

Do Bigger Legislatures Lead to Bigger Government? Evidence from a Brazilian Municipal Council Reform*

Evan Plous Kresch
Rodrigo Schneider

Henrique Veras
Mark Walker

Abstract

Do bigger legislatures lead to bigger government? We exploit a Brazilian reform that allocated the number of municipal council seats based on population thresholds in a regression discontinuity design. We find that larger councils have significantly higher expenditures on social goods, with no significant jump in spending on legislative costs. Increased spending is partly financed by significantly higher local tax revenues, and is driven by a less salient form of tax to voters - on services - than property taxes. As a potential explanation for our findings, we show that, consistent with Duverger's Law, more council seats led to greater political diversity.

Keywords: Legislature Size; Municipal Councils; Local Taxes; Government Expenditure; Regression Discontinuity; Brazil

JEL Classification Numbers: D72, H72, R51

*Kresch: ekresch@oberlin.edu, Oberlin College & CDEP; Schneider: rschnei2@skidmore.edu, Skidmore College; Veras: henrique.veras@centre.edu, Centre College; Walker: mwalker2@oberlin.edu, Oberlin College. We are grateful to Martin Abel, Baafra Abeberese, Marcelo Bergolo, Michael Best, Carolina Castilla, Ray Fisman, Oyebola Okunogbe, Joana Naritomi, Kartini Shastry, and participants of the 2020 NEUDC conference, Virtual LAC development seminar, 2021 LAC Public/Labor Conference, and 2021 NTA conference for comments on an earlier draft. Any remaining errors are ours alone.

A central feature of most modern democracies is the role that representation – where voters choose leaders to craft and enact policy – plays in fiscal and social planning. The effectiveness of governments worldwide in performing the financial functions of state is uneven across countries (Besley and Persson, 2014). One potential driver of these observed differences is the size of legislatures (Miller and Moe, 1983), however the effect of legislature size on the size and efficacy of government is not entirely clear. On the one hand, larger legislatures may create a weak “local Leviathan” - an overextended and poor bureaucratic system - with little checks on its growth and inefficient use of the available resources. Similarly, more representatives could lead to greater opportunities for gridlock and the ability to veto legislation. On the other hand, a larger number of representatives might increase diversity in political participation and increase voter enfranchisement. This diversity may ensure that a plurality of views are effectively addressed, creating the necessary incentives and checks on elected representatives to deliver public goods and services to their electorate.

Despite the important welfare implications, the role of legislature size has not been extensively studied in developing countries. The vast majority of papers studying this question have focused on developed economies in Europe and North America (Egger and Koethenbueger, 2010; Frank and Stadelmann, 2021; Höhmann, 2017; Pettersson-Lidbom, 2012), and have generally found that legislature size reduces spending, with any local tax changes being driven by property taxes (Freire et al., 2021). With its higher levels of informality, inequality, and ethnic diversity (Alesina, Baqir and Easterly, 1999; Beach and Jones, 2017; Luo et al., 2010; Miguel and Gugerty, 2005), in addition to lower tax compliance and state capacity (Besley and Ghatak, 2006; Naritomi, 2019; Slemrod, 2019), developing countries may have a considerably different relationship between legislature size and the efficacy of the government to tax and spend.

This paper examines how legislature size affects the size of government and how it collects and spends revenues. We study a 2004 Brazilian reform that allocated the number of seats on a municipal council based on population thresholds; cities received an additional council seat for each 47,671 inhabitants. Employing a regression discontinuity (RD) design, we find that municipalities with an extra council seat have significantly higher expenditures. Importantly, the increase in expenditures is not driven by “bloat” in the form of spending on legislative costs. Rather, the effect is driven by jumps in spending on “social” goods: education, health, and housing and urban development.

To partly fund these increased expenditures, municipalities with larger councils raised significantly more local tax revenue. Brazilian municipalities have two primary tax instruments at their disposal: on property (IPTU) and services (ISS). We find that service tax revenue increases with council size, and do not find evidence of a similar jump in property

taxes. This result is in contrast to [Egger and Koethenbueger’s \(2010\)](#) finding of increased property taxation by Bavarian municipalities. Along the lines of [Cabral and Hoxby \(2012\)](#), we argue that the decision to increase revenue through service taxes as opposed to property taxes is driven by salience. In Brazil, property owners have their bill with the full year’s tax burden mailed to them in early February. Service taxes, on the other hand, are fragmented and collected as a small fraction of transactions at point-of-sale, and thus are less obvious to citizens and easier to collect.¹

Two anecdotes are revealing in demonstrating the resistance to property taxes in Brazil. In 2006, the city of Manaus attempted to update property tax values (which had not been updated since 1983), but faced a legal challenge and was struck down by Brazil’s active court system.² On March 16th, 2015, the municipal council of Itapetininga in São Paulo unanimously vetoed a service tax on construction services. This event was unusual in the presence of media coverage and popular attendance; service taxes are not generally salient, and citizens became aware of the tax in this specific situation as it was being charged together with their property tax payments.³

Lastly, we present evidence that sheds light on a potential mechanism to rationalize the increased spending and taxation by larger local councils. We reconcile our findings in support of the “Law of 1/n” proposed by [Weingast, Shepsle and Johnsen \(1981\)](#) that larger legislatures would lead to more government spending, as officials would have an incentive to increase spending to please their core supporters and spread these costs across the entire community. As Brazil uses a multi-member proportional representation system, we find that increasing the size of local councils increases political diversity, as measured by the “effective number of parties” on council. While we do not see significant increases in the diversity of characteristics of individual council members, the increase in party diversity suggests that more council seats indirectly enfranchises a larger share of the population, leading to politicians incentivized to provide more pro-social public goods ([Chattopadhyay and Duflo, 2004](#); [Fujiwara, 2015](#); [Ting, Hirano and Snyder Jr, 2018](#)).

Our focus on local councils is of primary importance to policymakers concerned with economic growth and development. The ability of governments to raise and spend tax revenue is central to the building of state capacity ([Besley and Persson, 2009](#); [Gaspar, Jaramillo and Wingender, 2016](#); [Sánchez De La Sierra, 2020](#)). Increasingly, the role of spending and taxation is being decentralized to state and local governments; for example, tax revenue

¹Additionally, politicians up for reelection have an increased incentive to levy a less transparent tax on voters ([Bordignon, Grembi and Piazza, 2017](#)).

²A modified version of this reform was eventually implemented in 2011. More information on the reform can be found in an article from one of the main Brazilian newspapers *O Globo (G1)*: [link to article](#).

³The online portal *O Globo (G1)* highlighted the event: [link to article](#).

collection at the state and local level has increased in nearly 75 percent of OECD countries since 1995 (Shi and Tulli, 2020).

