

Rocha, Fabiana; Orellano, Veronica Ines Fernandez; Bugarin, Karina

## Article

# Elected in a close race: Mayor's characteristics and local public finances

EconomiA

## Provided in Cooperation with:

The Brazilian Association of Postgraduate Programs in Economics (ANPEC), Rio de Janeiro

*Suggested Citation:* Rocha, Fabiana; Orellano, Veronica Ines Fernandez; Bugarin, Karina (2018) : Elected in a close race: Mayor's characteristics and local public finances, EconomiA, ISSN 1517-7580, Elsevier, Amsterdam, Vol. 19, Iss. 2, pp. 149-163, <https://doi.org/10.1016/j.econ.2017.10.005>

This Version is available at:

<https://hdl.handle.net/10419/266916>

## Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

## Terms of use:

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



<https://creativecommons.org/licenses/by-nc-nd/4.0/>

# Elected in a close race: Mayor's characteristics and local public finances<sup>☆</sup>

Fabiana Rocha<sup>a</sup>, Veronica Ines Fernandez Orellano<sup>b,\*</sup>, Karina Bugarin<sup>c,d</sup>

<sup>a</sup> FEA-USP, Brazil

<sup>b</sup> São Paulo School of Economics, EESP/FGV, Brazil

<sup>c</sup> EAESP/FGV, São Paulo of Public Administration and Government, EAESP/FGV, Brazil

<sup>d</sup> CEPESP/FGV and EPRG, Brazil

Received 7 April 2017; received in revised form 16 October 2017; accepted 26 October 2017

Available online 6 November 2017

## Abstract

The purpose of this paper is to evaluate the role of mayor's characteristics (education, experience and gender) on fiscal indicators of Brazilian municipalities. We use regression discontinuity and the outcomes of close elections to identify causal effects for 2000, 2004 and 2008. We find evidence that experienced and educated mayors choose to devote a smaller fraction of the budget to current and personnel expenditures, and so they seem to be concerned with the quality of public finances. Moreover, educated mayors are better in negotiating discretionary transfers. Unfortunately, the results indicate that women and men elected in close races are different regarding education, and therefore we were not able to evaluate the effect of gender on fiscal indicators.

*JEL classifications:* C31; H41; H83

*Keywords:* Mayors; Fiscal indicators; Education; Experience; Regression discontinuity design

© 2017 The Authors. Production and hosting by Elsevier B.V. on behalf of National Association of Postgraduate Centers in Economics, ANPEC. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

Brazil, like other countries around the world, adopted administrative and fiscal decentralization in the hopes that increased information on citizen needs improved government efficiency, effectiveness, responsiveness and accountability.

The shift of responsibility from central to local governments came, however, with a heterogeneous response in that some municipalities exceed others in terms of fiscal and policy performance.

Literature points to a series of factors that affect governmental behavior and are possible explanations for the different fiscal responses by Brazilian municipalities.

<sup>☆</sup> We are grateful to prof. Sérgio Ricardo de Brito Gadelha for kindly helping us with the data used to calculate the fiscal indicators.

\* Corresponding author.

E-mail address: [veronica.orellano@fgv.br](mailto:veronica.orellano@fgv.br) (V.I. Fernandez Orellano).

Among the usual economic variables (growth rates, productivity), budgetary institutions appear to be particularly important. [Alesina et al. \(1999\)](#) are the first ones that formally evaluate the impact of the quality of budget institutions, measured by an index that captures different stages of the budgetary process, on fiscal performance. The evidence for 20 Latin American and Caribbean countries indicates that hierarchical (top-down) procedures, that impose a hard budget constraint and budgetary transparency, are positively related to fiscal discipline. [Dabla-Norris et al. \(2010\)](#) build multi-dimensional indices of the quality of budget institutions for low-income countries, and conclude that better fiscal institutions help improve fiscal balances and the adoption of countercyclical policies.

The electoral competitiveness hypothesis, according to which, more competition is associated with higher performance ([Holbrook and Van Dunk, 1993](#)), and leader's political support (for instance [O'Toole and Meier \(2004\)](#)), also explain governmental performance. On the other hand, party alternation can create instability and overspending as pointed by [Calcagno and Escaleras \(2007\)](#).

As pointed by [Avellaneda \(2008\)](#) political and economic factors are external to public organizations, and it is important to take into account the influence of internal organization factors as well, such as manager characteristics. Although the product of collective action, public policies are ultimately the product of the actions of a single-actor, the mayor, when the setting involves local decision-making. The mayor in fact is the most important decision maker for municipal performance, since he is responsible for political and administrative functions. She then suggests as measure of managerial quality the mayor's human capital, that is, his educational background and job-related experience.<sup>1</sup> Both variables still have the advantage of being quantifiable and observable homogeneously across different contexts.

There are not many studies assessing the influence of manager's education and experience on performance. [Gibson and Lehoucq's \(2003\)](#) find that mayors with higher levels of education (the ones with more completed years of education) hire more staff to monitor forest conditions in Guatemala. [Fernández \(2005\)](#) do not find evidence of the impact of superintendent total years of experience on the performance of school districts in Texas. [Gohlmann and Vaubel \(2007\)](#) show that, besides mayoral qualifications (education and professional background), the gender of monetary policymakers is important for inflation. [Avellaneda \(2008\)](#) tests the mayoral qualifications thesis against the political and economic explanations. In order to do so she evaluates 40 municipalities in the Colombian Department of Norte de Santander, and finds evidence that mayoral qualifications positively influence municipal performance with respect to education coverage (school enrollment). However, these positive effect decreases under external constraints, such as the presence of illegal armed groups. [Dreher et al. \(2009\)](#) find evidence that the professional background of the head of government influences the adoption of market-liberalizing reforms. [Congleton and Zhang \(2009\)](#) and [Besley et al. \(2011\)](#) conclude that highly educated political leaders promote higher economic growth.

Regarding specifically fiscal outcomes, [Persson and Zhuravskaya \(2011\)](#) show that leaders that began their career in a given province and stayed their (inside provincial leaders) have a higher probability of making more infrastructure investments than leaders that come from a different province (outside provincial leaders). [Jochimsen and Thomasius \(2014\)](#) find evidence that prior professional experience in the financial sector makes finance ministers less prone to deficits.

The purpose of this paper is to evaluate the determinants of municipal fiscal performance given mayors' characteristics. More precisely, we seek to explain the impact of mayors' previous public sector experience and educational achievement on selected fiscal indicators. As far as we know this is the first research that provides evidence for Brazilian municipalities on the causal effect of mayors' education and experience on fiscal indicators.

