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THE SIZE OF LOCAL LEGISLATURES AND WOMEN'S POLITICAL REPRESENTATION: EVIDENCE FROM BRAZIL

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RESUMO

O presente trabalho explora mudanças exógenas no número de vereadores dos municípios brasileiros em certos cortes populacionais, a fim de investigar se o tamanho das Câmaras Municipais impacta a participação política de mulheres, um grupo consideravelmente subrepresentado no contexto político do Brasil. Os resultados sugerem que a presença feminina na política é significativamente afetada pelo número de legisladores municipais, e que esses efeitos são consequência direta de mudanças na competição política. O trabalho também apresenta evidências de que a representatividade feminina no processo de tomada de decisões dos governantes influencia a provisão de bens e serviços públicos.

ABSTRACT

Exploiting the exogenous changes in local legislature size at certain population thresholds in Brazil, this article investigates whether the number of legislators can impact the political participation of women, a group that is extremely underrepresented in Brazilian politics. The results suggest that the number of seats in the legislature has a significant positive impact on women's presence in the political sphere, and that these effects are direct consequences of changes in local political competition. This article also reports that the representation of women in the decision-making process influences the municipal provision of public goods and services.

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1 Introduction

For a better understanding of the public provision of services and goods, it is very important to analyze the political context in which policy decisions are made.[1] In this sense, a substantial part of the recent political economy literature has studied the relationship between electoral representation and public policy in representative democracies.

The relevance of this relationship is better understood by analyzing the distinction between direct and representative democracies. In direct democracies, every enfranchised citizen is equally represented in the decision-making process because all eligible voters directly vote on matters of economic importance. On the other hand, people in representative democracies elect officials to represent them in the decision-making process.[2] In this indirect type of democracy, it is possible that a part of the population does not elect any representative and therefore rarely becomes a focus of the policy platforms established by politicians.

The empirical literature on political economy has given a great deal of attention to this debate. For example, Pande (2003), Chattopadhyay and Duflo (2004), and Iyer et al. (2011) show how the establishment of mandated political reservation that guarantees a certain group in the decision-making process affects policy outcomes. Miller (2008), Lott and Kenny (1999), and Cascio and Washington (2013) explore the direct changes in the pool of eligible voters, evaluating the consequences of enfranchising a new group of people. Their common conclusion is that the new enfranchised citizens receive more resources and political attention after having been included in the voting process. Additionally, other important articles analyze changes in political institutions that indirectly affect electoral representation, such as Fujiwara (2012) and Shue and Luttmer (2009). They both show the importance of voting technology on *de facto* enfranchisement, which ultimately affects policy decisions.

This paper contributes to the discussion of how political institutions relate to electoral representation and public policy. I focus on a specific mechanism that has not been extensively studied in the economic literature so far: the size of local legislatures. The study analyzes how the number of city legislators can affect the political representation of underrepresented groups in local politics and how these effects may impact the public provision of goods and services. To the best of my knowledge, this is the first empirical attempt to study the relationship between council size and political representation in a representative democracy.[3]

To accomplish my goal, I use the Brazilian local political context, which allows me to

[1] See Persson and Tabellini (2000) and Besley (2006) for a modern treatment of political economy.

[2] See Hinnerich and Pettersson-Lidbom (2013) for a discussion of the difference between direct and representative democracies.

[3] Other papers that focus on legislature size investigate its relationship to government size or to government spending. See Pettersson-Lidbom (2012) as an example of a study that uses a Regression Discontinuity (RD) design to estimate the causal effect of council size on government spending.

overcome two significant obstacles that are frequently observed in the empirical literature on political economy: (i) the difficulty of inferring causality in a transparent identification strategy and (ii) the limited availability of data. First, a new federal law completely determined the municipal council size in the elections of 2004 and 2008 based on population thresholds, creating discontinuities in the number of legislators at the thresholds set by the law. I explore this quasi-experimental source of variation to make causal inferences among the effects I am interested in using the sharp Regression Discontinuity (RD) design. Second, I have a detailed set of electoral information on all the candidates for local legislatures in the elections I study.

Motivated by the unequal gender representation in Brazilian politics and taking advantage of the available information on the gender of all candidates, my focus in this article is on women's participation in politics. I investigate how women's political representation is related to the number of local legislators in municipal councils. Therefore, this paper also directly relates to the discussion of female political participation, which is an important issue in many democracies (WORLD BANK, 2012).[4]

The results of my estimations suggest that a rise in the number of legislators has a significant impact on electoral representation by increasing women's participation in politics. More specifically, it elevates the percentage of female legislators in the council and increases the chances of having at least one woman elected to the legislature. I explain these effects by showing that they are consequences of the impacts of council size on local political competition. First, my findings suggest that an increase in the number of seats in the legislature attracts only male candidates, a result consistent with theoretical models in which women face political barriers to their entry decision (BHALOTRA; CLOTS-FIGUERAS; IYER, 2013; CASAS-ARCE; SAIZ, 2011). I also report that despite this increase in the number of male candidates, the share of votes for the set of candidates of each gender is not altered by council size. Therefore, there are more men competing for the same share of votes in those municipalities with a greater number of seats in the legislature. This evidence thus indicates that male candidates "cannibalize" each other, improving the chances that women will be elected. Therefore, the greater political participation of women that I observe in municipalities with larger legislature sizes is a consequence of these changes.

My findings also suggest that council size does not affect other observable characteristics of the elected officials, such as their age, degree of education, and chance of reelection.[5] Additionally, I report that the impacts of council size on women's presence in the political sphere are also present in the elections for mayor, which are held at the same time as the

[4] I discuss the literature on women's political representation in more detail later in the article (subsection 2.3).

[5] I believe that an increase in the number of legislators may also increase the representation of other political minorities, such as racial minorities. However, I do not have sufficient data to empirically test this hypothesis.

municipal legislative elections.

Finally, my empirical exercises also show that changes in female participation in local politics translate into policy outcomes. The evidence shows that a greater political representation of women is related to the public provision of goods and services that are most commonly associated with women's preferences (e.g., day care facilities, pre-natal health care). These results are in line with papers that show how a politician's gender affects public policy, such as Bhalotra and Clots-Figueras (2014), Brollo and Troiano (2013), Clots-Figueras (2012), and Svaleryd (2009) (among others).[6,7]

This article also relates to a study by Ferraz and Finan (2011), which uses similar data and the same political background (Brazilian local elections) to evaluate the effects of local legislators' wages on competition for office, political entry, and political performance. Although the focus of my analysis is distinct from theirs, both papers study important issues of municipal politics in Brazil.

The remainder of this paper is organized as follows: Section 2 describes the Brazilian political context and institutional background of the elections I analyze. Section 3 discusses the data and the empirical strategy used. The empirical findings are reported in Section 4, and I perform robustness checks in Section 5. Finally, Section 6 presents the main conclusions of my work.

2 Institutional Background

2.1 Local politics in Brazil

Municipalities are the smallest national administrative units in Brazil and are responsible for the provision of important public services and goods, such as health care, local infrastructure, education, and local transportation. The country has over 5,000 municipalities in its 26 states.[8] Each municipality is governed autonomously by a mayor in conjunction with a legislative council, both directly elected by voters in elections held simultaneously at four-year intervals and staggered by two years relative to state and federal elections.

The 1988 Federal Constitution set the principal qualifications that citizens must meet to be eligible to be elected to a local council. Among other requirements, a person must have

[6]Ferreira and Gyourko (2013), on the other hand, find no effect of the gender of the mayor on policy outcomes in the context of U.S. cities.

[7]The previously cited Chattopadhyay and Duflo (2004), Iyer et al. (2011), and Pande (2003) also shed light on how policy preferences can be distinct between genders and how this difference can shape the decisions made by elected officials.

[8]The number of municipalities in Brazil has increased recently. In 2014, Brazil had 5,570 municipalities; there were 5,565 municipalities in 2008 and 5,560 in 2004.

Brazilian nationality, be at least eighteen years old, and be affiliated with a political party for at least one year before the elections. A federal law[9] also states that each party must present its list of candidates chosen among those eligible affiliates four months before the elections. There is a maximum number of candidates per party of 1.5 times the number of seats in the municipal council.[10]

While the mayor of each municipality is elected from a plurality rule,[11] the local council is selected in a multi-member election through an open-list, proportional representation system. In this voting system, each party announces a list of candidates before the elections. Each voter has one vote and can cast it for a party or an individual candidate on a party's list. Voting is mandatory in Brazil, so citizens may also register an invalid vote.[12] After the election, the total number of votes received by each party is calculated, taking into account both the votes cast directly for the parties and the ones cast for their candidates. The seats in the legislature are allocated to the parties according to the proportion of total valid votes received by each one of them, and then parties fill their allocated seats with the most-voted candidates on their lists.[13]

Once the legislature is formed, the elected body can influence public policy by (i) interfering in the elaboration of the city budget, (ii) proposing and voting on municipal laws, (iii) making public service requests to the mayor, and (iv) monitoring the mayor's activities.

2.2 The number of seats in local councils

The rule setting the size of each municipal council has changed over time. Before the 2004 elections, the local legislators themselves set the legislature size, respecting the caps defined by the federal Constitution. These caps are defined as follows: municipalities with up to one million inhabitants must have between nine and 21 legislators; in those with population between one and five million, the council size must be between 33 and 41 legislators; and localities with more than five million people must have from 42 to 55 legislators.

In 2004, the Brazilian Supreme Court (*Supremo Tribunal Federal* - STF) reinterpreted the law and set a principle of arithmetic proportionality to define the exact number of legislators a

[9] Law Number 9.504, dated September 30, 1997.

[10] Parties may form a coalition before the elections. In this case, the maximum number of candidates per coalition is of two times the number of seats in the council.

[11] A simple plurality rule is used in municipalities with less than 200,000 voters, and a two-ballot system is mandatory for the others above that threshold.

[12] Invalid votes in Brazil are either "null votes" or "blank votes", and both mean that the voter is indifferent between candidates. "Blank vote" is an option given by electronic voting machines, while a "null vote" is registered when a voter presses a number not associated with any candidate.

[13] If a coalition of parties is formed before the elections, it is treated as one party. The only difference is the maximum number of candidates allowed to be on its list, as I discussed in the last paragraph.

municipality should have according to its population. The rule respects the caps defined in the Constitution but creates several intervals between these caps to determine the local council sizes in Brazil. The rule is exposed in Table 1. Municipalities with up to 47,619 inhabitants must have nine legislators, those with a population from 47,620 to 95,238 must have 10, and so on.[14] In 2008, after several judicial discussions of which would be the number of seats for each municipality in the coming elections, the federal electoral authorities established that the rule made valid in 2004 would also be applicable to the 2008 local elections.[15]

Finally, it is important to note that although the 2004/2008 rule sets 36 population intervals to determine the council size, approximately 95% of the Brazilian municipalities have less than 95,000 inhabitants, falling under the first two intervals of the rule (thus having nine or 10 local legislators).

2.3 Women's Political Representation in Brazil

Although some gender gaps such as educational enrollment and life expectancy have recently closed in several societies, the gender inequality in political representation remains an important issue in many countries.[16] According to Quota Project (2014), for example, women constitute 20.4% of the members of parliaments around the world. In addition, WORLD BANK (2012) states that the situation is particularly striking in the Middle East and North Africa, where only one parliamentarian in 10 is a woman. To mitigate this problem, affirmative actions have been implemented at various levels of politics in the world. These actions are usually institutional measures adopted to enforce women's access to political positions, such as specifying shares of legislative seats reserved for women and establishing mandated quotas for women in party lists. The main rationale behind these measures is that female politicians focus on the implementation of policies that male officials do not, such as prenatal and child health, children's education, and violence against women.

The economic literature pays considerable attention to this topic, especially by relating women's representation in politics to the provision of certain goods and services. A comprehensive review of the impacts of political gender quotas on a range of outcomes can be found, for example, in the study by Ford and Pande (2012), where the authors report clear evidence that quota systems matter to increasing female leadership. Chattopadhyay and Duflo

[14]The number of people that corresponds to one legislator, 47,619, was calculated based on the caps in the federal Constitution: dividing the population limit of the first interval (one million) by the limit of the council size in this interval (21), it gives the value of one legislator per 47,619 inhabitants.

[15]The law changed again for the elections in 2012. A new resolution of the Superior Electoral Court gave the power to define its own number of legislators back to local councils, respecting the caps according to the municipalities' population. Although similar to the rule made valid before 2004, the new rule sets many more population intervals.

[16]See WORLD BANK (2012) for a complete analysis of gender inequalities around the world.

(2004), Duflo (2005), and Iyer et al. (2011) are also important papers on the impacts of gender quotas on policy choices. Furthermore, Lott and Kenny (1999) and Miller (2008) show how women's empowerment might shift economic decisions by exploring the institutional change of giving women the right to vote. Finally, a considerable set of papers uses distinct empirical strategies to report evidence that female politicians indeed adopt different policies than male officials (SVALERYD, 2009; CLOTS-FIGUERAS, 2012; BROLLO; TROIANO, 2013; BHALOTRA; CLOTS-FIGUERAS, 2014).