Our paper contributes to the literature on the relevance of legislature size – an old theme of political thought. Empirical papers testing the prediction of Weingast, Shepsle and Johnsen (1981) have had decidedly mixed results, with some finding support for increased spending (Asatryan et al., 2017; Baqir, 2002; Egger and Koethenbueger, 2010; Halse, 2016; Hirota and Yunoue, 2012), while others find a negative relationship between legislature size and expenditures (Chen and Malhotra, 2007; Garmann, 2014; Höhmann, 2017; Pettersson-Lidbom, 2012). Moreover, with the notable exception of Lewis’s (2019) study in Indonesia, nearly all of the literature has focused on studies in the developed world: the United States, Germany, Scandinavia, and Japan. Given the disparity in state and fiscal capacity across levels of economic development, our paper provides a valuable test of Weingast, Shepsle and Johnsen (1981) in a developing country setting.

This paper also relates to the literature on the importance tax salience in public finance. The effect of tax salience has been studied on consumer behavior (Blumkin, Ruffle and Gannun, 2012; Bradley and Feldman, 2020; Cabral and Hoxby, 2012; Chetty, Looney and Kroft, 2009; Goldin, 2015), tax collection (Asatryan, Baskaran and Heinemann, 2017; Finkelstein, 2009; Slemrod, 2019), and voting behavior (Bordignon, Grembi and Piazza, 2017; Matějka and Tabellini, 2016; Sances, 2017; Sausgruber and Tyran, 2005). In the case of Brazil, where property tax compliance is around 60 percent and property taxes are perceived as a political burden to municipal legislators (Ter-Minassian, 2012), the salience of property taxes to voters greatly influences the government’s propensity to rely on it to finance expenditures. Many developing countries have a similar experience to Brazil in regards to tax enforcement; many countries have compliance rates far lower than Brazil’s (Weigel, 2020). In contrast to the United States (Galletta and Ash, 2019) and Germany (Egger and Koethenbueger, 2010), where property taxes play a larger role in local finances, the ability of local government in developing countries to increase revenue from an alternative and less salient tax source may make it the preferred option to fund the increased size of government.

The rest of the paper is organized as follows. Section I provides background on the composition and responsibilities of municipal councils in Brazil. Section II describes the data and discusses the empirical strategy. The main empirical findings are presented in section III, with placebo tests in section IV, and a potential mechanism discussed in section V. Section VI concludes.

I Institutional Background

A Municipal Public Finances

The Brazilian political system is a federation with three levels: federal, state, and municipal. The approximately 5,500 local (municipal) governments are comprised of an elected mayor, municipal council, and municipal court.

Municipalities enjoy some degree of political autonomy, guaranteed by the constitution. Specifically, municipalities enact their own laws and, every fiscal year, the mayors produce a budget proposal detailing the public expenditure and investments for the subsequent year, based on the expected tax revenue. Municipal councilors are responsible for evaluating and voting on the mayor's proposal, as well as any other proposal put forward by themselves. Once the proposed budget is approved, it becomes the Budgetary Law (*Lei Orçamentária*) dictating the destination of the tax revenue collected at the municipal level.

Municipalities collect local tax revenue from two main sources: property and services. Property taxes are levied annually on ownership (IPTU) and over real estate transactions (ITBI).⁴ While Brazilian Law 10,257/2001 limits the IPTU rate to be at most 15 percent, this value is much higher than the 1-1.5 percent rate that is usually charged across municipalities in Brazil.

Service taxes (ISS) are levied on every transaction that involves the exchange of services within the municipality boundaries. Municipal counselors have the autonomy to legislate the tax rate for any type of local service, as long as they respect the constitutional range of 2 to 5 percent.⁵ The municipal councils, therefore, can use legislation to add or remove services to be taxed according to their interpretation of the services covered by this law, and also change the tax rate of the services that are already being taxed.

Municipal councils are active in updating and altering ISS tax schedules.⁶ For example, on March 27, 2018, the municipal council of Boa Vista in Roraima approved an amendment to include six new services to the list of activities taxed via ISS. Conversely, on March 16, 2015, council members of Itapetininga in São Paulo voted to eliminate housing reform from the list of service taxes. More recently, the city of São Paulo approved a tax rate increase for banking services from 2 percent to 5 percent in March 2020.

⁴This paper focuses on IPTU, as ITBI accounts for less than 0.5 percent of overall taxation in Brazil (Afonso, Soares and Castro, 2013) and its contribution to municipal revenue is almost negligible.

⁵This limit was set by Complementary Law 116/2003.

⁶Although we do not have a comprehensive database on the variation in ISS tax rates across municipalities, a list constructed by the private security union of the state of São Paulo (SESVESP) provides some insights. SESVESP collected the ISS rate for private security in each of São Paulo's 645 municipalities; this tax varies from 2 percent to 5 percent, with an average 3.66 percent (std. 1.18) across municipalities.

B Municipal Councils

Municipal councils are directly elected by the population for a four-year term. However, unlike the mayor - who is elected by a simple majority rule – municipal councils are elected based on an open list proportional representation system, in which parties’ share of seats is proportional to the quantity of votes cast to their candidates. Municipal councils, on average, have a wage that is 2.6 times the average in their municipalities (Colonnelli, Prem and Teso, 2020). Nonetheless, most of them have an outside job as they are only required to be in the council on average four days per month (Ferraz and Finan, 2011). Their main duty is to approve local legislation, such as tax adjustments and the municipal budget. They are also involved in the submission of bills and request for public works and monitoring the executive for its use of public resources.

With the objective of reducing municipal expenditures on administration and personnel, the Brazilian Supreme Electoral Court in 2004 expedited a resolution assigning the number of seats to each municipality according to a strict rule based on population size. This ruling came into effect for the 2004 election cycle. Each municipality received a minimum of 9 council seats, adding one additional seat for each 47,619 inhabitants, up to 21 seats for municipalities with less than 1 million inhabitants.⁷ Appendix table A.1 provides a list of the population thresholds for municipalities with fewer than 500,000 residents.

Importantly for our empirical strategy, the court ruling occurred only seven months before the 2004 elections and used the 2003 population estimates from the IBGE to determine the population thresholds. Given the abrupt timing of the ruling and use of the previous year’s population, candidates faced an exogenous shock to electoral competition for seats and were unlikely to anticipate the new political reality. Moreover, municipalities were not able to endogenously react to the new ruling before the start of elections. Figure A.1 shows the distribution of municipalities by population and council size for the 2005-2008 council term, with a sharp discontinuity at the policy thresholds.

II Data and Empirical Methodology

A Data

Data on public finances comes from the *Secretaria do Tesouro Nacional* (STN). All finance variable are provided at the municipal level, and we restrict our attention to the

⁷This increment was determined by the Court’s ruling that a municipality with less than one million inhabitants should have at most 21 councilors: $1,000,000/21 = 47,619$.