In order to verify the impact of mayors' characteristics on policy outcomes we use a regression discontinuity design (RDD) based on close elections. If the election between two candidates is sufficiently close, whether the municipality elects an educated (experienced) mayor or not is the outcome of a random event. The probability of winning is the same for both educated (experienced) and non-educated (non-experienced) mayors, given that in close elections random factors matter a lot. [Freier and Thomasius \(2016\)](#) apply the same procedure to evaluate the effects of politician's qualification (education and experience) on local public debt, local expenditures and local taxes, using a sample of German municipalities. They, however, use a fuzzy regression discontinuity design to evaluate the effect of mayor's education since their education variable reflects the average university graduates for the occupation category of the candidate. Since we have information on the level of education of each candidate in each election we can create an indicator variable of whether the new mayor is educated or not and use a sharp design.

<sup>1</sup> Managers' education and experience should then contribute to performance not only in the public, but in the private sector as well.

We also seek to provide evidence on the causal effect of the gender of the policymaker on fiscal indicators.

The literature that discuss if women's representation shapes actual policy choices increased rapidly since the models developed by [Alesina \(1988\)](#) and [Besley and Coate \(1997\)](#) to account for divergence between male and female candidates regarding their policy proposals. Empirical studies find evidence which support the theoretical predictions that female mayors choose actions that are closer to their preferences, regarding both the size of government and the allocation of resources ([Chattopadhyay and Duflo, 2004](#); [Svaleryd, 2009](#)). An exception is [Ferreira and Gyourko \(2014\)](#) who are unable to find evidence on the effects of gender on the size of government, composition of spending, employment or crime rates for U.S. cities.

Regarding the role of women as policymakers, however, the contribution of this paper is smaller. [Brollo and Troiano \(2016\)](#) also use a regression discontinuity design to evaluate the causal effect of the gender of mayors on corruption in Brazil. The intuition follows ours: municipalities in which a woman won the election against a man by a narrow margin are good counterfactuals for municipalities in which a man won the election against a woman, also by narrow margin. Since our data on mayoral characteristics include gender, we also test the role of gender on fiscal indicators. Besides the difference in the dependent variable, our paper differs from theirs in the sample used: we use three elections (2000, 2004 and 2008) and therefore three municipal administration mandates (2001–2004, 2005–2008 and 2009–2012) while they use only the first two elections (mandates).

We find evidence that educated and experienced mayors tend to spend less on current expenditures, and as a consequence more on capital expenditures, and tend to attract more intergovernmental transfers. One possible explanation, that we will explore carefully in the near future, is that educated and experienced mayors have a higher reelection probability, and by attracting more discretionary transfers (which are mostly for capital investment) and spending on capital they are able to signal that they are better managers.<sup>2</sup> Other possible explanation, in line with [Brollo and Troiano \(2016\)](#), is that educated and experienced mayors are more corrupt and attract discretionary transfers and spend more on capital to increase campaign contributions that are frequently associated to money deviation.

Regarding gender, we find evidence that female mayors are not similar to male mayors in terms of education, even when considering only close electoral races, casting doubt on the results found by [Brollo and Troiano \(2016\)](#). However, we believe that more research is necessary to understand which individual characteristic really matters for policymaking, gender or education, before we can reach a more definite conclusion.

It is worthy to note that, although regression discontinuity in mixed education, experience or gender close electoral races is a good strategy to deal with endogeneity issues, the methodology may capture characteristics of the candidates that are not representative of a larger population. Close elections could attract certain types of candidates over others (for example, risk lovers). Politics can also attract individuals of more (or less) human capital. This might give rise to some form of self-selection.

The paper proceeds as follows. The second section presents Brazilian municipalities spending and taxing responsibilities as well as the context in which they operate. The idea is to make clear the political and fiscal autonomy of Brazilian municipalities in order to justify the choice of the mayor as the most important local decision-maker. The third section describes the data and shows some statistical evidence, while the fourth section details the empirical strategy. The fifth section presents and discusses the main results and, finally, the sixth section summarizes the main conclusions.

## 2. Institutional background

The 1988 Constitution delegated a higher degree of fiscal autonomy to sub-national governments. It formally established Brazil as a federal republic with three levels of government: a federal government, twenty-six states and a federal district (Brasília) and more than 5000 municipalities. The New Constitution, therefore, established the legal status of municipalities as federal entities.

It also established local government's responsibilities regarding the provision of goods and services. They include the provision of basic education and health services, local infrastructure and local transportation.

Brazilian mayors also gained responsibilities over time and nowadays have huge taxation autonomy. They rely mainly on two types of taxes: an annual tax on urban land and buildings (*Imposto Predial e Territorial Urbano*) and a

<sup>2</sup> [Brollo and Troiano \(2016\)](#) find evidence that male mayors have a higher reelection probability than male mayors.

tax paid by services providers (companies or professionals) to a third party (*Imposto sobre Serviços*). Mayors are free to choose tax rates on both types of taxes, and the rates vary substantially according to the municipality.

As in other decentralized systems, local governments are not able to finance their public policy responsibilities using only their own tax revenues. Therefore, municipalities benefit from a complex revenue-sharing arrangement and can count on expressive fiscal transfers both from the central and state governments.

The great majority of Brazilian municipalities have intergovernmental transfers as their main source of revenue. Only federal transfers represent approximately 65% of the municipal budget (Brollo and Troiano, 2016). The main federal transfer to local governments, called *Municipality Participation Fund* (Fundo de Participação dos Municípios — FPM), which is a general purpose or unconditional transfer, intended to enhance revenue equity among the municipalities and it is mandatory by law. The FPM is extremely transparent since the transfers depend on known formulas based on several population cutoffs (until 10,188 inhabitants, from 10,189 to 13,584 inhabitants, and so forth).

Regarding the political process of decentralization,<sup>3</sup> the mayor is in charge of local administrative matters, while the municipal legislature (Câmara dos Vereadores) is in charge of local legislative matters. Individuals (men and women) who are more than 18 years old and less than 70 years old are obliged to vote. Individuals who are at least 16 years old and more than 70 are free to vote if they want to.

Since 1996, Brazilians choose both the mayor and the municipal legislature in general elections every four years.<sup>4</sup> The last election happened in 2016. Brazilians use a plurality rule for mayors' elections. For municipalities with less than 200,000 inhabitants the election uses a single-ballot plurality vote, a first-past-the post system where the candidate with most votes wins. For municipalities above 200,000 inhabitants, the election uses the dual-ballot plurality rule (second-round “runoff”) where the two most voted candidates from the first round face a second round.

The increased strength of Brazilian local governments had an important impact in the career goals of politicians. High municipal autonomy made municipalities an attractive political choice, as shown by the career path of politicians, which show that municipal-level positions are highly demanded by them after they serve in Congress (Samuels, 2000, 2004).

