Larger Legislatures and the Cost of Political Brokerage: Evidence from Brazil

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Abstract

This article shows that larger legislatures reduce the electoral power of incumbent parties in the executive. The electoral effects of legislature size have been largely overlooked by a literature that emphasizes its impact on policy outcomes. I estimate the effects of municipal council size on the results of mayoral, gubernatorial and presidential elections in Brazil. The regression discontinuity design exploits variation from a law that set non-linear council size caps after 2012. In a nutshell, every additional seat triggers a 10% vote loss for the candidates backed by the mayor's party. I also show evidence that these losses are a consequence of a breakdown in the political brokerage relationships that often characterize developing democracies: in Brazil, mayors exchange patronage for the councilors' electoral support. Larger councils raise this transaction cost for the executive, more so when council and mayor have unaligned electoral incentives at the state/national levels.

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Efficient institutional design is essential for the functioning of democracies.[1] In this context, scholars have been particularly interested on how legislature size shapes representation, either in terms of policy outcomes or the productivity of the administration (Primo and Snyder, 2008; Chen and Malhotra, 2007; Weingast, 1994).[2] This institutional feature is even more relevant in light of separation of powers, as chamber size might also influence the executive-legislative bargain process. Nevertheless, less attention has been paid to the effects of legislature size on the most central of all democratic institutions: elections. In the slightest, if the number of seats influences the bargain between powers, it should also affect the levels of electoral competition and incumbency advantage.[3] Perhaps this omission derives from the intrinsic difficulty in finding exogenous variation in assembly sizes,[4] or in separating its direct electoral effects from mere spillovers of the often studied policy impacts.

This article fills this gap in two significant ways. First, it identifies the effects of municipal council size in the three executive elections in Brazil in 2014-16 (for president, governor, and mayor). In doing so, it focuses on a dimension of electoral competition that has raised ample interest in the literature: reverse coattail effects (Feierherd, 2020; Erikson, Folke, and Snyder, 2015; Magar, 2012; Broockman, 2009); and thus emphasizes the performance of the tickets backed by the mayor's party. The effects are identified with a quasi-natural experiment: a federal law that set non-linear caps for the size of local councils based on population thresholds, starting as low as 15,000. The caps range from 9 to 55 seats, increasing by two additional councilors at every threshold. In these elections, a fuzzy regression discontinuity (FRD) design shows that the vote shares of candidates supported by the mayor fall by 5 percentage points for every additional council seat (a 10% loss).

Second, I argue that this vote loss is driven by a previously uncharted theoretical mechanism: a breakdown in the political brokerage relationships that characterize elections in much of the developing world (Gingerich, 2020; Larreguy, Montiel Olea, and Querubin, 2017; Rueda, 2017; Larreguy, Marshall, and Querubín, 2016; Holland and Palmer-Rubin, 2015; Gingerich, 2014; Stokes

[1] See relevant examples in Lijphart (1999); Taagepera and Shugart (1993); Duverger (1954).

[2] These articles focus on the impact of chamber size on public spending. In recent work, Barber, Bolton, and Thrower (2019); Bolton and Thrower (2016) have also shown that legislative capacity significantly affects certain dimensions of policy implementation by the executive.

[3] Shugart and Taagepera (2017) is one notable exception in this literature. The authors use a cross country analysis to propose a model where assembly sizes, in conjunction rules of the electoral system, determine the number of effective parties winning seats. While they focus primarily on parliamentary systems, they also discuss potential channels through which assembly size could influence executive (presidential) races. In a nutshell, they argue that larger legislatures, by increasing the number of represented parties, also increase the fragmentation of executive elections.

[4] Legislature size is often jointly determined with other institutions that also affect electoral outcomes. This endogeneity limits the ability of most cross country analyses to identify causal links between assembly size and elections.

et al., 2013).[5] Simply put, an increase in council size raises the brokerage cost for mayors that rely on a coalition of councilors to mobilize the electorate in favor of their candidates in local, state and national races.

In Brazil, local political power is shared between the executive (mayor) and the council. Mayors have ample control over spending, given the decentralized public good delivery system. This places them in a position to play the role of political brokers for the candidates backed by their parties in state and national races (Novaes, 2018; Avelino, Biderman, and Barone, 2012; Brollo and Nannicini, 2012), and magnifies the importance of reverse coattails in these elections (Ames, 1994). On the other hand, councilors are particularly close to voters, and often meet their demands with targeted jobs, goods or services (Bobonis et al.; Nichter, 2018; Nichter and Peress, 2017; Lopez, 2004). Not surprisingly, mayors themselves rely on the support of a coalition of councilors for both electoral mobilization and policy implementation (Cepaluni and Mignozzetti, 2020; Colonnelli, Prem, and Teso, 2019). As local executives control the purse, the coalition's loyalty is primarily acquired with public resources, either in the form of patronage (e.g. jobs) or bribes.[6]

Given that Brazil has a fragmented political system, local executives rely on multiparty coalitions to support their administrations. These alliances are often ideologically incoherent, and coalition councilors typically have electoral incentives in state and national races that are unaligned with the mayor's party. The councilor's trade-off in every executive election is thus between supporting the candidates backed by their allied mayor – which provides access to local patronage – or to endorse an alternative ticket, which in state and national races is often their own party's candidate.[7]

In this context, a larger council implies that the executive needs the loyalty of more individual legislators to obtain the same proportional level of support. Everything else equal, every individual councilor now extracts less rents from the executive and, from their perspective, the value of supporting the mayor's party relative to an alternative option decreases. This weakens local coalitions and the mayor's ability to broker votes in all these elections.

[5] This literature examines different dimensions of the party-broker relationship, such as the impact of monitoring capacity on performance (Rueda, 2017; Larreguy, Marshall, and Querubín, 2016), the electoral returns to brokerage (Gingerich, 2014), the party's ability to efficiently allocate resources across brokers (Gingerich, 2020), the broker's diverse incentives (Larreguy, Montiel Olea, and Querubin, 2017) and types of engagement with parties (Holland and Palmer-Rubin, 2015); and the impact of development on the efficiency of brokers (Stokes et al., 2013).

[6] This practice is also widely documented by the local press. In page 5, I provide the examples of several municipalities.

[7] Larreguy, Montiel Olea, and Querubin (2017) already show that party attachments play an important role in the performance of brokers in Mexico. These attachments are not only determined by ideological preferences. Even in an environment of weak parties and personalistic politics such as Brazil, politicians might be strongly attached to their parties due to relationships with prominent party members (such as congress members), or career opportunities, for example.

I present additional fuzzy regression discontinuity (FRD) results that provide additional support for this mechanism. First, I estimate the effects of legislature size on the size of the mayor's coalition elected in the council in 2012. They show that, where legislatures are larger, local coalitions include **more** individual councilors that come from a **higher** number of parties, even though these alliances still attain a similar level of proportional support. Second, I estimate the effects of council size on the longevity of these mayoral coalitions between 2012 and 2016. Again, where councils are larger, the coalition is **more** likely to breakdown preceding the 2016 municipal election, as a significant share of the allied councilors opts to support an alternative ticket in the reelection race.

The heterogeneity in the main results also suggests that the political unalignment within the mayoral coalition is behind the negative effects of council size observed in gubernatorial and presidential elections. I estimate these effects now for two sub-samples, based on the congruence between local coalitions and national and state party alliances. The results show that all electoral losses are concentrated in municipalities where alignment is low. In these locations, candidates endorsed by the mayor's party **lose** 12-15 pp of their vote percentage for every additional council seat. These losses, however, disappear in municipalities where coalitions are highly aligned.

I also rule out alternative explanations for the results, particularly the competing view that these electoral losses are a secondary consequence of the impact of council size on policy. At first, this view resonates within the Brazilian political environment, where a recent literature documents that voters are responsive to the performance of local politicians in areas such as public good distribution or corruption (Boas, Hidalgo, and Toral, 2020; Zucco Jr., 2013; Ferraz and Finan, 2008). In fact, underperforming individual mayors have been shown to tarnish both their party reputations and electoral performance in both municipal and higher elections (Feierherd, 2020; Klašnja and Titiunik, 2017). The present results, however, show that council size has no effect in the size, allocation and volatility of public spending, and on a variety of policy outcomes in health and education.

Accordingly, I also discuss potential explanations for why policy effects are absent in this context. First, mayors have little agency to determine the size of the local budget, which primarily comes form scheduled state and federal transfers. Second, I show that council size does not affect the average profile of the politicians that are elected in the municipality in 2012 – for both executive and legislative positions. If the descriptive characteristics of elected officials are correlated with their policy preferences, this explains, at least partially, the lack of policy effects. Finally, I use data from the

Brazilian barometer survey to show that voters' preferences for candidates and parties are much more unaligned within a municipality than their policy preferences. In other words, voters are much more likely to agree on the type of spending that they prefer, than on their voting choices. If politicians represent voters, this suggests that the lack of policy effects could be explained by a high level of policy alignment between mayor and coalition councilors – which is not the case of electoral incentives, as I argued before.