In Brazil, women's political participation has also been a critical issue, especially after the redemocratization process that occurred in the late 1980s. The elections that followed the promulgation of the 1988 Constitution showed a very low participation of female candidates (MIGUEL, 2008), which has fostered discussions about gender equality in politics. Trying to respond to this situation, in 1997, the Brazilian government established a law introducing electoral quotas for women in Brazil. The law aimed to increase women's political participation by mandating that the list of candidates for each coalition of parties shall contain a minimum of 30% and a maximum of 70% of candidates of each gender.[17] However, the impact of the introduction of these quotas was very limited, as shown by Miguel (2008), Miguel and Queiroz (2006), and AraÚjo (2001).[18] Currently, 17 years after the establishment of the law, the representation of women in the Brazilian political sphere is slightly higher but remains very low compared to other countries. In a 2014 ranking by the Inter-Parliamentary Union (IPU) comparing the percentage of women in the parliaments across 189 countries, for example, Brazil stood in the 124$^{\text{th}}$ position.[19]

To quantify the low participation of women in Brazilian politics, I present some descriptive statistics on female political representation in Figure 1. In Panel A, the table shows that despite the fact that the current president is a woman, the presence of women in the last federal and state elections (in 2010) was considerably low. For example, less than 10% of the 513 federal deputies elected in 2010 were female, and women represent two out of the 27 state governors elected in the same elections. In local politics, the gender gap is also very high, as I show in Panel B of Figure 1. First, the average percentage of female candidates in the last local elections for mayor was 12.9%, and only 11.5% of the municipalities elected a woman as their local executive leader. For the municipal councils, it is worth noting that the average

[17] In fact, a first electoral law (Law No. 9100) was established in 1995, requiring that a minimum of 20% of vacancies on party lists be filled by women. The law was implemented in the following year's elections for mayors and members of the municipal councils. In 1997, Law No. 9504 increased that figure to 30% and also regulated state and federal elections, extending the principle to the contests for state Legislative Assemblies and the federal Chamber of Deputies.

[18] In my opinion, however, it is questionable whether these articles identify a causal relationship because they do not adequately address possible endogeneity concerns.

[19] The referred ranking was released on January 1st, 2014. It can be accessed at http://www.ipu.org/wmn-e/classif.htm.

percentage of women among the set of candidates increased in the most recent elections, finally reaching the 30% quota established by the 1997 electoral law.[20] However, I show that the average percentage of seats held by women in local legislatures remains considerably low and did not exhibit an upward trend in recent years.

Therefore, the discussion on women's political empowerment remains considerably relevant in Brazil and worldwide. Enhancing female participation in the decision-making process is crucial for the promotion of gender equality and the acceleration of development (DUFLO, 2012), and Brazil has substantial room to improve with regard to this topic.

3 Data and Estimation Strategy

3.1 Electoral and Municipal Data

To evaluate how the number of local legislators affects the electoral representation in Brazilian municipalities, this paper uses the microdata from the Superior Electoral Court (*Tribunal Superior Eleitoral* - TSE) as its main data source. This resource contains information about all of the candidates that ran in the elections that I study, allowing me to analyze both the pool of candidates and the pool of politicians elected. It also contains other important electoral data, such as information on citizens' party affiliations, the number of votes each candidate received, and the abstention rate in each municipality.

Because the number of seats in local councils in the elections of 2004 and 2008 was defined based on the municipal populations of 2003 and 2007, this information is also very relevant for my analysis. These data are provided by the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatistica* - IBGE), an independent national institute. The IBGE annually reports the population size of Brazilian municipalities, although population counts are not performed every year. In years when the IBGE does not perform population counts, it reports population estimates based on information contained in the previous count and in the most recent reports on births, mortality, and immigration rates.[21] It is important to reinforce that these estimates are calculated by the IBGE and not

[20] This is most likely due to a greater enforcement of the law because the topic was again widely discussed in 2010. An example of a media report at that time can be found here (in Portuguese): http://congressoemfoco.com.br/noticias/tse-exigira-cumprimento-de-cotas-para-mulheres/

[21] Population counts in Brazil are performed in the IBGE Demographic Census, conducted every ten years, and in the IBGE Population Count, conducted in between census years. The last two waves of the Demographic Census were performed in 2010 and 2000, and the last two Population Counts occurred in 2007 and 1996. Population estimates have been reported every year since 1991 except those years when Demographic Census or Population Counts were performed. Methodological notes on the population estimates can be found in http://www.ibge.gov.br/english/.

by each municipality individually, making their manipulation very unlikely.[22] For my study, I obtain the information on population sizes from the 2007 Population Count and from the 2003 inter-census Population Estimates.

Lastly, because my main result concerns a significant increase in women's political representation, I gather data from several additional sources to analyze how these changes in electoral representation impact public policy decisions. Therefore, the datasets I use provide information on policies related to the preference of females for the municipal administration mandates considered in this study (2005-2008 and 2009-2012). First, for the analysis on municipal public finance indicators, I use the database of the National Secretary of Treasury (FINBRA), which contains annual data on municipal spending and revenues by category. I also use information on the number and gender of all local councilmembers provided by the 2005 Census of Brazil's Municipal Councils. Collected by a sub-secretary of the Brazilian Senate (*Interlegis*), this is the only official census of municipal councils in Brazil. Another policy outcome that I analyze is children's enrollment in day care centers because I believe it could be affected by the increase in women's participation in politics. Thus, I gather data from the 2007 and 2011 waves of the Annual School Census, which are collected by a national institute of educational research associated with the Ministry of Education (INEP) and include all schools in Brazil. To verify the possible impacts on measures of educational quality, I use the INEP's standardized examination (*Prova Brasil*) for 5th-grade students in municipal public schools as well as the scores of the municipal Index of Basic Education Development (IDEB), which is based on *Prova Brasil* and the students' average passing rate. For these outcomes, I use the information for the third year following the elections that I study. I also investigate the impacts on prenatal health services, whose data are provided by the information systems of the Data Processing Department of the Unified Health System (DATASUS) from the Ministry of Health. The Information System on Live Births (SINASC) annually provides data on prenatal health outcomes, such as the number of prenatal medical visits and the number of births considered premature, while the Information System on Mortality (SIM) provides the yearly number of fetal and infant deaths in each municipality. Additionally, the Hospital Information System (SIH) contains information on the number of women admitted to the hospital for treatment of injuries from aggression. For the examination on the participation of women in the formal workforce, I obtained the data from the Annual List of Social Information (RAIS), a data collection instrument from the Brazilian Ministry of Labor and Employment that provides information on occupation by gender in each Brazilian municipality. Finally, the 2006 and 2011 waves of the IBGE survey on public administration (MUNIC) provide information on various aspects of municipal administration

[22] I return to this issue in subsection 3.3, where I discuss some concerns for my identification strategy.

that could be related to a greater representation of women, such as the existence of maternity hospitals in municipalities and the gender of municipal health and education secretaries.

3.2 Identification Strategy

The focus of this paper is the analysis of how legislature size impacts electoral representation and consequently public policy. Evaluating these effects is challenging because of the difficulty of identifying a causal relation between the size of local legislatures and the variables of interest. The endogeneity of political institutions is always an important concern in the empirical research on political economy.[23]

For a better explanation of the endogeneity issues in my context, I use the counterfactual framework pioneered by Rubin (1974).[24] I am interested in the causal effect of a binary intervention: an increase by one in the number of local legislators.

Define $Y_i(0)$ and $Y_i(1)$ as the pair of potential outcomes for municipality i: $Y_i(0)$ is the outcome without treatment, and $Y_i(1)$ is the outcome of municipality i with an additional legislator. Although my interest deals with estimating the average difference in potential outcomes, i.e., $E(Y_i(1) - Y_i(0))$, I can never observe both $Y_i(0)$ and $Y_i(1)$ for a certain municipality. If $W_i \in \{0, 1\}$ defines whether the treatment is received or not, with $W_i = 1$ if municipality i received an additional legislator and $W_i = 0$ otherwise, I can write the outcome observed as $Y_i = (1 - W_i) \cdot Y_i(0) + W_i \cdot Y_i(1)$.

A simple comparison between municipalities with different numbers of legislators, i.e., $E(Y_i(1)|W_i = 1) - E(Y_i(0)|W_i = 0)$, would generate unbiased estimates of $E(Y_i(1) - Y_i(0))$ only if the treatment indicator W was statistically independent of $(Y(0), Y(1))$. In my case, however, the treatment is given to municipalities with larger populations, which could be correlated to the potential outcomes $(Y(0), Y(1))$. Therefore, I need a different approach to my estimations.

To properly address endogeneity concerns, I exploit the credibly exogenous source of variation on the size of local legislatures in the elections of 2004 and 2008 in Brazil. As explained in Section 2 and exposed in Table 1, the number of legislators of each city in these two elections was a deterministic and discontinuous function of the municipal population size, enabling the use of a sharp Regression Discontinuity (RD) approach. Because more than 95% of Brazilian municipalities have fewer than 95,000 inhabitants, the focus of my analysis is on the discrete and discontinuous change from nine to 10 local legislators, which

[23] See Acemoglu (2005) for a discussion of the problems and challenges facing empirical work on political economy.

[24] See Imbens and Wooldridge (2009) for a survey on the use of the Rubin Causal Model (RCM) in the economic literature. The following explanation is based on Imbens and Lemieux (2008).

happens at the cutoff point of 47,619 inhabitants.

The basic idea behind this design is that the assignment of treatment is completely determined by the location of the municipality's population on either side of a fixed threshold (47,619 inhabitants). That is, W is a deterministic function of the treatment-determining variable X, defined as the number of inhabitants. Therefore, I can formalize the assignment to the treatment group as:

$$W_i = 1[X_i > 47,619] \tag{1}$$

Municipalities with populations greater than 47,619 receive the treatment (one additional seat in the legislature), and those with populations lower than or equal to 47,619 are assigned to the control group. To estimate the average causal effect of the treatment, I look at the discontinuity in the conditional expectation of Y given X: $\lim_{x \downarrow 47,619} E(Y_i|X_i = x) - \lim_{x \uparrow 47,619} E(Y_i|X_i = x)$. This is interpreted as the Local Average Treatment Effect (LATE) at the discontinuity point, which I call τ:

$$\tau = E[Y_i(1) - Y_i(0)|X_i = 47,619] \tag{2}$$

This approach addresses the endogeneity problems I discussed, and my empirical strategy estimates τ. The potential concerns of this strategy are discussed in the following subsection.

3.3 Estimation

The most direct way to estimate τ for a series of outcomes of interest would be to compare the values of the dependent variables for observations in small intervals on either side of the threshold. However, due to the limited number of observations in those small intervals, this non-parametric approach would present low statistical power.

To overcome this issue, I use as my main specification a parametric strategy consisting of estimating two separate regressions on each side of the threshold and comparing the predicted value of their dependent variable at the cutoff point.[25] The most direct way of doing this is to run a pooled Ordinary Least Squares (OLS) regression on both sides of the cutoff point, as suggested by Lee and Lemieux (2010) and represented by the following equation:

$$Y_i = \beta_0 + \tau W_i + g_1(X_i - \overline{c}) + W_i g_2(X_i - \overline{c}) + \epsilon_i \tag{3}$$

[25]The results from the non-parametric approach and from further specifications are presented as robustness checks in Section 5.

where W_i is a dummy variable indicating whether the observation i is on the left side ($W_i = 0$) or on the right side ($W_i = 1$) of the cutoff, X_i is the population of municipality i, $\overline{c}$ is the first threshold set by the rule ($\overline{c} = 47,619$), and $g_1(\cdot)$ and $g_2(\cdot)$ are third-order polynomials. The parameter of interest is τ, which in my case gives the causal effect on Y_i of increasing the number of local legislators from nine to 10.

Because I focus only on the first discontinuity set by the rule, I restrict my sample to municipalities with populations up to 95,238 inhabitants (the second threshold). Additionally, because the rule was valid in the elections of 2004 and 2008, I pool the observations from those years to run the regressions and cluster the standard errors at the municipal level.

One relevant concern for my empirical strategy is whether there are other policies determined by the same threshold in the population or determined by cutoff points close to the one I am focusing on. The existence of these other policies could lead me to false conclusions about the impacts of the number of local legislators. The first issue is not a problem in my context because the population cutoff I analyze only defines the local council sizes. Nevertheless, two other policies are determined following rules based on the municipalities' population, although there are reasons to believe that they do not drive my results.

First, the wages of local legislators are determined following a rule based on certain population cutoffs. The law specifies caps for the salary that the legislators define for themselves, as I show in Panel A of Table 2.[26] Although the cutoff points are not the same as the ones I am studying, the first two thresholds in the wage rule are in the interval of cities that I consider, and one of these (50,000) is close to the cutoff I am examining (47,619). In Panel B of Table 2, I present population intervals according to both the law defining the number of legislators and that defining the caps on salaries to clearly expose the discontinuities caused by these rules. For each population interval, I report the number of legislators established by the law, the limits on legislators' salaries and the number of municipalities in my sample. Because the legislators' income could have some effects on variables that I analyze and because I conduct a parametric estimation fitting polynomials on both sides of the discontinuity point, I only include in my sample municipalities with more than 10,000 inhabitants, the first threshold of the wage rule.[27] My sample thus consists of municipalities with populations from 10,000 to 95,238 inhabitants in the 2004 and 2008 elections, giving a total number of observations of 5,282.[28] Furthermore, the robustness check section argues that the effects I find are indeed within the threshold that I analyze and not in the one set by the rule that determines salary

[26]The already cited work by Ferraz and Finan (2011) uses the discontinuities generated by this rule to estimate with a Fuzzy Regression Discontinuity approach how local legislators' wages affect competition for office, political entry, and political performance.

[27]The results for the complete sample are shown in the validity tests in Section 5.

[28]For some variables that I use as dependent variables, I have missing data for some municipalities. Therefore, the number of observations may vary slightly from one regression to another.

limits.