Therefore, Brazil is very similar to Colombia and other Latin American countries, where mayoral leadership is very important. As well pointed by Avellaneda (2008) “in municipal settings, where the figure of city manager is absent, the single actor, the elected official, the identifiable individual, as well as the manager, is the mayor. There, the mayor performs not only political but also administrative functions. This makes the mayor the key decision maker for municipal performance (p. 3)”.

### 3. Data and descriptive statistics

Our analysis is based on a large data set of 5561 (out of 5570) Brazilian municipalities, for which information was collected on the outcomes of three mayoral elections (years of 2000, 2004 and 2008). For the three elections, there is complete information for both incumbent and runner-up on educational level, professional background (including if the candidate had previous public sector managerial experience), gender, and vote share.

The election data come from the Superior Electoral Court (*Tribunal Superior Eleitoral* — TSE), the most important entity of the electoral justice in Brazil. TSE acts jointly with the regional electoral courts (*Tribunal Regional Eleitoral* — TRE), which are directly responsible for the administration of the electoral process in the states and municipalities.<sup>5</sup>

We adopt several fiscal indicators.

The first group involves expenditure indicators that take into account the nature of expenditures, that is, qualitative indicators of spending. We use different ratios to measure relative expenditure on different public goods: *current*

<sup>3</sup> Decentralization is the transfer of authority, responsibility and resources to lower levels of government. There are in general two processes of decentralization. The political involves the adoption of elected, autonomous sub-national governments that can make binding policy decisions. The functional decentralization implies the transfer of policy responsibilities, expenditure capacity and revenue-raising power to the sub-national governments. As such, it also involves what some call administrative decentralization and fiscal decentralization.

<sup>4</sup> Federal and the state government politicians' choice occur in the same election. Therefore, every four years, Brazilians vote for a President, federal and state parliament members, senators and a state governor. The last election occurred in 2014. Therefore, every other year there is one election in the country.

<sup>5</sup> Data available at <http://www.tse.jus.br/eleicoes/estatisticas/repositorio-de-dados-eleitorais>.

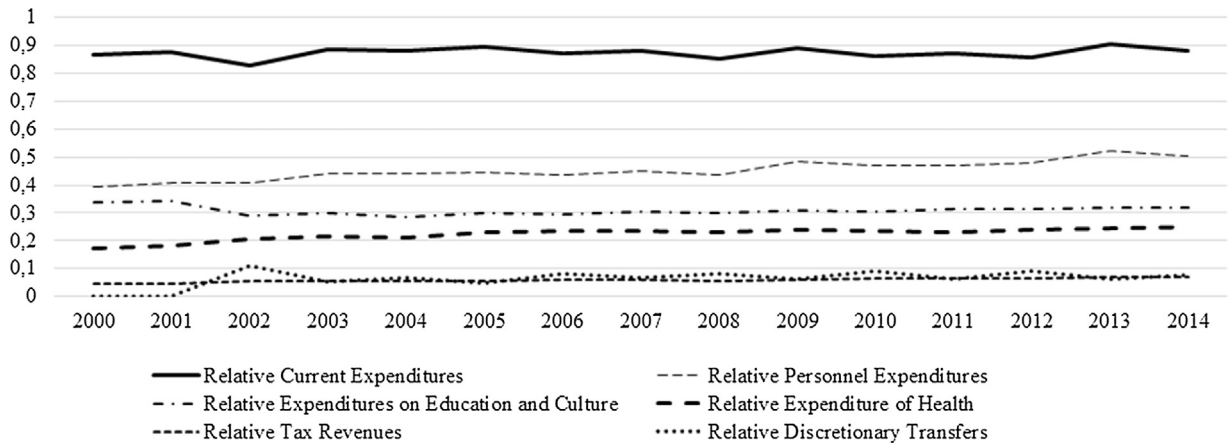


Fig. 1. Relative Expenditures, Tax Revenues and Total Transfers.

Note 1: relative current expenditures=current expenditures/total expenditures; relative personnel expenditures=personnel expenditures/total expenditures; relative expenditures on education and culture=expenditures on education and culture/total expenditures; relative expenditure on health=expenditures on health/total expenditures; relative tax revenues=own revenues/total revenues; relative discretionary transfers=discretionary transfers/total transfers.

Note 2: averages for all municipalities in each year.

*expenditures/total expenditures; personnel expenditures/total expenditures; health expenditures/total expenditures and expenditures on education and culture/total expenditures.*

As previously discussed, the public education and health system in Brazil is highly decentralized. Local governments are the main providers of primary education (Mendes et al., 2008) and must spend at least 25% of their total revenues (own revenues plus transfers) on education according to the 1988 Constitution. Local governments are also the providers of basic health care, and as such must spend 15% of their total revenues on health actions (Mendes et al., 2008). They also have some freedom to manage the resources among the different health/education actions. The bottom line is that, as observed by Brollo and Troiano (2016), municipalities in Brazil are responsible for the decisions concerning resource allocation despite all the restraints they are subject. Data on expenditures and their composition are from the Brazilian National Treasury (*Tesouro Nacional*) Website — *FINBRA*.<sup>6</sup>

The second group involves indicators of spending financing. We initially use *tax revenues/total revenues*, so we can assess the economic costs caused by excessive taxation to finance spending. As most Brazilian municipalities rely on transfers (from the federal and state governments) as their main revenue sources, and most of them are unconditional, we also use as an indicator the ratio between discretionary transfers and total transfers, to assess the mayors' negotiation capacity. Data on revenues and their composition are also from the Brazilian National Treasury (*Tesouro Nacional*) Website — *FINBRA*.<sup>7</sup>

Regarding the timing of the mandates, given that all mayors start their mandates at the same time (January 1st), the beginning of the mayoral administration and the beginning of the calendar year are the same, and therefore municipalities' fiscal indicators can be associated with a specific mayoral administration.

Fig. 1 presents the time path of the fiscal indicators (averages for all municipalities). Since all indicators are ratios, their averages can potentially vary between 0 and 1. We observe that those ratios stayed quite stable over time, but we can see a fall on the average relative expenditures on education and culture in the beginning of the 2000 decade, accompanied by a slight rise on the average relative health expenditures in the same period. We also observe a rise on average relative personnel expenditures in 2008 and 2012.

Regarding the revenue indicators, the averages are very low. The relative discretionary transfers' ratio is particularly low because almost all the transfers received by the municipalities in Brazil are mandatory, although we observe a clear rise in these transfers in 2001. The relative tax revenues ratio is also low because most municipalities, especially the small ones, depend heavily on transfers since they have no capacity to tax given their low levels of economic activity.

