = 0$ . By a slight abuse of notation, we could also state that the local ATE increases if the marginal impact of transfers on votes ( $f'(\tau_i)$ ) increases. Assuming  $f(\cdot)$  to be linear, for instance, would deliver the same comparative statics result obtained on  $R$  for the political effectiveness of transfers. The

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<sup>10</sup>To obtain interior solutions, we are implicitly assuming that the first-order condition in equation (4)—evaluated at  $P_i = 0$ ,  $\tau = 0$ , and  $MVP_i^0 = 0$ —is strictly positive. The proof of Proposition 2 easily follows from the implicit function theorem. Define the first-order condition in equation (4) as  $g(\tau_i, MVP_i^0) = 0$ . Therefore, at  $P_i = 1$ :  $(\partial\tau_i/\partial MVP_i^0) = -(\partial g/\partial MVP_i^0)/(\partial g/\partial\tau_i) < 0$ . In fact:  $(\partial g/\partial\tau_i) < 0$  because of the second-order condition; and  $(\partial g/\partial MVP_i^0) = -\frac{R\theta f'(\tau_i)}{\sigma} \frac{\rho MVP_i^0 + \theta f(\tau_i)}{\sigma} \phi[\frac{\rho MVP_i^0 + \theta f(\tau_i)}{\sigma}] < 0$ , as  $\phi'[x] = -x\phi[x]$ . Similarly, at  $P_i = 0$ :  $(\partial\tau_i/\partial MVP_i^0) = -(\partial g/\partial MVP_i^0)/(\partial g/\partial\tau_i) < 0$ , because in this case:  $(\partial g/\partial MVP_i^0) = \frac{R\theta f'(\tau_i)}{\sigma} \frac{\rho MVP_i^0 - \theta f(\tau_i)}{\sigma} \phi[\frac{\rho MVP_i^0 - \theta f(\tau_i)}{\sigma}] < 0$ .

impact of political credit spillovers—as captured by  $\theta$ —is instead unclear, because implicit differentiation does not deliver a clear sign for the relationship between  $\theta$  and  $\tau$ .

At the end of the day, our framework shows that the higher the value of political capital, or the higher the marginal impact of transfers on the incumbent party’s reelection probability, the larger the causal impact of political alignment on transfers in close races. Furthermore, the higher electoral uncertainty or volatility, the lower the causal impact of political alignment on transfers in close races, because it is more likely that random factors—instead of transfers—will decide the future electoral outcome of ex-ante contestable races. The level of political credit spillovers has instead an ambiguous impact on the tactical allocation of federal transfers.

## 2.2 Identification and estimation

The close-race RDD setup is particularly suited to take the above theoretical predictions to the data. We are interested in estimating the causal effect of political alignment on the amount of (discretionary) federal transfers. Define  $\tau_{im}(1)$  as the potential transfers received by municipality  $i$  during the administrative mandate  $m$  if the mayor is politically aligned with the President, and  $\tau_{im}(0)$  as the potential transfers of the same municipality if the mayor is not aligned with the President. In the data, the variable  $P_{im}$  defines the treatment status:  $P_{im} = 1$  if there is political alignment, and  $P_{im} = 0$  otherwise. The observed outcome is thus:  $\tau_{im} = P_{im} \cdot \tau_{im}(1) + (1 - P_{im}) \cdot \tau_{im}(0)$ . The estimand of interest is the ATE,  $E[\tau_{im}(1) - \tau_{im}(0)]$ , defined over some subpopulation of interest.

Define  $W_i$  as a set of relevant municipality-specific covariates (including state fixed effects),  $X_{im}$  as a set of (mandate-varying) mayoral characteristics, and  $\delta_m$  as mandate fixed effects. In the OLS estimation

$$\tau_{im} = \alpha + \pi P_{im} + W_i' \beta + X_{im}' \phi + \delta_m + \varepsilon_{im}, \tag{5}$$

the estimated  $\hat{\pi}$  is based on the conditional comparison of the observed transfers of aligned versus unaligned municipalities, which does not generally provide an unbiased estimate of the ATE, as long as towns with different unobservable characteristics affecting federal transfers self-select into political alignment by voting for different parties.

A diff-in-diff estimator can instead control for time-invariant confounding factors by means of municipality fixed effects  $\gamma_i$ :

$$\tau_{im} = \alpha + \pi P_{im} + X'_{im}\phi + \gamma_i + \delta_m + \varepsilon_{im}. \quad (6)$$

Also in this estimation, however,  $\hat{\pi}$  might fall short of providing an unbiased estimate of the ATE. In particular, unobservable confounding factors might be time-varying too.

In order to deal with the presence of both time-invariant and time-varying confounding factors, we implement an RDD strategy in the spirit of Lee (2008) and compare municipalities where the politically aligned candidate barely won with municipalities where the politically aligned candidate barely lost.<sup>11</sup> Specifically, we calculate the margin of victory of the mayoral candidate politically aligned with the Brazilian President in each municipality  $i$  and mandate  $m$  ( $MVP_{im}$ ).<sup>12</sup> This measure is thus positive in municipalities where the mayor belongs to the central government coalition, and negative otherwise. At the zero threshold,  $MVP_{im} = 0$ , political alignment  $P_{im}$  sharply changes from zero to one. This treatment assignment mechanism is an example of *sharp* RDD and can deliver a direct test of Proposition 1 in our theoretical framework.

$MVP_{im}$  can be seen as a random variable depending on observable and unobservable variables, as well as on random events on election day (the shock  $\epsilon_i$  in our model). Lee (2008) shows that, in this sharp RDD setup, identification requires that: (i) for each political candidate, the probability of winning is never equal to zero or one; (ii) for each political candidate, the probabilities of winning or losing the election by a narrow margin are identical.<sup>13</sup> In other words, electoral outcomes depend on both predictable elements and random chance, which is crucial only for close races. The ATE in close electoral races can thus be identified as:

$$E[\tau_{im}(1) - \tau_{im}(0) | MVP_{im} = 0] = \lim_{\epsilon \downarrow 0} E[\tau_{im} | MVP_{im} = \epsilon] - \lim_{\epsilon \uparrow 0} E[\tau_{im} | MVP_{im} = \epsilon]. \quad (7)$$

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<sup>11</sup>See also Lee, Moretti, and Butler (2004). Ferreira and Gyourko (2009) and Petterson-Lidbom (2008) use the same identification strategy to estimate the impact of political parties with different ideologies on policy outcomes in the U.S. and Sweden, respectively.

<sup>12</sup>This corresponds to  $MVP_i^0$  in the theoretical model; we omit the superscript for the sake of simple notation. We use two different measures of political alignment according to either the government coalition or the political party of the President. See Section 3.3 for more details.

<sup>13</sup>These conditions are equivalent to the standard RDD assumption that potential outcomes must be a continuous function of the running variable at the threshold (Hahn, Todd, and Van der Klaauw, 2001).

Note that equation (7) expresses a local effect, which cannot be extrapolated to the whole population without additional homogeneity assumptions. This local effect, however, is exactly what Proposition 1 predicts to be strong and positive, that is, the impact of political alignment on federal transfers in close races. The fact that our model predicts that the central government can target electoral races decided by a narrow margin—allocating higher transfers to its friends or lower transfers to its enemies—does not violate the RDD identification assumptions. In fact, there are two possible responses to this strategy. First, the opposition coalition might reply by targeting the same races with its own political instruments (e.g., campaigning time and money); in this case, from one election to the next, the level of political competition would change only because of random shocks. Second, the opposition coalition might be constrained in its political instruments (at one extreme, it might also have no instruments, as in our model); in this case, the central government could shift the past close races in its favor, but still there will be some other races decided by a narrow margin at the next electoral cycle.

The crucial argument here is that ex-ante close races are different from ex-post close races, which cannot be manipulated and therefore deliver a treatment assignment mechanism that is as good as random around the zero threshold.<sup>14</sup> The only price we have to pay to obtain internal validity is a loss in external validity; to achieve exogenous assignment to political alignment in close elections, we must restrict the sample to races with only two (or at most three) political candidates, one of whom is politically affiliated with the Brazilian President.<sup>15</sup> Only in these races, it is plausible to assume that the aligned candidate had a non-zero probability of winning.

Various methods can be used to estimate the local ATE expressed in equation (7). We first apply a split polynomial approximation, that is, we fit a  $p$ -order polynomial in  $MVP_{im}$  on either side of the threshold  $MVP_{im} = 0$ :

$$\tau_{im} = \sum_{k=0}^p (\rho_k MVP_{im}^k) + P_{im} \sum_{k=0}^p (\pi_k MVP_{im}^k) + \delta_m + v_s + \eta_{im}, \quad (8)$$

where  $\delta_m$  are mandate fixed effects, and  $v_s$  state fixed effects. The estimated coefficient  $\hat{\pi}_0$  identifies the local ATE at the zero threshold, and we expect  $\hat{\pi}_0 > 0$  to validate Proposition

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<sup>14</sup>See Section 4.3 for validity tests that control for the absence of manipulative sorting in our data.

<sup>15</sup>See Section 3.3 for more details on the sample selection procedure.

1. Standard OLS inference procedures can be applied; we also cluster standard errors at the town level, because the same municipality may be observed in repeated mayoral terms.

An additional advantage of equation (8) is that the shape of the polynomial on the left of zero (i.e., the estimated coefficients  $\hat{\rho}_k$ ) and of the polynomial on the right of zero (i.e., the estimated coefficients  $\hat{\pi}_k$ ) can indirectly test Proposition 2, that is, they can tell us something on the relationship between the level of political competition and discretionary transfers to the President’s (political) friends or enemies. Because the assignment to political alignment is endogenous as we move far away from zero, however, this evidence ought to be interpreted with caution.

The above split polynomial estimation is attractive for many reasons, although a possible concern is that it may be sensitive to outcome values for observations far away from the threshold (see Imbens and Lemieux, 2008). To avoid this, the local linear regression approach restricts the sample to municipalities in the interval  $MVP_{im} \in [-h, +h]$  and estimates the model:

$$\tau_{im} = \rho_0 + \rho_1 MVP_{im} + \pi_0 P_{im} + \pi_1 P_{im} \cdot MVP_{im} + \delta_m + v_s + \eta_{im}, \quad (9)$$

where  $\delta_m$  are mandate fixed effects,  $v_s$  state fixed effects, standard errors are clustered at the town level, and the optimal bandwidth  $h$  is selected by cross-validation.<sup>16</sup> Again,  $\hat{\pi}_0$  identifies the local ATE at the zero threshold.