Second, federal transfers to municipal governments also vary according to various population cutoffs, and two of these thresholds (of 44,148 and 50,940 inhabitants) are close to the one I analyze (of 47,619). However, I believe that this is of less concern. As shown by Ferraz and Finan (2011), due to misassignments around the population thresholds and the possibility of manipulation, the block grant actually received by each city is much more continuous across cutoffs than would be expected. Furthermore, in a paper studying this specific type of transfer, Brollo et al. (2013) finds no visible increase in observed transfers at the 44,148 threshold.[29] Therefore, I am confident that the cutoff points of 44,148 and 50,940 inhabitants in the law defining federal transfers to municipal governments do not confound my results. Even so, it is important to note that in Section 5, I perform a non-parametric estimation using only municipalities around the cutoff point of 47,619, thus isolating my results from the effects of these other discontinuities.

Another potential concern for my strategy is whether the rule determining the number of legislators was actually respected by Brazilian municipalities. In Figure 2, I plot the council size against the population for all of the observations in my sample to show that the electoral law was indeed respected and created a sharp discontinuity in the legislature size. I can notice that the probability of treatment jumps from 0 to 1 at the cutoff point.[30]

The possibility of auto-selection around the threshold is also an important issue in regression discontinuity designs. Nonetheless, auto-selection is highly implausible in the political context I analyze because municipal populations were not self-declared but estimated by the independent national institute IBGE, as explained in subsection 3.1. Furthermore, as I have already stated, the electoral authorities established the rule valid in the 2004 and 2008 elections only in the respective years of the elections. Because the number of seats in each local legislature in those elections was based on the 2003 and 2007 municipal populations, the municipalities did not know the rule that defined their council sizes before the publication of the population estimates. Manipulation is therefore very unlikely. Even so, I perform a statistical test to check for this possibility. Following McCrary (2008), I plot in Figure 3 the density of the population of municipalities in my sample. If the density was not continuous at the cutoff point, municipalities could manipulate their population counts to benefit from a larger legislature. However, the density appears continuous at the threshold, showing no evidence

[29]The authors restrict their sample to municipalities with fewer than 50,940 inhabitants.

[30]0.3% of the total number of observations in my sample did not respect the law. This occurred particularly in the 2008 election. Those municipalities were prosecuted by electoral authorities and in some cases had to adapt their number of legislators after the election. It is important to note that some of them elected more legislators than foreseen by the law, while others elected fewer. Because it was a judiciary issue and the number of observations is almost irrelevant, I simply ignored those municipalities in my regressions. The results do not change when I include them and are available upon request.

of non-random sorting. Additionally, to complement this analysis, Section 5 also presents the results of some tests that indicate that my sample is balanced around the threshold.

To sum up, I am confident that my empirical strategy indeed estimates the causal effects of interest: the impact of increasing the number of seats in the local councils from nine to 10.

4 Main Results

This section reports and discusses the main findings of the empirical specification presented in the last section, and it is divided into four subsections. The first presents the effects of the number of seats in the local councils on the candidates' entry into elections and on the pool of candidates running for office. Then, I report the estimates for the election results and the pool of elected officials, where my main result is the increase in women's participation in politics. In the third stage, I show that the council size also affects the elections for mayor, which occur simultaneously to legislative elections. Finally, I present evidence that the greater representation of women has effects on policy outcomes.

4.1 Political Entry

Because the focus of this study is on the relationship between the size of local councils and the electoral representation of women, the first step of the analysis is to examine how the number of seats in legislatures affects the candidates' entry into municipal elections. Table 3 reports the results of my main estimation (Equation 3) for this entry stage. I begin by investigating whether the increase in the number of seats in the local council influences the number of citizens affiliated with a political party and the formation of parties or coalitions in the municipalities. It is important to reinforce, however, that the rule determining the number of legislators in each municipality was confirmed only close to the 2004 and 2008 elections, as discussed in Section 2. Therefore, the affiliation of citizens and the formation of parties to run in the 2004 and 2008 municipal elections happened before the establishment of the rule that redefined the size of each local legislature, so these variables should not be affected in my context. The results for these estimations are shown in columns 1 to 3 of Panel A (Table 3) and indicate no discontinuous jump in these variables at the cutoff point, as expected.[31,32]

[31] A significant result in these estimations could mean that citizens and political parties anticipated the establishment of the new rule determining the council size by distinct population thresholds.

[32] I further investigated: (i) whether the distribution of affiliates among parties changed before the elections at the cutoff point, and (ii) whether there is an asymmetric effect between genders in the number of citizens affiliated with political parties before and after the elections. The estimates were not significantly different from zero; these data are available upon request.

The stage in which parties choose their sets of candidates among their affiliates, on the other hand, happens only four months before elections in Brazil, meaning that parties could adjust their sets of candidates in response to the establishment of the law defining the number of seats in each council. There are two main reasons why the number of candidates running for office might be affected by the size of the legislature. First, because local legislators are selected under a proportional representation system, a greater number of seats in the council means that each candidate needs a lower proportion of votes to be elected. This may increase the number of affiliated citizens motivated to run for office because they perceive greater chances of being elected. Second, as I discussed in Section 2, the cap on the number of candidates for each party or coalition is defined according to the council size. Therefore, an increase in the number of seats elevates the maximum number of candidates that each party or coalition may include in its list.[33]

I investigate whether the legislature size affects the number of candidates running for office and report the results in column 4 of Panel A (Table 3) . The estimation suggests that an increase in the number of seats in the legislature from nine to 10 elevates the number of candidates running in the elections. Although this estimate is not significantly different from zero in my main specification, the increase in the total number of candidates is statistically significant in the other functional forms I use, as will be discussed in more detail in Section 5 and as reported in Table 9. An interesting observation is that the proportional increase in the number of candidates running is 11%,[34] which is equal to the proportional increase in the number of seats (11.1%). This means that the number of candidates per seat does not change at the cutoff point, as I expose in column 5 of the same panel.

Because my main interest in this article is the effects of council size on the electoral representation of women, I also investigate whether the reported increase in the number of candidates is asymmetric between genders. This is consistent with conceptual frameworks in which women face some political barriers to their entry decision, as in the theoretical models of Bhalotra, Clots-Figueras and Iyer (2013) and Casas-Arce and Saiz (2011). The estimates of this analysis are reported in columns 6 and 7 of Panel A (Table 3) and show that while the number of male candidates jumps 12.4% at the cutoff point (column 6), the number of

[33]I have checked that these limits are indeed binding for some parties or coalitions in municipalities whose populations are in a small interval on the left of the threshold. On average, those municipalities present 2.65 parties or coalitions that have offered the maximum number of candidates allowed. Additionally, there is no discontinuous change on this value at the cutoff point.

[34]This is the marginal increase, 11.29, divided by the average at the cutoff point, indicated in the table (103.0).

female candidates is not significantly altered by the increase in the council size (column 7).[35] I further examine these findings by showing that the larger number of male candidates is driven by the entry of citizens who did not participate in the previous election (column 1, Panel B), whereas the number of female candidates who did not participate in the previous election is not affected by the increase in the number of seats (column 2, Panel B). This means that the set of female candidates does not change with the increase in the council size, but the set of male candidates is enlarged with the entry of new competitors.[36]

Additionally, I look at the pool of legislators at the time of the elections to check whether the number of seats to be filled in the elections has any effect on the percentage of legislators running for reelection.[37] This variable may be affected by council size because candidates know they need to attract a lower proportion of votes to be elected when the number of seats being disputed is larger. The results are presented in columns 3 and 4 of Panel B (still in Table 3). First, it is interesting to note that for municipalities just before the cutoff point, 75% of their local legislators attempt to be reelected on average, regardless of the politician's gender. My estimations suggest no significant impact of the council size on these rates, although it is worth noting the distinct coefficients for male and female legislators.

Continuing to expose the results for political entry, I use a set of available electoral information to check other possible effects of the council size on the pool of candidates. Columns 5, 6, and 7 of Panel B present no significant effect on the share of candidates from the incumbent mayor's party, the average age, and the average level of schooling for the pool of candidates, respectively.[38]

To summarize, my estimations from the available data suggest that the number of seats affects the pool of candidates only in the gender dimension, increasing the number of male candidates while not altering the number of female candidates.[39]

[35] I also check whether the council size has any effect on the percentage of competing parties/coalitions that respect the minimum of 30% of women on their list of candidates (I discussed this electoral law in subsection 2.3). I find no change in this variable at the cutoff point. Moreover, it is interesting to note that on average, only 18% of parties/coalitions in municipalities in a small interval on the left of the threshold respect the gender quota.

[36] It is also possible to use the percentages of candidates of each gender who did not participate in the last election as dependent variables instead of using their absolute number. When I do this, I see an increase of 3.9 p.p. in the percentage of male candidates who are new entrants (from 59.8% at the cutoff point), while I find a negative but non-significant coefficient of -2.2 p.p. for female candidates (from 76.1% at the cutoff point).

[37] There is no term limit for local legislators in Brazil.

[38] I also constructed different measures of the candidates' age and education, such as the percentage of candidates that are more than 60 years old and the percentage of illiterate candidates. I found no effect of those variables. The results are available upon request.

[39] It is possible that council size affects the entry decision of candidates from other underrepresented groups, but I do not have the necessary data to test this notion.

4.2 Election Results and the Pool of Elected Legislators

After showing how the number of seats in the local council affects the entry of citizens into politics, I now turn to the effects on the election results. I present them in Table 4.

The first investigation addresses the participation of citizens in elections by verifying whether municipalities on either side of the cutoff point present different abstention rates. This analysis is motivated by the notion that the greater number of candidates in those municipalities with larger legislatures may foster political debate and increase the chances that citizens feel represented by candidates, thus attracting more people to participate in elections. The estimate reported in column 1 of Panel A (Table 4) is consistent with this hypothesis, as it shows that the number of seats in the local council is negatively related to the abstention rate in elections. Unfortunately, however, my data do not allow me to differentiate between the abstention of men and women to check whether there is an asymmetric effect on those rates.

Beyond the abstention rate, I also investigate whether the share of invalid votes has a discontinuous jump at the cutoff point.[40] The results reported in column 2 show that council size has no impact on this variable. This means that despite the fact that more citizens decide to participate in politics, the share of the electorate that actually chooses a candidate or party does not change.

Next, I begin to analyze the possible distinct impacts of council size on the election results for men and women. It is important to remember a relevant result presented in the last subsection: the increase in the number of seats in the council elevates the number of male candidates while leaving the number of female candidates unaltered. That said, I begin the analysis by separately calculating the percentage of total valid votes cast for candidates of each gender and reporting in columns 3 and 4 of Panel A (Table 4) that they show no discontinuous change at the cutoff point. This indicates that a group of voters is not attracted by the new male entrants and keeps voting for women despite the greater number of male candidates. Therefore, the evidence presented means that a greater number of male candidates competes for the same share of votes when the number of seats in the legislature is increased by one, suggesting a greater competition among men.

To show that male candidates indeed face greater competition when the number of seats in the legislature is increased, I first present in columns 5 and 6 of Panel A that the average number of votes individually received by each male candidate is reduced by approximately 16% at the cutoff point, while there is no significant effect on the average number of votes individually received by women. More importantly still, I calculate the Herfindahl-Hirschman

[40] Refer to Section 2 for the definition of invalid votes in Brazilian elections.

Index (HHI) for the votes received by men and women to evaluate what happens with the concentration of votes for candidates of each gender at the cutoff point.[41] The impacts on these variables are reported in columns 7 and 8 of Panel A, which show a discontinuous decrease in the concentration of votes for male candidates and no effect on the concentration of votes for female candidates. I interpret these findings as evidence that in my context, the increase in the number of seats in the legislature only boosts the competition among men. Therefore, male candidates "cannibalize" votes from each other, increasing women's chances of being elected to the council.

In Panel B of Table 4, I show how these electoral results influence the pool of elected legislators. The first column shows that on average, there are more parties elected in municipalities with more legislators, suggesting a more diverse representation of society. The results reported in columns 2 and 3 indicate that there is no change in the average age and months of education of the elected officials at the cutoff point.[42]

The remainder of Panel B reports my main findings: women's participation in politics is elevated by a larger council size. First, it can be noted in columns 4 and 5 that the estimates for the reelection rates of male and female politicians are quite different, although neither is statistically significant.[43] I view this result as primary evidence of the increased chance of election for female candidates, as explained above. Most importantly, with the rise in the number of seats in the local legislature, the average number of women elected increases almost 50% (column 6) in a political context in which female officials are a minority group. This means a significant increase in the percentage of the legislature filled by women (column 7). I also show, using a Linear Probability Model,[44] that the probability of electing at least one woman to the council increases 20 percentage points (or 44%) at the cutoff point (column 8).

The results thus indicate that the number of local legislators affects the participation of women in the legislature, suggesting a greater representation of the female electorate. This is an extremely important finding for the discussion of how to enlarge the participation of underrepresented groups in the decision-making process because changes in council size are not usually present in the set of institutional measures implemented to face this problem.

[41]The Herfindahl-Hirschman Index is an statistical indicator of concentration that is used to measure competition in a variety of contexts. In this paper, the HHI is used as a measure of political competition among candidates. The index was calculated separately by gender, by summing the squares of each candidate's individual vote share based on the total votes received by candidates of the respective gender.

[42]Again, I checked other measures of the education and age of the legislators elected and found no impact of council size on these dimensions. The results are available upon request.

[43]The reelection rate is calculated as the percentage of candidates who attempted reelection that got reelected.

[44]I use as the dependent variable a dummy indicating whether there is at least one woman as a legislator in the municipality.

Next, I report that the increase in legislature sizes has indirect effects on the elections to local executive power, which occurs simultaneously to the legislative elections.

4.3 Mayoral Elections

As the elections for mayor are held at the same time as the elections for the legislature, I use my empirical strategy to verify whether council size has any impact on the political competition for the executive power and on the characteristics of the elected mayor. This investigation is motivated by possible indirect effects: changes in electoral abstention, in the pool of candidates, campaign spending, and parties' strategies in the legislative election might affect the simultaneous elections for mayor.