<sup>6</sup> Data available at [http://www.tesouro.fazenda.gov.br/pt\\_PT/contas-anuais](http://www.tesouro.fazenda.gov.br/pt_PT/contas-anuais).

<sup>7</sup> Data available at [http://www.tesouro.fazenda.gov.br/pt\\_PT/contas-anuais](http://www.tesouro.fazenda.gov.br/pt_PT/contas-anuais).



**Table 1** presents the main descriptive statistics for the fiscal indicators and reveals that they vary significantly between municipalities. Considering the coefficient of variation (CV), that is, the ratio between the standard deviation and the mean in percentage, the largest relative variation occurs in the revenue indicators, although they have a very low average. The CV for relative discretionary transfers is approximately 86% and for relative tax revenues is approximately 97%.

The CV for the expenditure indicators is lower, but still expressive, varying from approximately 26% for relative expenditure on health to 8% for relative current expenditures.

**Table 2** shows some election information. First, we observe that 9850 are close elections, with a margin of victory of no more than 10% for the winner, and out of those, 5310 are elections with a margin of victory of no more than 5%.

**Table 3** presents some mayor characteristics by election. It calls the attention how women have a low participation in politics, although it increased over time.

Given that the level of education in Brazil is quite low, we decided to use two thresholds to separate educated and non-educated mayors. The first one is high school completion. In the 2000 election, 45.63% of the elected mayors had at least a high school degree. In the 2004 election, the percentage of educated mayors increased to 48.11%, reaching 50.54% in the 2008 election. When we use a stricter definition, a university degree, the percentages do not change much and maintain the increasing trend, indicating that mayors are relatively more educated, when compared to the average education level of the population, which is quite low.

Table 1  
Fiscal indicators: descriptive statistics.

	Relative current expenditures	Relative personnel expenditures	Relative expenditures on education and culture	Relative expenditure on health	Relative tax revenues	Relative discretionary transfers
Mean	0.872	0.460	0.303	0.231	0.061	0.080
Standard-deviation	0.070	0.081	0.087	0.061	0.059	0.069
Min	0.000	0.000	0.000	0.000	0.000	0.000
Max	1.000	0.992	0.754	0.758	0.784	0.845

Table 2  
Number of elections and candidates by election outcome.

	All	10% window	5% window
Election results (no run-off)	21162	9790	5278
Run-off elections <sup>a</sup>	124	60	32
Same votes	10	10	10
Total	21286	9850	5310

<sup>a</sup> For municipalities above 200,000 inhabitants, if neither candidate gets, at least, 50% of the votes.

Table 3  
Incumbent characteristics by election.

	2000	2004	2008
Gender	318	408	491
(% of total)	5.72%	7.34%	8.84%
Mayor with at least a high school degree	2515	2652	2786
(% of total)	45.63%	48.11%	50.54%
Mayor with a university degree	2130	2268	2421
(% of total)	38.33%	40.81%	43.57%
Mayor with previous public sector experience	753	928	1645
(% of total)	13.55%	16.70%	29.60%
Total	5555	5521	5415

Table 4

Educated mayors (with at least a high school degree) in each region over total number of educated mayors in Brazil in %.

Year	North	Northeast	Central	Southeast	South
2000	33.26%	46.42%	37.01%	48.98%	45.62%
2004	39.73%	48.80%	45.59%	50.18%	46.08%
2008	38.98%	50.39%	44.61%	53.18%	51.60%

Table 5

Educated mayors (with a university degree) in each region over total number of highly educated mayors in Brazil in %.

Year	North	Northeast	Central	Southeast	South
2000	5.27%	33.36%	7.11%	34.12%	20.14%
2004	6.18%	32.32%	7.86%	33.51%	20.13%
2008	5.54%	31.74%	7.48%	33.31%	21.94%

Table 6

Experienced mayors (previous public sector experience) in each region over total number of experienced mayors in Brazil in %.

Year	North	Northeast	Central	Southeast	South
2000	9.04%	27.93%	6.52%	33.24%	23.27%
2004	8.86%	31.97%	8.53%	29.05%	21.60%
2008	7.80%	29.07%	8.04%	32.78%	22.30%

Finally, although the percentage of experienced mayors increased over time, only 30% of the mayors had previous public sector experience in the 2008 election. If we compare education and experience, it is possible to conclude that Brazilian mayors' are more educated than experienced.

Given the huge heterogeneity among Brazilian municipalities, we also present mayors characteristics by regions. [Table 4](#) shows the percentage of educated mayors (with at least a high school degree), while [Table 5](#) presents the percentage of educated mayors (with a university degree) in each region. It is interesting to observe that when education involves only high school, the percentage of educated mayors increases in all regions and is not very different among regions.

However, when education involves a university degree, the differences among regions is quite impressive. It calls attention that the Northeast region (one of poorest) and the Southeast (the richest) have similar percentages of educated mayors, and that both show a small decrease in the percentage of educated mayors over time.

Regarding experience in the public sector, the Northeast and the Southeast regions have the most experienced mayors, although only around 1/3 of the mayors have worked previously in the public sector ([Table 6](#)). There is anecdotal evidence that outsiders usually win elections, especially for the federal legislative. People get disappointed with the politicians and bet on unknown candidates hoping they do better. Maybe the same happens in mayoral elections.

#### 4. Empirical strategy

As already stated, the present study seeks to evaluate the impact of mayor's educational level and previous public sector experience, as well as gender, on municipal fiscal indicators.

We use a regression discontinuity design (RDD) to account for other potential endogeneity problems. It is quite possible that some unobservable local characteristics and local economic shocks, which can vary both over time and across municipalities, affect the outcome of mayoral elections and other local decisions at the same time, resulting in an endogeneity bias of the ordinary least squares estimator or the fixed effects estimator. Therefore, in order to obtain a consistent estimator of the mayoral characteristics effect, we use a RDD based on close elections.

Given that elections in Brazil are compulsory to all citizens between 18 and 70 years of age, possible external factors that could affect turnout (such as weather conditions) seem not to be important for the Brazilian case.



Our analysis of the effect of mayor education, experience or gender on fiscal indicators is close to the one by Freier and Thomasius (2016), except that they use a fuzzy RDD to evaluate the effects of education on fiscal outcomes, while we use a sharp RDD. Our data set contains precise information on incumbent and runner up educational achievement, as well as previous professional experience. Therefore, we are able to discriminate among mayors with a high school degree (or with previous public sector experience or that are males) and mayors without a university degree (or without experience or that are females).

We want to estimate the difference in potential outcome, given the difference in the education level of the mayors (or in previous experience, or gender). Therefore, we have to use mixed education, experience or gender elections. The problem is that we do not observe both potential outcomes, that is, the potential outcome a municipality that has an educated (or experienced or male) mayor would have achieved with an uneducated (or unexperienced or a female) mayor.