2005-2008 electoral cycle. Relevant data includes the destination of yearly public expenditures and source of municipal tax revenue. Appendix table A.2 provides summary statistics of our main outcome variables for the full sample, as well as for the municipalities in the optimal bandwidth as discussed in greater detail in the next subsection. We use tax revenue as the outcome variable, as no reliable data on individual tax rates for all Brazilian municipalities exist (Dahis and Szerman, 2020).⁸ Additionally, we define “social” spending by a municipality as the total annual expenditures on health, education, and housing programs.

Electoral data is provided by the *Tribunal Superior Eleitoral* (TSE). Outcomes of interest include the number of legislative council seats in a municipality, characteristics and party affiliation of council members, and electoral outcomes from the 2004 election cycle.

We also collect municipal-level characteristics from the *Instituto Brasileiro de Geografia e Estatística* (IBGE). Population estimates for 2003 from the IBGE are used to verify the application of the municipal council reform, and to construct the running variable. Additionally, pre-treatment variables from the 2000 census are used to check the balance in municipal characteristics across the discontinuity, as discussed part C of this section.

We restrict our analysis (and variables of interest) to the 2005-2008 electoral term. Additionally, we focus on municipalities affected by the first and second population thresholds (47,619 and 95,238, respectively). The sample covers municipalities with populations under 120,000 residents, and municipal councils with 9, 10, or 11 seats. Figure 1(A) shows the distribution of council seats by municipal population for this sample, with a large number of observations on each side of the well-defined threshold. This restricted sample covers over 97 percent of municipalities in Brazil (see appendix figure A.1(B)) and more than half of the total population of the country. While focusing our analysis on smaller municipalities reduces the generalizability of our findings, we note that the larger council threshold do not have enough observations to support the empirical strategy. Moreover, the smaller sample has the added benefit of reducing concerns related to the heterogeneity in (un)observables across all Brazilian municipalities.

B Identification

This section outlines the regression discontinuity (RD) design utilizing the 2004 resolution that determined the number of municipal council seats based on strict population thresholds. This setting allows us to implement a sharp RD design to estimate the reduced-form (RF) effect of council size, with municipal population as the running variable. The underlying identifying assumption of this strategy is that municipalities with similar population levels

⁸This is true for many other settings as well, including the United States (Galletta and Ash, 2019).

around the cutoffs would have similar expenditures and tax revenues in the absence of the 2004 resolution. Our specification follows the basic RD form:

$$y_m = \alpha + \beta t_m + f(x_m) + \epsilon_m \tag{1}$$

$$\forall x_m \in (c - h, c + h)$$

where y_m is the outcome of interest, t_m is an indicator for whether municipality m is on the “high” side of the council size threshold ($t_m = \mathbb{I}[x_m \geq c]$), and the running variable x_m is the municipal population relative to the appropriate threshold. We pool the first two thresholds of the 2004 reform and normalize them to a cutoff c , which is equal to zero. The function $f(x_m)$ is a local linear function fit separately on each side of the cutoff.⁹ We restrict attention to municipalities with the endogenously chosen mean squared error optimal bandwidths (h) to account for biases arising from the choice of large bandwidths (Calonico, Cattaneo and Titiunik, 2014).

Following Calonico et al. (2019) we do not include a host of municipal-specific control variables, as including covariates is not well-justified in this setting. Since we run a stacked regression by pooling the first two population thresholds, we follow the standard practice of including a threshold fixed effect (Abdulkadiroğlu, Angrist and Pathak, 2014). One potential issue associated with this pooling approach is if municipalities close to different population cutoffs differ in a range of characteristics (Bertanha, 2020; Cattaneo et al., 2016; Eggers et al., 2018), however we reduce the impact of this concern by restricting attention to the cutoffs associated with 9, 10, and 11 member council sizes.¹⁰ Figure 1(A) displays the sharp discontinuity at the specified thresholds.

C Preliminary Checks

There are three potential threats to the validity of our estimation strategy. First, our strategy relies on the assumption that the only difference between municipalities on either side of the cutoff should be the assignment to treatment (in our case, an additional seat in the municipal council). To address the plausibility of the assumption, we run our specification on a range of municipal-level socioeconomic indicators to test whether there are any differences in these characteristics across the treatment cutoff. These pre-treatment variables should not

⁹Estimates using a local quadratic function are presented in appendix table A.4. We restrict our attention to first and second degree polynomials as higher order polynomials might introduce bias to our estimation (Gelman and Imbens, 2019).

¹⁰See Britto and Fiorin (2020) for a more detailed discussion of restricting attention to the lower thresholds of the 2004 reform.

vary at the population threshold, and we present evidence of this balance in appendix table A.3. The table displays the results of these checks across several municipal characteristics, including public finance variables, electoral outcomes, and socioeconomic and demographic factors. We do not observe any statistically or economically significant differences on these characteristics across municipalities around the cutoff.

Second, if the population thresholds determining council size is also used to implement other policies, the estimated coefficient and its interpretation will be biased. While no other government policy uses these precise population thresholds, other aspects of public finances in Brazil are partly determined by similar population threshold rules. To address this, we run placebo tests using different population thresholds to check whether our results can be attributed to two other policies based on population thresholds: federal transfers and legislator salaries. Reassuringly, we do not find evidence of statistically significant effects for any of the placebo thresholds. A more detailed discussion of these placebo tests is provided in section IV.

The third threat to validity is the possibility of manipulative sorting by government officials on either side of the threshold. Our results might be biased if the likelihood to successfully manipulating official population numbers is correlated with (unobserved) municipal characteristics. This concern is mitigated due to the fact that the 2004 resolution was based on 2003 population estimates, which were already published prior to the decision of the Supreme Electoral Court to establish the population-based rule for council size. Nevertheless, we formally address this concern in figure 1(B) by performing the density test outlined by [Cattaneo, Jansson and Ma \(2018\)](#) to check for discontinuities in the population distribution, and find no manipulation around the cutoff.

III Main Results: Local Spending and Taxes

A Government Expenditures

We start this section by examining the effect of increased council size on municipal expenditures. Panel A of figure 2 plots binned averages of legislative expenditures over the municipal population relative to the normalized reform threshold. Local linear fits on either side of the cutoff are included in the figure as well. Figure 2(A) shows no significant increase in legislative expenditures due to the addition of an extra council member. This is in contrast to government expenditures geared toward social (i.e. education, health, and housing) programs and assistance, shown in Figure 2(B), which display a clear jump at the discontinuity.

In Table 1, we present the corresponding estimates using estimating equation B. Columns 1 and 2 present the estimated change in expenditures for legislative and social program functions, respectively. Corroborating figure 2(A) and 2(B), we find no significant increase in legislative expenditures in municipalities on the high-side of the population threshold. While larger councils do not lead to significant increases in spending on the municipal councils themselves, there is a significant increase in government spending on social programs, with an estimated effect size of 22 percent for larger councils.