Table 5 presents my estimations. I report in columns 1 and 2 the coefficients that suggest a larger number of candidates running and a greater distribution of votes among candidates, although neither is significantly different from zero. However, my evidence shows a very interesting finding: the increased female participation in politics caused by the larger number of legislators also exists for mayoral elections, reinforcing my results of a change in women's political representation. First, I report in column 3 that the number of women running for the local executive elections increases when the number of seats in the legislature increases from nine to 10, a result that I did not observe in the legislative election (shown in Table 3). Additionally, columns 4 and 5 present the results for the selected officials, using as a dependent variable a dummy indicating whether an elected mayor was a woman ($= 1$) or a man ($= 0$). In column 4, I show that the probability of having a woman elected as a mayor is increased by 14 percentage points at the cutoff point when I do not control for the presence of a female candidate, and this elevation is 27 percentage points when I do control for it (column 5).

In conclusion, these results reinforce the evidence that the number of legislators in a municipality affects the electoral representation, augmenting female participation in the decision-making process.

4.4 Policy Outcomes

The results presented so far clearly indicate that the size of local councils of Brazilian municipalities influenced women's political representation in the 2004 and 2008 elections. Based on these findings, a natural next step is to investigate whether this increase in women's participation in politics impacts municipal public policies adopted in the administration mandates of 2005-2008 and 2009-2012. This is motivated by previous empirical articles that indicate that including women in the decision-making process can alter the policy decisions

politicians make, as I discussed in Sections 1 and 2. I address these issues in this subsection by examining whether the provision of several public goods and services presents a discontinuous change at the threshold that defines the increase in the council size (47,619 inhabitants). My focus, as will be clearer below, is on policy outcomes that the economic literature has already associated with women's preferences.

However, before directly analyzing public policy, my first interest is to investigate whether the reported increase in the number of women in official political positions influences the cabinet formation and the announced foci of the municipal administration. I believe that the larger female participation in the decision-making process could translate into a greater chance of women being appointed to other key positions in the community. Furthermore, as I have already discussed, it is possible that a local government with more women in leadership roles presents policies that are more closely related to women's preferences as the focus of the administration. For these estimations, I use information available in the 2005 Census of Brazil's Municipal Councils and in the 2006 and 2011 waves of the IBGE survey about local political management (MUNIC)[45]. The former provides the number of male and female councilmembers, while the latter indicates the genders of the health and education municipal secretaries and also indicates whether a local administration considers the expansion of care services for students with special needs to be one of its five main goals. The results are reported in columns 1 to 4 of Panel A in Table 6.[46] As exposed, I find no significant effect on the probability of a woman being appointed to the position of health or education secretary (columns 1 and 2), but it is interesting to note that both coefficients are positive and have an important magnitude compared to the average value for those municipalities in a small interval in the left side of the threshold. In column 3, I report that the ratio of female servers to male servers in the legislature is increased at the cutoff point, suggesting that a relatively greater presence of women in the legislature reflects the choice of councilmembers. Moreover, I show in column 4 that the focus on special needs students increases significantly at the cutoff point. This is a very interesting finding because the literature suggests that women place relatively greater weight on child welfare and that empowering women might increase investments in policies targeted to children (DUFLO, 2003; MASON; KING, 2001; MILLER, 2008; SVALERYD, 2009).

Having analyzed how a larger council size (and its effects on the participation of women in politics) affects other dimensions of the political spectrum, I now turn to evaluate its impacts

[45] See subsection 3.1 for a better explanation of the datasets used in this subsection.

[46] Unfortunately, MUNIC does not contain the same set of information every year. For this reason, the regression in column 2 only contains data for 2011, while the one in column 4 only contains data for 2006. The estimation in column 1 uses the 2006 data for the political mandate of 2005-2008 and the 2011 data for the political mandate of 2009-2012.

on policy outcomes. Motivated by articles that relate the size of local legislatures to the size of the government (PETTERSSON-LIDBOM, 2012) and women's political representation to the amount and composition of government expenditures (LOTT; KENNY, 1999), I begin my investigation by examining the effects of the number of local legislators on public finance outcomes. The results of these estimations are also shown in Table 6. In those regressions, my dependent variable is the logarithm of the expenditures or revenue analyzed for the three years following the elections, and the number of observations in the regressions may vary due to the availability of data because FINBRA, the data source for fiscal variables, does not provide information for all municipalities.[47] Columns 5 and 6 of Panel A show that the council size has no effect on total expenditures or total revenues, in contrast to the results presented by Pettersson-Lidbom (2012), which show that the number of local legislators in Sweden and Finland is negatively related to the size of local governments. In the same panel, column 7 shows that the increase in the number of seats in the councils from nine to 10 has no impact on the expenditures specific to the legislatures.[48] This is a very interesting finding because it would be expected that maintaining an additional legislator would require additional expenses. I believe that this result might be a consequence of the national Fiscal Responsibility Law established in 2000, which imposes limits on the municipalities in terms of the percentage of total revenue to be spent by local legislatures. To complement this analysis, I use data from the 2005 Census of Brazil's Municipal Councils to investigate a possible channel through which local councils might adjust their expenditures to respect the law. I do it by checking if the number of councilmembers presents a discontinuous change at the cutoff point. Column 8 of Panel A shows that this effect indeed exists: the number of people working in the legislatures decreases by 7.1 at the cutoff point from a mean of 19.9 in the municipalities in a small interval on the left of the threshold.

Panel B of Table 6 reports estimations showing that variables that could be related to women's preferences are significantly affected by the number of local legislators. These findings, together with some results presented in following tables, suggest that the increased participation of women in the decision-making process induced by larger legislatures significantly impacts policy outcomes in the municipalities. In columns 1 and 2, I continue the investigation about the impacts on municipal public finance and report the estimates for two expenditures that are frequently associated with female preferences. First, I report in column 1 an increase of approximately 38% in the expenditures on community assistance, and col-

[47]The main results reported so far are not sensitive to the inclusion or exclusion of observations whose information on public finance are not provided by FINBRA.

[48]To have a clear *ceteris paribus* interpretation of the effects of all public finance outcomes that I use as depend variables, I also estimated my main specification controlling for the total expenditures and/or the total revenues of each municipality for the three years following the elections. The results are not altered in terms of significance, and the coefficients remain very similar. They are available upon request.

umn 2 shows an approximate increase of 70% in the expenditures on childcare and preschool (the education of children from birth to five years old).[49] I believe that this is closely related to the increase in the political representation of women because female politicians may emphasize early childhood education as a critical issue related to the participation of women in the workforce and to gender equality.[50] Additionally, to show that this increase in childcare and preschool expenditures is reflected in the municipal provision of these services, I report in column 4 (Panel B) that the number of children enrolled in day care centers in the third year following the elections presents a large discontinuous jump at the cutoff point. This indicates that changes in women's empowerment not only affected the composition of public expenditures but also had direct effects on service provision.

I continue my analysis still focused on educational outcomes. As I have stated before, some empirical articles show a relationship between women's empowerment and children's education (CLOTS-FIGUERAS, 2012; SVALERYD, 2009), and therefore I believe it is important to investigate these effects in my context. To accomplish this, I examine the educational quality of lower-grade students in the third year following the elections. This examination thus uses data from the national standardized examination (*Prova Brasil)* for 5^{th} graders as well as from the municipal Index of Basic Education Development (IDEB). It is very interesting to note that both of these outcomes show a significant discontinuous jump at the cutoff point, as reported in columns 5 and 6 of Panel B (Table 6). These findings are very important to reinforce that women's empowerment can influence children's education, as previously reported by the literature.

Another set of public policies intuitively associated with women's preferences is related to health services related to prenatal care ((BROLLO; TROIANO, 2013; BHALOTRA; CLOTS-FIGUERAS, 2014). Therefore, I investigate whether the greater political representation of women as a consequence of larger council size impacts the provision of these services and report the results in Table 7. The first outcome I examine is the existence of a maternity hospital in municipalities, an information available in the 2011 IBGE survey about municipal administration (MUNIC). As shown in column 1, my estimation suggests that municipalities just above the threshold present a higher probability of providing this service three years after the elections, indicating an improvement in public policy targeted to women.[51] Continuing the focus on services to pregnant women, I also find that the number of births in the three

[49]Each of these expenditure categories (community assistance and childcare/preschool education) corresponds to approximately 2% of the total expenditures.

[50]My estimations, however, show no impact on women's share of the workforce in the years following the elections (column 3 of Panel B).

[51]This estimation only considers municipalities that have elected at least one woman as a local legislator. Furthermore, the regression controls for the percentage of women in the population. I find no significant result (although a positive coefficient) when using the whole sample and no controls.

years following elections presents a significant discontinuous decline of 9.2% at the cutoff point (column 2), indicating that greater female participation in policymaking can foster contraception and fertility control.[52] The estimate in column 3 suggests a larger share of pregnant women receiving four or more prenatal visits from public authorities in the three years following the elections, and columns 4 and 5 indicate a lower number of births in which the child was born premature and weighing less than 2,500 g.[53] Although these results are not statistically significant, it is important to note that they all point in the same direction, indicating improvements in prenatal care services. Moreover, I show in the first four columns of Panel B (still in Table 7) a relevant decrease at the threshold in the number of fetal and infant deaths in the three years following the elections, which I also associate with improved pregnancy and post-partum services.[54] While columns 1 and 2 report the results for the absolute number of fetal and infant deaths, columns 3 and 4 show the treatment effect estimate for the ratio between the number of fetal or infant deaths and the number of births.[55] Therefore, my investigations provide consistent evidence that the increased participation of women in the decision-making process as a consequence of larger legislatures indeed affects the provision of health services focused on prenatal care.

I also examine whether violence against women is affected by their increased political representation. This analysis is motivated by the study by Iyer et al. (2011), which investigates the relationship between female representation in Indian local governments and crime outcomes. The result is presented in column 5 (Panel B, Table 7), which shows a negative (but non-significant) effect on the number of women admitted to hospitals for the treatment of injuries from aggression in the three years following elections. Although not significantly different from zero, the magnitude of the coefficient is considerable: it indicates a decrease of 4.16 from an average of 4.6 in a small interval on the left of the threshold.

To summarize, my RD estimates present evidence that the number of local legislators affects policy decisions, particularly in those outcomes that the economic literature usually associates with female preferences. I believe that this result is caused by the impact of legis-

[52]The number of births could also be affected by an increase in the participation of women in the workforce, but I have already shown in Panel B of Table 6 (column 3) that there is no effect of this variable.

[53]I consider the number of premature live births and the number of live births in which the child was born weighing less than 2,500 g as outcomes that are hard to change in the short run. For this reason, I use the value for the third year after the elections instead of the total of the three years following them. Furthermore, I use the *Number of live births* as a control variable in these two regressions, to obtain a *ceteris paribus* interpretation of my results.

[54]Fetal death refers to the death of a fetus at any time during pregnancy, and infant death is the death of a child of less than one year of age.

[55]Because I have shown a decrease in the number of births (column 2 in Panel A), the estimations of the ratio between the number of fetal or infant deaths and the number of births are important to prove my result. This is because a decrease in the absolute number of fetal or infant deaths could be related to the decrease in the number of pregnant women.

lature size on the participation of women in local politics both in the executive and legislative powers, as shown in subsections 4.2 and 4.3. Therefore, my evidence adds to the literature about the relationship between women's representation and public policy and complements the view that female politicians implement different policies than their male counterparts.

The final step of my empirical exercise is to show that my results are robust and consistent.

5 Robustness checks

In this section, I perform some tests to validate the parametric RD estimations presented in Section 4. I begin with a visual inspection of my main findings in Figures 4 and 5. In each graph, the outcome of interest is plotted against the estimated population of the municipalities centered on the threshold of 47,619 inhabitants. Scatter points represent the mean of the outcomes for municipalities within bins of 1,666 inhabitants (3.5% of 47,619), and a third order polynomial is fitted on the original data at each side of the vertical threshold. As expected, the scatterplots and the fitted third-order polynomial exhibit clear discontinuities at the cutoff point.

As I discussed in Section 3, a first concern with regard to my empirical strategy is whether there are other determinants of women's participation in politics and policy outcomes in addition to the number of legislators that are also discontinuous at the cutoff point of 47,619 inhabitants. In that section, I stated that no other policy is determined by this threshold, discussed other policies defined by population cutoffs, and reported that the density of the municipal population in my sample is continuous at the threshold of 47,619 inhabitants (in Figure 3). Now, I complement this analysis by testing whether some observed baseline variables are "locally balanced" on either side of the threshold. In the case of imbalance, the difference in these baseline variables could drive my results, thereby weakening my conclusions. To test for this, I use a vast set of municipal characteristics for the year 2000 and estimate Equation 3.[56] However, because my empirical strategy consists of a pooled OLS estimation with data from the same municipalities for 2004 and 2008, I cannot use my entire sample in those regressions. Otherwise, municipalities would appear twice in the database with the same information from 2000. To account for that, I separately regress Equation 3 using the estimated population from both 2004 and 2008. The results are reported in Table 8 and suggest that my sample is well-balanced across the cutoff point for the distinct municipal characteristics and previous participation of women in politics. These results reinforce that

[56]Most of the variables in this balance test come from the 2000 Population Census. I also use some information provided by the TSE from 2000 to check the balance in women's participation in politics. The only variable that is not from 2000 is the *Existence of a Radio Station*, which comes from the 2006 and 2011 waves of the IBGE survey on public administration (MUNIC).

the findings I presented in this article are direct consequences of the increase in the size of local legislatures.