The underlying hypothesis to the identification strategy for the RDD is that victory between a candidate with a specific characteristic (educated, experienced or male), and one without this characteristic, is randomly decided if the election is a very close race. For example, in an election between an educated candidate and a non-educated one, the probability of winning is the same for both types of candidates if the election is a close race. Municipalities in which an educated candidate won against an uneducated candidate by a narrow margin are an adequate counterfactual for municipalities in which an uneducated candidate won against an educated candidate.

If this is the case, we must observe two conditions. First, the score variable (the margin of victory) must be close to the threshold (zero), so that if it ends up just left or just right to the threshold is the result of a random event. Second, no other factors that can influence the fiscal indicators (besides mayor's characteristics) can change at the same threshold, that is, the treatment at the threshold must be unique.

For the regression discontinuity design to be valid, we must then consider only the observations in which the winner and the best opponent have different levels of education or different levels of experience or different gender.

Given these restrictions, that affect sample size, it is important to point out the local nature of the RDD estimators. The inference will be valid only for observations for which two candidates have different levels of education or experience or gender. The inference will be internally valid because observations just right and just left to the threshold will have similar characteristics, but we have no guarantee that the observations that are not considered are in fact similar to the ones near the threshold, and so there is no guarantee of external validity.

We denote the educational level of the election winner by  $edu_w$  and the educational level of the best opponent by  $edu_o$ . These variables can take only two values: 0 for less than a high school degree and 1 for at least a high school degree, so that the value 1 includes mayors' that entered the university but did not graduate. Analogously, the previous experience in the public sector of the election winner is denoted by  $exp_w$ , and of the best opponent by  $exp_o$ . These variables also can take only two values: 0 for no previous public sector experience and 1 for public sector experience. Finally, the gender of the election winner is denoted by  $gen_w$ , and of the best opponent by  $gen_o$ , where 1 is used to identify males.

The vote share of the more highly educated is denoted by  $v_h$ , and  $v_l$  for the lower educated. Then we define the margin of votes of the higher educated candidate,  $m$ , as the difference between  $v_h$  and  $v_l$ . That is,  $m = v_h - v_l$ , and therefore  $m$  determines whether the candidate with higher education is elected, with the cutoff at  $m = 0$ . Thus we have a sharp discontinuity in the treatment variable ( $d_i$ , described below) at  $m = 0$ . The same idea applies to experience and gender.

It is noteworthy that we assess the three mayor characteristics separately, and, as a result, there are three running variables. In other words, we define  $m_c$  in terms of education, experience or gender ( $m_{educ}$  or  $m_{exp}$  or  $m_{gen}$ ). For simplicity, we consider  $m_c$  as  $m$ , where  $c$  can be education ( $educ$ ) or experience ( $exp$ ) or gender ( $gen$ ).

The treatment  $d_i$  (where  $i$  refer to the unit of observation, omitting a time index  $t$ ) is an indicator variable of whether the elected mayor is educated or has previous experience or is a male. That is,  $d_i = edu_w$  in the case of the educational level,  $d_i = exp_w$  in the case of experience, and  $d_i = gen_w$  in the case of gender. The margin of victory ( $m$ ) uniquely determines  $d$ :  $d = 1$  [ $m > 0$ ].

Since we have a sharp design, given that the relationship is deterministic, we do not have to use instrumental variable estimation to deal with the discontinuity of the treatment variable.

We implement the following specification:

$$y_i = \beta_0 + \beta_1 d_i + X_i \gamma + f(m_{ci}) + \varepsilon_i \quad (1)$$

where  $y$  is a fiscal indicator,  $X$  is the set of control variables (that do not need to be included if there is no significant difference in these variables between treatment and control unities around the cutoff,  $m = 0$ ), and the function  $f(m)$  is a polynomial in the margin of victory,  $m$ .

We introduce the flexible functional form  $f(m)$  in order to control for any correlation of treatment with omitted variables in the error term that could be related with the margin of votes. This requires a clear criterion to select the polynomial degree. Lee and Lemieux (2010) discuss various approaches to choose the best polynomial specification. We initially use different non-parametric polynomial specifications with varying order degrees to verify whether the effects of mayors' characteristics on fiscal indicators are sensitive to the choice of the functional form. We then use the Akaike Criteria as a generalized cross-validation case to select the most adequate polynomial degree.

To choose the optimal bandwidth around the threshold ( $m = 0$ ) we use the optimal robust variance estimator proposed by Calonico et al. (2014a,b). As confidence intervals may significantly change according to the interval chosen, leading to possible misleading inference, the authors propose a robust confidence interval estimator for the average treatment effect at the cutoff by balancing the trade-off between squared-bias and variance of the RDD estimator. This approach brings an additional robustness to estimates, as the optimal bandwidth is valid only when the usual bandwidth conditions are valid and it requires an additional bias-correction. The adopted kernel functions are triangular, as we estimate the average treatment effects and, therefore, favor middle value observations for treatment, excluding outliers.

Given the strong case for exogenous treatment assignment, our results will be internally valid. However, as we claimed before, external validity is still a challenge. Observations in which the candidate wins by a large margin might be different from the observations that we consider (the ones in which the candidate wins by a narrow margin), so the results cannot be generalized.

Regarding the internal validity of the RDD design, a common concern is about the potential effect of political variables (like party affiliation or alignment with the president or governor party) on fiscal outcomes, since these political characteristics of the elected mayor may be correlated with other mayoral characteristics, even around the cutoff.

A possible strategy would be to include political variables as control variables in the RDD regressions. However, upon closer examination, we decided not to take this path mainly because the political variables are themselves outcome variables, which may directly depend on the characteristics of the mayors. For instance, the mayor party affiliation may also reflect its characteristics such as education and experience. As consequence, we believe the inclusion of political controls may be an example of bad controls as highlighted by Angrist and Pischke (2009) who establish that “bad controls are variables that are themselves outcomes of the treatment variable”.

Therefore, to deal with the potential effects of political variables on fiscal indicators, we include two political variables in the internal validity tests in order to verify if there are differences regarding these political characteristics between treatment and control unities around the cutoff,  $m = 0$ . If the regression discontinuity design is correct we should find no differences.

We chose as political variables, the mayor alignment with the president and the governor party, instead of party affiliation since this would require the use of many dummy variables.

We also run internal validity tests for the mayors' characteristics of interest. For example, if the treatment variable is the mayors' education, then mayors' education should not affect mayors' experience or mayors' gender around the cutoff. The same idea applies when the treatment variable is mayors' experience or mayors' gender.