The lack of a significant jump in legislative expenses implies that representatives on larger councils were not motivated by individualistic purposes to directly benefit municipal councils, e.g., by increasing the wages of council members. Our findings suggest a story where the mechanical increase in the size of government does not lead to administrative “bloat”, but rather to an increase in government spending on public goods. These findings complement those of [Mignozzetti and Cepaluni \(2019\)](#), which find significant gains in health and education as a result of this policy; larger council sizes lead to significant decreases in infant mortality and increases in kindergarten enrollment. These welfare gains are partly driven by an increase in government resources devoted to these sectors, and not solely from efficiency gains using existing resources. Moreover, spending on visible health and urban infrastructure may benefit re-election chances, as spending on these types of building projects are highly salient to voters [Brollo and Nannicini \(2012\)](#).

B Tax Revenues

We next examine how larger municipal councils funded these increases in government expenditure. Panels C and D of figure 2 display the RD plots for property taxes (IPTU) and service taxes (ISS), respectively, averaged over population bins relative to the normalized cutoff. As seen in the figure, the effect is driven by a significant increase in service tax revenue, whereas property taxes do not seem to be significantly different across municipalities around the population cutoff.

Table 1 quantifies the impact of the additional seat on both service and property tax revenue, shown in figure 2. Column (4) shows a statistically significant increase in service tax revenue for municipalities with an additional council seat. This is contrasted with the estimate effect on property tax in column (3), which shows no significant impact on IPTU revenue in municipalities with larger legislatures. Our findings suggest an estimated increase of 54 percent in services tax revenue, whereas point estimates for property tax are neither statistically nor economically significant.

It is important to note that although a 50 percent increase in tax revenue might seem

implausibly large, the share of tax revenue collected directly by municipalities is fairly low in Brazil. The average share of service tax to total revenue from all sources—including state and federal transfers—is approximately 4.1 percent, whereas the average share of property tax is around 2.65 percent in our sample. Thus the estimated increase in service tax revenue represents an approximately 2 percent increase in total municipal revenue on average.¹¹

Our finding that an additional seat at the municipal council increases service tax revenue and not property taxes seems at odds with the Ramsey rule in regards to taxing more inelastic goods. Our results are also in contrast with [Egger and Koethenbueger’s \(2010\)](#) finding that increases in local spending in Bavaria are driven primarily by property taxes. Property taxes are economically more efficient to raise revenue than other types of taxes, given properties’ immovable nature and, consequently, the difficulty of evasion. However, property taxes are relatively more salient than indirect taxes, such as services taxes ([Slack and Bird, 2014](#)).¹² Moreover, property taxes are deeply unpopular with voters ([Ahmad, Brosio and Pöschl, 2015](#); [Cabral and Hoxby, 2012](#); [Sances, 2017](#)), and delinquency in property tax payments in developing countries is fairly common ([Okunogbe and Pouliquen, 2018](#); [Weigel, 2020](#)). We therefore interpret our results as an indication that, given the relatively higher political burden of an increase in property tax, legislators in high-delinquency, low state-capacity environments have an incentive to raise tax revenue through the less transparent services tax.¹³

IV Placebo Tests: Transfer and Salary Thresholds

As mentioned in the validity checks in section II, we provide additional evidence from placebo tests that the main result is being driven by the increase in municipal council size, and is not due to other government policies. As our paper relies on a regression discontinuity framework to provide quasi-experimental variation in legislative size, the causal interpretation of our estimated treatment effect would be biased if the population thresholds determining council size were also used for the implementation of other policies. While, to the best of our knowledge, no other government policies employ the same population thresholds, there exist two other policies based on population cut-offs that could plausibly drive the results

¹¹Appendix Figure A.2 shows the fraction of total municipal tax revenue derived from property taxes (IPTU) and displays considerable spread, with nearly municipalities generating less than 25 percent of tax revenue from property assessments.

¹²In Brazil, property tax payments are usually billed by the local authorities in the month of January to the property owner’s address, as opposed to the indirect services tax, which are not explicitly displayed in the prices paid by the final consumer.

¹³[Bracco, Porcelli and Redoano \(2019\)](#) finds a similar result for a relatively higher tax burden on less salient taxes in Italian municipalities when electoral competition is higher.

on local public finance. The policies are related to federal transfers and legislator salaries, and we analyze them in turn below.

Federal transfers to municipalities (*Fundo de Participação dos Municípios – FPM*) are partly determined by a formula based on population thresholds, as documented in [Corbi, Papaioannou and Surico \(2019\)](#), [Litschig and Morrison \(2013\)](#), and [Rocha \(2019\)](#). While FPM policy is based on a discontinuous function employing different population thresholds than the municipal council ruling, FPM transfers are a significant source of federal support for municipalities and could have a dominant effect on local public finance decisions. One concern is that municipalities just below an FPM threshold could be more strained in their financial resources, for which municipalities might compensate by taxing more and spending less.

Panel A of Table 2 displays estimated effects of an RD specification employing the FPM threshold instead of the municipal councils thresholds used in equation B. That is, coefficients in Panel A are the estimated RF effect for municipalities on the “high” side of the threshold that receive more federal transfers than those similarly sized municipalities on the “low” side of the discontinuity. As in equation B, we aggregate municipalities and normalize the cut-off to the nearest population threshold, and restrict the sample to those municipalities present in the main specification. We do not find any robust evidence that the FPM threshold is driving the difference in either expenditure or tax revenues across municipalities with different legislature sizes.

An additional policy that may be relevant for local public finances is legislator salaries. As with FPM transfers, the maximum allowable wages for local legislators in Brazil are set by a formula partially based on municipal population thresholds (*see Cunha and Manoel (2019) and Ferraz and Finan (2011)*). The population thresholds employed in this salary policy are different than the ones employed in this paper, but the policy could nevertheless potentially drive our main results. Legislators’ ability to increase their salaries above thresholds on the salary cap could necessitate greater tax revenues to cover these increased expenses.

We explore the role of legislator salaries on local finances in panel B of table 2. The panel presents estimated coefficient from an RD specification using the thresholds related to legislator salary caps. As in Panel A, we find no evidence that legislator salaries have a significant impact on either expenditure or tax revenue. The estimates are likewise imprecisely estimated and not statistically different from zero.

The lack of significance in either panel provides additional support to the fact that the differences in public finances observed in the main results are driven by differences in legislature size and not in coincident government policies that employ population thresholds across municipalities.