Finally, I also show that the observed electoral losses, especially in the case of the mayoral race, are not simply the mechanical effect of a higher fragmentation in the executive contest – a potential mechanism suggested by the model in Shugart and Taagepera (2017). In short, municipalities with larger legislatures do not see an increase in the number of mayoral candidates in 2016.

Local coalitions and political brokerage in Brazil

Brazil has a fragmented party system with nearly 30 active parties (as of 2012), 26 of which won at least one mayoral election in 2012. Parties are generally seen as weak (Klašnja and Titiunik, 2017; Ames and Smith, 2010), and the institutions favor candidate-centered elections. Not surprisingly, linkages between politicians and voters are often rooted on the exchange of targeted public resources for electoral support (Frey, 2019; Nichter, 2018; Hidalgo and Nichter, 2015; Gingerich, 2014).

Local politicians play an important role in raising support for their candidates in national and state elections, helped by the decentralized system of public policy implementation (Novaes, 2018; Avelino, Biderman, and Barone, 2012; Ames, 1994). Most spending in categories such as health, education, and infrastructure is done by municipal administrations, and financed primarily by scheduled transfers from federal and state administrations.[8] In this context, voters often request goods and favors from local politicians – such as medicine, medical treatments, and construction goods – with a promise of political support (Nichter, 2018). These demands are then met "using political criteria, given that the number of requests often exceeds available resources" (Bobonis et al.). Accordingly, incumbent parties at the state and federal levels often rely on these local relationships for electoral endorsement, and thus target discretionary resources accordingly (Frey, 2020; Bueno, 2018; Brollo and Nannicini, 2012). This further increases the incentives for mayors to campaign locally for their higher candidates.

[8]Local taxes play a minimal role in the local budget, especially in smaller, poorer municipalities.

Power sharing in local coalitions Municipal political power is shared by the executive (mayor) and a council that ranges in size from 9 up to 55 members. Both are elected at the same time, every four years, while state and national elections happen in the midterms, also every four years. In this multiparty environment, mayors rely on broad and large coalitions to support their administrations. Despite the existence of nearly 30 parties, municipalities have less than 3 mayoral candidates on average. Each of these candidates relies on the electoral support of multiple council candidates from different political groups. As a result, the average number of parties in a winning mayoral coalition is 6.2, and in only 4% of the municipalities the mayor's party is able to achieve council majority alone (in 58% of them, however, the mayor's coalition elects 50%+1 of all councilors).

Accordingly, the strength of these coalitions typically relies on a *quid-pro-quo* between mayor and individual councilors. Mayors need the support of councilors to approve legislation, accounts, and to minimize the risk of prosecution from malfeasance (Poulsen and Varjao, 2019). In addition, because council candidates are closer to voters, they typically play the role of brokers for their mayoral candidates (Colonnelli, Prem, and Teso, 2019; Novaes, 2018). On the other hand, councilors depend on mayors to access resources, given that the executive controls both the budget and most public sector jobs. The result is an exchange of political support for rents, which councilors use for their private consumption, or to meet the demands of their constituencies (Cepaluni and Mignozzetti, 2020).[9]

This dynamic is well illustrated by the recent events in Ribeirão Preto (SP). In 2016, the federal police uncovered a scheme of bribes directed to nine councilors from six different parties, which were paid to support the local PSD administration. The bribes included payments in cash, and jobs for their closer activists in companies with ties with the mayor.[10] Similar bribing schemes are a relatively common practice in the country, and have been uncovered in multiple other municipalities such as Joaquim Gomes (AL), Fundao (ES), Parauapebas (PA), Cuiaba (MT), and Iranduba (AM), for example.[11]

What is more, these local coalitions are typically formed around local rivalries and interests, and

[9]The linkages between councilors and their voters are often personalistic and based on clientelistic exchanges (Lopez and Almeida, 2017; Nichter and Peress, 2017). However, while both the press and the literature show extensive evidence that clientelism is common in Brazil (Hidalgo and Nichter, 2015; Brollo et al., 2013), it is not necessarily the only reason that leads voters to follow electoral endorsements of councilors. Voters might simply reward politicians that claim credit over policies (Zucco Jr., 2013), or even extend their support due to cultural patterns of reciprocity (Mares and Young, 2016), for example.

[10]See *Globo.com* in https://glo.bo/2YPXf9O.

[11]See in *Globo.com* (https://glo.bo/3hJqbHB), *A Gazeta* (https://bit.ly/308hQHi), *Globo.com* (https://glo.bo/32HqlJx), *MidiaNews* (https://bit.ly/3gR8g0U), and *Acritica* (https://bit.ly/3lx23dT).

span the entire ideological spectrum. This is illustrated in Figure 2, where the arcs represent the number of coalitions between a pair of parties in any local election. As an example, even PT and PSDB, the most notable rivals in national politics (Samuels and Zucco Jr., 2014), are often seen supporting each other's mayoral candidates.[12]

These local alliances are also unstable. On average, only 50% of the parties in the winning mayoral coalition (2012) remained supporting the incumbent party in the following election (2016). This is not surprising for coalitions with loose ideological ties that rely on the distribution of material rewards – councilors often revoke their support if they find more attractive alternatives. For example, in Guanambi (BA), three councilors left the mayor's coalition to support a former state governor in the upcoming mayoral race.[13] In Batalha (BA), councilors and mayor disagreed on issues of chamber leadership, and the incumbent's coalition that previously held eight of the nine seats fell apart.[14] Politicians also revoke support due to their relationships in national politics: in Ladário (MS), councilors left PSDB to DEM after a request from members of the national cabinet.[15]

The fragility of local coalitions is also underscored by a high degree on unalignment in electoral incentives: local coalitions are often inconsistent with party alliances at the state or federal level. Figure 1 below shows, for each winning mayoral coalition, the share of parties that also support the same candidate than the mayor's party in gubernatorial and presidential elections. In more than half of the cases, 50% or less of the coalition partners formally support coincident candidates in higher races.

In this context, the loyalty of councilors is divided. In the one hand, the local incumbent party attempts to use its local alliances to obtain the council's electoral backing. For example, in Teresina (PI), the gubernatorial candidate from PSDB used his relationship with the partisan mayor to seek the support of the 25 local councilors that make up the the mayor's base – including councilors from parties that opposed PSDB at the state level (as PP, for example).[16]

On the other hand, coalition councilors might prioritize their intraparty relationships over their commitments to the local incumbent. In Caxias do Sul (RS) and Goiânia (GO), for example, councilors openly endorsed a gubernatorial candidate opposing the one favored by their partner mayor.[17]

[12] The same goes for PT and DEM, which alse never form alliances at the state or national levels.
[13] See in *Agência Sertão* (https://bit.ly/2DcwdBw).
[14] See in *Sete Segundos* (https://bit.ly/3fbfknS).
[15] See in *Diário Corumbaense* (https://bit.ly/2DjRc5C).
[16] See in *Cidade Verde* (https://bit.ly/3gwOIyw)
[17] See in *Pioneiro* (https://bit.ly/3hZmEoP) and in *Jornal Opção* (https://bit.ly/309s9ep).

In Passo Fundo (RS), a councilor declared that while he admired the mayor's candidate for governor, he would support a different candidate to "follow the party".[18] This unalignment of electoral incentives has the potential to hinder the electoral success of the candidates supported by local incumbent parties, especially in a context where councilors actively employ their mobilization capacity to raise votes for their candidates. In Juazeiro (BA), one councilor expressed that, in support of their presidential candidate, local councilors would "unite friends and communities. We would go to the streets as if this (presidential) election was the local council race."[19]

Legislature size and electoral power: theoretical predictions

This article studies the impact of local legislature size on the electoral performance of the executive branch of government in Brazil. While the literature focuses on the policy effects of council size, I argue that the results observed here are primarily a consequence of a novel mechanism: the unalignment of political incentives within the brokerage relationship between legislators and the executive. This logic, within the context described in the previous section, suggests the following hypotheses to be tested in the article.

H1: Candidates supported by the mayor's party lose votes when the council is larger.

The logic here is better summarized by the following arguments:

(i) Mayors are key brokers for the state and national candidates backed by their parties.

(ii) In that capacity, they rely on the support of coalition councilors to secure votes – not only in state and national races, but in the mayoral race itself. As local executives control the purse, the coalition's loyalty is primarily acquired with patronage.

(iii) Coalition councilors come from multiple parties, and often have opposing electoral incentives at higher levels. Locally they might also be swayed to other mayoral tickets with better electoral prospects (due to the challenger's valence or political connections, for example).

[18] See in *O Nacional* (https://bit.ly/2BEhcIc).

[19] In Portuguese: "Não basta declarar o voto. Vamos unir nossos amigos e nossas comunidades. Vamos para a ruas como se esta fosse a eleição de cada um dos vereadores." See in https://bit.ly/2CSdXxE

(iv) The councilor's trade-off in executive elections is thus between supporting the candidates backed by their allied mayor – which provides access to patronage – or to endorse an alternative ticket, which is often the candidate of their own parties in state and national races.