Another relevant test to validate my results is to check whether they are also present when different functional forms are used in the estimations. This is important to guarantee that my conclusions are not unique to the choice of an arbitrary specification. As explained in Section 3, I obtained my baseline estimates using a third-order polynomials on either side of the threshold with a sample consisting of municipalities with populations from 10,000 to 95,238 inhabitants (which I call a limited sample). To validate this strategy, I also regress Equation 3 with a third-order polynomial using a complete sample (municipalities from 0 to 95,238 inhabitants) and with a second-order polynomial using both the limited and the complete sample. Additionally, I perform a simple t-test of the means of my outcomes in a small interval around the threshold.[57] This non-parametric exercise, although presenting lower statistical power, is very important for RDD estimations because it is not affected by observations that are far from the threshold. It also isolates my results from possible confounding factors from the policies determined by other population thresholds, such as the federal transfers to municipalities and caps on local legislators' salaries (both discussed in Section 3). The results for the most relevant outcomes are shown in Tables 9 and 10, which report similar estimates for a large part of those functional forms.

I also check whether my results are driven by the threshold set by the rule that defines the limits of legislators' salaries, which is 50,000 inhabitants. As discussed in Section 3, the existence of this other threshold close to the one I analyze could influence my estimations if the variables I study are also affected by the legislators' salaries. To account for that, I first run my main specification (third-order polynomial) considering the cutoff point of 50,000 instead of 47,619. I also perform a simple t-test of the means in a closed interval around the fictitious cutoff of 50,000 inhabitants. Table 11 presents these estimates. As can be clearly noted, the effects of the council size that I find in my regressions do not appear in the estimations considering the threshold of the salary rule, confirming that my results are not affected by this other policy.

Lastly, I perform several placebo regressions with false thresholds to rule out the possibility that the effects I found in the threshold defining the council size are spurious. I begin by running my main specification in false cutoffs close to the one I analyze (between 90% and 110% of the true cutoff value of 47,619). In Figures 6 and 7, I plot the coefficients estimated by these placebo regressions together with a 90% confidence interval. They show that the magnitude and statistical significance of the treatment effect for my most relevant outcomes are indeed maximized at the true threshold, which increases the confidence in my results. I

[57] The interval used was of 2,380 inhabitants, equivalent to 5% of the cutoff point (47,619).

complement this analysis with Figures 8 and 9. They report the t-statistics of my main regression (vertical line) together with the cumulative density function of t-statistic values from several RD estimations at false discontinuities between 50% and 150% of the cutoff value, using increments of 0.1 percentage points.[58] Because the t-statistics of my true regressions are always extreme values compared to the regressions in false thresholds, I see these placebo regressions as an additional confirmation that my results are robust and consistent.

6 Conclusion

There is a growing body of literature on political economy studying how distinct institutional mechanisms affect electoral representation and influence politicians' decisions. I contribute to this debate by empirically analyzing a specific institutional parameter: the number of local legislators.

My empirical strategy is based on a quasi-experimental source of variation in the council size of Brazilian municipalities in the 2004 and 2008 elections, when a constitutional amendment required legislature sizes to be calculated as a deterministic and discontinuous function of cities' populations. The econometric evidence shows that a larger number of local legislators affects electoral representation by increasing the participation of women in local politics. The results also show impacts on the public provision of goods and services that could be considered preferred by women as a consequence of these effects on women's participation.

I believe this article contributes to two central discussions. First, deciding the optimal size of legislatures is extremely relevant in representative democracies because this choice defines the number of politicians who represent the people. A small number of representatives may be associated with a small number of groups being represented in the political process, facilitating *pork-barrel* policies and corruption and hindering the efficient allocation of resources. On the other hand, electing a large number of legislators might be extremely costly. Our findings shed light on this debate by reporting evidence of a change in electoral representation as a consequence of an increase in the number of legislators. Due to data availability, I only focused on the gender dimension, although the political representation of other minorities may also increase when enlarging the local council. People tend to ignore these arguments when debating political representation in representative democracies. In my opinion, the size of legislatures should be included in the pool of institutional parameters believed to affect the participation of minority groups in the political process.

[58] This empirical exercise was based on falsification tests made by Vigna and Ferrara (2010). In my case, I exclude the regressions ran in false thresholds in the interval between 90% and 110% of the cutoff value because they are treated in Figures 6 and 7.

The second important topic to which this paper contributes is the representation of women in politics. Several countries have adopted institutional innovations to guarantee the equal gender political representation, and a set of articles has discussed this topic. As I show that women's participation in the decision-making process is affected by legislature size and impacts public policy, my results add to this literature, especially by analyzing an institutional mechanism that had yet to be studied. Furthermore, the investigation of women's participation in politics in Brazil is interesting per se because the country presents a considerably low political representation of females.

Lastly, my evidence is also considerably relevant for the current discussion about Brazilian local politics because the rule defining council size has changed three times in the last four elections and continues to be discussed. However, additional studies are needed to better evaluate the relationship between the legislature sizes, electoral representation, and public policy, especially in other political contexts and for other underrepresented groups.

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Table 1: The number of local legislators - 2004 and 2008 elections

Population Intervals			No of Legislators	Population Intervals			No of Legislators
0	to	47,619	9	1,609,757	to	1,731,707	38
47,620	to	95,238	10	1,731,708	to	1,853,658	39
95,239	to	142,857	11	1,853,659	to	1,975,609	40
142,858	to	190,476	12	1,975,610	to	4,999,999	41
190,477	to	238,095	13	5,000,000	to	5,119,047	42
238,096	to	285,714	14	5,119,048	to	5,238,094	43
285,715	to	333,333	15	5,238,095	to	5,357,141	44
333,334	to	380,952	16	5,357,142	to	5,476,188	45
380,953	to	428,571	17	5,476,189	to	5,595,235	46
428,572	to	476,190	18	5,595,236	to	5,714,282	47
476,191	to	523,809	19	5,714,283	to	5,833,329	48
523,810	to	571,428	20	5,833,330	to	5,952,376	49
571,429	to	1,000,000	21	5,952,377	to	6,071,423	50
1,000,001	to	1,121,952	33	6,071,424	to	6,190,470	51
1,121,953	to	1,243,903	34	6,190,471	to	6,309,517	52
1,243,904	to	1,365,854	35	6,309,518	to	6,428,564	53
1,365,855	to	1,487,805	36	6,428,565	to	6,547,611	54
1,487,806	to	1,609,756	37	6,547,612		plus	55

Notes: This table exposes the rule defining the legislature size in Brazilian municipalities for the 2004 and 2008 elections. As can be noticed, the number of legislators varies according to 36 intervals in the municipalities' population.

Table 2: Caps on local legislators' salary and the number of local legislators

Panel A

Population	Cap on salary as a percentage of state legislators salary
0 to 10,000	20%
10,001 to 50,000	30%
50,001 to 100,000	40%
100,001 to 300,000	50%
300,001 to 500,000	60%
500,000 plus	75%

Panel B

Population Intervals	Number of local legislators	Cap on salary as a percentage of state legislators salary	Number of observations
0 to 10,000	9	20%	5,279
10,001 to 47,619	**9**	**30%**	**4,659**
47,620 to 50,000	**10**	**30%**	**45**
50,001 to 95,238	**10**	**40%**	**578**

Notes: Panel A of this table exposes the rule defining caps on the salaries of local legislators (Constitutional Amendment No. 25, 2000). The caps are defined as a percentage of state legislators' salary, which are defined as a percentage of the salary of federal deputies. In Panel B, I present population intervals according to both the law defining the number of legislators and the one defining the caps on salaries. For each population interval, I report the number of legislators established by the law, the caps on legislators' salaries and the number of municipalites (pooled for 2004 and 2008) in the respective interval.

Table 3: The Effects of the Local Council Size on Political Entry

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Number of citizens affiliated to parties	Number of parties running	Number of coalitions running	Total number of candidates	Number of candidates per seat	Number of male candidates	Number of female candidates
Treatment effect	-24.29	-0.614	0.633	11.29	0.070	9.650*	1.644
	(0.637)	(0.455)	(0.260)	(0.110)	(0.925)	(0.056)	(0.462)
average at the cutoff	579.2	16.6	9.9	103.0	11.4	77.8	25.2
Observations	5,282	5,282	5,282	5,282	5,282	5,282	5,282
Panel B	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Number of male candidates not in previous elections	Number of Female candidates not in previous elections	% of male incumbents trying reelection	% of female incumbents trying reelection	% of candidates from the mayor's party	Average age of candidates (months)	Average educ of candidates (years)
Treatment effect	8.660**	0.619	-0.015	0.086	0.563	4.755	-0.031
	(0.020)	(0.729)	(0.594)	(0.242)	(0.656)	(0.260)	(0.896)
average at the cutoff	48	19.4	0.75	0.75	9.3	512.3	10.5
Observations	5,282	5,282	5,026	3,646	5,282	5,282	5,282

Notes: This table reports RDD estimates of the effects of the council size on political competition and the entry of citizens in politics. RDD specification with a third order polynomial in either sides of the cutoff point using a sample of municipalities with population from 10,000 to 95,238. *Number of citizens affiliated to parties* represents the number of citizens in the municipalities who became affiliated with a political party in the year before the elections. The 'average at the cutoff point' is calculated using 20 municipalities with population from 46,620 up to the threshold (47,619). Robust p-value in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Table 4: The Effects of the Local Council Size on Election Results and on the Pool of Elected Legislators

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Electoral abstention rate (%)	Invalid votes (%)	% votes received by male candidates	% votes received by female candidates	Avg. number of votes for male candidates	Avg. number of votes for female candidates	HHI of votes for male candidates	HHI of votes for female candidates
Treatment effect	-1.739**	0.020	-0.559	0.570	-47.96**	-11.38	-0.004*	0.005
	(0.025)	(0.950)	(0.615)	(0.608)	(0.056)	(0.577)	(0.095)	(0.758)
average at the cutoff	16.4	4.7	84.8	15.2	306.9	177.1	0.03	0.13
Observations	5,281	5,281	5,274	5,274	5,282	5,278	5,274	5,268

Panel B	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Number of parties elected	Average age of elected legislators (months)	Average educ of elected legislators (years)	Reelection rate of male candidates (%)	Reelection rate of female candidates (%)	Number of women elected	% of the legislature filled by women	Elected at least 1 woman to the council
Treatment effect	0.604**	7.624	-0.141	-2.768	16.42	0.431**	3.329*	0.203**
	(0.025)	(0.356)	(0.708)	(0.447)	(0.103)	(0.024)	(0.092)	(0.016)
average at the cutoff	5.4	498.8	11.8	43.0	20.4	0.9	10.0	0.45
Observations	5,282	5,275	5,275	5,276	3,178	5,282	5,282	5,282

Notes: This table reports RDD estimates of the effects of the council size on elections results and on the pool of elected legislators. RDD specification with a third order polynomial in either sides of the cutoff point using a sample of municipalities with population from 10,000 to 95,238. The *Electoral abstention rate* represents the fraction of the registered electorate that abstained from voting. *Invalid votes* is the percentage of votes which did not go to a candidate or party (either blank or null vote). *HHI of votes for male (female) candidates* is the Herfindahl-Hirschman Index measuring the concentration of votes for the candidates of each gender. *Reelection rates* represent the percentage of candidates who attempted reelection that got reelected. The 'average at the cutoff point' is calculated using 20 municipalities with population from 46,620 up to the threshold (47,619). Robust p-value in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Table 5: The Effects of the Local Council Size on Mayoral Elections

	(1)	(2)	(3)	(4)	(5)
	Total number of candidates	HHI of votes for candidates	Number of female candidates	Elected a female mayor (not conditional)	Elected a female mayor (conditional)
Treatment effect	0.285	-0.029	0.197*	0.140**	0.268*
	(0.138)	(0.192)	(0.089)	(0.030)	(0.056)
average at the cutoff	3.3	0.43	0.35	0.10	0.33
Observations	5,282	5,282	5,282	5,282	1,464

Notes: This table reports RDD estimates of the effects of the council size on mayoral elections, which occur simultaneously to the legislative elections. RDD specification with a third order polynomial in either sides of the cutoff point using a sample of municipalities with population from 10,000 to 95,238. *HHI of votes for candidates* is the Herfindahl Hirschman Index measuring the concentration of votes for the candidates for mayor. The difference between columns 4 and 5 is that the estimation of column 5 only uses the municipalities which had female candidates for mayor. The 'average at the cutoff point' is calculated using 20 municipalities with population from 46,620 up to the threshold (47,619). Robust p-value in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Table 6: Impacts on policy outcomes (1/2)

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Woman as education secretary	Woman as health secretary	Council-members: ratio of female over male servers	Focus on special needs students as main goal	Log of total revenue	Log of total expenses	Log of expenditures specific to the legislatures	Number of council-members
Treatment effect	0.059	0.101	0.923**	0.243**	0.019	0.007	-0.046	-7.078**
	(0.492)	(0.422)	(0.036)	(0.0466)	(0.794)	(0.920)	(0.729)	(0.040)
average at the cutoff	0.65	0.43	1.02	0.46	18.7	18.7	15.0	19.9
Observations	5,282	2,660	1,934	2,622	4,681	4,681	4,162	2,067

Panel B	(1)	(2)	(3)	(4)	(5)	(6)
	Log of expenses on community assistance	Log of expenses on childcare & preschool	% of the workforce represented by women	Number of Children in day care centers	*Prova Brasil* scores of 5th graders	IDEB score of municipal public schools
Treatment effect	0.393*	0.697*	1.016	126.7**	0.358**	0.437**
	(0.068)	(0.069)	(0.609)	(0.044)	(0.022)	(0.035)
average at the cutoff	14.5	14.3	43.4	338.9	4.6	3.88
Observations	4,520	4,357	5,282	5,282	5,106	5,106