## 5. Internal validity and results

As observed before, we analyze the municipalities with mixed education, experience, and gender races for the 2000, 2004 and 2008 elections. Therefore, our sample is restricted to elections where the two candidates have different levels of education, experience or gender. Besides, our fiscal indicators are averages across the years of mandate. For example, for the 2000 election they are the average of 2001–2004.

As observed before, we should expect no differences in municipalities' characteristics between treatment and control unities around the cutoff,  $m = 0$ . To test for internal validity, we run an RDD for non-outcome variables on the treatment variables, and expect that treatment does not affect any of the observable local characteristics.

We use *income per capita*, *squared income per capita*, *population* and *squared population* as characteristics of the municipalities. We also run the tests for the two observable political variables: political alignment of the mayor with the president party and with the governor party. Table 7 shows the results. We find evidence that all municipality

Table 7

RDD estimates: discontinuities of municipalities' characteristics and political variables in mixed close elections.

Variable of interest	Running variable	RDD results
Same Party as Governor	At Least High-school Degree	0.0277 (0.04276) [1688]
	Previous Public Sector Experience	0.0109 (0.042) [1924]
	If Mayor is Male	−0.0219 (0.05794) [847]
Same Party as President	At Least High-school Degree	0.0691* (0.03566) [1686]
	Previous Public Sector Experience	0.0262 (0.03133) [1937]
	If Mayor is Male	−0.0052 (0.04453) [857]
Population	At Least High-school Degree	−3940.3000 (3826.6) [1681]
	Previous Public Sector Experience	1728.3000 (2917.2) [1705]
	If Mayor is Male	−514.4900 (2937.2) [819]
Squared Population	At Least High-school Degree	−590.0000 (6000.00) [1852]
	Previous Public Sector Experience	910.0000 (1000.00) [1920]
	If Mayor is Male	740.0000 (9400.00) [824]
Income	At Least High-school Degree	−0.0001 (0.00019) [1706]
	Previous Public Sector Experience	−0.0001 (0.00019) [1686]
	If Mayor is Male	0.0001 (0.00025) [829]
Squared Income	At Least High-school Degree	−99.1510 (112.59) [1836]
	Previous Public Sector Experience	−80.1130 (140.29) [1454]
	If Mayor is Male	24.9500 (51.25) [1454]

Note: Significance levels: \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Robust standard errors in parenthesis. Number of observations in square brackets.

characteristics and political variables are balanced across the cut-off  $m = 0$ . Just the alignment with the president party, for the running variable based on education, shows a significant difference, but only at 10% level, and therefore does not affect the reliability of the main results.

Finally, we also run internal validity tests for the mayors' characteristics, that is, we test if there are differences in mayors' characteristics (education, experience and gender) between treatment and control unities around the cutoff,  $m = 0$ . Table 8 summarizes the results.

Table 8

RDD estimates: discontinuities of mayor's characteristics on themselves.

Variable of interest	Running variable	RDD results
At Least a High-school Degree	Public Sector Experience	0.06091 (0.0501) [1215]
	Mayor Gender	−0.17601** (0.06636) [614]
Previous Public Sector Experience	At Least High-school Degree	0.0255 (0.04125) [1402]
	Mayor Gender	−0.01907 (0.07069) [614]
Elected Mayor is Male	At Least High-school Degree	−0.0372 (0.02819) [1402]
	Previous Public Sector Experience	−0.0320 (0.03289) [1215]

Note: Significance levels: \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Robust standard errors in parenthesis. Number of observations in square brackets.

We find evidence that there is no discontinuity around the cut-off when the running variables are education and experience. This assure us that we can interpret the results neatly, that is, our estimates when using these running variables will reflect only the effects of differences in education and experience.

The results of this balance check for gender, however, seems to indicate that there is a discontinuity around the cut-off for the running variable gender with respect to education. The victory of a male seems negatively related to the level of education of the mayor, even for close elections. Therefore, our estimates can potentially reflect a difference on mayors' education and not on mayors' gender.<sup>8</sup> Therefore, we decide not to proceed with the analysis of the effects of mayors' gender on fiscal indicators, and focus just on the effects of mayors' education and previous experience.

Graphical presentations of the outcome variables (fiscal indicators) and the value of the running variables (mayors' education and previous experience) are shown in the appendix (Figs. 1a and 1b). They provide visual evidence of a discontinuity across the cutoff only for relative current and personnel expenditures (both for rating variables based on education and experience) and relative discretionary transfers (just for the rating variable based on education). For the other fiscal indicators, it is not possible to detect a visual break.

Table 9 shows the results of the RDDs for education and experience. The evidence from the RDD analysis indicates that more educated and experienced mayors tend to spend a relatively smaller percentage of the budget on current expenditures and specifically on personnel expenditures. The lower relative current expenditures mean that more educated and experienced mayors tend to spend a relatively larger percentage of the budget on capital expenditures, since relative current expenditure is equal to 1 minus relative capital expenditure.

<sup>8</sup> This result contrast with the ones in Brollo and Troiano (2016). Their balance checks for mayoral characteristics show no discontinuity and so they interpret their estimates as reflecting solely gender differences. It is important to remember that we have one additional election year (2008), although we are not sure if this enough to explain the difference between our results and theirs.

Table 9

RDD estimates: the impact of education and experience on fiscal indicators.

Variable of interest	Running variable	RDD results
Relative Current Expenditures	At Least High-school Degree	−0.00871** (0.00349) [3003]
	Previous Public Sector Experience	−0.00737* (0.00364) [2724]
Relative Personnel Expenditures	At Least High-school Degree	−0.00896* (0.00508) [2696]
	Previous Public Sector Experience	−0.00132* (0.00603) [1994]
Relative Expenditures on Education and Culture	At Least High-school Degree	0.00109 (0.00591) [2459]
	Previous Public Sector Experience	−0.00299 (0.00597) [2458]
Relative Expenditure of Health	At Least High-school Degree	0.00358 (0.00331) [2912]
	Previous Public Sector Experience	−0.00200 (0.0038) [2512]
Relative Discretionary Transfers	At Least High-school Degree	0.00825** (0.00365) [2798]
	Previous Public Sector Experience	0.00205 (0.00388) [2365]
Relative Tax Revenue	At Least High-school Degree	0.00086 (0.00346) [3098]
	Previous Public Sector Experience	0.00187 (0.00375) [2943]

Note: Significance levels: \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Robust standard errors in parenthesis. Number of observations in square brackets. The sample size is obtained directly from the optimization of bandwidth selection using the mean squared error (MSE) expansion of the RDD estimators, as proposed by [Calonico et al. \(2014a,b\)](#).