(v) In this context, larger legislatures forcibly require mayors to recruit more individual councilors to obtain the same level of proportional support.[20] Everything else equal – including the budget – every individual coalition councilor now extracts less rents from the executive. Thus, from their perspective, the value of supporting the mayor's party decreases relative to the alternative options. I highlight that the attractiveness of the alternative options for councilors is not necessarily affected by council size. For example, they might support an alternative ticket due to their ideological attachments; intra-party career opportunities; personal relationships with other local, state or national politicians; or even due to the competing candidate's valence.

H2: These effects are higher where local coalitions have a low degree of electoral alignment.

This hypothesis follows directly the logic described above, and it is particularly relevant to the incumbent party's ability to successfully raise votes for its candidates in national and state elections. When national (or state) and local coalitions are unaligned, coalition councilors have a more attractive alternative option in these elections, i.e., the ticket supported by their own parties. All else equal, the mayor's party is more likely to lose votes in these locations.

H3: These effects are not a spillover from effects on either policy implementation or the council's profile.

The potential causal links between legislature size and policy are often a consequence of two mechanisms. First, policy effects could be a direct consequence of shifts in the legislators' preferences. For example, if larger chambers have, on average, more members that are left leaning, the executive will likely face more pressure to increase both taxation and spending. A similar argument can be made if larger legislatures are also more likely to be more descriptively diverse – there is an extensive literature that shows how descriptive characteristics of politicians affect policy outcomes.[21]

Second, even if the legislature size does not affect the chamber's profile, the executive-legislative bargaining process might be affected by the change in the number of players involved. One example

[20] Both in terms of the council majority and the electorate.
[21] See a recent example in Brazil, in the case of gender, in Brollo and Troiano (2016).

is the seminal argument that more legislators will put pressure on the executive for higher pork barrel spending, which would trigger a sub-optimal increase in the public budget (Primo and Snyder, 2008; Chen and Malhotra, 2007; Weingast, 1994). Alternatively, the number of legislators might also affect spending through monitoring capacity over a budget-maximizing bureaucracy (Pettersson-Lidbom, 2012); or even, as shown in the case of Brazil, through an increase in the demands to the executive for public services that are highly salient to voters (Cepaluni and Mignozzetti, 2020).

If any of the above mechanisms is at play in the context studied here, the resulting policy changes might have indirect effects on the electoral performance of local incumbents. Indeed, an extensive literature has emphasized that voters are responsive to the performance of municipal administrations in Brazil (Boas, Hidalgo, and Toral, 2020; Feierherd, 2020; Klašnja and Titiunik, 2017; Ferraz and Finan, 2008). In order to argue that the findings in this article are primarily caused by the breakdown of the brokerage relationships described in H1 and H2, I show that the results are not driven by either policy effects or changes in the profile of elected legislators. I also discuss in page 14 some potential explanations for why policy effects are absent in the context of this analysis.

Empirical design and data

This article's empirical strategy exploits a federal legislation from 2009 that established caps for the size of municipal councils in Brazil, based on several population thresholds – see details in Figure A.1 (appendix, page 1). This discontinuous assignment in the maximum number of seats allows me to use a regression discontinuity design to compare the electoral outcomes in municipalities just above each population threshold (those with a larger cap), to the ones in municipalities just below. I use this design to identify the effect of council size on the electoral performance of the local incumbent party in executive elections in Brazil (mayoral, gubernatorial and presidential). Figure 3 below illustrates the number of council seats in Brazil after the municipal 2012 election.[22]

[22]In the previous two electoral cycles, instead of a cap, the law determined the exact council size of each municipality. Even though the number of seats was also set based on the local population, the thresholds were different, and much higher. As a result, under the previous rule, not many municipalities are found with population around the cutoff points (the lowest was population cutoff was 47,619, followed by 95,238). In contrast, the 2009 rule set the first three new thresholds at 15,000, 30,000 and 50,000. Figure 3 shows how the vast majority of municipalities in Brazil have less than 50,000 inhabitants, which provides a lot more observations that are truly comparable in terms of population – this explains this paper's choice for the 2009 assignment rule. For perspective, using all locations within 7,500 inhabitants of a population threshold allows me to use nearly 3,000 municipalities (53% of the total) under the 2009 rule. However, under the same population range, this number drops to less than 300 (roughly 5% of the total) under the 2004 rule.

The maximum council size set by the legislation is not binding. This means that local administrations can choose not to increase the number of seats, or to increase it to less than the assigned cap (80% of all municipalities have their council size at the cap). This has direct implications for the empirical design employed in the estimation of the treatment effects, which requires a fuzzy RD (FRD) design (Calonico, Cattaneo, and Titiunik, 2014; Imbens and Lemieux, 2008). In the sharp RD design, the uptake of treatment is forcefully determined at the discontinuity, in which case the probability of an increase in council size would be precisely one. Here (FRD), the probability of treatment compliance still *jumps* at the threshold, but it is between zero and one.

Accordingly, the estimation of the FRD resembles an instrumental variables (IV) design, where the discontinuous assignment rule first identifies an exogenous change in council size (under the usual RD assumptions), and this variation in council size is used to identify the local treatment effect on electoral outcomes at the discontinuity, in a second stage.[23] This estimation process is better illustrated by the system of equations below.[24]

$$SEATS_{iw} = \gamma_0 + \gamma_1 T_{iw} + \gamma_2 POP_{iw} + \gamma_3 T_{iw} POP_{iw} + \lambda_w + \mu_{iw} \quad (1)$$

$$Y_{iw} = \beta_0 + \beta_1 \hat{SEATS}_{iw} + \beta_2 POP_{iw} + \beta_3 T_{iw} POP_{iw} + \lambda_w + \epsilon_{iw} \quad (2)$$

Equation 1 is the first stage, which estimates the effects of the assignment rule on the compliance with treatment (i.e. on the increase in council seats) for municipality i, and assignment window w around each population threshold. The variable T_{iw} indicates whether the municipality is just above the threshold in each window w, and thus eligible to a larger council. The variable POP_{iw} is the normalized value of the population.[25] Finally, I also include fixed effects by assignment window (λ_w), given that the assignment to treatment is made locally around each population threshold.[26]

The data on council size, as well as data on all electoral results and the profile of candidates was obtained from the Superior Electoral Courts in Brazil (TSE). Figure 4 shows the estimation of

[23] In the FRD case, the treatment effect is always local, given that it is the effect on compliers, i.e., on the municipalities that increased their number of seats as a result of the legislation.

[24] I highlight that the statistical software estimates this equation system in one single stage, and already provides properly adjusted standard errors.

[25] This is the highest value of municipal population among the official IBGE measures of 2010 and 2011, subtracted by the threshold value in each assignment window. These were the years before the 2012 election in which municipalities were allowed to change their bylaws to increase the council size.

[26] I highlight that this is not necessary for the identification of effects – it is aimed to increase the estimatiomn precision.

equation 1. On average, municipalities with population just above the threshold have roughly one more council member than very similar municipalities just below. In the appendix (Table A.2, page 2), I show that these coefficients are robust to the choice of bandwidth, polynomial, and the inclusion of state fixed effects and other demographic covariates, which are also balanced at the discontinuity. Table A.4 (appendix, page 4) shows the usual RD balance test for these covariates, and describes the construction of each variable. Finally, as it is usual, observations are weighted by the triangular kernel, and the estimation only includes observations within a bandwidth around each population threshold, which is set by the algorithm in Calonico, Cattaneo, and Titiunik (2014).[27]

Ultimately, this article studies the effects estimated by equation 2. Here, for any electoral outcome Y_{iw}, the explanatory variable is now the predicted number of council seats ($\widehat{SEATS}_{iw}$) obtained with equation 1. Accordingly, the local treatment effect is given by β_1. In most specifications, I also include fixed effects by state, and demographic and political party covariates fully described in the appendix.[28]

Council size and electoral losses by local incumbents

Table 1 shows the effect of council size on the electoral performance of the local incumbent party in the three executive elections during the mayoral tenure of 2013-2016 (gubernatorial and presidential in 2014, and a new mayoral election in 2016), which is a direct test of H1. The outcome is always the percentage of the municipal vote that is obtained by the candidate supported by the mayor's party in each election.[29] The first line shows the estimation for an index of electoral strength, which aggregates these three elections.[30] In the three elections under analysis, the effects are consistently negative: the candidates of the local incumbent party lose 3.9 to 4.7 percentage points for every extra council member in the municipality. Given that the candidate of the incumbent averages 45

[27] Within the bandwidth, only the first seven population thresholds have at least one observation on each side of the discontinuity (see Table A.1, appendix, page 1). In practice, only municipalities with population below 305,000 are potentially included in the estimation – this is 99% of the total in the country.

[28] As it is typical in RD designs, pre-treatment covariates are included to improve the precision in the estimation. I later show that the results are robust to their exclusion. Table A.4 (appendix, page 4) shows the description of the demographic covariates, and their sources. The political party covariates are dummies that indicate whether the mayor elected in 2012 belongs to one of the seven largest parties in Brazil by number of mayors (PT, PMDB, PSDB, PSB, PSD, PP and PDT), and one dummy that indicates if the incumbent is part of PT's federal coalition. Table A.5 (appendix, page 5) shows that these variables are not themselves affected by the treatment assignment of council size.