Finally, to evaluate the comparative statics of our model, we check for treatment effect heterogeneity in separate subsamples. The intuition for this test is simple. Assume that  $D_{im}$  captures a given heterogeneity dimension, which can be interpreted as a good proxy

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<sup>16</sup>In particular, we apply the following cross-validation method (see Imbens and Lemieux, 2008), which consists in choosing  $h$  so as to minimize the loss function:

$$CV_\tau(h) = \frac{1}{N} \sum^N (\tau_{im} - \hat{\mu}_h(MVP_{im}))^2, \quad (10)$$

where the predictions  $\hat{\mu}_h(MVP_{im})$  are retrieved as follows. For every  $MVP_{im}$  to the left (right) of the threshold, we predict the value of transfers as if the point were at the boundary of the estimation, using only observations in the interval  $[MVP_{im} - h, MVP_{im}]$  ( $[MVP_{im}, MVP_{im} + h]$ ). We then calculate the loss function discarding 50% of the observations on either side of the threshold  $MVP_{im} = 0$ .

for either political capital or the marginal impact of transfers on votes. We estimate:

$$\begin{aligned} \tau_{im} = & \sum_{k=0}^p (\rho_k MV P_{im}^k) + P_{im} \sum_{k=0}^p (\pi_k MV P_{im}^k) + \\ & + D_{im} \cdot \left[ \sum_{k=0}^p (\alpha_k MV P_{im}^k) + P_{im} \sum_{k=0}^p (\beta_k MV P_{im}^k) \right] + \delta_m + v_s + \xi_{im}. \end{aligned} \quad (11)$$

As a result,  $\hat{\pi}_0$  identifies the treatment effect in  $D_{im} = 0$ ,  $\hat{\pi}_0 + \hat{\beta}_0$  in  $D_{im} = 1$ , and  $\hat{\beta}_0$  the difference between the two. If  $D_{im}$  measures the importance of political capital for the central government, we expect  $\hat{\beta}_0 > 0$ . Similarly, if  $D_{im}$  measures the effectiveness of additional revenues in terms of the electoral outcome, we expect  $\hat{\beta}_0 > 0$ . Unfortunately, we do not have a good proxy for electoral uncertainty in our data, so that we can only test the above two comparative statics results.

## 3 Institutions and Data

### 3.1 The Brazilian federal system

Brazilian politics takes place in the framework of a federal presidential democracy and of a multi-party system. Legislative power is exercised by the bicameral National Congress, made up of the Federal Senate (or upper house, with 81 members) and of the Chamber of Deputies (or lower house, with 513 members). The Brazilian territory is divided in 26 states and one federal district (*Brasilia*), ruled by a governor and a legislative assembly. Municipalities represent the lowest layer of administrative division, and are ruled by an elected mayor (*Prefeito*) and an elected city council (*Camera dos Vereadores*). Municipal governments are in charge of a relevant share of the provision of public goods and services related to education, health, and infrastructure projects.

President, governors, and mayors of municipalities above 200,000 voters are (directly) elected with (runoff) majority rule, while mayors of municipalities below 200,000 are (directly) elected with plurality rule. Deputies and senators are elected with open-list proportional representation, and the same holds for state deputies and city councillors. The elections of the President, governors, and members of Congress all take place at the same time every four years, while municipal elections are staggered by two years and also take place every four years.

The Brazilian party system is highly fragmented, and the composition of coalition governments has constantly changed over time. In particular, the fragmentation of the party system increased in the late 1980s, because of a new legislation easing the requirements for party organization, and because of an exodus from the two largest parties, PMDB (*Partido do Movimento Democrático Brasileiro*) and PFL (*Partido da Frente Liberal*). Nowadays, there are 27 officially registered parties. Besides PMDB and PFL, PT (*Partido dos Trabalhadores*) and PSDB (*Partido da Social-Democracia Brasileira*) are the most important of them. The current President is Luiz Inácio Lula da Silva, affiliated with PT. He was elected in October 2002, and reelected in October 2006 (oath of office taking place in January of the following year). PT also rules some states and major cities, but none of the major Brazilian states. The former President was Fernando Henrique Cardoso from PSDB. He was elected in October 1994, and reelected in October 1998. PSDB rules the two biggest Brazilian states, *Sao Paulo* and *Minas Gerais*. However, PMDB is the largest party, measured by number of affiliates, number of deputies and senators, and number of mayors. Because of its relevance and median position in the ideological spectrum, PMDB usually supports the government; indeed, it was a member of the government coalition in both Cardoso's mandates and in the second of Lula's mandates. Among the main parties, PFL is the more right-oriented and has been concentrated in the Northeast of Brazil. Note that our sample encompasses part of both Cardoso's and Lula's tenure in office.

Brazil has a weakly institutionalized party system, with high electoral volatility, low levels of party identification in the electorate, high fragmentation, and lack of strong ideological platforms. Following the Constitution of 1988, however, all Presidents have been able to build reasonably stable post-electoral government coalitions by means of several discipline devices, such as veto power on many issues, special prerogatives on budget allocation—including federal transfers—and the strong power of the leaderships of the coalition parties (see Figueiredo and Limongi, 2000; Pereira and Mueller, 2002).

### **3.2 The allocation of federal transfers**

The resources of Brazilian municipalities come from (i) local revenues, such as fines, exemptions, service taxes, and residential property taxes; and (ii) transfers from the federal, state, or other municipal governments. The most important source of municipal revenues

is represented by federal transfers, which on average amount to 65% of the municipal budget. Basically, there are two types of federal transfers: (i) Constitutional automatic transfers, mostly unrestricted (*Fundo de Participacao do Municipios*, FPM) or tied to education and health programs; and (ii) discretionary transfers (*CONVÊNIO*), mostly related to infrastructure projects. Excluding some big cities, such as Brazilian state capitals, municipal governments are strongly dependent on these transfers for their budget (tax revenues average to only 5.5% of municipal total revenues).

In this study, we focus on discretionary federal transfers devoted to infrastructure projects, which amount to about 15% of total municipal expenditure in infrastructures. These transfers are related to budget items that involve the construction of buildings and bridges, the paving of roads, the building of water and sewer systems, the purchase of ambulances, and so on. We focus on this type of federal transfers because the bulk of the other revenues are largely non-discretionary and hard to manipulate.<sup>17</sup> Furthermore, such transfers are used to finance highly visible projects, that is, they are an ideal target for politicians willing to tease voters. Although mayors have to exert some effort in applying for these discretionary transfers, the legislative and the executive have an important role in defining their allocation. The support of a federal deputy in pointing out a municipality during the budget process and the consent of the President are crucial ingredients of the allocation mechanism.

Because of the institutional and political context described above, the President usually faces the hard task of passing his legislative agenda in a Congress where there are about 18 parties, and where the President's party usually controls less than 20 percent of the seats. Political institutions, however, provide him with a wide array of instruments to unify his coalition in Congress, and discretionary transfers to targeted areas are one of them.

Basically, the annual budget law (*Lei Orçamentária Anual*, LOA) is first drafted by the executive and then subject to (individual or collective) amendments by legislators. In most cases, the municipalities that will receive the (discretionary) grants are chosen by legislators trying to bring the pork home, as the bulk of the proposed amendments include benefits to local areas. The Budget Committee is responsible for the authorization of the

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<sup>17</sup>As a falsification test, we also performed our RDD estimations on Constitutional automatic transfers (FPM), detecting no effect of political alignment on their allocation (results available upon request).

bill. After a period of discussion, Congress votes for the budget law, which is then sent to the President for the final decision. As the budget law is not mandatory in Brazil, the President has a major role in deciding the allocation of the discretionary transfers, and he can use them to make deputies follow the guidelines of the government coalition. On the other hand, municipal governments should also exert some effort to receive these transfers. A budgetary amendment can be executed only if an agreement (i.e., *CONVÊNIO*) between the municipal administration and the central government is signed.

At the end of the day, voters in a given municipality will receive discretionary infrastructure transfers depending on three factors: (i) The effort of their municipal administration; (ii) the interest of a federal deputy; and (iii) the interest of the President in executing the budget amendment (that is, send the money exactly to that municipality). The federal President has the last word in the decision process. Yet, the mayor of the municipality will probably obtain the lion's share of the political credit for the higher municipal revenues, especially when voters are not sufficiently informed about the source of the grant.

### **3.3 Data sources and sample selection**

Data on federal transfers are obtained from the Brazilian National Treasury (*Tesouro Nacional*) website, which provides yearly information from municipal balance sheets for all Brazilian municipalities. Electoral data and information about mayoral characteristics and party affiliation are obtained from the National Electoral Office (*Tribunal Superior Eleitoral*). Town characteristics are retrieved from the 2000 Brazilian Census.

Basically, every two years there are elections in Brazil. Federal elections and municipal elections take place at a different time: their exact timing over our sample period is illustrated in Figure 2. Our study encompasses federal governments in office during the three four-year mandates 1999–2002, 2003–2006, and 2007–2010; as well as municipal administrations in office during the three four-year mandates 1997–2000, 2001–2004, and 2005–2008. Our baseline results consider federal transfers only in the last two years of each mayoral mandate, that is, the per-capita amount of infrastructure transfers for the periods 1999–2000, 2003–2004, and 2007–2008. The choice of this timing is motivated by the fact that we want to capture opportunistic transfers in proximity of upcoming municipal elections. For the years 1999–2000, the President was Fernando Henrique Cardoso from

PSDB, while in the years since 2003 the President was Luis Inácio Lula da Silva from PT. As a second step, however, we also check whether opportunistic transfers take place in proximity of federal rather than municipal elections. We thus build an alternative measure of transfers, referring to the first two years (last two years) of each of our three municipal (federal) mandates: that is, 1997–1998, 2001–2002, and 2005–06.

As for the treatment, we define two different variables capturing whether the municipality is politically aligned with the federal President or not. The first measure indicates if the mayor belongs to a party in the federal government coalition, and the second measure indicates if the mayor belongs to the President’s party. In Table 1, we provide details on the political parties included in the federal government coalition year by year.