Notes: This table reports RDD estimates of the effects of the council size on some fiscal variables. RDD specification with a third order polynomial in either sides of the cutoff point using a sample of municipalities with population from 10,000 to 95,238. The public finance variables *Log of Total Revenue*, *Log of Total Expenses*, *Log of Expenses on the Legislative*, *Log of Expenses on childcare & preschool*, and *Log of Expenses on Community Assistance* represent the aggregated value for the 3 years following the elections. Information on the council servers are available only for 2005. Robust p-value in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Table 7: Impacts on policy outcomes (2/2)

Panel A	(1)	(2)	(3)	(4)	(5)
	Have a maternity hospital in 2011	Number of live births	% pregnant women w/ 4 or more prenatal visits	Number of premature live births	Number of live births <2500 g
Treatment effect	0.234*	-217.8*	0.03	-5.574	-2.348
	(0.070)	(0.085)	(0.122)	(0.275)	(0.404)
average at the cutoff	0.5	2478.9	0.9	63.0	62.2
% female pop.	*Yes*	*No*	*Yes*	*No*	*No*
No of births in the 3rd year after elections	*No*	*No*	*No*	*Yes*	*Yes*
Observations	1,864	5,282	5,274	5,276	5,282

Panel B	(1)	(2)	(3)	(4)	(5)
	Absolute number of fetal deaths	Absolute number of infant deaths	Fetal deaths over total births	Infant deaths over total births	Women admitted to hospitals for aggression
Treatment effect	-6.80***	-7.95**	-0.17**	-0.20**	-4.16
	(0.009)	(0.025)	(0.036)	(0.019)	(0.128)
average at the cutoff	31.2	41.2	1.3	1.6	4.6
Observations	5,282	5,282	5,282	5,282	5,282

Notes: This table reports RDD estimates of the effects of the council size on policy variables associated with women's preferences. RDD specification with a third order polynomial in either sides of the cutoff point using a sample of municipalities with population from 10,000 to 95,238. The 'average at the cutoff point' is calculated using 20 municipalities with population from 46,620 up to the threshold (47,619). Robust p-value in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Table 8: Balance test

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Average monthly nominal salary	Unempl. rate	% of people living in urban areas	% of women in the population	Average number of children per woman	% of houses w/ limited access to Sewer and water	% of houses with bathroom and water supply	% of houses w/ access to garbage collection system
Effect at the cutoff point (population of 2004)	49.99 (0.227)	-1.067 (0.418)	-0.485 (0.920)	-0.392 (0.121)	-0.012 (0.950)	1.002 (0.819)	1.197 (0.874)	-2.083 (0.656)
Observations	2,618	2,622	2,618	2,618	2,622	2,622	2,622	2,622
Effect at the cutoff point (population of 2008)	64.55 (0.102)	-0.749 (0.558)	-2.241 (0.688)	-0.344 (0.203)	-0.206 (0.343)	-4.413 (0.315)	12.62 (0.101)	4.610 (0.326)
Observations	2,656	2,660	2,656	2,656	2,660	2,660	2,660	2,660

Panel B	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Existence of a radio station	No access to electricity	Number of legislators in 2000	% of female candidates in 2000	Number of female legislators in 2000	% of female legislators in 2000	Elected at least 1 woman to the council in 2000
Effect at the cutoff point (population of 2004)	-0.029 (0.621)	1.751 (0.629)	0.027 (0.958)	1.907 (0.106)	0.239 (0.408)	1.406 (0.526)	0.168 (0.118)
Observations	2,622	2,622	2,622	2,445	2,445	2,445	2,445
Effect at the cutoff point (population of 2008)	-0.013 (0.895)	0.275 (0.950)	0.474 (0.399)	-0.082 (0.950)	0.248 (0.389)	1.398 (0.515)	0.004 (0.969)
Observations	2,660	2,660	2,660	2,480	2,480	2,480	2,480

Notes: This table reports a balance test of municipal characteristics at the cut-off point of 47,619 inhabitants. RDD specification with a third order polynomial in either sides of the cutoff point using a sample of municipalities with population from 10,000 to 95,238. Estimations presented using the municipal population of 2004 and 2008 separately. *Average monthly nominal salary* is calculated for individuals who were 10 years old or older, and *Average number of children per woman* is counted only after the reproductive period (15 to 49 years old). The variable *Existence of a radio station* was only available in 2005 and 2009, so I used the information of 2005 for the 2004 elections and the information of 2009 for the 2008 elections. Robust p-value in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Table 9: Validity test - Further functional forms - Political outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total number of candidates	Number of male candidates	Avg. number of votes for male candidates	HHI of votes for male candidates	Number of women elected	% of the legislature filled by women	Elected at least 1 woman to the council	Elected a female mayor (not conditional)
Main specification	11.29	9.650*	-47.96**	-0.004*	0.431**	3.329*	0.203**	0.140**
	(0.110)	(0.056)	(0.056)	(0.095)	(0.024)	(0.092)	(0.016)	(0.030)
mean comparison	13.97**	11.02**	-29.55	-0.0056***	0.393**	2.979*	0.133*	0.144**
5% interval	(0.026)	(0.015)	(0.136)	(0.003)	(0.027)	(0.082)	(0.089)	(0.014)
Ha:	diff >0	diff >0	diff <0	diff <0	diff >0	diff >0	diff >0	diff >0
3rd order - complete	9.885	8.099*	-55.54**	0.0009	0.508***	4.192**	0.219***	0.105*
	(0.135)	(0.087)	(0.018)	(0.646)	(0.005)	(0.027)	(0.005)	(0.081)
2nd order - limited	10.37*	9.599**	-24.58	-0.0035**	0.331**	2.360	0.161**	0.055
	(0.050)	(0.011)	(0.200)	(0.029)	(0.027)	(0.129)	(0.010)	(0.242)
2nd order - complete	14.03***	12.62***	-9.901	-0.009***	0.287**	1.868	0.126**	0.058
	(0.005)	(0.001)	(0.583)	(0.000)	(0.046)	(0.208)	(0.032)	(0.184)
Obs.: complete	10,561	10,561	10,561	10,552	10,561	10,561	10,561	10,595
limited	5,282	5,282	5,282	5,274	5,282	5,282	5,282	5,282

Notes: This table presents a validity test of my main specification, by reporting RDD estimates of the effects of the council size on political outcomes in different functional forms. The dependent variables (in the columns) were already specified in previous tables. The *mean comparison* is a simple t-test of the means of the outcomes in a small interval around the threshold. *Ha* reports the alternative hypothesis used in the test and the interval used was of 2,380 inhabitants, equivalent to 5% of the cutoff point (47,619). *3rd order* and *2nd order* indicate the order of the polynomial fitted either sides of the cutoff point, while *limited* and *complete* indicate the sample used: *limited* is the sample used in my main specification (municipalities with population from 10,000 to 95,238) and *complete* is a sample of municipalities with population from 0 to 95,238. Robust p-value in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Table 10: Validity test - Further functional forms - Policy outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Focus on special needs students as main goal	Log of expenses on community assistance	Log of expenses on childcare & preschool	Number of Children in day care centers	*Prova Brasil* scores of 5th graders	IDEB score of municipal public schools	Have a maternity hospital in 2011	Number of live births	% pregnant women w/ 4 or more prenatal visits	Absolute number of fetal deaths
Main specification	0.243**	0.393*	0.697*	126.7**	0.358**	0.437**	0.234*	-217.8*	0.03	-6.80***
	(0.047)	(0.068)	(0.069)	(0.044)	(0.022)	(0.035)	(0.070)	(0.085)	(0.122)	(0.009)
mean comparison	0.046	0.328*	1.303***	251.9***	0.438***	0.557***	0.286*	-170.4*	0.041*	-6.548***
5% interval	(0.368)	(0.069)	(0.002)	(0.000)	(0.002)	(0.003)	(0.051)	(0.070)	(0.051)	(0.004)
Ha:	diff $>$ 0	diff $>$ 0	diff $>$ 0	diff $>$ 0	diff $>$ 0	diff $>$ 0	diff $>$ 0	diff $<$ 0	diff $>$ 0	diff $<$ 0
3rd order - complete	0.184	0.360*	0.301	89.50	0.398***	0.488**	0.267**	-170.2	0.033*	-5.650**
	(0.109)	(0.078)	(0.403)	(0.136)	(0.008)	(0.014)	(0.022)	(0.153)	(0.095)	(0.022)
2nd order - limited	-0.022	0.321**	-0.002	23.73	0.068	0.079	0.199**	-274.9***	0.008	-5.762***
	(0.805)	(0.044)	(0.995)	(0.641)	(0.566)	(0.611)	(0.024)	(0.004)	(0.629)	(0.005)
2nd order - complete	-0.107	0.391***	0.170	19.31	-0.082	-0.105	0.212***	-292.8***	-0.011	-5.880***
	(0.214)	(0.009)	(0.532)	(0.691)	(0.470)	(0.486)	(0.007)	(0.001)	(0.471)	(0.003)
Obs.: complete	5,301	9,023	8,618	10,558	9,561	9,561	5,204	10,561	10,561	10,561
limited	2,622	4,520	4,357	5,282	5,106	5,106	2,656	5,282	5,282	5,282

Notes: This table presents a validity test of my main specification, by reporting RDD estimates of the effects of the council size on policy outcomes in different functional forms. The dependent variables (in the columns) were already specified in previous tables. The *mean comparison* is a simple t-test of the means of the outcomes in a small interval around the threshold. *Ha* reports the alternative hypothesis used in the test and the interval used was of 2,380 inhabitants, equivalent to 5% of the cutoff point (47,619). *3rd order* and *2nd order* indicate the order of the polynomial fitted either sides of the cutoff point, while *limited* and *complete* indicate the sample used: *limited* is the sample used in my main specification (municipalities with population from 10,000 to 95,238) and *complete* is a sample of municipalities with population from 0 to 95,238. Robust p-value in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Table 11: Validity test - Estimations in the threshold set by the salary rule

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total number of candidates	Number of male candidates	Avg. number of votes for male candidates	HHI of votes for male candidates	Number of women elected	% of the legislature filled by women	Elected at least 1 woman to the council	Elected a female mayor (not conditional)
3rd order polynomial	0.078	0.605	-12.19	0.001	0.225	1.850	0.198**	0.015
	(0.992)	(0.910)	(0.643)	(0.696)	(0.247)	(0.353)	(0.021)	(0.811)
mean comparison	-7.16	-5.54	40.32	0.003	-0.137	-1.373	0.097	-0.093
5% interval	(0.841)	(0.862)	(0.950)	(0.960)	(0.771)	(0.771)	(0.137)	(0.902)
Ha:	diff > 0	diff > 0	diff < 0	diff < 0	diff > 0	diff > 0	diff > 0	diff > 0
Observations	5,282	5,282	5,282	5,274	5,282	5,282	5,282	5,282

Panel B	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Focus on special needs students as main goal	Log of expenses on community assistance	Log of expenses on childcare & preschool	Number of Children in day care centers	*Prova Brasil* scores of 5th graders	IDEB score of municipal public schools	Have a maternity hospital in 2011	Number of live births	Absolute number of fetal deaths
3rd order polynomial	0.260**	0.253	0.470	37.95	0.122	0.134	0.124	-46.23	-2.633
	(0.040)	(0.217)	(0.248)	(0.583)	(0.450)	(0.521)	(0.268)	(0.732)	(0.339)
mean comparison	0.077	-0.018	-0.398	-52.25	-0.178	-0.238	0.092	213.9	3.616
5% interval	(0.288)	(0.536)	(0.832)	(0.805)	(0.870)	(0.865)	(0.181)	(0.968)	(0.940)
Ha:	diff > 0	diff > 0	diff > 0	diff > 0	diff > 0	diff > 0	diff > 0	diff < 0	diff < 0
Observations	2,622	4,520	4,357	5,282	5,106	5,106	1,864	5,282	5,282

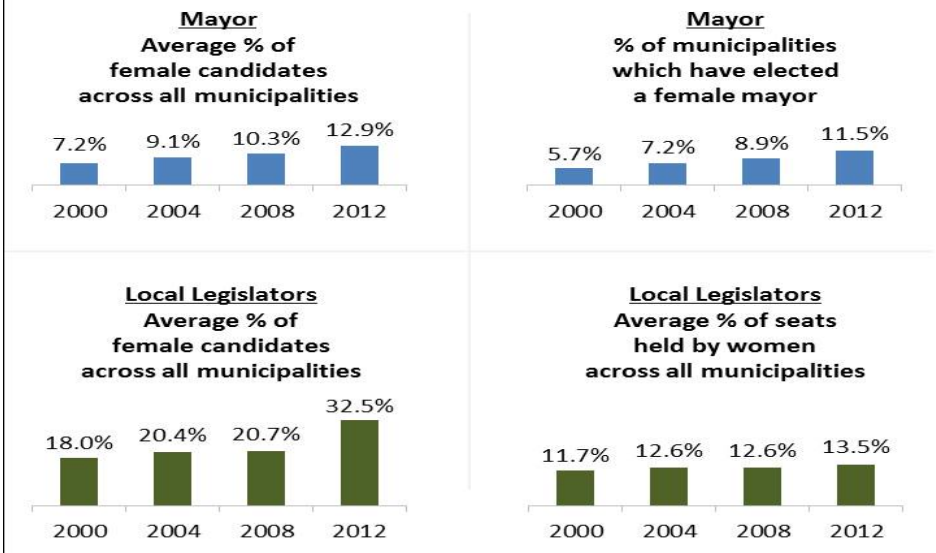
Notes: This table reports a validity test comparing my RDD results (cutoff point at 47,619) with RDD estimates in threshold set by the rule that defines the limits of legislators' salaries, which is 50,000 inhabitants. RDD specification with a third order polynomial in either sides of the cutoff point using a sample of municipalities with population from 10,000 to 95,238. The *mean comparison* is a simple t-test of the means of the outcomes in a small interval around the threshold. *Ha* reports the alternative hypothesis used in the test and the interval used was of 2,380 inhabitants, equivalent to 5% of 47,619. The dependent variables (in the columns) were already specified in previous tables. Robust p-value in parentheses. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Figure 1: Women's Political Representation in Brazil