We find that educated mayors, on average, spend around 0.87% points less in relative current expenditures and around 0.9% points less in relative personnel expenditures than lower educated mayors. On the other hand, experienced mayors, on average, spend about 0.74% points less in relative current expenditures and about 0.13% points less in relative personnel expenditures than mayors without previous experience in the public sector.

The results from the RDD analysis also indicate that educated mayors, tend to obtain a relatively larger rate of discretionary transfers over total transfers, suggesting that they have more abilities or better conditions in the bargaining process involved in the request of these type of transfers. Educated mayors, on average, tend to obtain about 0.825 additional percentage points of discretionary transfers over total transfers when compared to lower educated mayors.

It is worthy to notice that the RDD analysis shows significant effects for the variables that we observe visual evidence of discontinuity across the cutoffs (relative current expenditures, relative personnel expenditures and relative discretionary transfers).

One possible explanation is that educated and experienced mayors have a higher reelection probability, and by attracting more discretionary transfers (which are mostly for capital investment) and spending more on capital they are able to signal that they are better managers. Other possible explanation, in line with [Brollo and Troiano \(2016\)](#), is that

educated and experienced mayors are more corrupt and they attract more discretionary transfers and spend more on capital to increase campaign contributions that are frequently associated to money deviation. As pointed out by Boas et al. (2014), firms that contribute to the campaigns of important politicians are able to increase their contracts with the government, and these firms almost always are linked to the infrastructure sector. Explore the links between these variables is not an easy task but we plan to do so in the near future.

## 6. Conclusions

The purpose of this paper is to evaluate the importance of mayors' education, previous experience on the public sector and gender on fiscal indicators.

The theoretical hypothesis is that, when other factors that can affect fiscal indicators are controlled for, the main influence on local performance comes from inside the administrative structure and not from outside (political, socio-economic and institutional factors), as pointed out by Avellaneda (2008). Given that mayors in Brazil perform political functions as well as administrative functions, it is possible to say that public policies are mainly the responsibility of the mayors.

We use a regression discontinuity design based on close elections, and find evidence that qualified mayors (educated and experienced) choose to devote a smaller fraction of the budget to current expenditures and specifically to personnel expenditures. Besides, educated mayors also tend to obtain a higher percentage of discretionary transfers over total transfers.

We also find evidence that when a man wins the election, the mayor is more likely to be less educated than when the winner is a woman, even for close races. Therefore, it is not possible to evaluate the impact of the gender on fiscal indicators since the estimates could reflect the difference in education and not the difference in gender itself.

These results contradict the intuition behind the median voter theorem. According to our results, in principle voters can control policy decisions through the right choice of the identity of the mayor.

The local nature of RDD points to a natural path for future research, which involves the identification of the effect of education and experience on fiscal indicators in situations of less electoral competition.

## Appendix A.

Figs. Ia and Ib shows the effect of having an educated and an experienced mayor on the selected fiscal indicators.

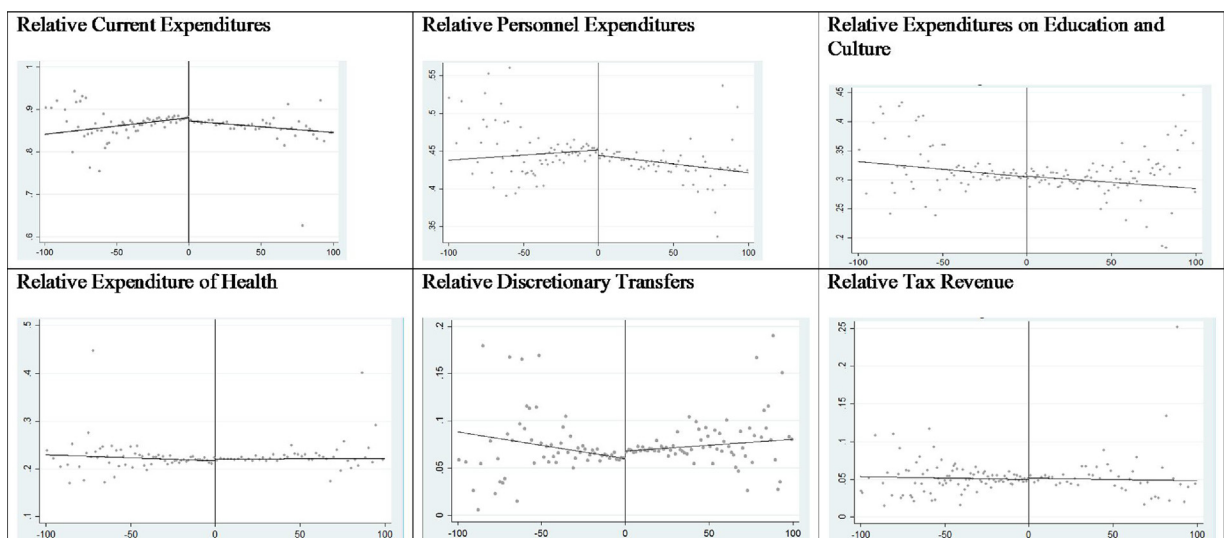


Fig. Ia. Education – At least a High-school Degree.



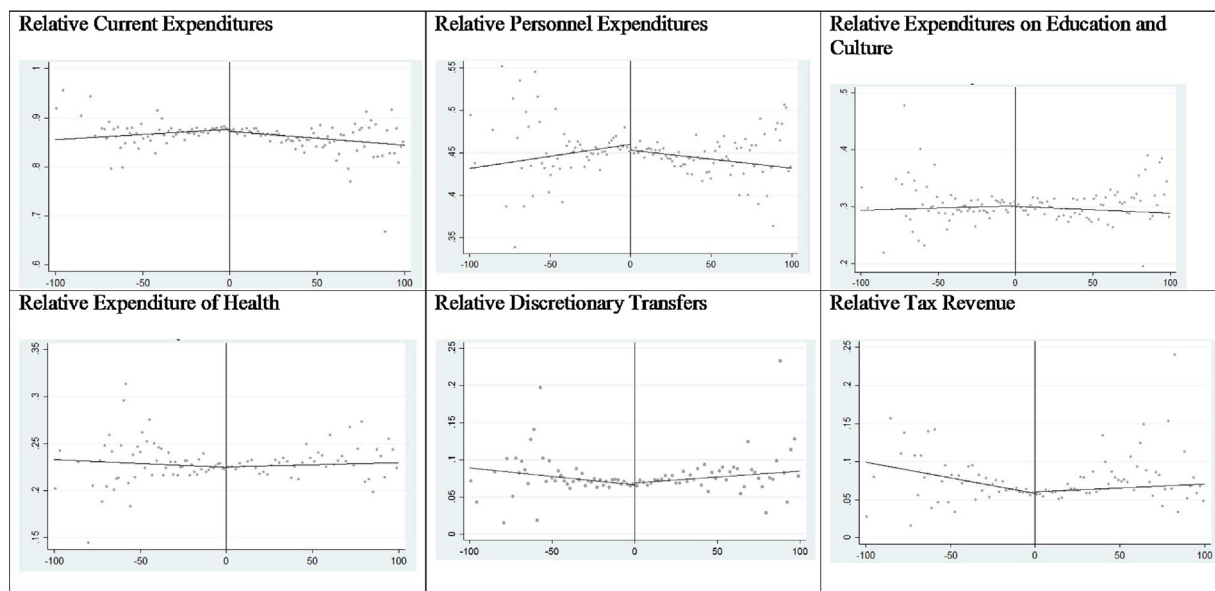


Fig. 1b. Experience – Previous Public Sector Experience.