In order to implement our identification strategy in the Brazilian multi-party system along the lines discussed in the previous section, we must restrict our sample to municipalities where only two (or at most three) candidates ran for mayor and one of them was politically aligned with the federal President. This is due to the fact that the assignment to political alignment can be considered as good as random only if the mayoral candidate aligned with the President (based on one of our two measures) had a fair chance of winning the election. This sample selection procedure improves internal validity, but it comes at the price of lower external validity. The races with only two candidates amount to 51% of the total, while races with only three candidates amount to 31%, so that races with at most three candidates represent 82% of all municipal elections. If we further restrict the sample to elections where the aligned mayor belonged to the first two (or three) candidates, we end up with a sample of two-candidate races that covers 42% (19%) of the total when we look at the President’s coalition (party). With three-candidate races, we end up with a sample that covers 55% (28%) of the total when we look at the President’s coalition (party).

To evaluate what we lose in terms of external validity, we can look at how our RDD samples differ from the rest of Brazilian municipalities.<sup>18</sup> Table 2 (Table 3) compares two-candidate (three-candidate) races with the other municipal elections. The variables we consider are the following town-specific Census characteristics (i.e., the covariates  $W_i$ ):

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<sup>18</sup>In all specifications, we consider only municipalities with less than 200,000 inhabitants, where elections are held under plurality rule.

population size; per-capita income; the over-20 literacy rate; the rate of urban population; the fraction of houses with access to water, sewer, or electricity; the presence of a radio station; and geographical location.

Looking at the President’s coalition, municipalities with two-candidate races are not so different from the rest, although they appear to be slightly bigger in terms of average population and more likely to have a local radio station. Municipalities with three-candidate races, despite their higher frequency, tend to be more diversified from the rest, as they are not only bigger and with a radio station, but are also better endowed of public infrastructures (i.e., house access to water, sewer, electricity). Looking at the President’s party—not surprisingly given the even lower sample size—differences are also stark, in both two-candidate and three-candidate races. In particular, the Southeast—which is the most developed area of the country—appears to be overrepresented in both samples.

Furthermore, focusing on the RDD samples of two-candidate and three-candidate races, we can preliminary check if there are statistically significant differences between municipalities with a politically aligned mayor and municipalities with a politically unaligned mayor. According to the summary statistics reported in Table 4 and Table 5, municipalities aligned with the President’s coalition (or the President’s party) tend to receive larger per-capita transfers when municipal elections are approaching (that is, in the last two years of the mayoral term), while no significant difference emerges with respect to first two-year transfers. The reelection probability of aligned mayors also tend to be considerably higher. Looking at the Census characteristics, there is no evidence of “selection on observables” in our two samples. Indeed, there are no statistically significant differences between aligned and unaligned municipalities, except for three-candidate races with the President’s party as a measure of political alignment. This means that in general municipalities that are politically aligned with the President do not seem to differ from the others in terms of wealth and development. This is not particularly relevant for our identification strategy—which accommodates for both selection on observables and unobservables—but it is an additional piece of information on Brazilian politics.

## 4 Empirical Results

### 4.1 The effect of political alignment on federal transfers

Our main results are reported in Table 6, which shows the benchmark OLS and diff-in-diff estimates, and in Table 7, which shows the RDD estimates. We look at two different outcomes: in the first two columns of both tables, the dependent variable is the amount of transfers in the last two years of the mayoral term (when the next municipal election is approaching); in the last two columns, the dependent variable is the amount of transfers in the first two years of the mayoral term (when the next federal election is approaching). For both dependent variables, we have two separate columns because, as discussed above, we measure political alignment referring to both the President’s coalition and party.

According to the benchmark cross-sectional and panel evidence reported in Table 6, politically aligned municipalities receive more infrastructure transfers in the last two years of the mayoral mandate, while the estimates on the transfers received in the first two years are never statistically significant. The results of the OLS regressions in the all sample and in two-candidate (or three-candidate) races are fairly similar between each other, for both measures of political alignment. This further reassures about the external validity of our RDD sample restriction. For all municipalities (panel A), transfers increase by 20.5% or 27.1% when the mayor belongs to the coalition or party of the President, respectively, with respect to the average level of unaligned municipalities. In two-candidate (panel B) and three-candidate races (panel C), the OLS estimates point to a 31.1% (two-candidate) or 22.2% (three-candidate) effect of the coalition alignment, and to a 27% (two-candidate) or 40.3% (three-candidate) effect of the party alignment. Also the size of the diff-in-diff estimates is in the same ballpark, with just one exception: in two-candidate races, being aligned with the President’s party has an effect on transfers that is almost twice as much as the other estimates (81.5%). This discrepancy might be due to the fact that the diff-in-diff strategy is removing a downward bias in the OLS coefficient. Yet, also the diff-in-diff results in two-candidate races may suffer from omitted bias, as long as unobservable confounding factors vary across mayoral terms.

Table 7 reports the main RDD results in (close) two-candidate and three-candidate elections. In the two-candidate sample (panel A), according to the baseline estimation with

split polynomial approximation and full bandwidth as in equation (8), being affiliated with the coalition of the Brazilian President increases the amount of per-capita infrastructure transfers by about 42%.<sup>19</sup> The effect of being affiliated with the President’s party is instead not statistically significant. In the three-candidate sample (panel B), being affiliated with the President’s coalition increases transfers by about 28.6%. The effect of being affiliated with the President’s party amounts to 38.6%, although it is significant only at a 10% level. The RDD results on the President’s coalition are a direct confirmation of Proposition 1 in our model. The fact that the results on the President’s party are less robust could receive a twofold explanation: from a political point of view, the Brazilian President might be forced to please his political allies even more than his own party, in order to keep the government coalition united (see the discussion in Section 3.2); from a statistical point of view, as the point estimates on the President’s party are fairly similar to those on the President’s coalition, the lower significance might be a problem of accuracy induced by the reduced sample size.

In Table 7, we also implement local linear regression with optimal bandwidth as in equation (9). According to these estimates, being affiliated with the President’s coalition in close races entails an increase in per-capita infrastructure transfers by 46.3% (two-candidate) or by 35.7% (three-candidate). The estimates on the President’s party are never statistically significant. Overall, the size of the effect of political alignment in the RDD estimations is somehow higher than the effect in the OLS or diff-in-diff estimations. Also this result could receive a twofold explanation: on the one hand, the RDD setup controls for unobservables removing omitted bias; on the other hand, the RDD effect is identified for close electoral races only, where the impact of political alignment might be higher because of tactical motivations, as predicted by our theoretical framework.

Table 7 also confirms the OLS and diff-in-diff evidence on per-capita infrastructure transfers from the federal government in the first two years of the municipal mandate (when the federal elections are approaching). There is no evidence of opportunistic transfers in proximity of federal elections. This result highlights a clear political budget cycle in federal transfers to municipal governments with respect to the timing of municipal elections. And

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<sup>19</sup>We implement the split polynomial approximation with a third-order polynomial, but the results are robust to the use of a second-order or fourth-order polynomial (available upon request).

it also reinforces the idea that mayors can claim the lion’s share of the political credit from larger transfers (i.e., that the parameter  $\theta$  in our model is greater than zero), because tactical redistribution takes place only in proximity of the elections for mayor and not of the elections for the Brazilian President.

Figure 3 shows the estimated split polynomials in  $MVP_{im}$  to highlight not only the jump in federal transfers at  $MVP_{im} = 0$ , but also the shape of the relationship between federal transfers and political competition for aligned municipalities (to the right of the zero threshold) and unaligned municipalities (to the left of the zero threshold). This is a way to indirectly assess Proposition 2 in our model. With respect to the President’s coalition, Figure 3 clearly shows that the RDD estimate is driven by a sizable cut in transfers to unaligned municipalities close to the zero threshold. In other words, the central government penalizes municipalities ruled by mayors belonging to the opposition coalition, especially if they won by a narrow margin, thereby tying the hands of its (political) enemies for the next electoral race. This evidence on the left of zero is consistent with the theoretical prediction in Proposition 2. But the evidence on the right of zero does not show a stark increase in transfers to aligned municipalities that won by a narrow margin. On the contrary, there is some evidence that the federal government gives more money to its strongholds (where  $MVP_{im}$  is positive and very high), although we do not know if this is driven by the (endogenous) local characteristics of these municipalities or by political motivations (as predicted by Cox and McCubbins, 1986). In addition, note that the tails of the polynomials are not accurately estimated because of the small sample size.

Our model assumes that federal transfers improve the reelection prospects of the incumbent party (as long as there are political credit spillovers). This has been tested by others and our data do not allow us to credibly identify this effect. But it is still interesting to identify the effect of political alignment *per se* (in ex-ante close races) on the future reelection probability of the incumbent political party. Keeping in mind, of course, that this effect (if any) could be driven by many factors, beyond the amount of politically motivated transfers received by the municipality in the last two years of the term. Table 8 reports the benchmark OLS and diff-in-diff estimates on this outcome variable. According to these results, the impact of political alignment on the reelection of the incumbent party is strong and positive, especially when we look at the President’s party (with an

estimated effect ranging from 32% to 56% depending on the sample or specification). Table 9 reports the RDD estimates, which lose statistical significance. The split polynomial approximation results, however, still convey the message that the President’s party has a differentially higher incumbency advantage—with respect to other parties that also won by a narrow margin—from 21.6% to 27.2%, depending on the sample or specification.

## 4.2 Treatment effect heterogeneity

In Table 10 and Table 11, we estimate equation (11) to detect heterogeneity (if any) in the treatment effect. This a way to evaluate some of the comparative statics results of our model. We consider two dimensions: whether the value of political capital for the central government is high or not; and whether the transfers are expected to have a strong impact on the electoral outcome or not. As empirical proxies for the first dimension, we use two measures: i) the population size of the municipality; ii) whether there is a local radio station or not. The intuition behind these measures is that in small municipalities without radio station local politicians have a strong role in influencing the public opinion, and are therefore valuable allies for the President. As empirical proxies for the second dimension, we also use two measures: i) whether the incumbent mayor is allowed to run for reelection or faces a binding term limit; ii) whether the incumbent mayor is aligned with the state governor or not. Here, the idea is that mayors who can run for reelection, or may have a hard time obtaining discretionary resources from other sources, are going to put more effort in using the additional revenues for political purposes.

The estimation results in Table 10 confirm the theoretical predictions. There, we can see that the effect of political alignment on transfers is much higher in municipalities without a local radio station and in small municipalities (i.e., with a population size below the median).<sup>20</sup> In two-candidate races, for both subsamples, political alignment almost doubles the amount of transfers (+83.3% in municipalities with no radio station; +100.6% in below-median municipalities). The effect is not statistically significant in municipalities with a radio station and in municipalities with above-median population.