Panel A
Women in Federal and State Elections

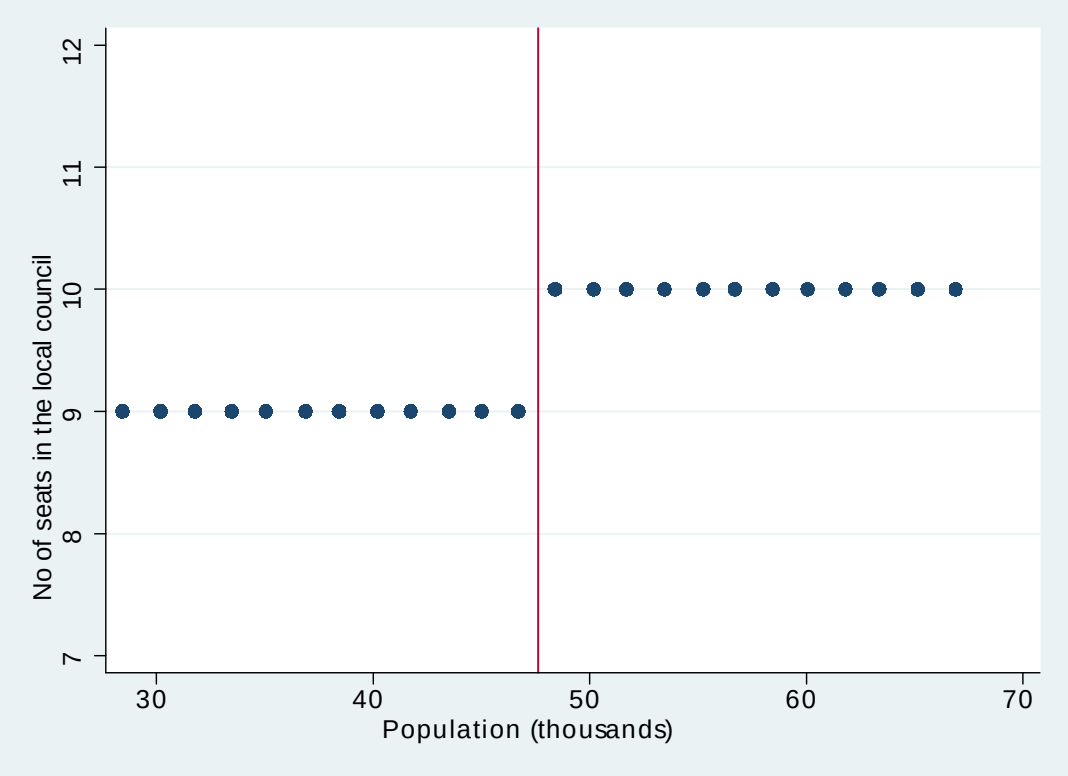
	Women	Men
Senate - candidates in 2010	29	193
Senate - elected in 2010	7	47
Federal Deputies - candidates in 2010	936	3,974
Federal Deputies - elected in 2010	45	468
State Deputies - candidates in 2010	2,656	10,053
State Deputies - elected in 2010	138	921
State Governor - candidates in 2010	16	135
State Governor - elected in 2010	2	25

Panel B
Women in Municipal Elections



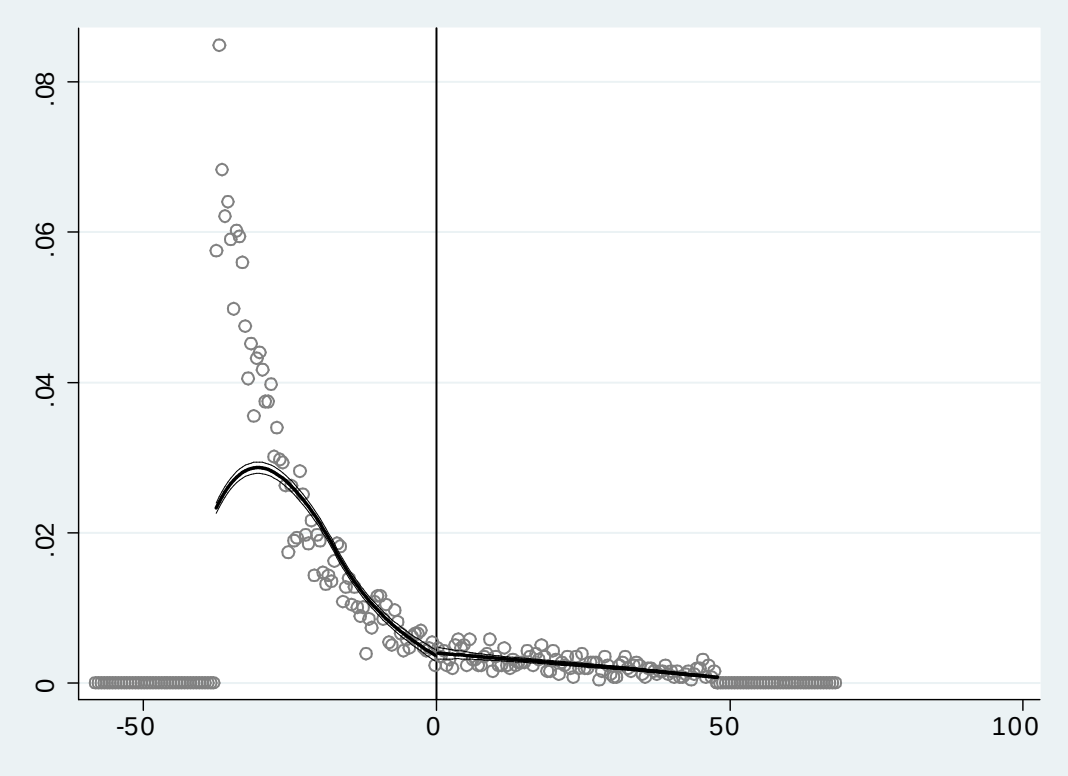
Notes: This figure presents information on the political participation of women in Brazil.

Figure 2: Sharp RD - Probability of treatment jumping from 0 to 1 at the cutoff point



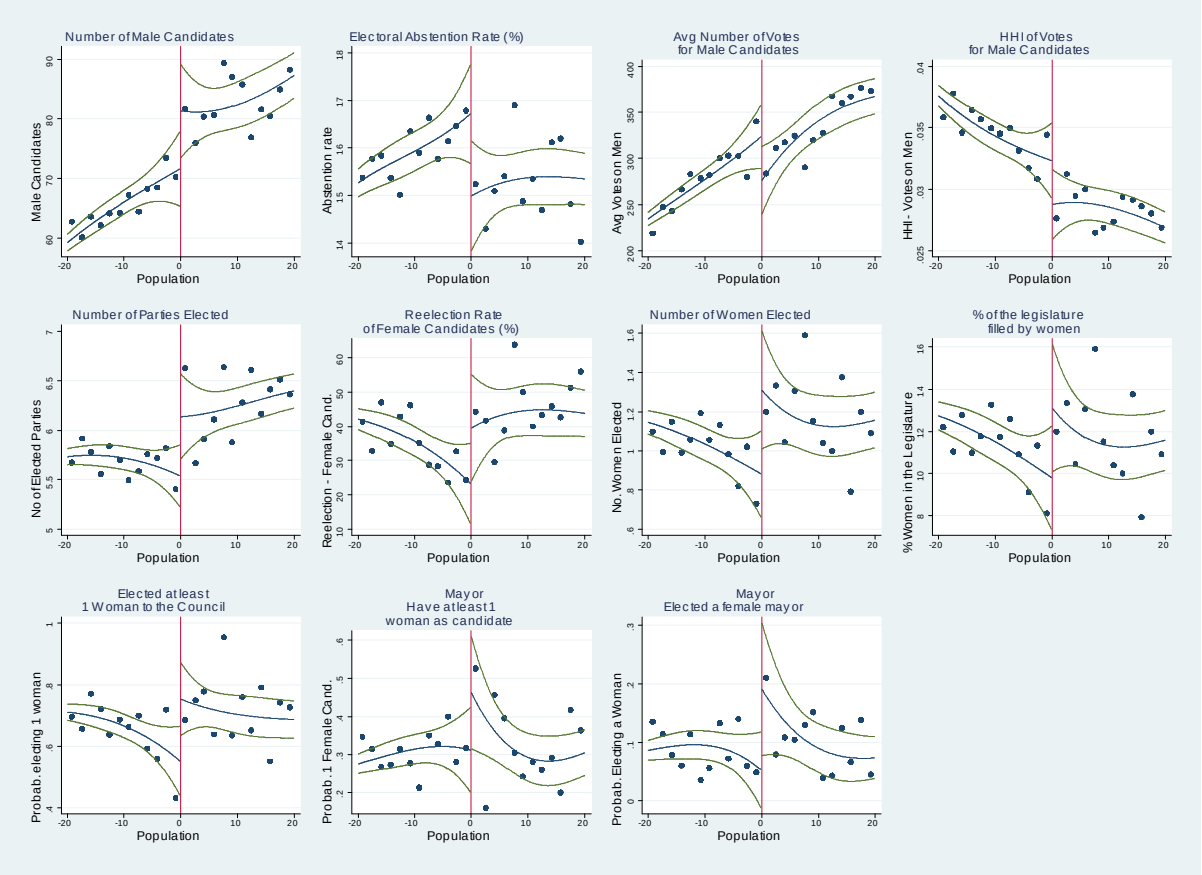
Notes: This figure shows the number of legislator by population. The vertical line denotes the threshold of the rule and the scatter points are averaged over 1,666 inhabitants, which is 3.5% of the cutoff point (47,619 inhabitants).

Figure 3: McCrary Test - Distribution of municipal population



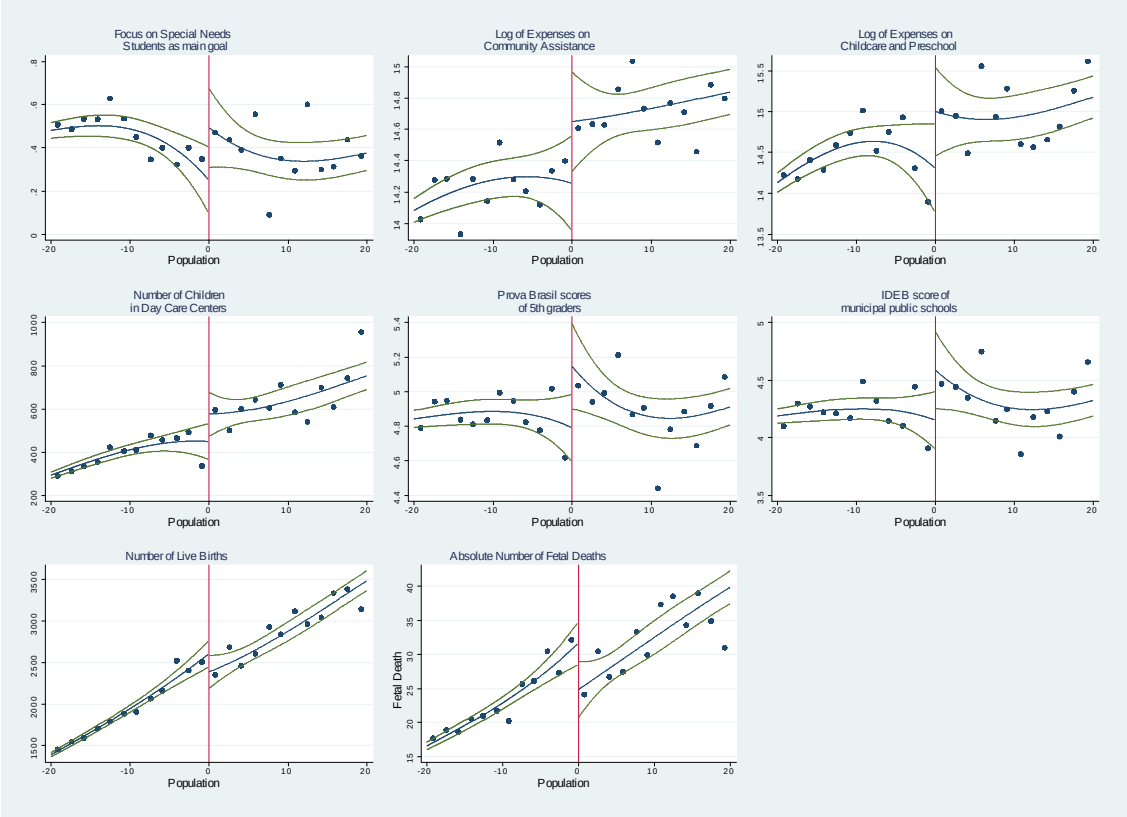
Notes: This figure is based on McCrary (2008), and shows the distribution of the population of municipalities in my sample. The population of each municipality is centered at the threshold I analyze, of 47,619 inhabitants, so the cutoff point is represented by the vertical line (=0).