V Potential Mechanism: Electoral Diversity

In this section, we shed light on a potential mechanism to rationalize the increase in government spending and taxation across the RD threshold. We provide evidence that an increase in the number of council seats up for election increases the political diversity of parties represented in the local legislature. Consistent with the literature on public expenditure and political diversity, more politically diverse councils spend more on providing “pro-social” goods, such as education and housing, necessitating the need for greater tax revenue.

Our mechanism is driven by two key insights from the political economy literature. The first comes from the theoretical framework of the “law of $1/n$ ” proposed by [Weingast, Shepsle and Johnsen \(1981\)](#), which shows a positive relationship between the number of elected officials and public spending financed via taxation. The mechanism underlining this relationship is straightforward: public expenditures are financed via taxation, and voters reward politicians representing their district if their individual benefits are larger than their costs. Since voters have concentrated benefits from public goods but their costs are diffused among all voters, it is more likely that the perceived benefits of publicly-financed projects will surpass their costs. Therefore, politicians are incentivized to increase the size of the government to benefit their district.

Empirical evidence supporting this theory is mixed. [Mignozzetti and Cepaluni \(2019\)](#) find evidence of welfare increases from larger Brazilian councils—consistent with the theory and most likely an outcome of the increase in government expenditures on public goods shown in section III. However, papers studying developed country setting, such as [Pettersson-Lidbom’s \(2012\)](#) paper on a similar reform in Sweden and Finland, find that local government size is negatively related to government expenditure ([Freire et al., 2021](#)).

We reconcile these findings and support the predictions of [Weingast, Shepsle and Johnsen \(1981\)](#) in the Brazilian context using the insight of Duverger’s Law. [Duverger \(1954\)](#) proposes that a multi-member proportional representation system, such as used in Brazilian local elections, favor multipartyism. This is in contrast to single seat elections, which favors two-party competition.¹⁴ Therefore, in Brazilian local elections where more seats are open for competition, one would expect this increase to produce a wider array of potential candidates, and engender an increase in political diversity on larger councils.

To test Duverger’s Law, we follow the empirical approach developed by [Laakso and Taagepera \(1979\)](#) in measuring political diversity. We define the effective number of parties

¹⁴This can be explained by the psychological effects this voting system has on voters; when voters realize the minor party they like most has no chance of winning, they strategically vote for the party that they least “dislike” within the top two options ([Benoit, 2006](#); [Fujiwara, 2011](#)).

in a given municipal council to be the inverse of the sum of the square of each party’s proportion of all votes. Formally, for municipality m with $i = 1 \dots N_m$ political parties that received votes in the local election, we calculate the effective number of parties as:

$$ENP_m = \frac{1}{\sum_{i=1}^{N_m} p_i^2} \quad (2)$$

where p_i is the proportion of votes received by each party i in municipality m .

Column 1 of table 3 presents the results of the RD specification outlined in equation B, with the effective number of parties as the dependent variable. We find that an additional municipal council seat translates on average to more than one effective party.¹⁵ Therefore, the range of ideological positions in local councils increased—theoretically enfranchising voters’ preferences that were not being previously represented in the legislative system. Politicians representing these newly enfranchised voters have an incentive to increase expenditures that will benefit them, raising tax revenue in the process.

We also check whether the relaxation of electoral competition driven by an additional council seat affected the diversity of the members elected to council. Using demographic data on candidates elected to the municipal councils in 2004, we find little to no evidence that larger councils had a higher share of members that were born in the city, female, or more educated (columns 2-5). While the larger councils lead to a greater *ideological* diversity of political parties, it did not translate to an increase in diversity of elected representatives, per se.

Our finding that political diversity increases with council size corroborates evidence from the laboratory setting (Hix, Hortala-Vallve and Riambau-Armet, 2017) and in Indonesia (Lewis, 2018).¹⁶ Moreover, we argue that this increase in diversity can explain the divergence from Petttersson-Lidbom (2012). In that paper the author finds suggestive evidence that in the case of Sweden and Finland, larger councils elected legislators that had a personal interest in lower taxes (e.g. business owners). The increase in political diversity of Brazilian councils is in line with higher expenditures: a candidate without countervailing interests (perhaps unlike the less diverse candidates in the Swedish and Finnish case) has an incentive to spend more money targeted at her group of supporters while costs are diffused across the city.

Our results are also consistent with other work in Brazil focusing on increasing voter enfranchisement. Fujiwara (2015) and Schneider, Athias and Bugarin (2019) find that an

¹⁵As ENP is a type of Herfindahl–Hirschman Index, the increase we find translates to more diversity of political parties, and not necessarily an increase in one additional political party.

¹⁶In a related article, Lewis (2019) finds that larger local legislatures in Indonesia do not have a significant impact on expenditures. This is due primarily to the Indonesian context, where local governments are more fiscally constrained and councils have a more adversarial relationship with the mayor.

increase in electronic voting technology in Brazil led to greater *de facto* enfranchisement of poorer citizens, leading to an increase in spending on social goods. Similarly, [Gouvea and Girardi \(2021\)](#) find that more left-leaning mayors—who benefited from voter enfranchisement—increased social spending, particularly in the 2004-2008 term. Although the reform analyzed in this paper does not directly enfranchise voters in the same way as electronic voting, increasing the number of seats in local councils allows voters to be indirectly enfranchised, since their preferences have a larger likelihood of being represented as more parties can effectively participate in elections, increasing the range of ideological options.

VI Conclusion

This paper studies the role of legislature size on the size and functioning of government in a developing country setting. Relying on discontinuous changes in the number of seats allocated to municipal councils in Brazil, we find that one additional seat leads to increases in spending on “social goods”, and not on expenditures that solely benefit the larger legislatures. This increase in expenditures is partly financed by more municipal tax revenue, and is driven by service taxes, as opposed to property taxes that are deeply unpopular with voters.

Our findings are consistent with the “Law of $1/n$ ” proposed by [Weingast, Shepsle and Johnsen \(1981\)](#), which has mixed support from the empirical literature. The results of this paper also stand in contrast to most studies focusing on Europe and the United States that find a negative effect of legislature size on spending. We believe that aspects of a developing country setting (lower state capacity, higher diversity, lower tax compliance) can reconcile the divergent findings of our study relative to similar reforms in developed countries.

Our paper sheds light on the importance of institutional context in understanding the intrinsic relationship between representation and local state capacity, both in terms of political party structure, as well as the tools of taxing and spending that legislatures have at their disposal. Public policies aiming to improve these dimensions of local public finance might benefit from political reforms targeting greater political diversity and voters’ enfranchisement.