[29] In the few cases that the incumbent party did not support any candidate, the municipalities are excluded from the sample – this represents .001% of the gubernatorial elections, and 11% of mayoral elections. I also exclude 2% of municipalities that had the 2012 election canceled by the courts, and 0.5% of municipalities that had missing data on covariates.

[30] This is the usual procedure for testing multiple outcomes. The index is the average electoral performance in these three elections, weighed by the inverse of the covariance matrix for the three outcomes (Anderson, 2008).

to 47% of the vote in the pre-treatment baseline, the effect of one council member is a decrease in vote percentage of nearly 10%. Table A.3 (appendix, page 3) shows that these estimates are robust to polynomial and bandwidth changes.[31]

I also show in the appendix a placebo test of this empirical design (Table A.7, page 7), where I re-estimate these results using data from the pre-treatment period, i.e., with elections that happened before the changes in the number of councilors (elections in 2010 and 2012). As expected, I find no significant effects before the treatment.

Evidence of the mechanism: breakdown of local coalitions

Here I examine the council size effects on the coalition supporting the mayor's party. In a nutshell, under larger councils, the coalition of the mayoral incumbent still manages to control a similar share of the total seats. However, this comes at a cost: these coalitions are now composed by a significantly larger number of individual council members, and also a larger number of parties. Table 2 shows the relevant results, which I discuss in the sequence.

The first row shows that the number of parties competing for seats does not change with council size (first column). However, with larger councils, more parties win seats (second column), and the incumbent's coalition is composed by a larger number of parties (third column).

The second row shows a similar pattern. The total number of candidates (per seat) in the municipality does not change with council size (first column). However, the second column shows that there is an increase in the number of council members elected by the incumbent's coalition, which is likely a mechanical effect of having more seats in contention. Nevertheless, the third column shows that the this does not imply that the coalition increases its proportional support (share of seats), which is the relevant measure to determine the political power of the incumbent mayor during the 4-year tenure.

Unaligned electoral incentives. The patterns described above have direct implications for the gubernatorial and presidential elections in 2014. As discussed in page 6, local coalitions are often unaligned with party alliances at the state/national levels. This might lead coalition councilors to use their local networks to endorse their party candidates instead of the candidates supported by allied mayors. The third row of Table 2 shows that larger councils aggravate the problem of unaligned elec-

[31] Table A.3 also shows the estimation of equation 1 for the electoral outcomes (the *reduced-form*).

toral incentives: on average, the local incumbent's coalition elects less councilors that also support the same candidates in gubernatorial and presidential elections.

A direct test of H2. Figure 6 shows the heterogeneous effects of council size on the vote shares, by the level of alignment within the mayoral coalition. Here the sample is split in two groups, according to the share of parties in the mayor's coalition that support coincident candidates in the 2014 gubernatorial and presidential races.[32] The plot shows that the electoral losses coming from a larger council size are highly concentrated in municipalities where the coalition is less aligned. On the other hand, when the mayor's coalition parties also rally around the same gubernatorial (or presidential) candidates the local incumbent does not suffer any electoral losses.

The negative electoral impact of council size on local incumbents is not exclusive to the party performance in state and national elections. The results show a similar pattern of fragmented support within the local incumbent coalition preceding the 2016 reelection race – this is illustrated by Figure 5. The plot first focuses on the effect of council size on the share of seats gained by the mayor's coalition in 2012. The first coefficient shows that council size has no effect on the proportional support obtained by the mayor at the start of the 2013-2016 term. However, the second coefficient highlights how the coalition falls apart preceding the 2016 election: the mayor's party loses the support of a significant share of elected councilors in advance of the reelection run.

What is more, the same pattern is observed for a sub-sample that only considers coalition councilors that actually attempt reelection in 2016 (see the third and fourth coefficients in the plot). Finally, the last coefficient also supports this fragmentation pattern. Here the outcome variable is the change in the number of total coalition partners (i.e. parties) between 2012 and 2016 for the mayor elected in 2012. The estimates – although only significant at a 90% confidence level – imply that larger councils increase the instability of the winning coalition during the 2013-2016 tenure.

[32] More precisely, the share is calculated as the number of parties in the coalition that support the same candidate as the mayor's party in 2014, divided by the total number of parties in the alliance. The sample is split by the median value of these variable, by state. These shares are continuous at the discontinuity. I highlight that this is not the same definition as the outcome variables in Table 2, which use the number of elected councilors in the coalition. The variable here uses simply the parties that compose the alliance, have they elected councilors or not. This is intentional to avoid post-treatment bias form the effects shown in the third row of the previous Table.

Alternative explanations: policy outcomes and the council's profile

As discussed in page 7, the potential effects of council size on policy outcomes could provide a competing explanation for the mechanism presented here, i.e., if policy changes also have an indirect impact on the electoral performance of incumbent parties.[33] Figure 7 shows direct evidence that this is not the case in this context. The plot presents the effects of council size on several local policy outcomes, including public school enrollment, health indicators, the size and distribution of budget by type of spending, and spending volatility.[34] In a nutshell, none of the twelve coefficients is statistically significant, which suggests that the electoral results are not a spillover of policy effects.

The absence of policy effects might seem puzzling in light of both the existing empirical literature and the theory presented here. In other words, if there is a change in the cost of patronage for mayors, this could also affect their ability to pass legislation and implement policy. Accordingly, I discuss below four potential reasons that might explain why these effects are absent in the context studied here.

First, local budgets in Brazil, especially in smaller municipalities, are primarily financed by scheduled transfers from federal and state resources. This means that the bulk of public spending is determined independently from local administrations. This likely explain the lack of effects on spending here, even though they are often found in other unicameral systems (Chen and Malhotra, 2007).

Second, this absence could also be explained by the fact that council size has no impact on the profile of elected politicians, both in the executive and legislative branches of local administrations. If the policy preferences of politicians are correlated with their observable characteristics such as gender, age, political party, or experience, it is not surprising that the policy outcomes here remain similar across different council sizes. Figure 8 shows the absence of significant changes on the profile of both the average councilor (left-side plot), and mayors (right-side plot).[35]

Third, even with the profile of legislators unchanged, policy effects could arise as a response to changes in the executive-legislative bargaining process. Consider for example the argument made in

[33] For example, a larger council might reduce the executive's ability to efficiently deliver services demanded by voters. If voters attribute this change to the actions of the executive, mayors might lose votes in the presence of larger councils.

[34] Spending volatility is particularly useful to address the argument that councils might curb more extreme executives from implementing extreme policies in terms of spending (i.e. either expansionist or fiscally conservative). Here, the variable measures the effect on absolute deviations from the average spending, and directly checks whether municipalities have less variation in spending profiles in the presence of larger councils.

[35] Table A.6 (appendix, page 6) also shows the absence of treatment effects on the following variables that measure electoral competition in 2012: the number of mayoral candidates; the vote share of the winning mayor; the number of parties in the winning coalition; and the share of parties in this coalition that backed coincident candidates (with the mayor's party) in the 2014 gubernatorial and national races.

H1 that larger councils increase the cost of political support for mayors. Why didn't this mechanism also affect policy? One possible explanation is that the polarization in policy preferences at the municipal level is relatively low in Brazil. To illustrate this, consider a case where the mayor supports an increase in health programs, but most coalition councilors prefer to prioritize education programs. The stronger the councilors' preference for education over health, the more patronage it takes for them to embrace the mayor's agenda. However, if health spending also widely benefits the council's constituencies – and polarization is low in this dimension – a small reduction in patronage might not jeopardize the mayor's control over the coalition's policy choices.

Even though I cannot directly measure the policy preferences of individual local politicians, the 2012 Brazilian Barometer survey (LAPOP)[36] provides some insight on the preferences of voters, which are likely correlated with the councilors' positions. The survey shows that health and education programs are by far the most relevant priorities for voters: 93% of them mention at least one of these categories when asked about their top two spending preferences.[37] What is more, 77% rate health policy as their number one priority, and among the voters that do so, two-thirds also rate education as their second priority. Overall, this pattern strongly suggests a high level of congruence in policy preferences at the local level, and offers a possible explanation for why a weakening of mayoral coalitions doesn't significantly impact policy outcomes.

What is more, the same congruence is not observed in electoral preferences – Figure 9 illustrates this point. For the 106 municipalities in the LAPOP survey, the dark shade shows the distribution of the average preference for health spending. Again, voters are highly likely to agree in the policy dimension, as 77% of them favor this category. On the other hand, the lighter shade suggests that voters were less likely to agree on the choice of presidential candidate in the 2010 race.[38] Here I show the distribution of the average vote for the incumbent (PT party) and election winner across the same 106 municipalities: on average, only 46% of voters rally behind PT. This relatively higher split in electoral preferences is consistent with a political environment where a reduction in patronage it is more likely to impact the electoral endorsement of councilors than their support for policy implementation.

[36] www.lapopsurveys.org. We thank the Latin American Public Opinion Project (LAPOP) and its major supporters (the United States Agency for International Development, the Inter-American Development Bank, and Vanderbilt University) for making the data available.

[37] The survey question is: "what is the area in which the public sector should invest more resources?" The options were: education, security, infra-structure, anti-poverty policies, retirement, health, housing, and environmental policies.