Figure 4: Graphical Representation of the Discontinuities - Political Outcomes



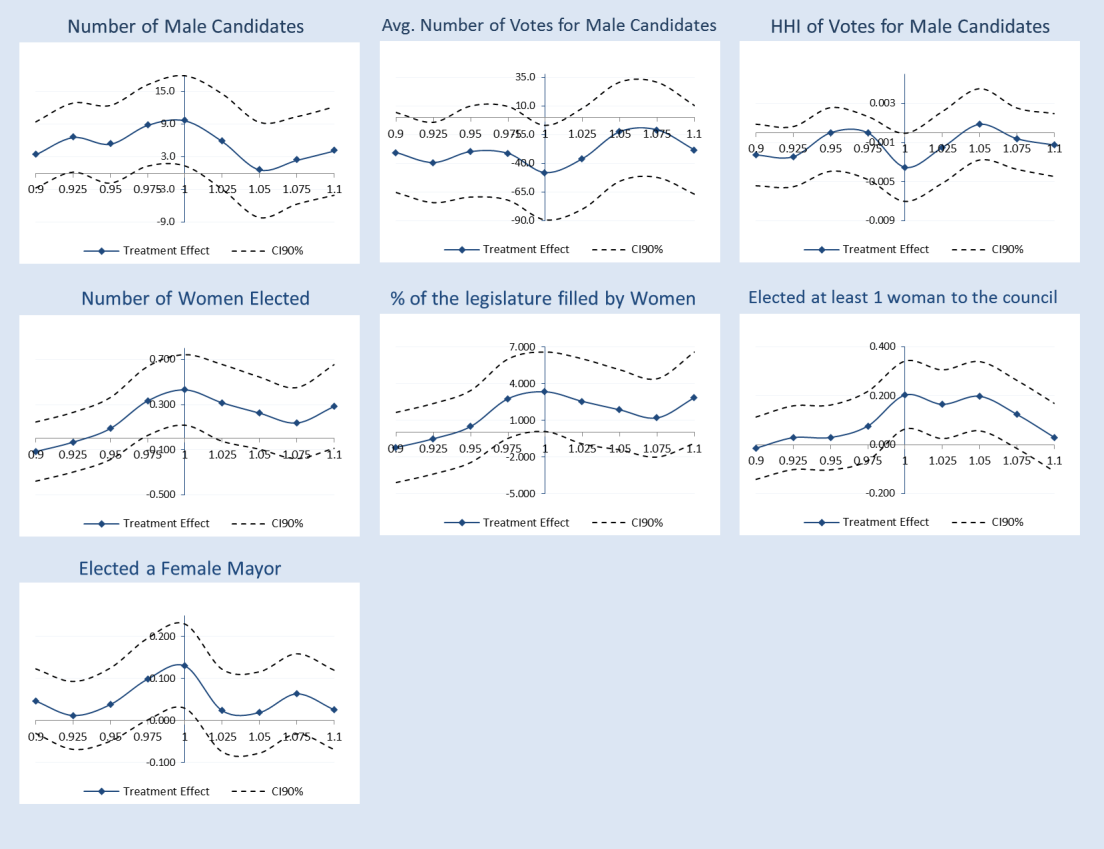
Notes: This figure shows the graphical representation of my main results for political outcomes. The population of each municipality in my sample in centered in the cutoff point. The vertical line indicates the threshold, the blue line is a third order polynomial fitted separately on each side of the threshold, and the green lines are the 95% confidence interval of the polynomial. Scatter points are averaged over 1,666 inhabitants, which is 3.5% of the cutoff point (47,619 inhabitants).

Figure 5: Graphical Representation of the Discontinuities - Policy Outcomes



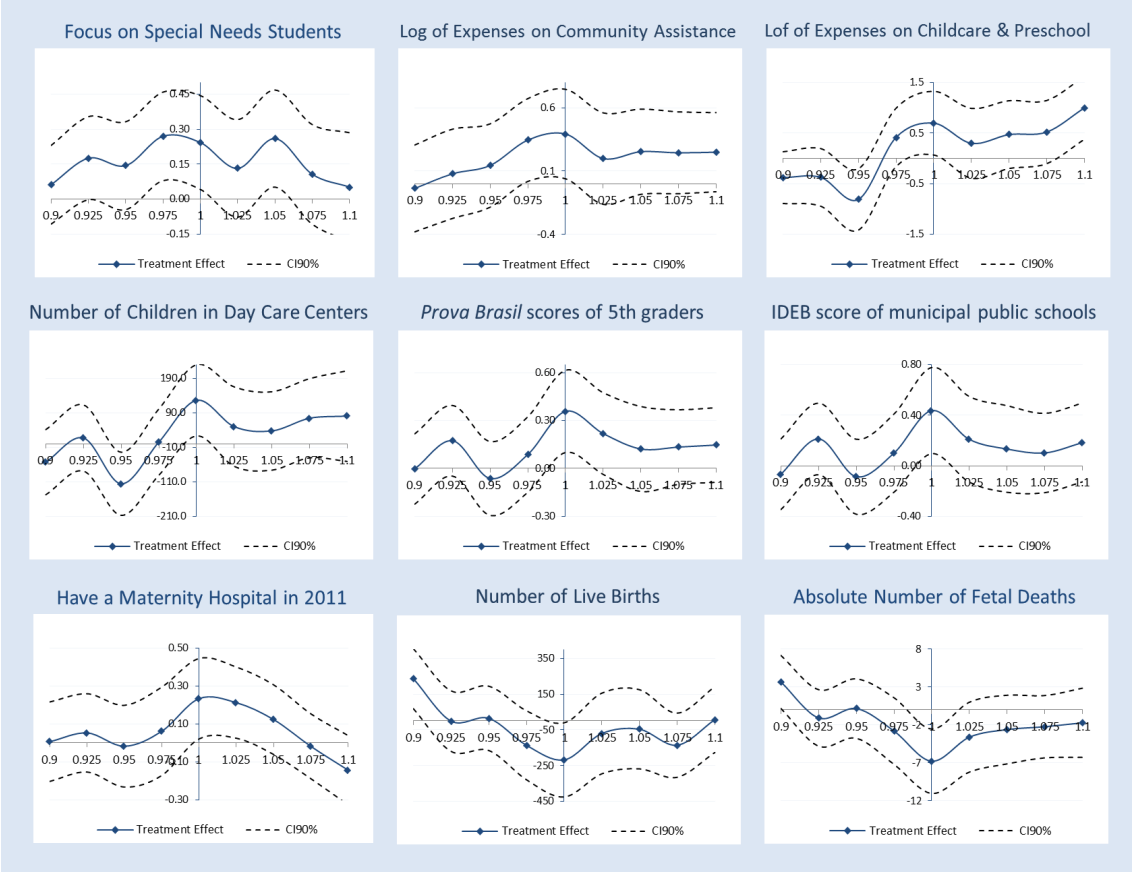
Notes: This figure shows the graphical representation of my main results for policy outcomes. The population of each municipality in my sample in centered in the cutoff point. The vertical line indicates the threshold, the blue line is a third order polynomial fitted separately on each side of the threshold, and the green lines are the 95% confidence interval of the polynomial. Scatter points are averaged over 1,666 inhabitants, which is 3.5% of the cutoff point (47,619 inhabitants).

Figure 6: Estimations in false thresholds closed to the cut-off point - Political outcomes



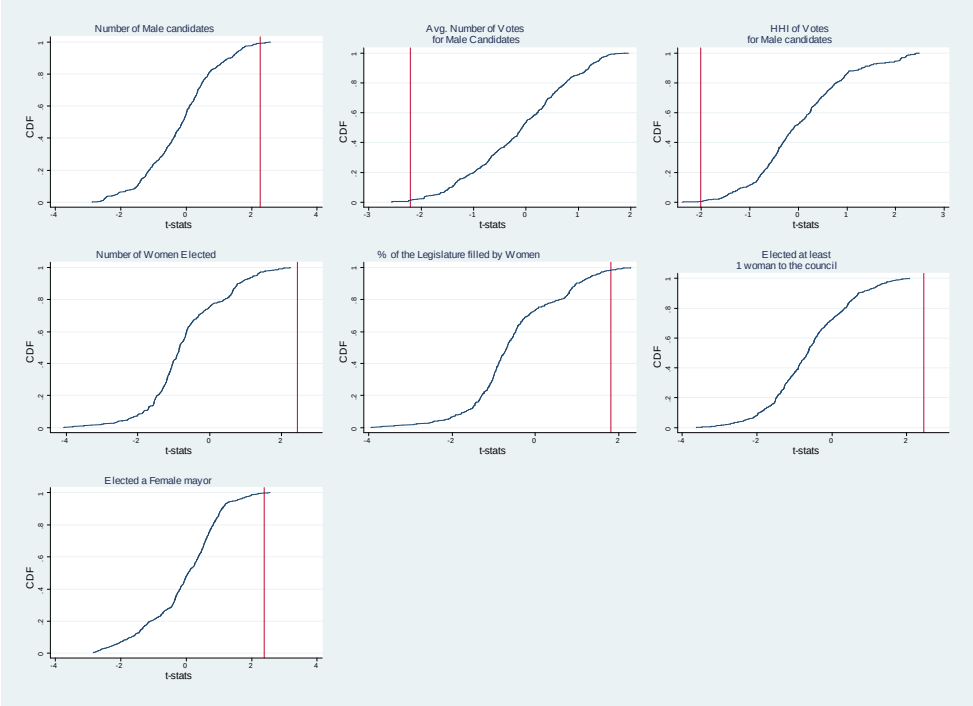
Notes: This figure shows the results of my main RDD specification for political outcomes in false thresholds closed to the true cutoff point. The x axis represents how far the false threshold is from the true one, and the y axis reports the estimates of the regression using the respective threshold. The vertical line is the cutoff point of 47,619 inhabitants, and dotted lines represent the 95% confidence interval of the estimates.

Figure 7: Estimations in false thresholds closed to the cut-off point - Policy outcomes



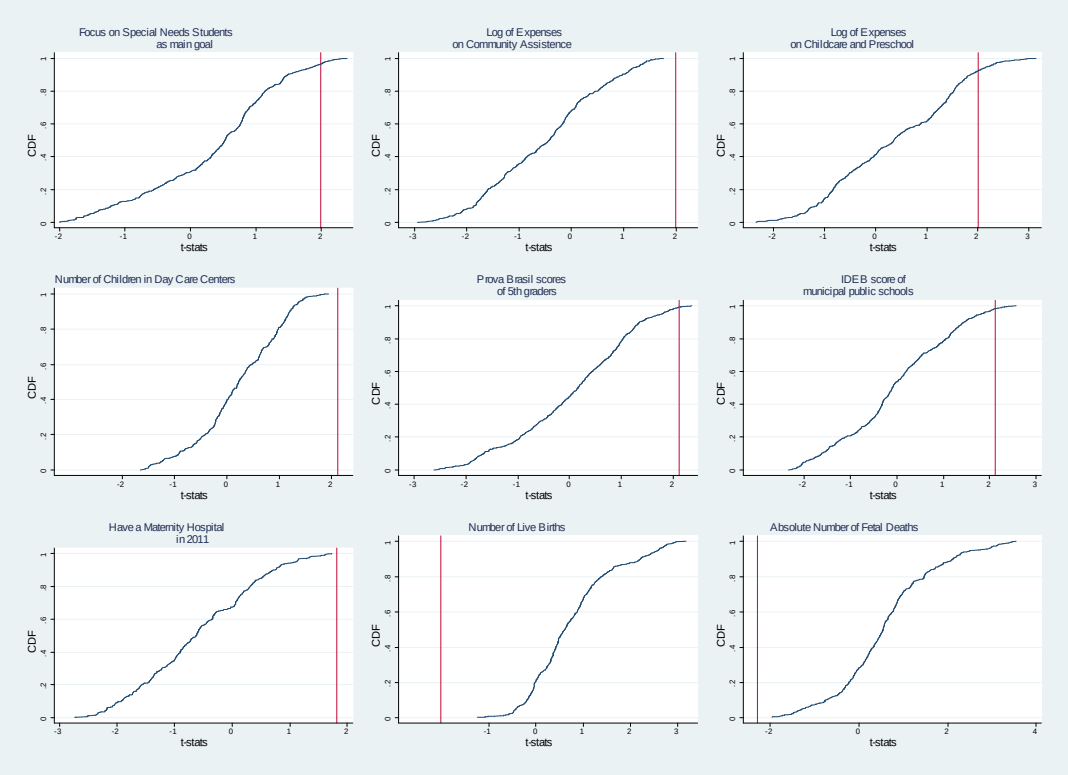
Notes: This figure shows the results of my main RDD specification for politicy outcomes in false thresholds closed to the true cutoff point. The x axis represents how far the false threshold is from the true one, and the y axis reports the estimates of the regression using the respective threshold. The vertical line is the cutoff point of 47,619 inhabitants, and dotted lines represent the 95% confidence interval of the estimates.

Figure 8: CDF of t-Statistics for 800 Placebo Regressions - Political Outcomes



Notes: This figure reports the cumulative density function of the t-statistics from RDD estimations at 800 false discontinuities between 50% and 150% of the cutoff point of 47,619 inhabitants, using increments of 0.1 p.p. and excluding the interval between 90% and 110% of the cut-off. The vertical line represents the t-statistic of my main specification in the true threshold.

Figure 9: CDF of t-Statistics for 800 Placebo Regressions - Policy outcomes



Notes: This figure reports the cumulative density function of the t-statistics from RDD estimations at 800 false discontinuities between 50% and 150% of the cutoff point of 47,619 inhabitants, using increments of 0.1 p.p. and excluding the interval between 90% and 110% of the cut-off. The vertical line represents the t-statistic of my main specification in the true threshold.