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<sup>20</sup>The results on population size are robust to the estimation of a continuous version of equation (11), with the exact number of resident inhabitants in the place of  $D_{im}$ .

The estimation results in Table 11 also confirm the model’s predictions. The effect of political alignment on transfers is much higher for first-term mayors and for mayors unaligned with the state governor. In two-candidate races, for mayors who can run for re-election, political alignment almost doubles the amount of transfers (+86.3% with respect to the average); for mayors who cannot count on the support of the state governor, the increase in transfers induced by political alignment is equal to about 39.2%. The effect is instead not statistically significant for second-term mayors and for mayors aligned with the state governor.

### 4.3 Validity tests

In order for our RDD econometric strategy to be internally valid, as discussed in Section 2.2, political parties must not be able to sort above the threshold of zero margin of victory. In other words, political parties, even when they control the federal government, should not be able to manipulate electoral outcomes in close elections. To check for the absence of manipulative sorting, we perform: (i) visual inspection of the histograms of  $MVP_{im}$  in Figure 4; and (ii) formal tests of the continuity of the density at  $MVP_{im} = 0$ , in the spirit of McCrary (2008), in Figure 5. The latter procedure tests the null hypothesis of continuity of the density of the margin of victory at the zero threshold, and it is implemented by running kernel local linear regressions of the log of the density separately on both sides of zero. None of these procedures shows any evidence of manipulative sorting around the zero threshold. This means that (ex-post) close races are really decided by random shocks, rather than choice variables such as federal transfers or campaigning effort and ability.

In Table 12, we further check for discontinuities of the 2000 Census variables and geographic location at the zero threshold by implementing a set of balance tests, which are performed estimating equation (8) with the town-specific characteristics  $W_i$  as dependent variables. As these variables are predetermined with respect to the treatment (political alignment), we should observe no discontinuity, as long as there is no manipulative sorting around the zero threshold. This is indeed the case, as all of the variables are balanced around the threshold, excluding a few exceptions in three-candidate races with respect to the President’s party.

## 5 Conclusion

In this paper, we document the existence of (sizable) tactical motivations in the allocation of federal transfers by the Brazilian government, aimed at penalizing unaligned municipalities where mayors belonging to the opposition coalition won by a narrow margin. Our RDD estimates—which accommodate for the presence of both time-invariant and time-varying confounding factors—show that mayors politically aligned with the Brazilian President receive larger federal transfers in (ex-ante) close races, by an amount that varies from 29% to 46% according to the used estimation method or the measure of partisan alignment. The results are statistically significant only for federal transfers received in the last two years of the mayoral term (pointing to the existence of a relevant political budget cycle in Brazilian municipal revenues) and for federal transfers in infrastructure (which are highly discretionary and linked to projects that are visible to voters). The normative implications of our empirical findings call for a financing system of infrastructure projects that should emphasize the fiscal responsibility of local governments, rather than central transfers, which appear to be strongly influenced by political distortions.

## References

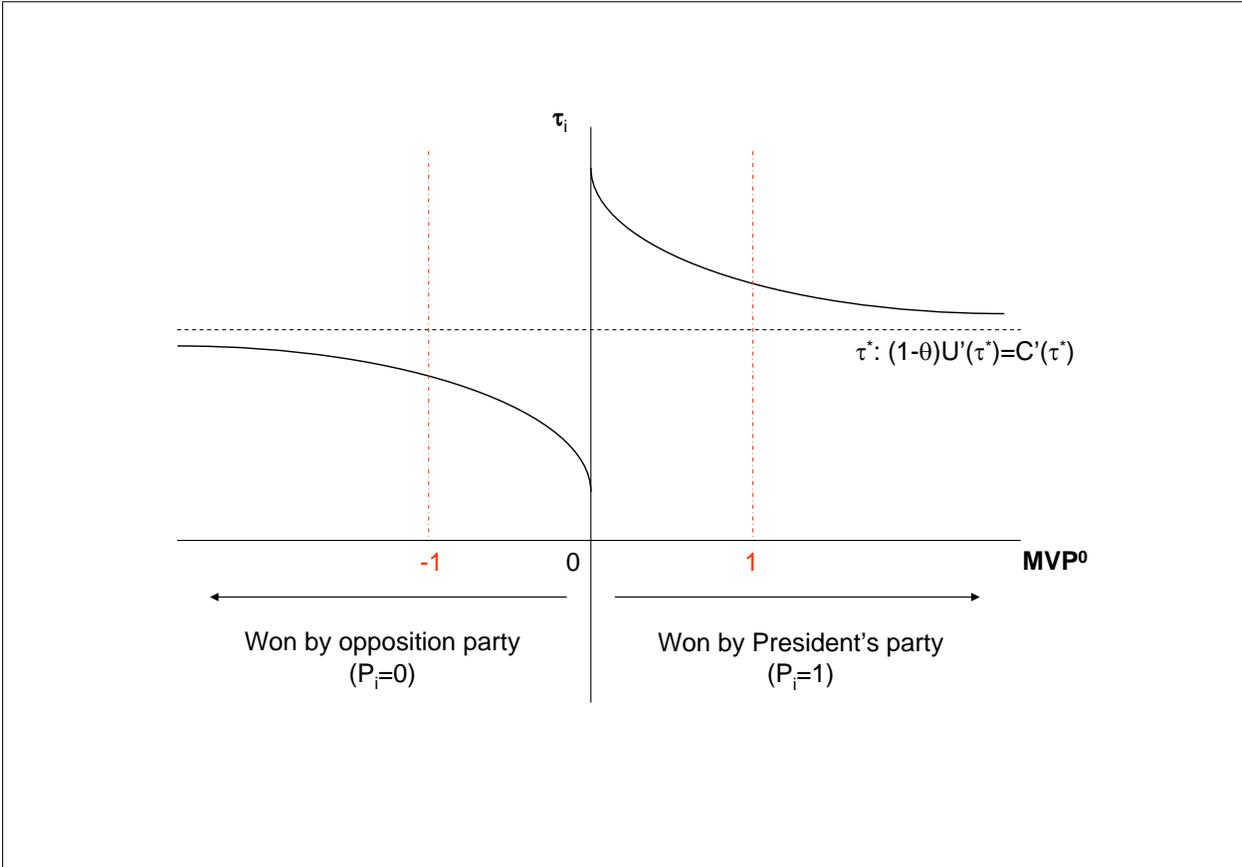
- Arulampalam W., S. Dasgupta, A. Dhillon, and B. Dutta (2009): “Electoral Goals and Center-state Transfers: A Theoretical Model and Empirical Evidence from India” *Journal of Development Economics* 88, pp. 103–119.
- Brollo, F. (2008): “Who Is Punishing Corrupt Politicians: Voters or the Central Government? Evidence from the Brazilian Anti-Corruption Program,” IGIER working paper No. 336.
- Brollo, F., T. Nannicini, R. Perotti, and G. Tabellini (2009): “The Political Resource Curse,” NBER working paper No. 15705.
- Cox, W. G. and M. D. McCubbins (1998): “Electoral Politics as a Redistributive Game,” *Journal of Politics* 48, pp. 370–389.
- Case, A. (2001): “Election goals and Income Redistribution: recent Evidence from Albania,” *European Economic Review* 45, pp. 405–423.
- Dixit, A. and J. Londregan (1998): “Fiscal Federalism and Redistributive Politics,” *Journal of Public Economics* 68, pp. 153–180.
- Ferraz, C. and F. Finan (2008): “Exposing Corrupt Politicians: The Effects of Brazil’s Publicly Released Audits on Electoral Outcomes,” *Quarterly Journal of Economics*, 123, pp. 703–745.
- Ferreira, F. and J. Gyourko (2009): “Do Political Parties Matter? Evidence from U.S. Cities,” *Quarterly Journal of Economics* 124(1), 349–397.
- Figueiredo, A. C. and F. Limongi (2000): “Presidential Power, Legislative Organization and Party Behavior in Brazil,” *Comparative Politics* 32, pp. 151–170.
- Galasso, V. and T. Nannicini (2009): “Competing on Good Politicians,” CEPR discussion paper No. 7363.
- Grossman, J. P. (1994): “A Political Theory of Intergovernmental Grants,” *Public Choice* 69, pp. 295–303.

- Hahn, J., P. Todd, and W. Van der Klaauw (2001): “Identification and Estimation of Treatment Effects with Regression Discontinuity Design,” *Econometrica* 69, pp. 201–209.
- Imbens, G. and T. Lemieux (2008): “Regression Discontinuity Designs: A Guide to Practice,” *Journal of Econometrics* 142, pp. 615–635.
- Johansson, E. (2003): “Intergovernmental Grants as a Tactical Instrument: Empirical Evidence from Swedish Municipalities,” *Journal of Public Economics*, 87, 883–915.
- Larcinese, V., L. Rizzo, and C. Testa (2006): “Allocating the U.S. Federal Budget to the States: The Impact of the President,” *Journal of Politics*, 68(2), 447–456.
- Lee, D.S. (2008): “Randomized Experiments from Non-random Selection in the U.S. House Elections,” *Journal of Econometrics*, 142(2), 675–697.
- Lee, D.S., E. Moretti, and M.J. Butler (2004): “Do Voters Affect or Elect Policies? Evidence from the U.S. House,” *Quarterly Journal of Economics*, 119, 807–859.
- Levitt, D. S. (1995): “Political Parties and the Distribution of Federal Outlays,” *American Journal of Political Science*, 39, 958–980.
- Lindbeck, A. and J. W. Weibull (1987): “Balanced-Budget Redistribution as the Outcome of Political Competition,” *Public Choice* 52, pp. 237–297.
- Litschig, S. and K. Morrison (2009): “Electoral Effects of Fiscal Transfers: Quasi-Experimental Evidence from Local Executive Elections in Brazil, 1982-1988,” mimeo, Universitat Pompeu Fabra.
- Manacorda, M., M. Edward, and A. Vigorito (2009): “Government Transfers and Political Support,” mimeo, UC Berkeley: Center for International and Development Economics Research.
- McCrary, J. (2008): “Manipulation of the Running Variable in the Regression Discontinuity Design: A Density Test,” *Journal of Econometrics* 142, 698–714.