Just to the right of the thresholds are elections in which the educated mayors, or the experienced mayors, won. We group the information in bins in order to make the results clearer. The outcome variable on the horizontal axis are the average of these variables over the mayors' mandates.

Relative current expenditures show a visual break at the cutoff point for both education and experience, but not as clear as the one observed for relative personnel expenditures. Relative discretionary transfers show a visual break just for the running variable based on mayors' education level. For the other fiscal indicators it is not possible to detect a visual break.

## References

- Alesina, A., 1988. *Credibility and policy convergence in a two-party system with rational voters*. *Am. Econ. Rev.* 78, 796–805.
- Alesina, A., Hausmann, R., Hommes, R., Stein, E., 1999. Budget institutions and fiscal performance in Latin America, Inter-American Development Bank Working Paper Series 394. September.
- Angrist, J., Pischke, J.S., 2009. *Mostly Harmless Econometrics: An Empiricist's Companion*, 1st ed. Princeton University Press.
- Avellaneda, C.N., 2008. *Municipal performance: does mayoral quality matter?* *J. Public Adm. Res. Theory* (February), 1–28.
- Besley, V., Coate, S., 1997. *An economic model of representative democracy*. *Q. J. Econ.* 112, 85–114.
- Besley, T., Montalvo, J.G., Reynal-Querol, M., 2011. *Do educated leaders matter?* *Econ. J.* 121 (554), F205–F227.
- Boas, T., Hidalgo, F.D., Richardson, N., 2014. *The spoils of victory: campaign donations and government contracts in Brazil*. *J. Politics* 76 (2), 415–429.
- Brollo, F., Troiano, U., 2016. *What happens when a woman wins an election? Evidence from close races in Brazil*. *J. Dev. Econ.* 122, 28–45.
- Calcagno, P., Escaleras, M., 2007. *Party alternation, divided government, and fiscal performance within US States*. *Econ. Gov.* 8 (2), 111–128.
- Calonico, S., Cattaneo, M., Titiunik, R., 2014a. *Robust nonparametric bias corrected inference in the regression-discontinuity designs*. *Econometrica* 82 (6), 2295–2326.
- Calonico, S., Cattaneo, M., Titiunik, R., 2014b. *Robust data-driven inference in the regression discontinuity design*. *Stata J.* 14 (4), 909–946.
- Chattopadhyay, R., Duflo, E., 2004. *Women as policy makers: evidence from a randomized policy experiment in India*. *Econometrica* 72 (5), 1409–1443.
- Congleton, R.D., Zhang, Y., 2009. *Is it all about competence? The human capital of U.S. presidents and economic performance*, SSRN Working Paper, 1684151.
- Dabla-Norris, E., Allen, R., Zanna, L.F., Prakash, T., Kvintradze, E., Lledo, V., Yackovlev, I., Gollwitzer, S., 2010. *Budget institutions and fiscal performance in low-income countries*. IMF Working Paper WP/10/80.
- Dreher, A., Lamla, M.J., Lein, S.M., Somogyi, F., 2009. *The impact of political leaders' profession and education on reforms*. *J. Comp. Econ.* 37 (1), 169–193.
- Fernández, S., 2005. *Developing and testing an integrative framework of public sector leadership*. *J. Public Adm. Res. Theory* 8 (1), 117–130.
- Ferreira, F., Gyourko, J., 2014. *Does gender matter for political leadership? The case of U.S. mayors*. *J. Public Econ.* 112, 24–39.
- FINBRA, available at: [http://www.tesouro.fazenda.gov.br/pt\\_PT/contas-anuais](http://www.tesouro.fazenda.gov.br/pt_PT/contas-anuais). Accessed on July, 2018.

- Freier, R., Thomasius, S., 2016. Voters prefer more qualified mayors, but does it matter for public finances? Evidence for Germany. *Int. Tax Public Finance* 23, 875–910.
- Gibson, C.C., Lehoucq, F.E., 2003. The local politics of decentralized environmental policy in Guatemala. *J. Environ. Dev.* 12 (1), 28–49.
- Gohlmann, S., Vaubel, R., 2007. The educational and occupational background of central bankers and its effects on inflation: an empirical analysis. *Eur. Econ. Rev.* 51 (4), 925–941.
- Holbrook, T.M., Van Dunk, E., 1993. Electoral competition in the American states. *Am. Political Sci. Rev.* 87 (4), 955–962.
- Jochimsen, B., Thomasius, S., 2014. The perfect finance minister: whom to appoint as finance minister to balance the budget. *Eur. J. Pol. Econ.* 34, 390–408.
- Lee, D., Lemieux, T., 2010. Regression discontinuity designs in economics. *J. Econ. Lit.* (June (48)), 281–355.
- Mendes, M., Miranda, R.B., Cossío, F.B., 2008. Transferências intergovernamentais no Brasil: diagnóstico e proposta de reforma, Textos para discussão 40. Consultoria Legislativa do Senado.
- O'Toole, L., Meier, K., 2004. Public management in intergovernmental networks: matching structural networks and managerial networking. *J. Public Adm. Res. Theory* 14 (4), 469–494.
- Persson, P., Zhuravskaya, E., 2011. Elite capture in the absence of democracy: evidence from backgrounds of Chinese provincial leaders, SSRN Working Paper, 1506709.
- Samuels, D.J., 2000. The political logic of decentralization in Brazil. In: Kingstone, Peter, Power, Timothy J. (Eds.), *Democratic Brazil. Actors Institutions and Processes*. University of Pittsburgh Press, Pittsburgh, Pennsylvania.
- Samuels, D.J., 2004. The political logic of decentralization in Brazil. In: Montero, Alfred P., Samuels, David J. (Eds.), *Decentralization and Democracy in Latin America*. University of Notre Dame Press, Indiana.
- Svaleryd, H., 2009. Women's representation and public spending. *Eur. J. Political Econ.* 25 (2), 186–198.