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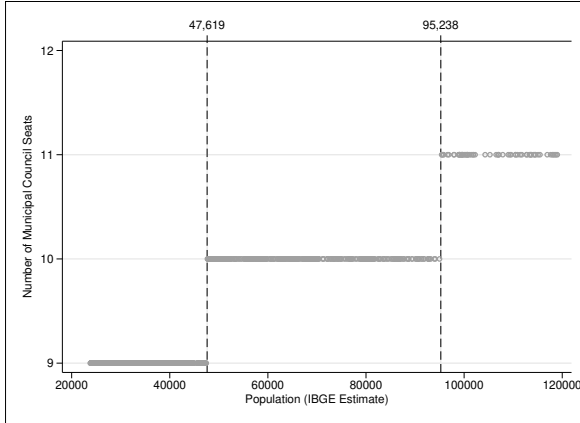
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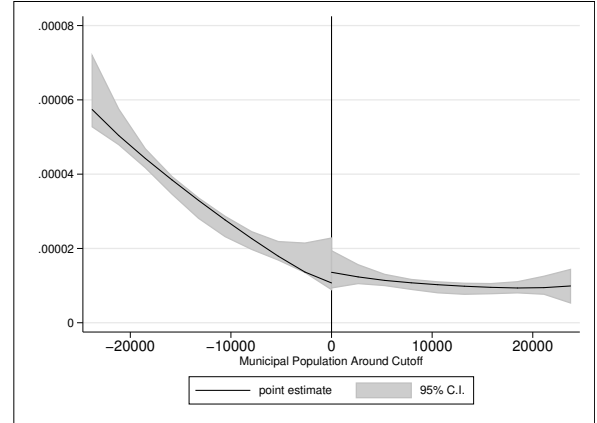
Figures

Figure 1: Distribution of Council Size by Population

Panel A: Municipal Council Sizes, 2005-2008



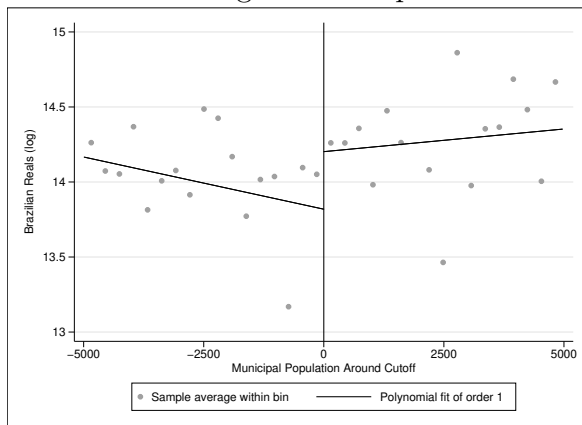
Panel B: Manipulation Density Plot



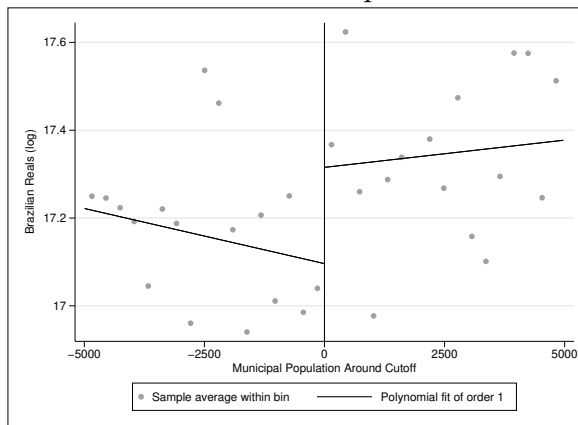
Notes: This figure shows the distribution of council size according to population size across municipalities. Panel A depicts the actual number of municipal council seats allocated to each municipality according to population size on the 2005–2008 electoral cycle for the first two cutoffs. Panel B displays the manipulation density plot based on [Cattaneo, Jansson and Ma \(2018\)](#).

Figure 2: RD Treatment Effects on Government Expenditures and Tax Revenue

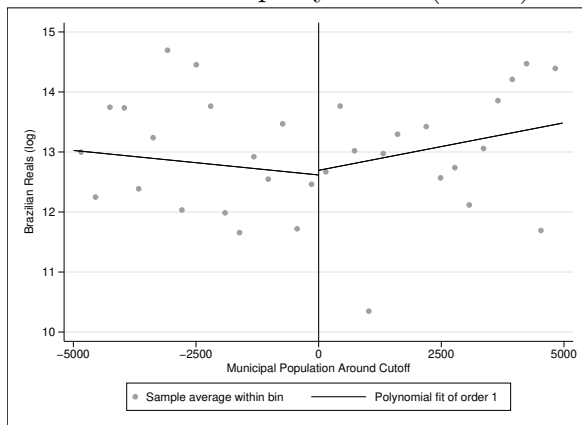
Panel A: Legislative Expenditures



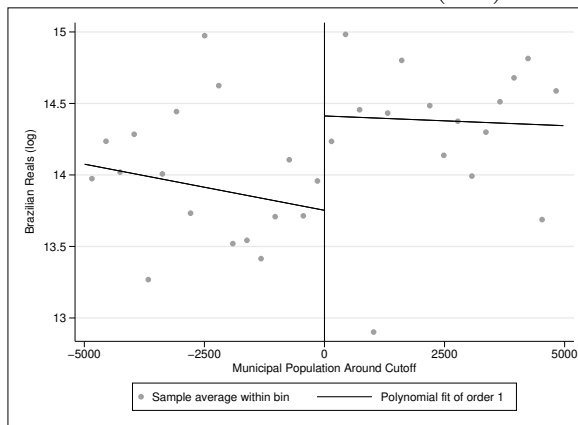
Panel B: Social Expenditures



Panel C: Property Taxes (IPTU)



Panel D: Service Taxes (ISS)



Notes: This figure shows the relationship between municipal council size and total expenditures and tax revenue. Each dot represents sample average for municipalities within each bin. Social spending is defined as the sum of spending on education, health, and housing programs. RD estimates with local linear polynomial with a uniform kernel are displayed.

Tables

Table 1: Local Government Spending and Taxation

	Government Expenditures		Tax Revenue	
	Legislative Costs (1)	Social Programs (2)	Property Tax <i>IPTU</i> (3)	Service Tax <i>ISS</i> (4)
Effect of Additional Council Seat	0.239	0.224***	-0.281	0.541**
	[-0.14, 0.62]	[0.06, 0.39]	[-1.65, 1.09]	[0.05, 1.03]
<i>Bandwidth</i>	9,972	6,487	7,589	9,775
Observations	1,001	1,078	1,075	1,078

The point estimates are constructed using a local polynomial estimator with a uniform kernel. Social spending is defined as the sum of spending on education, health, and housing programs. Significantly different than zero at 99 (***) , 95 (**), 90 (*) percent confidence. Local-linear regression-discontinuity point estimates are bias-corrected with robust, bias-corrected 95% confidence intervals in parentheses. Each column presents the RD specification restricting the sample to bins of size h around the municipal population cut-off. Results shown using the MSE-optimal bandwidth h developed by [Calonico, Cattaneo and Titiunik \(2014\)](#).