[38] These results are similar for gubernatorial and local elections, and available upon request.

Finally, a recent study directly examines the policy effects of council size in Brazil using the assignment rule that prevailed in 2004-2008 (Cepaluni and Mignozzetti, 2020) – see my detailed explanation in footnote 22, page 9. Similar to the results here, that article did not find any relevant changes in the size of the local budget or its allocation. They do, however, find some positive effects on the quality of selected health and education services (mortality rate and primary school enrollment). The differences between results are most likely caused by methodological differences: their study examines a different time period, and identifies effects for a different sample of much larger municipalities.

In addition to policy effects, I also assess the alternative explanation that the observed electoral losses, especially in the case of the mayoral race, are the mechanical effect of a higher fragmentation in the executive race triggered by new entrants in the contest (Shugart and Taagepera, 2017).[39] The argument is simple: seat-winning parties, through newly acquired local political representation, might be empowered to present candidates in the mayoral race. If larger councils elect more parties (as it is the case here – Table 2), then executive races might be more fragmented, and the arguably stronger incumbent party might loses more votes. Nevertheless, in the appendix (Table A.6, page 6) I show that council size has no effect on the number of candidates competing in the subsequent mayoral election in 2016, nor on the coalition size and electoral strength of the election winner.

Conclusion

This article uses a fuzzy regression discontinuity design to examine the effects of municipal legislature sizes on mayoral, gubernatorial and presidential elections in Brazil. In a nutshell, every additional council seat in a municipality triggers a reduction of nearly 5pp in the vote percentage obtained locally by the candidates backed by the mayor's party. Additional evidence supports the theory that these electoral losses arise from a breakdown in the executive-legislative electoral coalitions. In a context where councilors often extend political support to mayors in exchange for access to patronage, an increase in council size raises the cost of support for the executive, more so when council and mayor have unaligned electoral incentives at the state and national levels.

These findings have at least two significant implications for future research. First, they matter for

[39] This argument does not directly apply to the results in state and national races.

institutional design. The results here suggest that the size of legislatures might have consequences that go far beyond the issues of representation and policy outcomes often studied by the literature – they also influence who wins or loses elections. Second, they also uncover a new mechanism for how changes in institutional rules can weaken the electoral power of political incumbents. In doing so, the article particularly contributes to a burgeoning literature that studies the demise of entrenched, dominant political organizations in the developing world (Frey, Montero, and López-Moctezuma, 2020; Dasgupta, 2018), especially in a context where the hegemony is based on the targeted redistribution of public resources (Frey, 2020; Larreguy, Marshall, and Trucco, 2015; Fujiwara and Wantchekon, 2013).

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Table 1: Loss of electoral strength by the local incumbent party

Dependent variable: vote percentage	(1)	(2)	(3)
Vote Share Index	-4.685*	-4.772*	-4.218*
	(1.516)	(1.575)	(1.506)
Observations	1114	1114	1114
Gubernatorial '14	-4.908*	-4.887*	-4.573*
	(2.295)	(2.353)	(2.278)
Observations	1305	1305	1305
Presidential '14	-4.667*	-4.172†	-3.918
	(2.006)	(2.503)	(2.465)
Observations	1307	1307	1307
Mayoral '16	-3.848*	-3.706*	-3.089†
	(1.877)	(1.889)	(1.836)
Observations	1116	1116	1116
Demographic covariates	Y	Y	N
Political Party covariates	Y	N	N

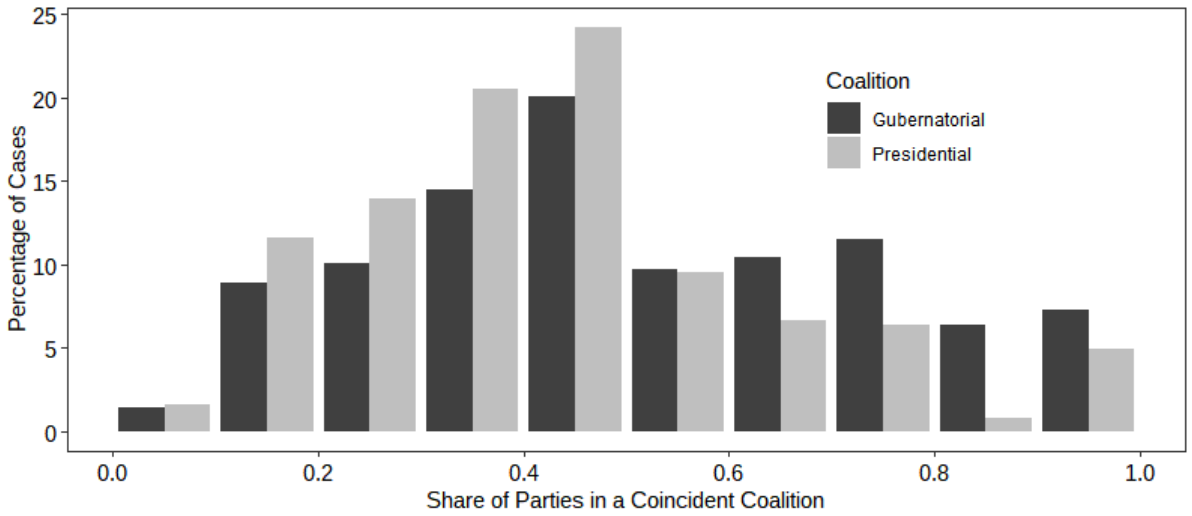
†p<0.1, *p<0.05. The dependent variable is the percentage of total votes in the municipality obtained by the candidate supported by the mayor's party in each election. The index aggregates the three election in the Table. Standard errors are heteroskedasticity robust and presented in parenthesis. The number of observations is shown right below. All regressions include fixed-effects for the assignment window, and state dummies. The covariates are listed in the appendix, Table A.4 and Table Table A.5. The bandwidth is 3,520 for all regressions, in line with the first stage shown in Figure 4.

Table 2: Effects of council size on the incumbent's coalition

Total number of parties running	Parties with seats in the local council	Parties with seats in the incumbent's coalition
0.227	0.451*	0.452*
(0.383)	(0.150)	(0.161)
Total number of candidates per seat	Total council members in the incumbent's coalition	Share of total seats won by the incumbent's coalition
-0.159	0.488*	-0.001
(0.245)	(0.209)	(0.020)
Share of members in the incumbent's coalition supporting the same gubernatorial coalition	Share of members in the incumbent's coalition supporting the same presidential coalition	
-0.063*	-0.053†	
(0.032)	(0.030)	

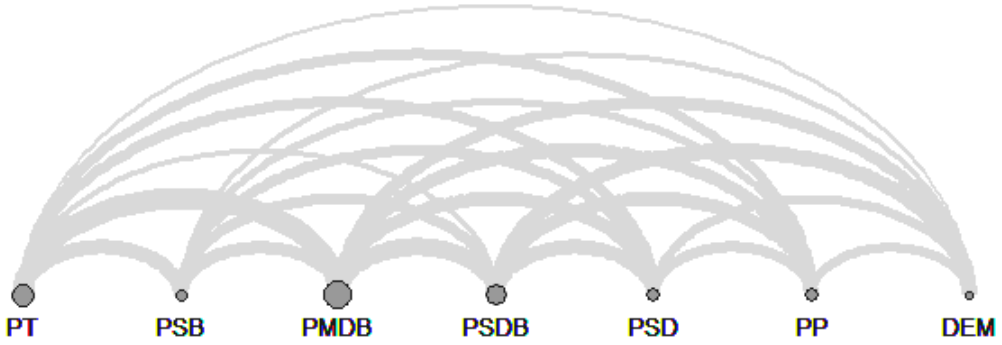
†p<0.1, *p<0.05. The dependent variables are described on top of each coefficient. Standard errors are heteroskedasticity robust and presented in parenthesis. All regressions include fixed-effects for assignment window and state, and demographics and party covariates.

Figure 1: Coalition members often support different gubernatorial or presidential candidates



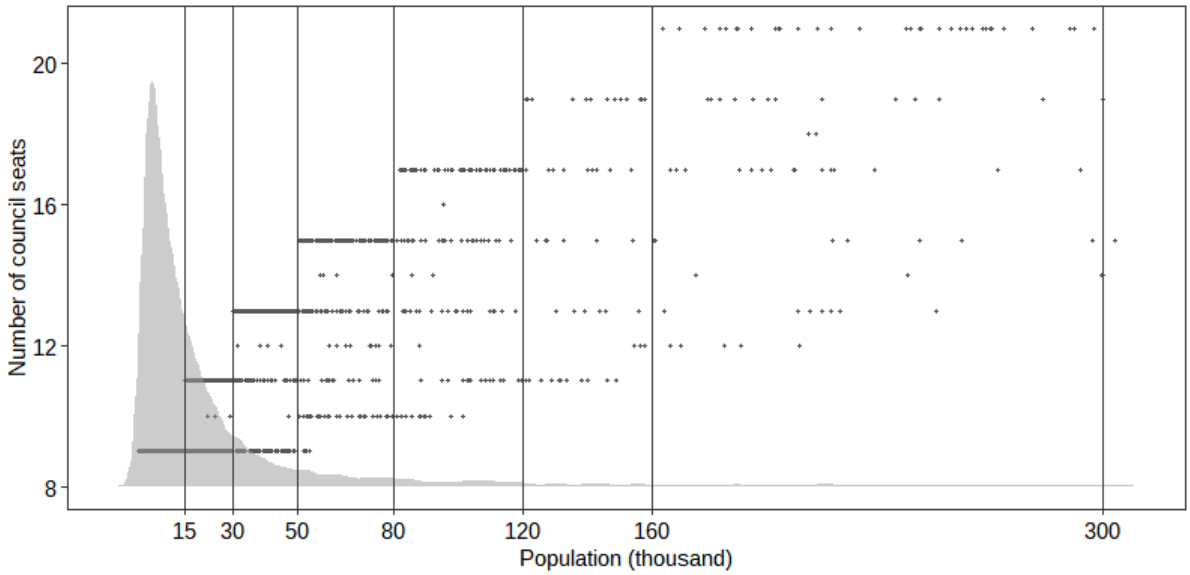
The plot splits the dependent variable into 10 bins of 10% each. The bars represent the percentage of all cases that fall within each bin.