- Musgrave, R. and P. Musgrave (1989): *Public Finance in Theory and Practice*, McGraw-Hill, New York, USA.
- Oates, W. E. (1972): *Fiscal Federalism*, Harcourt Brace Jovanovich, New York, USA.
- Pereira, C. and B. Mueller (2002): “Strategic Behavior in a Coalition-Based Presidential System: Executive-Legislative Relations in Budgetary Process in Brazil,” mimeo, Annual Meeting of the American Political Science Association.
- Petterson-Lidbom, P. (2008): “Do Parties Matter for Economic Outcomes? A Regression-Discontinuity Approach,” *Journal of the European Economic Association* 6, 1037–1056.
- Shepsle, K.A., R.P. Van Houweling, S.J. Abrams, and P.C. Hanson (2009): “The Senate Electoral Cycle and Bicameral Appropriations Politics,” *American Journal of Political Science*, 53 (2), 343–359.
- Sollé-Ollé, A. and P. Sorribas-Navarro (2008): “The Effects of Partisan Alignment on the Allocation of Intergovernmental Transfers. Differences-in-differences Estimates for Spain,” *Journal of Public Economics* 92, pp. 2302–2319.
- Sollé-Ollé, A. and P. Sorribas-Navarro (2009): “Does Partisan alignment affect the electoral reward of intergovernmental transfers?,” mimeo, Universitat de Barcelona.
- Stromberg, D. (2008): “How the Electoral College Influences Campaigns and Policy: The Probability of Being Florida,” *American Economic Review* 98(3), 769–807.
- Veiga, G. L. and M. M. Pinho (2007): “The Political Economy of Intergovernmental Grants: Evidence from a Maturing Democracy,” *Public Choice* 133, pp. 457–477.
- Worthington, A. C. and B. E. Dollery (1998): “The Political Determination of Intergovernmental Grants in Australia,” *Public Choice* 94, pp. 299–315.

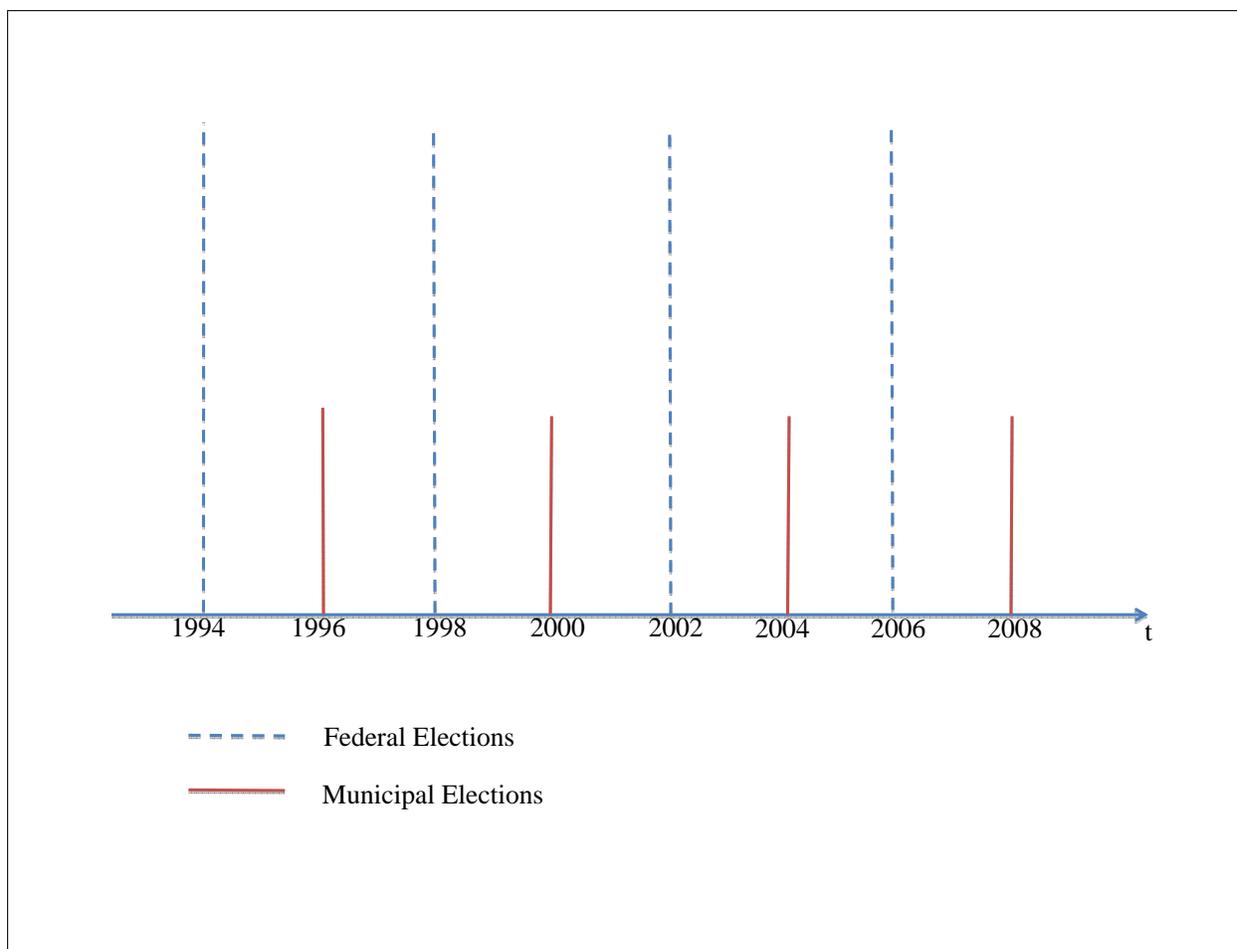
# Figures and Tables

Figure 1 – Politically motivated transfers



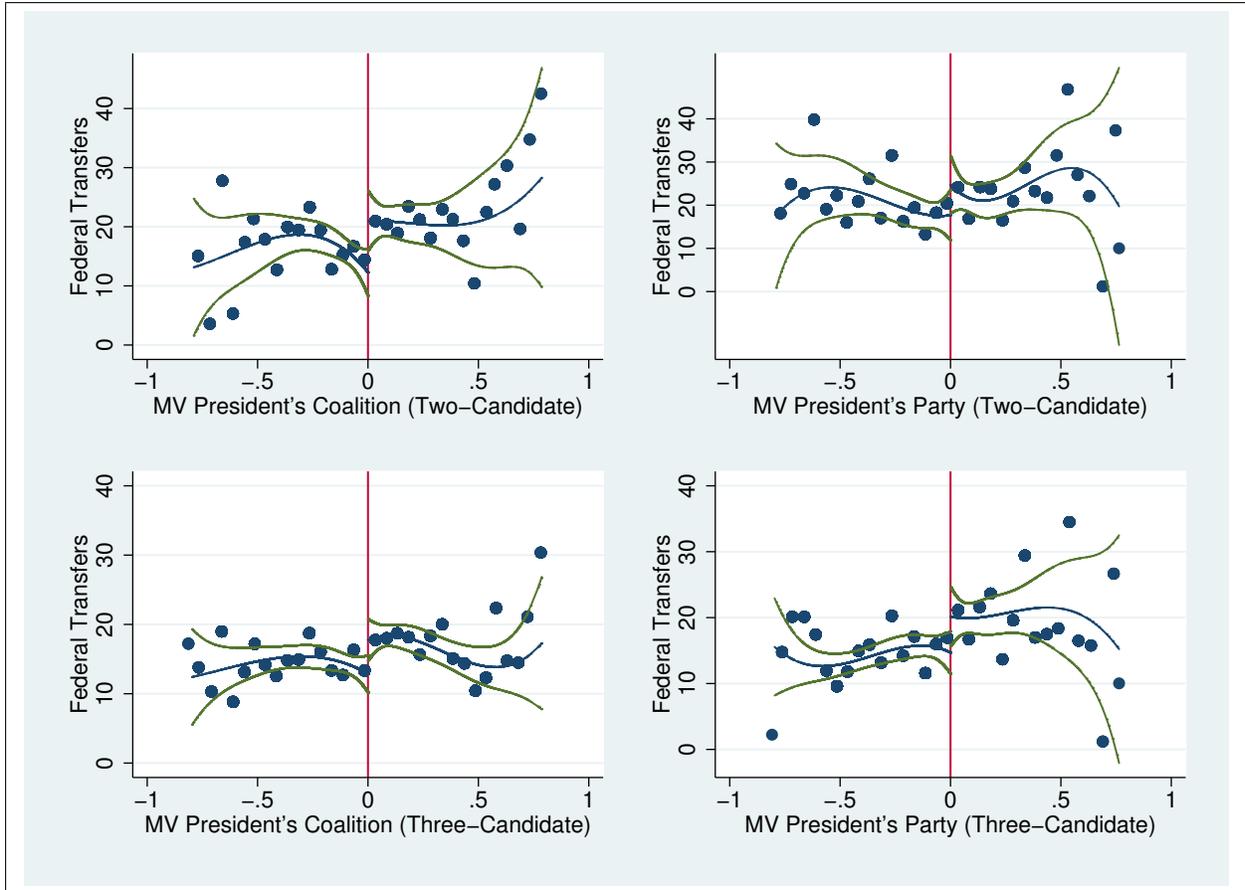
Notes. Politically motivated transfers as a function of the past margin of victory of the candidate aligned with the President.