Table 2: Placebo Tests Using Alternative Policy Cutoffs

Panel A: Federal Transfers Threshold				
	Legislative Costs (1)	Social Programs (2)	Property Tax (3)	Service Tax (4)
Effect of Additional Council Seat	0.017	-0.008	0.571	-0.141
	[-0.49, 0.52]	[-0.43, 0.41]	[-0.67, 1.82]	[-1.24, 0.96]
<i>Bandwidth</i>	2,373	1,942	1,690	2,088
Observations	987	1,064	1,061	1,064
Panel B: Legislator Salary Threshold				
	Legislative Costs (1)	Social Programs (2)	Property Tax (3)	Service Tax (4)
Effect of Additional Council Seat	-0.085	-0.093	-0.187	-0.148
	[-0.45, 0.28]	[-0.33, 0.15]	[-1.75, 1.38]	[-0.85; 0.56]
<i>Bandwidth</i>	5,825	5,431	5,980	7,368
Observations	725	776	775	776

The point estimates are constructed using a local polynomial estimator with a uniform kernel. Social spending is defined as the sum of spending on education, health, and housing programs. Significantly different than zero at 99 (***) , 95 (**), 90 (*) percent confidence. Local-linear regression-discontinuity point estimates are bias-corrected with robust, bias-corrected 95% confidence intervals in parentheses. Each column presents the RD specification restricting the sample to bins of size h around the municipal population cut-off. Results shown using the MSE-optimal bandwidth h developed by [Calonico, Cattaneo and Titiunik \(2014\)](#).

Table 3: Diversity on Municipal Councils

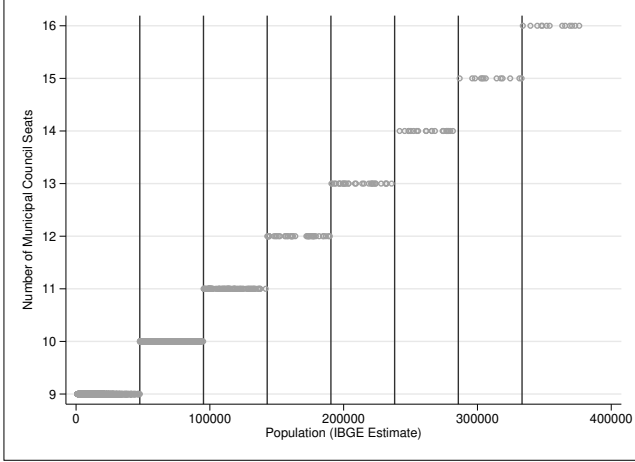
	Effective Number of Parties (1)	Share of elected councilors that are...			
		...born in the municipality (2)	...female (3)	...married (4)	... high school graduates (5)
Effect of Additional Council Seat	1.776** [0.1, 3.45]	-0.07 [-0.28, 0.14]	0.022 [-0.08, 0.13]	0.139* [0, 0.28]	-0.09 [-0.24, 0.06]
<i>Bandwidth</i>	6,728	9,867	8,578	6,610	9,065
Observations	1,083	961	961	961	961

The point estimates are constructed using a local polynomial estimator with a uniform kernel. Significantly different than zero at 99 (***) , 95 (**), 90 (*) percent confidence. Local-linear regression-discontinuity point estimates are bias-corrected with robust, bias-corrected 95% confidence intervals in parentheses. Each column presents the RD specification restricting the sample to bins of size h around the municipal population cut-off. Results shown using the MSE-optimal bandwidth h developed by [Calonico, Cattaneo and Titiunik \(2014\)](#).

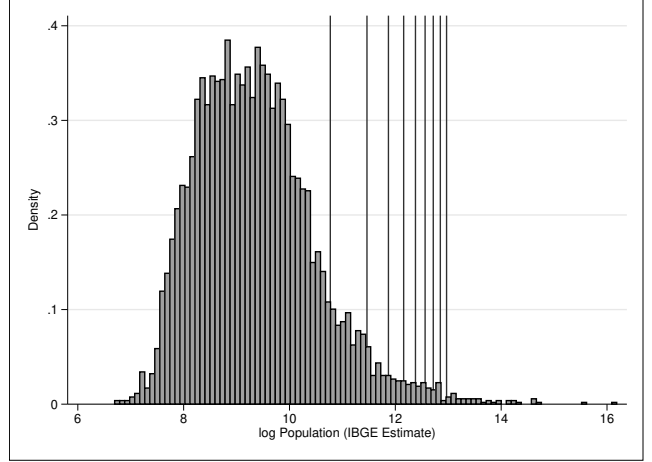
A Online Appendix

Figure A.1: Distribution of Council Size by Population

Panel A: Municipal Council Sizes, 2005-2008



Panel B: Population Density Distribution



Notes: This figure shows the distribution of council size according to population size across municipalities. Panel A depicts the actual number of municipal council seats allocated to each municipality according to population size on the 2005–2008 electoral cycle. Panel B displays the (log) population distribution. Vertical lines represent (log) population thresholds.

Figure A.2: Share of Municipal Tax Revenue from IPTU

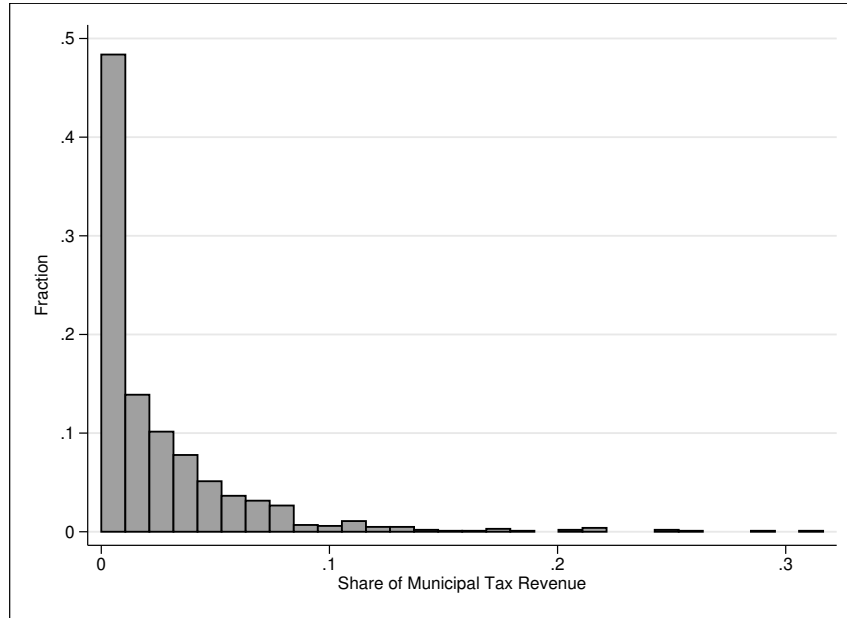


Table A.1: Municipal Cutoffs

Municipal Population	Number of Council Seats	Municipal Population	Number of Council Seats
[0 — 47,619]	9	[238,096 — 285,714]	14
[47,620 — 95,238]	10	[285,715 — 333,333]	15
[95,239 — 142,857]	11	[333,334 — 380,952]	16
[142,858 — 190,476]	12	[380,953 — 428,571]	17
[190,477 — 238,095]	13	[428,572 — 476,190]	18

The table displays the population brackets and associated number of seats each municipality was allocated in the 2004 municipal legislature elections, after the 2004 TSE Resolution.