Figure 2: Local political coalitions by party in Brazil



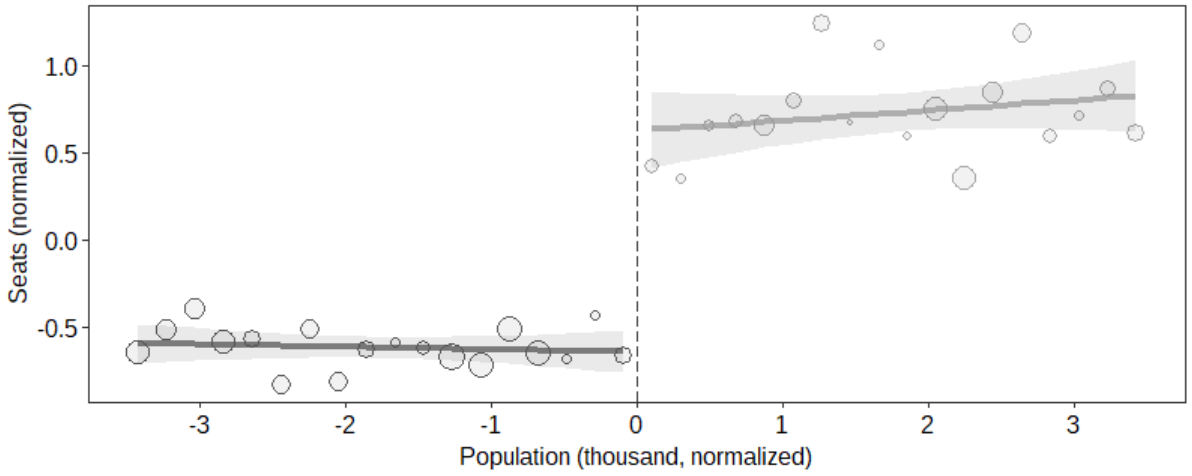
Only the 10 largest parties in the country are shown (based on the number of mayors in 2012). Parties are ordered from left to right by their L-R ideology score (Power and Jr., 2009). The size of the dots represent the number of times each party had a mayoral candidate. The thickness of the arc represents the number of alliances between party pairs. An alliance is counted every time one of these parties supports the mayoral candidate of the other party. PSD was created after the survey, so I placed the party in the Right-wing group due to the fact that most members came from PP and DEM, even though PSD supported the federal government under Leftist PT.

Figure 3: Number of council seats in Brazilian municipalities



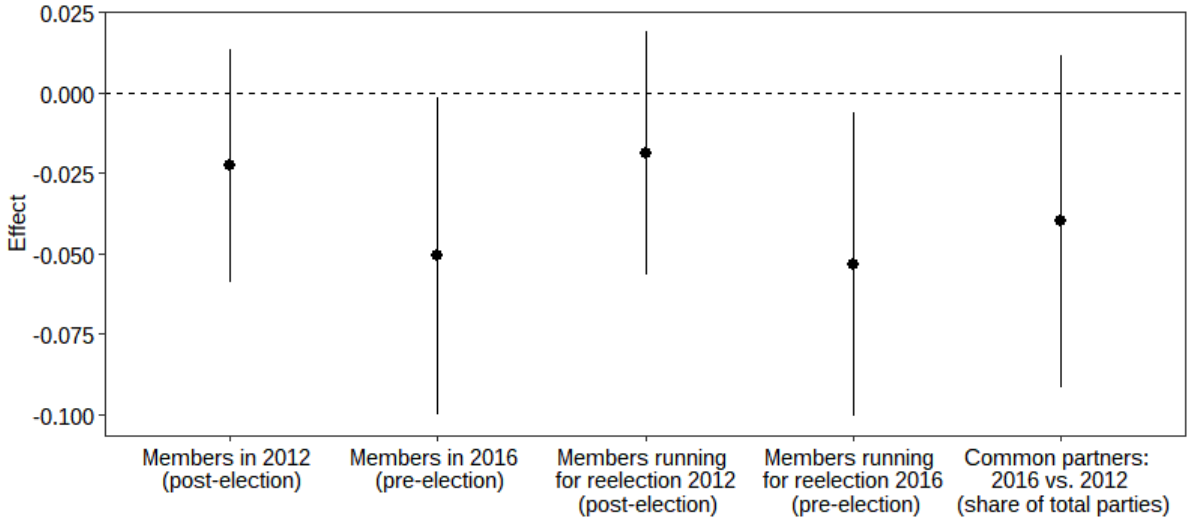
Each dot represents one municipality. The vertical lines show the population levels at which the cap on council size changes. The shaded area shows the density of the observations. For the purpose of presentation, the plot excludes 1% of all municipalities, which have population above 310 thousand. There is total of 5,428 municipalities in the plot.

Figure 4: Discontinuity in council size after 2012



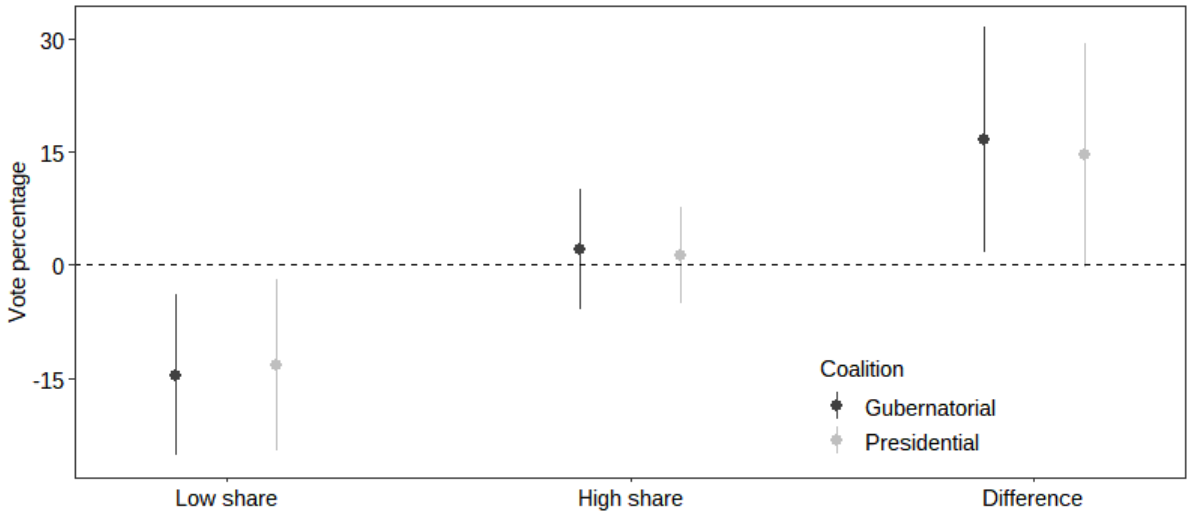
Pooled data from the first seven population windows. The x-axis shows the population (in thousand inhabitants), normalized by value of each assignment threshold. The outcome variable in the y-axis is also demeaned by their average value in each assignment window. The optimal bandwidth is 3,510 and the line is a linear fit on each side of the discontinuity.