Figure 2 – Timing of Brazilian elections



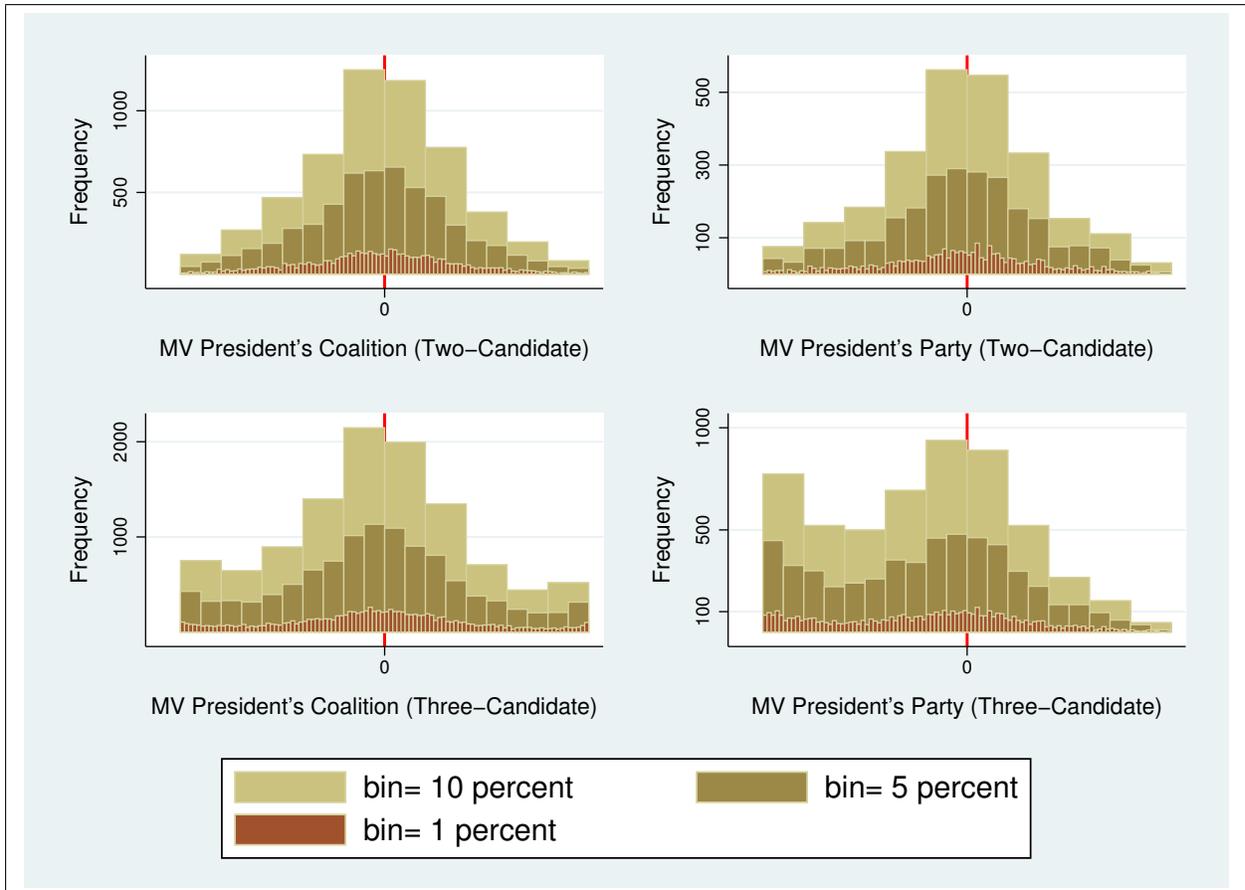
Notes. Timing of federal and municipal elections over the sample period.

Figure 3 – Political alignment and federal transfers



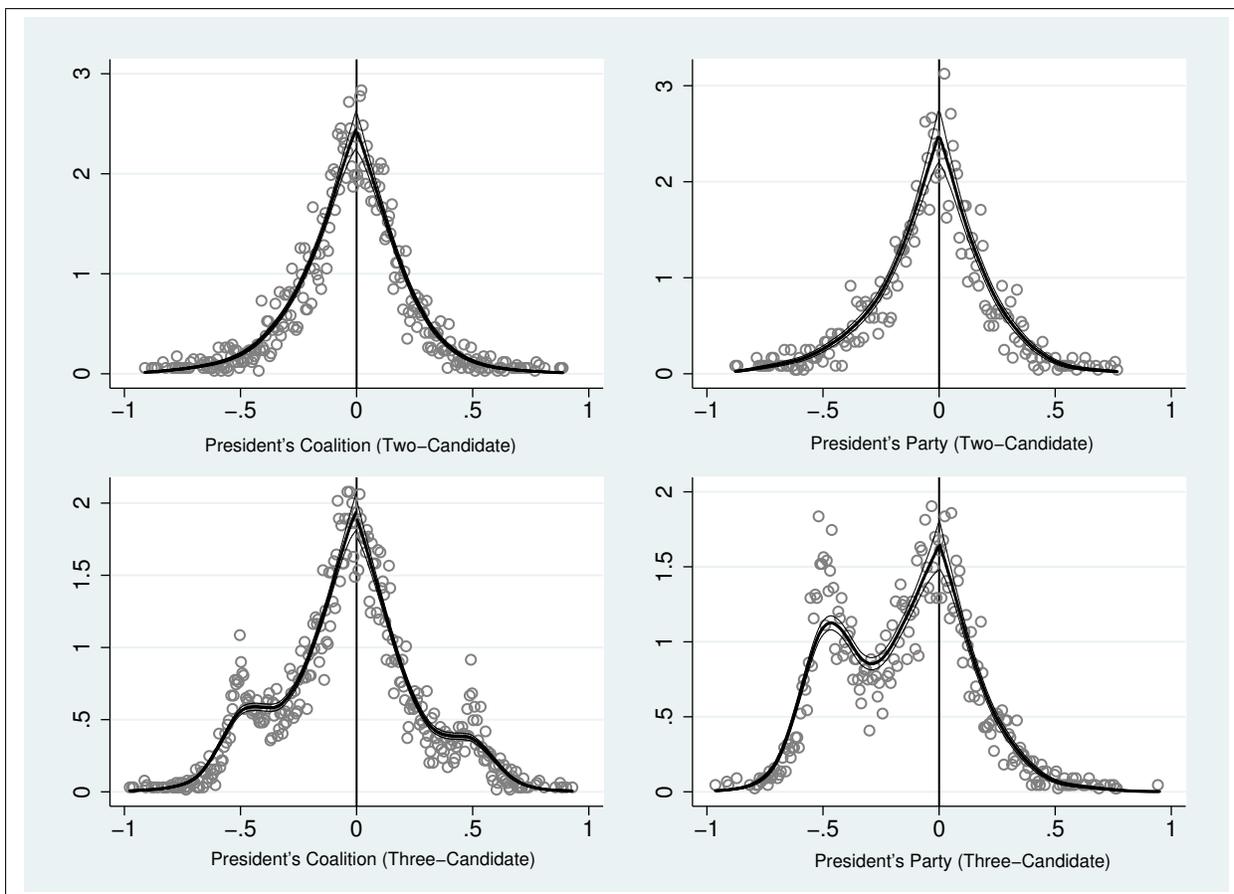
Notes. The central line is a split  $3^{rd}$ -order polynomial in the margin of victory of the President's coalition or the President's party, fitted over the interval  $[-0.80, +0.80]$ ; the lateral lines represent the 95% confidence interval. Scatter points are averaged over 5-unit intervals. *Two-candidate* (*Three-candidate*) races are those where only two (three) candidates run for mayor and one of them is affiliated with the President's coalition or party.

Figure 4 – Histograms of the margin of victory



Notes. Frequency of municipalities according to the margin of victory of the President's coalition or the President's party. *Two-candidate* (*Three-candidate*) races are those where only two (three) candidates run for mayor and one of them is affiliated with the President's coalition or party.

Figure 5 – McCrary tests in close races



Notes. Weighted kernel estimation of the log density according to the margin of victory of the President's coalition or the President's party, performed separately on either side of the zero threshold. Optimal binwidth and binsize as in McCrary (2008). *Two-candidate* (*Three-candidate*) races are those where only two (three) candidates run for mayor and one of them is affiliated with the President's coalition or party.

Table 1 – Definitions of President’s coalition in the last two years of municipal terms

Political party	Chamber of Deputies seats			Government coalition						
	1998 election	2002 election	2006 election	1995 & 1996	1997 & 1998	1999 & 2000	2001 & 2002	2003 & 2004	2005 & 2006	2007 & 2008
PMDB	83	76	89	YES	YES	YES	YES	NO	NO	YES
PT	59	91	83	NO	NO	NO	NO	YES	YES	YES
PSDB	99	70	65	YES	YES	YES	YES	NO	NO	NO
PFL	105	84	65	YES	YES	YES	YES	NO	NO	NO
PP	60	48	42	YES	YES	YES	YES	NO	NO	NO
PSB	18	22	27	NO	NO	NO	NO	YES	YES	YES
PDT	25	21	24	NO	NO	NO	NO	YES	YES	YES
PL	12	26	23	NO	NO	NO	NO	YES	YES	YES
PTB	31	26	22	YES	NO	NO	NO	YES	YES	YES
PPS	3	15	21	YES	YES	NO	NO	YES	YES	YES
PV	1	5	13	NO	NO	NO	NO	YES	YES	YES
PC do B	7	12	13	NO	NO	NO	NO	YES	YES	YES
PRONA*	1	6	2	NO	NO	NO	NO	NO	YES	YES
PSC	2	0	9	NO	NO	NO	NO	NO	NO	NO
PTC	0	0	4	NO	NO	NO	NO	NO	NO	NO
PSL	0	0	3	NO	NO	NO	NO	NO	NO	NO
PMN	2	1	3	NO	NO	NO	NO	NO	NO	NO
PHS	0	0	2	NO	NO	NO	NO	NO	NO	NO
PT do B	0	0	1	NO	NO	NO	NO	NO	NO	NO
PAN	0	0	1	NO	NO	NO	NO	NO	NO	NO
PRB	0	0	1	NO	NO	NO	NO	NO	NO	NO
PSDC	0	1	0	NO	NO	NO	NO	NO	NO	NO
PSL	1	1	0	NO	NO	NO	NO	NO	NO	NO
PSD	3	4	0	NO	NO	NO	NO	NO	NO	NO
PST	1	3	0	NO	NO	NO	NO	NO	NO	NO
Others	0	0	0	NO	NO	NO	NO	NO	NO	NO

Notes. See Figure 1 for the exact timing of federal and municipal elections over the sample period. Fernando Henrique Cardoso (PSDB) was elected as President in both 1994 and 1999. Luis Inácio Lula da Silva (PT) was elected as President in both 2002 and 2006. \*The political party PRONA was merged with PL and PR after 2005.