Table A.2: Municipal Finance Summary Statistics

	Full RDD Sample ($N = 1270$)				CCT Bandwidth Sample ($N = 381$)			
	Mean	Std Dev	Min	Max	Mean	Std Dev	Min	Max
<i>Panel A: Tax Variables</i>								
Municipal Tax Revenue	4,969	8,711	126.8	117,533	5,900	8,496	306.2	71,731
Service Tax Revenue (ISS)	2,330	4,830	40.90	65,003	2,867	5,153	146.2	43,910
Property Tax Revenue (IPTU)	1,563	3,641	0	41,691	1,789	3,260	0.340	28,332
Total Budget Revenue incl. Transfers [^]	48,454	44,969	12,791	676,597	58,132	53,183	17,631	676,597
Revenue Share from Service Tax	0.0349	0.0316	0.00181	0.320	0.0386	0.0354	0.00510	0.320
Revenue Share from Property Tax	0.0224	0.0338	0	0.290	0.0245	0.0327	0	0.290
<i>Panel B: Expenditure Variables</i>								
Municipal Expenditures on...								
...Legislative Costs [^]	1,323	1,453	0	23,223	1,520	1,447	0	16,645
...Health [^]	11,333	10,148	254.8	120,075	13,641	11,778	3,151	120,075
...Education [^]	13,997	10,441	3,124	169,665	16,767	12,555	4,082	169,665
...Housing/Urban Development [^]	5,368	7,487	0	136,640	6,653	11,037	46.31	136,640
Total Municipal Expenditures [^]	27,138	21,250	7,752	331,297	32,057	24,246	9,779	331,297

The table displays summary statistics of tax revenues and public expenditures for the municipalities in our sample. Variables denoted with [^] are in ,000s Reals. Total budget revenue includes transfer to the municipality from state and federal governments. Panel A describes summary measures for the relevant tax variables, and Panel B presents summary statistics for the relevant expenditure variables. Social spending is defined as the sum of spending on education, health, and housing programs. Summary statistics are presented for the full RD sample, whereas Panel B restricts the sample to the municipalities within the MSE-optimal bandwidth proposed by [Calonico, Cattaneo and Titiunik \(2014\)](#).

Table A.3: Balance of Predetermined Covariates

	<i>Linear</i> ($p = 1$)		<i>Quadratic</i> ($p = 2$)	
	Coefficient	(Robust SE)	Coefficient	(Robust SE)
<u>Panel A: Public Finance</u>				
Municipal Income	-0.483	(0.86)	-0.625	(1.10)
Transfers from Federal Government	-0.167	(1.49)	-0.064	(1.68)
<u>Panel B: Year 2000 Election</u>				
Total Votes for Councilors	-0.04	(0.12)	-0.019	(0.14)
Number of Council Candidates	0.067	(0.15)	0.163	(0.21)
Voter Turnout	-0.033	(0.02)	-0.051	(0.03)
Council Seats (2001)	-1.307	(0.87)	-1.528	(0.96)
<u>Panel C: Census Characteristics</u>				
Geographic Area	0.614	(0.47)	0.801	(0.60)
Distance to State Capital	0.031	(0.34)	0.448	(0.55)
Fraction of Households with...				
...running water	-0.041	(0.10)	-0.035	(0.10)
...electricity	0.034	(0.04)	-0.007	(0.06)
...refuse collection	-0.024	(0.06)	-0.013	(0.06)
...car ownership	0.002	(0.06)	-0.009	(0.06)
...land ownership	0.009	(0.03)	0.053	(0.04)
Theil Inequality Index	-0.027	(0.05)	-0.062	(0.05)

The point estimates are constructed using a local polynomial estimator with a uniform kernel. Significantly different than zero at 99 (***) , 95 (**), 90 (*) percent confidence. Regression discontinuity point estimates are bias-corrected with robust, bias-corrected 95% confidence intervals in parentheses. Results shown using the MSE-optimal bandwidth h developed by [Calonic, Cattaneo and Titiunik \(2014\)](#).

Table A.4: Robustness to Local Quadratic Fit

	Government Expenditures		Tax Revenue	
	Legislative Costs (1)	Social Programs (2)	Property Tax <i>IPTU</i> (3)	Service Tax <i>ISS</i> (4)
Effect of Additional Council Seat	0.484	0.257**	-0.356	0.498*
	[-0.12, 1.09]	[0.05, 0.46]	[-1.9, 1.19]	[-0.08, 1.08]
<i>Bandwidth</i>	8,241	6,756	10,475	12,135
Observations	1,001	1,078	1,075	1,078

The point estimates are constructed using a local quadratic polynomial estimator with a uniform kernel. Social spending is defined as the sum of spending on education, health, and housing programs. Significantly different than zero at 99 (***) , 95 (**), 90 (*) percent confidence. Local-linear regression-discontinuity point estimates are bias-corrected with robust, bias-corrected 95% confidence intervals in parentheses. Each column presents the RD specification restricting the sample to bins of size h around the municipal population cut-off. Results shown using the MSE-optimal bandwidth h developed by [Calonic, Cattaneo and Titiunik \(2014\)](#).

Table A.5: Robustness to Optimal Bandwidth Criteria

	Government Expenditures		Tax Revenue	
	Legislative Costs (1)	Social Programs (2)	Property Tax <i>IPTU</i> (3)	Service Tax <i>ISS</i> (4)
Effect of Additional Council Seat	0.43	0.252**	0.245	0.49
	[-0.21, 1.07]	[0.06, 0.45]	[-1.42, 1.91]	[-0.14, 1.12]
<i>Bandwidth</i>	5553	4533	7029	8142
Observations	1001	1078	1075	1078

The point estimates are constructed using a local polynomial estimator with a uniform kernel and restricting the sample to the CER-optimal bandwidth h developed by [Calonico, Cattaneo and Titiunik \(2014\)](#). Significantly different than zero at 99 (***) , 95 (**), 90 (*) percent confidence. Local-linear regression-discontinuity point estimates are bias-corrected with robust, bias-corrected 95% confidence intervals in parentheses.