Figure 5: Fragmentation of local alliances in 2013-2016



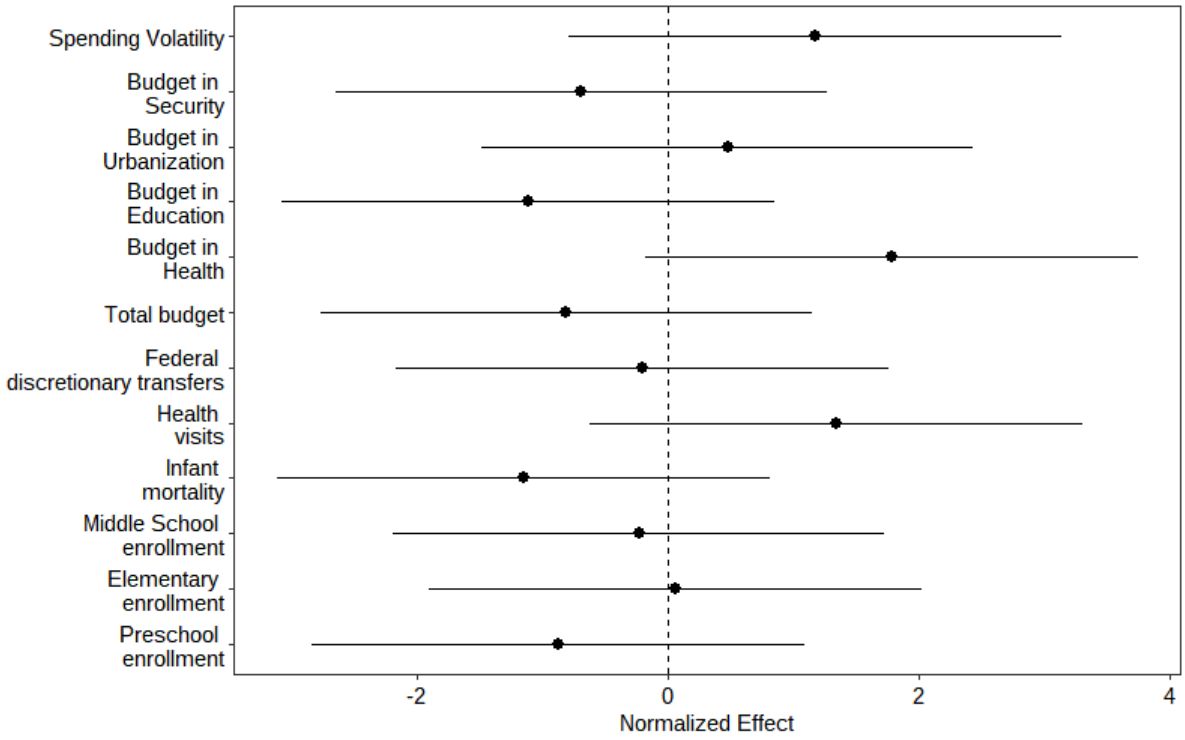
The coefficients represent the effect of council size on each variable. The plots show the 95% confidence intervals. All variables are calculated as a share of the total council seats in the municipality, unless otherwise noted. The estimation here only includes municipalities where the incumbent's party formally supported a candidate in the 2016 election (89% of the full sample).

Figure 6: Heterogeneity in vote losses: the role of unaligned electoral incentives



The coefficients represent the effect of council size on the vote shares of the candidates supported by the local incumbent's party in gubernatorial and presidential elections (2014). The two subsamples are described in the text.

Figure 7: Policy outcomes in 2013-2016



The coefficients represent the effect of council size on each variable. The plots show the 95% confidence intervals. School enrollment comes from the Brazilian school census of 2016 (INEP). The variables are coded as the number of students in each grade as a percentage of the local population.

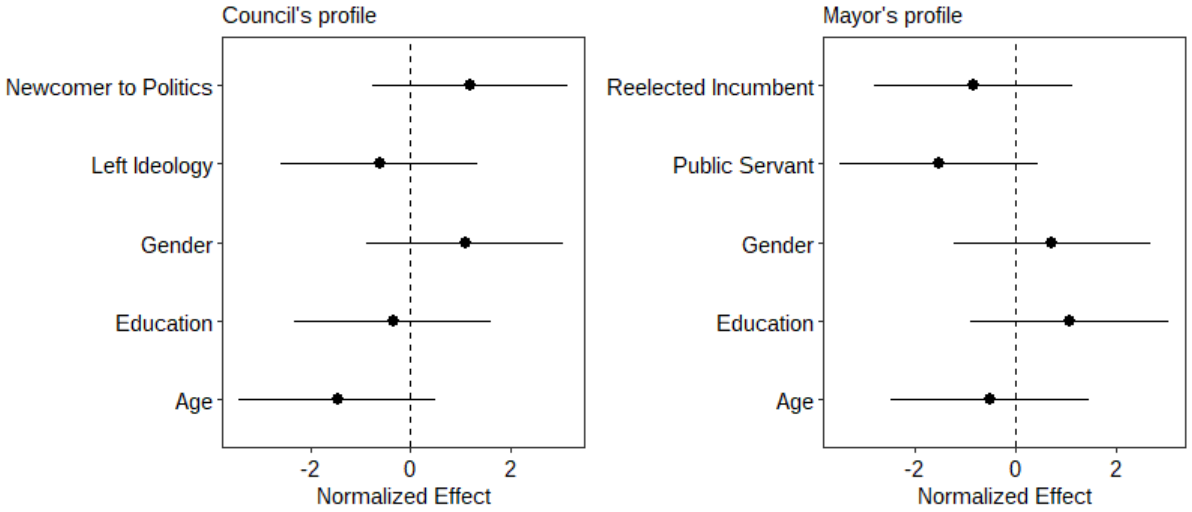
Budget data comes from the FINBRA database maintained by the National Treasure, for 2013-2016. Total budget is calculated in R$mn, and the shares are a percentage of the total spending. It only includes municipalities that reported at least two years of data.

Data on federal discretionary transfers comes from the SIAFI database for 2013-2016 (also in R$mn).

Infant mortality and health care visits come from http://tabnet.datasus.gov.br/. Mortality is calculated as the number of infant deaths per population, and it is available for 2013-2016, while health care visits only for 2013-2014 (calculated as the number of visits per covered household).

Spending volatility is measured as the absolute deviation in spending from the average within each group (treatment or control), within each treatment window.

Figure 8: Effects on the profile of elected politicians



The coefficients represent the effect of council size on each variable. The plots show the 95% confidence intervals. All coefficients are normalized by their standard deviation, for the purposes of presentation. The estimation here only includes municipalities where the incumbent's party formally supported a candidate in the 2016 election (89% of the full sample).

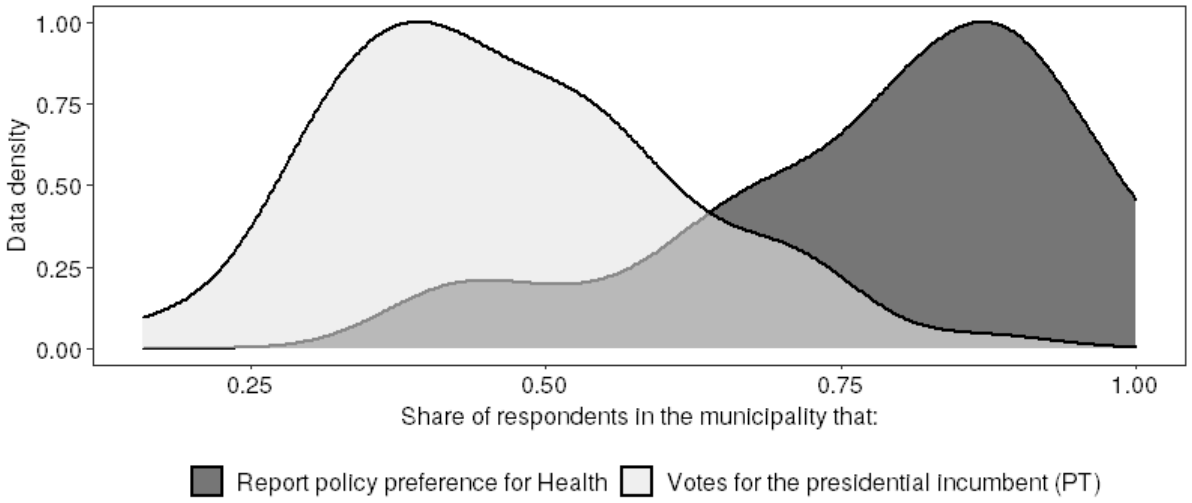
The left-side plot variables are defined as follows:

Gender: indicates whether the member is female; Left ideology: indicates whether the member belongs to a left-wing party; Newcomer to politics: indicates if the candidate registered as a party affiliated for the first time in 2011; Education: education level of the councilor; Age: councilor's age in 2012.

The right-side plot variables are defined as follows:

Gender: indicates whether the mayor is female; Reelected incumbent: indicates whether the recently elected mayor was also the mayor in 2009-12; Public servant: indicates whether the mayor was a former public servant; Education: education level of the mayor; Age: mayor's age in 2012.

Figure 9: Electoral and policy preferences of voters



The dark shade shows the distribution of the average preference for health policy across 106 municipalities surveyed in the LAPOP Brazil 2012. The light shade shows the distribution of the average vote for PT in the 2010 presidential election for the same 106 municipalities.

Larger Legislatures and the Cost of Political Brokerage: Evidence from Brazil

Appendix for Online Publication

Contents

A Tables

Table A.1: Maximum number of council members, by population

Population Above... (in thousand)	Maximum Number of Seats	Municipalities just below	Municipalities just above
15	11	1269	702
30	13	381	231
50	15	105	85
80	17	52	34
120	19	20	10
160	21	9	7
300	23	6	1
450	25	0	0
600	27	1	0
750	29	0	0
900	31	0	0
1050	33	0	0
1200	35	0	0
1350	37	0	0
1500	39	0	0
1800	41	0	0
2400	43	0	0
3000	45	0	0
4000	47	0	0
5000	49	0	0
6000	51	0	0
7000	53	0	0
8000	55	0	0

For a population below 15,000 the council size is capped at 9 members. This is also the minimum for all municipalities. The Table includes all municipalities in the sample that have a population within 7,500 of one of the thresholds.