Table 2 – Descriptive statistics, two-candidate vs. other races

	President's coalition			President's party		
	Two-candidate	Other	<i>p-value</i>	Two-candidate	Other	<i>p-value</i>
First two-year transfers	19.649	21.535	0.038	19.852	20.961	0.332
Last two-year transfers	18.384	19.046	0.558	20.795	18.298	0.079
Reelection rate	0.346	0.384	0.000	0.397	0.361	0.001
Population	12,007.31	10,518.84	0.000	11,711.63	11,002.67	0.016
Per-capita income	153.581	154.091	0.749	159.771	152.501	0.000
Urban	0.533	0.538	0.206	0.557	0.531	0.000
Water	0.554	0.555	0.921	0.572	0.550	0.000
Sewer	0.190	0.198	0.095	0.243	0.184	0.000
Electricity	0.870	0.870	0.858	0.881	0.868	0.000
Literacy rate	0.551	0.552	0.760	0.565	0.548	0.000
Radio	0.141	0.114	0.000	0.138	0.122	0.026
North	0.051	0.055	0.345	0.059	0.052	0.130
Northeast	0.321	0.322	0.869	0.229	0.344	0.000
Center	0.070	0.087	0.000	0.070	0.082	0.038
South	0.293	0.247	0.000	0.237	0.273	0.000
Southeast	0.265	0.289	0.002	0.404	0.249	0.000
Obs.	5,723	8,056		2,612	11,167	

Notes. *Two-candidate* races are those where only two candidates run for mayor and one of them is affiliated with the President's coalition or party. *Other races* are the other elections. All columns except those with *p-value* report the average values in the respective subsamples; *p-value* refers to the statistical significance of the difference between means. *Last two-year transfers* are the average infrastructure transfers from the federal government to municipalities in the last two years of the mayoral term (per-capita real values in 2000 Brazilian reais). *Reelection rate* captures whether the incumbent mayor is reelected or not. *Population* is the number of resident inhabitants in 2000. *Per-capita income* refers to monthly income in 2000 and is measured in Brazilian reais. The following variables refer to the 2000 Census and are expressed in percentage terms: *Urban population* is the fraction of people living in urban areas; *Water access*; *Sewer*; and *Electricity*; *Literacy rate* is the fraction of people above 20 who are literate; are the fraction of houses with access to water supply, sewer, and electricity, respectively; *Radio* captures whether there is at least one local radio station in the municipality. *North*, *Northeast*, *Center*, *South*, and *Southeast* are macro-regions.

Table 3 – Descriptive statistics, three-candidate vs. other races

	President's coalition		President's party	
	Three-candidate	Other	Three-candidate	Other
First two-year transfers	17.703	21.365	16.325	20.533
Last two-year transfers	15.693	17.935	16.193	16.902
Reelection rate	0.339	0.374	0.374	0.347
Population	17,099.41	11,756.43	18,175.86	13,334.85
Per-capita income	162.986	154.882	172.712	154.123
Urban	0.576	0.550	0.594	0.552
Water	0.581	0.560	0.597	0.562
Sewer	0.224	0.205	0.259	0.198
Electricity	0.878	0.868	0.885	0.869
Literacy rate	0.560	0.552	0.575	0.549
Radio	0.203	0.128	0.222	0.149
North	0.057	0.063	0.064	0.058
Northeast	0.307	0.318	0.239	0.340
Center	0.074	0.093	0.071	0.087
South	0.264	0.227	0.248	0.247
Southeast	0.299	0.298	0.378	0.268
Obs.	12,245	10,042	6,248	16,039

Notes. *Three-candidate* races are those where only three candidates run for mayor and one of them is affiliated with the President's coalition or party. *Other races* are the other elections. All columns except those with *p-value* report the average values in the respective subsamples; *p-value* refers to the statistical significance of the difference between means. *Last two-year transfers* are the average infrastructure transfers from the federal government to municipalities in the last two years of the mayoral term (per-capita real values in 2000 Brazilian reais). *Reelection rate* captures whether the incumbent mayor is reelected or not. *Population* is the number of resident inhabitants in 2000. *Per-capita income* refers to monthly income in 2000 and is measured in Brazilian reais. The following variables refer to the 2000 Census and are expressed in percentage terms: *Urban population* is the fraction of people living in urban areas; *Water access*; *Sewer*; and *Electricity*; *Literacy rate* is the fraction of people above 20 who are literate; are the fraction of houses with access to water supply, sewer, and electricity, respectively; *Radio* captures whether there is at least one local radio station in the municipality. *North*, *Northeast*, *Center*, *South*, and *Southeast* are macro-regions.

Table 4 – Descriptive statistics, aligned vs. unaligned municipalities in two-candidate races

	President's coalition			President's party		
	Aligned	Unaligned	<i>p-value</i>	Aligned	Unaligned	<i>p-value</i>
First two-year transfers	19.102	20.140	0.500	17.195	22.159	0.095
Last two-year transfers	20.871	16.146	0.000	22.709	19.133	0.050
Reelection rate	0.393	0.303	0.000	0.470	0.334	0.000
Population	11,676.64	12,304.95	0.119	11,768.52	11,662.22	0.860
Per-capita income	152.139	154.878	0.251	156.865	162.293	0.099
Urban	0.530	0.535	0.460	0.562	0.552	0.237
Water	0.548	0.559	0.080	0.573	0.572	0.877
Sewer	0.198	0.184	0.061	0.267	0.222	0.000
Electricity	0.872	0.867	0.236	0.882	0.880	0.800
Literacy rate	0.550	0.553	0.431	0.563	0.568	0.310
Radio	0.136	0.145	0.369	0.121	0.152	0.021
North	0.048	0.054	0.291	0.065	0.054	0.248
Northeast	0.322	0.320	0.895	0.206	0.250	0.008
Center	0.070	0.069	0.875	0.068	0.072	0.752
South	0.284	0.301	0.148	0.193	0.276	0.000
Southeast	0.276	0.255	0.074	0.468	0.348	0.000
Obs.	2,711	3,012		1,214	1,398	

Notes. Two-candidate races only. *Aligned* municipalities are those where the winner is affiliated with the President's coalition or party. *Unaligned* municipalities are those where the winner is not affiliated with the President's coalition or party. All columns except those with *p-value* report the average values in the respective subsamples; *p-value* refers to the statistical significance of the difference between means. *Last two-year transfers* are the average infrastructure transfers from the federal government to municipalities in the last two years of the mayoral term (per-capita real values in 2000 Brazilian reais). *Reelection rate* captures whether the incumbent mayor is reelected or not. *Population* is the number of resident inhabitants in 2000. *Per-capita income* refers to monthly income in 2000 and is measured in Brazilian reais. The following variables refer to the 2000 Census and are expressed in percentage terms: *Urban population* is the fraction of people living in urban areas; *Water access*; *Sewer*; and *Electricity*; *Literacy rate* is the fraction of people above 20 who are literate; are the fraction of houses with access to water supply, sewer, and electricity, respectively; *Radio* captures whether there is at least one local radio station in the municipality. *North*, *Northeast*, *Center*, *South*, and *Southeast* are macro-regions.

Table 5 – Descriptive statistics, aligned vs. unaligned municipalities in three-candidate races

	President's coalition		President's party		<i>p-value</i>
	Aligned	Unaligned	Aligned	Unaligned	
First two-year transfers	17.780	17.639	15.888	16.521	0.668
Last two-year transfers	17.172	14.463	20.218	14.376	0.000
Reelection rate	0.373	0.310	0.460	0.336	0.000
Population	16,992.09	17,188.67	16,875.58	18,762.72	0.004
Per-capita income	162.229	163.616	166.801	175.380	0.001
Urban	0.577	0.575	0.597	0.592	0.515
Water	0.583	0.579	0.602	0.594	0.224
Sewer	0.235	0.214	0.286	0.247	0.000
Electricity	0.878	0.879	0.885	0.885	0.963
Literacy rate	0.559	0.560	0.571	0.577	0.041
Radio	0.205	0.202	0.182	0.239	0.000
North	0.059	0.055	0.073	0.060	0.058
Northeast	0.301	0.312	0.199	0.257	0.000
Center	0.076	0.072	0.076	0.069	0.307
South	0.244	0.281	0.181	0.278	0.000
Southeast	0.321	0.280	0.471	0.335	0.000
Obs.	5,560	6,685	1,943	4,305	

Notes. Three-candidate races only. *Aligned* municipalities are those where the winner is affiliated with the President's coalition or party. *Unaligned* municipalities are those where the winner is not affiliated with the President's coalition or party. All columns except those with *p-value* report the average values in the respective subsamples; *p-value* refers to the statistical significance of the difference between means. *Last two-year transfers* are the average infrastructure transfers from the federal government to municipalities in the last two years of the mayoral term (per-capita real values in 2000 Brazilian reais). *Reelection rate* captures whether the incumbent mayor is reelected or not. *Population* is the number of resident inhabitants in 2000. *Per-capita income* refers to monthly income in 2000 and is measured in Brazilian reais. The following variables refer to the 2000 Census and are expressed in percentage terms: *Urban population* is the fraction of people living in urban areas; *Water access*; *Sewer*; and *Electricity*; *Literacy rate* is the fraction of people above 20 who are literate; are the fraction of houses with access to water supply, sewer, and electricity, respectively; *Radio* captures whether there is at least one local radio station in the municipality. *North*, *Northeast*, *Center*, *South*, and *Southeast* are macro-regions.

Table 6 – The impact of political alignment on federal transfers, OLS and diff-in-diff

	<i>Last two-year transfers</i>		<i>First two-year transfers</i>	
	President's Coalition	President's Party	President's Coalition	President's Party
<i>Panel A: All races</i>				
OLS	3.073*** (0.815)	4.181*** (1.317)	1.177 (1.647)	-0.511 (1.229)
Diff-in-diff	4.202*** (1.086)	3.749** (1.742)	0.490 (1.894)	-0.638 (3.036)
Obs.	22,287	22,287	22,287	22,287
<i>Panel B: Two-candidate races</i>				
OLS	5.027*** (1.530)	5.169** (2.443)	-0.117 (1.719)	-3.750 (3.775)
Diff-in-diff	7.353*** (2.339)	15.602*** (4.071)	-0.261 (3.104)	-2.389 (7.568)
Obs.	5,723	2,612	5,723	2,612
<i>Panel C: Three-candidate races</i>				
OLS	3.214*** (0.977)	5.799*** (1.498)	1.704 (1.847)	0.339 (1.548)
Diff-in-diff	3.850*** (1.108)	6.245*** (1.753)	-0.328 (2.353)	-1.909 (2.756)
Obs.	12,245	6,248	12,245	6,248

Notes. Dependent variables: *Last two-year transfers*, i.e., the average infrastructure transfers from the federal government to municipalities in the last two years of the mayoral term; *First two-year transfers*, i.e., the average infrastructure transfers from the federal government to municipalities in the first two years of the mayoral term (per-capita real values in 2000 Brazilian *reais*). *Two-candidate* (*Three-candidate*) races are those where only two (three) candidates run for mayor and one of them is affiliated with the President's coalition or party. OLS and diff-in-diff specifications as in equation (5) and (6), respectively. Robust standard errors clustered at the municipality level are in parentheses. Significance at the 10% level is represented by \*, at the 5% level by \*\*, and at the 1% level by \*\*\*.

Table 7 – The impact of political alignment on federal transfers, RDD estimates

	<i>Last two-year transfers</i>		<i>First two-year transfers</i>	
	President's Coalition	President's Party	President's Coalition	President's Party
<i>Panel A: Two-candidate races</i>				
Split polynomial	6.789** (3.095)	7.694 (5.314)	-3.470 (4.051)	-1.486 (6.447)
Obs.	5,723	2,612	5,723	2,612
Local linear regression	7.477** (3.150)	6.155 (5.221)	-2.609 (4.220)	5.634 (5.515)
Optimal $h$	25	11	25	11
Obs.	4,430	1,188	4,430	1,188
<i>Panel B: Three-candidate races</i>				
Split polynomial	4.134** (2.085)	5.550* (3.225)	-3.201 (2.572)	-1.939 (4.157)
Obs.	12,245	6,248	12,245	6,248
Local linear regression	5.170*** (1.991)	4.453 (3.519)	-2.766 (2.722)	1.308 (3.356)
Optimal $h$	22	11	22	11
Obs.	7,248	1,948	7,248	1,948

Notes. Dependent variables: *Last two-year transfers*, i.e., the average infrastructure transfers from the federal government to municipalities in the last two years of the mayoral term; *First two-year transfers*, i.e., the average infrastructure transfers from the federal government to municipalities in the first two years of the mayoral term (per-capita real values in 2000 Brazilian reais). *Two-candidate* (*Three-candidate*) races are those where only two (three) candidates run for mayor and one of them is affiliated with the President's coalition or party. RDD specifications with split polynomial and local linear regression as in equation (8) and (9), respectively. Robust standard errors clustered at the municipality level are in parentheses. Significance at the 10% level is represented by \*, at the 5% level by \*\*, and at the 1% level by \*\*\*.

Table 8 – The impact of political alignment on reelection, OLS and diff-in-diff

<i>Incumbent party's reelection</i>		
	President's Coalition	President's Party
<i>Panel A: All sample</i>		
OLS	0.048*** (0.010)	0.107*** (0.017)
Diff-in-diff	0.082 (0.009)	0.135*** (0.014)
Obs.	22,287	22,287
<i>Panel B: Two-candidate races</i>		
OLS	0.081*** (0.017)	0.141*** (0.027)
Diff-in-diff	0.066*** (0.017)	0.180*** (0.029)
Obs.	5,723	2,612
<i>Panel C: Three-candidate races</i>		
OLS	0.061*** (0.012)	0.136** (0.020)
Diff-in-diff	0.049*** (0.011)	0.188*** (0.019)
Obs.	12,245	6,248

Notes. Dependent variable: *Incumbent party's reelection*, i.e., the probability that the mayor's political party wins the next election. *Two-candidate* (*Three-candidate*) races are those where only two (three) candidates run and one of them is affiliated with the President's coalition or party. OLS and diff-in-diff specifications as in equation (5) and (6), respectively. Robust standard errors clustered at the municipality level are in parentheses. Significance at the 10% level is represented by \*, at the 5% level by \*\*, and at the 1% level by \*\*\*.

Table 9 – The impact of political alignment on reelection, RDD estimates

<i>Incumbent party's reelection</i>		
	President's Coalition	President's Party
<i>Panel A: Two-candidate races</i>		
Split polynomial	0.051 (0.033)	0.091* (0.051)
Obs.	5,723	2,612
Local linear regression	-0.073 (0.082)	0.042 (0.114)
Optimal $h$	08	11
Obs.	1,986	1,188
<i>Panel B: Three-candidate races</i>		
Split polynomial	0.067*** (0.025)	0.079** (0.038)
Obs.	12,245	6,248
Local linear regression	0.031 (0.061)	0.077 (0.084)
Optimal $h$	08	11
Obs.	3,397	1,948

Notes. Dependent variable: *Incumbent party's reelection*, i.e., the probability that the mayor's political party wins the next election. *Two-candidate (Three-candidate)* races are those where only two (three) candidates run for mayor and one of them is affiliated with the President's coalition or party. RDD specifications with split polynomial and local linear regression as in equation (8) and (9), respectively. Robust standard errors clustered at the municipality level are in parentheses. Significance at the 10% level is represented by \*, at the 5% level by \*\*, and at the 1% level by \*\*\*.

Table 10 – Last two-year transfers and political capital, RDD heterogeneity results

	<i>Two-candidate races</i>		<i>Three-candidate races</i>	
	President's Coalition	President's Party	President's Coalition	President's Party
	<i>Panel A: No radio vs. radio</i>			
No Radio	9.027** (3.606)	8.096 (6.082)	5.378** (2.561)	5.530 (3.938)
Radio	-5.318 (3.929)	2.224 (5.041)	-0.089 (2.248)	3.090 (3.330)
Difference	-14.345*** 5.536)	-5.872 (7.843)	-5.467 (3.480)	-2.440 (5.110)
Obs.	5,723	2,612	12,245	6,248
	<i>Panel B: Small vs. large municipalities</i>			
Small	9.878** (4.415)	7.257 (6.710)	7.646** (3.342)	8.412* (4.809)
Large	0.844 (3.564)	7.795 (8.230)	0.695 (1.993)	2.228 (3.360)
Difference	-9.034 (5.769)	0.538 (10.500)	-6.951* (3.866)	-6.184 (5.759)
Obs.	5,723	2,612	12,245	6,248

Notes. Dependent variable: *Last two-year transfers*, i.e., the average infrastructure transfers from the federal government to municipalities in the last two years of the mayoral term (per-capita real values in 2000 Brazilian reais). *No radio vs. Radio* compares municipalities without and with radio station. *Small municipalities vs. Large municipalities* compares municipalities below and above the median population. RDD specifications with split polynomial in different subsamples as in equation (11). Robust standard errors clustered at the municipality level are in parentheses. Significance at the 10% level is represented by \*, at the 5% level by \*\*, and at the 1% level by \*\*\*.

Table 11 – Last two-year transfers and effectiveness, RDD heterogeneity results

	<i>Two-candidate races</i>		<i>Three-candidate races</i>	
	President's Coalition	President's Party	President's Coalition	President's Party
	<i>Panel A: First vs. second term</i>			
First term	9.460*** (3.653)	10.901* (6.217)	5.247** (2.555)	7.786** (3.925)
Second term	0.688 (5.886)	1.415 (9.163)	1.312 (12.765)	0.081 (5.488)
Difference	-8.772 (6.946)	-9.486 (10.707)	-3.935 (4.369)	-7.705 (6.580)
Obs.	5,723	2,612	12,245	6,248
	<i>Panel B: Unaligned vs. aligned governor</i>			
Unaligned governor	6.950** (3.412)	12.929* (7.041)	4.851** (2.250)	9.627** (4.307)
Aligned governor	5.818 (7.999)	-0.447 (1.879)	-0.892 (5.607)	-3.967 (3.181)
Difference	-1.132 (8.678)	-13.376* (8.039)	-5.743 (6.050)	-13.594** (5.290)
Obs.	5,723	2,612	12,245	6,248

Notes. Dependent variable: *Last two-year transfers*, i.e., the average infrastructure transfers from the federal government to municipalities in the last two years of the mayoral term (per-capita real values in 2000 Brazilian *reais*). *First term* vs. *Second term* compares first-term and second-term mayors, where the latter face a binding term limit. *Unaligned governor* vs. *Aligned governor* compares municipalities with unaligned and aligned state governor. RDD specifications with split polynomial in different subsamples as in equation (11). Robust standard errors clustered at the municipality level are in parentheses. Significance at the 10% level is represented by \*, at the 5% level by \*\*, and at the 1% level by \*\*\*.

Table 12 – Discontinuities of town characteristics in close races, RDD estimates

	<i>Two-candidate races</i>		<i>Three-candidate races</i>	
	President's Coalition	President's Party	President's Coalition	President's Party
Per-capita income	4.410 (5.621)	-5.589 (7.456)	4.930 (4.158)	3.798 (6.573)
Population	-615.864 (1,197.854)	-12.502 (1,866.301)	-380.774 (1,305.727)	2,605.870 (2,235.925)
Urban	-0.002 (0.017)	-0.007 (0.025)	-0.001 (0.013)	0.009 (0.019)
Water	-0.005 (0.018)	-0.021 (0.025)	0.005 (0.013)	-0.009 (0.019)
Sewer	0.004 (0.015)	0.005 (0.023)	0.002 (0.011)	0.002 (0.017)
Electricity	-0.004 (0.009)	-0.005 (0.012)	-0.002 (0.007)	-0.002 (0.010)
Literacy rate	-0.001 (0.006)	-0.012 (0.009)	0.001 (0.004)	-0.000 (0.006)
Radio	0.028 (0.031)	-0.051 (0.048)	0.019 (0.027)	-0.048 (0.041)
North	-0.020 (0.017)	0.035 (0.028)	0.012 (0.015)	0.044* (0.023)
Northeast	0.066 (0.041)	-0.065 (0.056)	-0.032 (0.030)	-0.095** (0.040)
Center	0.012 (0.021)	0.029 (0.035)	0.012 (0.016)	0.012 (0.025)
South	-0.016 (0.042)	0.048 (0.057)	-0.002 (0.030)	0.083** (0.041)
Southeast	-0.042 (0.039)	-0.048 (0.062)	0.011 (0.029)	-0.043 (0.047)
Obs.	5,723	2,612	12,245	6,248

Notes. Estimated discontinuities of town characteristics at the threshold of zero margin of victory. RDD specifications with split polynomial as in equation (8). *Population* is the number of inhabitants in 2000. *Per-capita income* refers to monthly income in 2000 and is measured in Brazilian *reais*. The following variables refer to the 2000 Census and are expressed in percentage terms: *Urban population* is the fraction of people living in urban areas; *Literacy rate* is the fraction of people above 20 who are literate; *Water access*, *Sewer*, and *Electricity* are the fraction of houses with access to water supply, sewer, and electricity, respectively; *Radio* captures whether there is at least one radio station in the municipality. *North*, *Northeast*, *Center*, *South*, and *Southeast* are macro-regions. Robust standard errors clustered at the municipality level are in parentheses. Significance at the 10% level is represented by \*, at the 5% level by \*\*, and at the 1% level by \*\*\*.