Table A.2: RD effects in the first stage

	(1)	(2)	(3)	(4)	(5)
RD effect	1.169*	1.130*	0.919*	0.923*	0.799*
	(0.138)	(0.135)	(0.201)	(0.198)	(0.232)
Pre-treatment mean	9.920	9.920	10.221	10.149	10.266
Bandwidth	3.52	3.52	1.76	3.90	5.11
Observations	1308	1308	622	1453	2008
Bandwidth rule	optimal	optimal	optimal/2	optimal	optimal
Demographic covariates	N	Y	N	N	N
Polynomial	linear	linear	linear	quadratic	cubic

†p<0.1, *p<0.05. The dependent variable is the number of council seats in the municipality. Standard errors are heteroskedasticity robust and presented in parenthesis. Pre-treatment mean is the control average at the discontinuity.

Table A.3: Loss of electoral strength by the local incumbent party (robustness)

Dep. variable: vote percentage	(1)	(2)	(3)	(4)
Vote Share Index	-5.278*	-4.685*	-4.049*	-4.737*
	(1.492)	(1.516)	(1.339)	(1.593)
Observations	1114	1114	1241	1716
Gubernatorial '14	-5.534*	-4.908*	-4.487*	-5.519*
	(2.505)	(2.295)	(2.058)	(2.427)
Observations	1305	1305	1450	2004
Presidential '14	-5.271*	-4.667*	-4.033*	-4.770*
	(2.226)	(2.006)	(1.804)	(2.125)
Observations	1307	1307	1453	2008
Mayoral '16	-4.344*	-3.848*	-3.177†	-3.772†
	(1.962)	(1.877)	(1.670)	(1.958)
Observations	1116	1116	1244	1720
Bandwidth	3.52	3.52	3.90	5.11
Estimation	Reduced-form	FRD	FRD	FRD
Polynomial	linear	linear	quadratic	cubic

†p<0.1, *p<0.05. The dependent variable is the percentage of total votes in the municipality obtained by the candidate supported by the mayor's party in each election. Standard errors are heteroskedasticity robust and presented in parenthesis. All regressions include fixed-effects for the assignment window, as well as state dummies, and demographic and political party covariates described in Table A.4 and Table A.5. The reduced-form estimation corresponds to the sharp RD case, i.e., the direct effect of the treatment assignment on the outcome.

Table A.4: Balance of covariates

Dependent variable	(1)	(2)	(3)
Gender share	-0.148	-0.212	-0.198
	(0.156)	(0.136)	(0.125)
Urban share	-0.133	1.014	0.219
	(2.307)	(1.861)	(1.128)
Past pc budget (log)	-0.033	-0.015	-0.020
	(0.027)	(0.022)	(0.017)
Past Budget Share in H&E	-0.002	-0.002	-0.001
	(0.009)	(0.008)	(0.007)
Garbage collection	-0.938	0.519	-0.524
	(2.409)	(1.584)	(0.949)
Piped Water	-0.018	1.172	0.327
	(2.077)	(1.796)	(1.384)
Household Size	-0.094	0.041	-0.052
	(0.363)	(0.223)	(0.184)
Semi-arid location	0.018	0.011	0.011
	(0.047)	(0.033)	(0.030)
2012 pc GDP (log)	0.005	0.028	0.050
	(0.081)	(0.055)	(0.038)
Number of voters (log)	-0.019	-0.017	-0.019
	(0.015)	(0.013)	(0.012)
State fixed effects	N	Y	Y
Other covariates	N	N	Y

†p<0.1, *p<0.05. Standard errors are heteroskedasticity robust and presented in parenthesis. All regressions include fixed-effects for the assignment window. The specification in column (3) also every other covariate shown in this Table as a control, with the exception of the variable used as the outcome.

Gender share: share of male in the population (census 2010).

Urban share: share of urban population (census 2010).

Past pc budget: Local budget expenses per inhabitant (Finbra, average of 2009-2012). It only includes municipalities that report at least two years of data within the 4-year mayoral tenure.

Past Budget Share in HE: Share of the above budget allocated to health and education.

Garbage collection: share of households with garbage collection (census 2010).

Piped Water: share of households with access to piped water (census 2010).

Household Size: average size of household (census 2010).

Semi-arid location: indicates whether the municipality belongs in the semi-arid region.

2012 pc GDP: per capita GDP in 2012, from IBGE.

Number of voters: Number of registered voters in 2012, from TSE.

Table A.5: No effect on the mayor's profile and on 2012 elections

Dependent variable	(1)	(2)	(3)
PT's federal coalition	0.032	0.003	0.021
	(0.052)	(0.052)	(0.026)
PT mayor	0.014	0.016	-0.008
	(0.038)	(0.040)	(0.025)
PMDB mayor	0.012	0.004	-0.013
	(0.042)	(0.044)	(0.026)
PSDB mayor	0.013	0.021	0.022
	(0.036)	(0.037)	(0.032)
PSD mayor	-0.015	-0.016	-0.018
	(0.029)	(0.029)	(0.022)
PSB mayor	-0.003	0.000	0.006
	(0.025)	(0.025)	(0.023)
PP mayor	-0.011	-0.021	-0.020
	(0.031)	(0.030)	(0.022)
PDT mayor	0.007	-0.002	-0.010
	(0.026)	(0.028)	(0.021)
State effects and demographic covariates	N	Y	Y
Other covariates	N	N	Y

†p<0.1, *p<0.05. The dependent variable is always a dummy that indicates whether the mayor belongs to the party in question (or to PT's federal coalition, in the case of the first line). All regressions include fixed-effects for the assignment window. Standard errors are heteroskedasticity robust and presented in parenthesis. The demographic covariates are described in Table A.4. The specification in column (3) also every other variable shown in this Table as a control, with the exception of the variable used as the outcome.

Table A.6: No effect on other political covariates

Dependent variable	(1)	(2)	(3)
2012 Election			
Mayoral candidates	0.014	0.043	0.014
	(0.104)	(0.099)	(0.084)
Mayor's vote pct	0.031	0.064	0.057
	(0.053)	(0.053)	(0.045)
Parties in the winning coalition (log)	0.011	-0.003	0.013
	(0.021)	(0.021)	(0.019)
Share of coalition parties allied in state race	-0.009	-0.009	-0.008
	(0.014)	(0.014)	(0.012)
Share of coalition parties allied in national race	-0.044	-0.046	-0.007
	(0.049)	(0.049)	(0.034)
2016 Election			
Mayoral candidates	-0.054	-0.016	-0.052
	(0.117)	(0.117)	(0.102)
Mayor's vote pct	-0.006	-0.005	-0.007
	(0.013)	(0.013)	(0.012)
Parties in the winning coalition (log)	-0.062	0.024	-0.112
	(0.349)	(0.363)	(0.347)
State effects and demographic covariates	N	Y	Y
Other covariates	N	N	Y

†p<0.1, *p<0.05. Standard errors are heteroskedasticity robust and presented in parenthesis. All regressions include fixed-effects for the assignment window. The demographic covariates are described in Table A.4. The specification in column (3) also every other covariate shown in this Table as a control, with the exception of the variable used as the outcome. All variables below were provided by TSE:

Mayoral candidates: Number of candidates.

Mayor's vote pct: vote share (in %) of the winning mayoral candidate.

Parties in the winning coalition: Number of parties that compose the mayor's pre-election coalition.

Share of coalition parties allied in state race: Share of the total parties in the winning coalition that also supports the same gubernatorial candidate as the mayor's party in 2014.

Share of coalition parties allied in national race: Share of the total parties in the winning coalition that also supports the same presidential candidate as the mayor's party in 2014.

Table A.7: Loss of electoral strength by the local incumbent party (placebo)

Dependent variable: vote pct.	(1)	(2)	(3)
Vote Share Index	0.002	-0.083	-0.101
	(1.590)	(1.685)	(1.676)
Observations	883	883	883
Gubernatorial '10	0.652	0.670	0.808
	(2.497)	(2.506)	(2.431)
Observations	1102	1102	1102
Presidential '10	0.541	0.597	0.300
	(2.518)	(2.881)	(2.906)
Observations	1146	1146	1146
Mayoral '12	-0.025	-0.054	0.042
	(1.808)	(1.839)	(1.823)
Observations	1144	1144	1144
Demographic covariates	Y	Y	N
Political Party covariates	Y	N	N

†p<0.1, *p<0.05. The dependent variable is the percentage of total votes in the municipality obtained by the candidate supported by the mayor's party in each election. Standard errors are heteroskedasticity robust and presented in parenthesis. All regressions include fixed-effects for the assignment window, and state dummies. The covariates are listed in the appendix, Table A.4 and Table Table A.5. The bandwidth is 3,510 for all regressions, in line with the first stage shown in Figure 4.