Do some electoral systems select better politicians than others? Single- vs dual-ballot elections

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Abstract

I use the discontinuous allocation of single and dual-ballot rules across mayoral elections in Brazil to compare politicians fielded and elected in these systems. Dual-ballot candidates in general are not statistically different from their single-ballot counterparts in terms of age, education and occupational skill. Parties field female candidates at the same rate in both systems, but dual-ballot elections have less women in the top two and three positions, on average. These candidates raise and spend, on average, the same amount of resources in the electoral campaign and the rate at which they win and/or run for reelection is also similar. Interestingly, the only difference in performance found between the two types of mayors is in the attraction of discretionary transfers, which is larger in dual-ballot municipalities, but only in election years when mayors are eligible for reelection. Taken together, these results indicate that the experience demanded from candidates in major parties entering dual-ballot elections may translate into unobserved political skills that are required to deal with the electoral process in dual-ballot. That, by itself, punishes female candidates to the extent to which women's participation in politics has been historically low.

1 Introduction

Democratic institutions form a complex incentive system that determines which types of citizens become politicians and which politicians get elected. In particular, electoral rules determine how winners are chosen from a set of candidates (ballot) on the basis of voters'

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rankings of those candidates. Throughout the time, many voting rules have been developed so as to meet different desired properties. Those that allow for more than a ballot in a single election have specific features that, in theory, may provide voters' with more information about candidates and other voters' preferences. This paper examines whether single- and dual-ballot rules, in practice, affect the types of politicians who run for office and win elections.

Dual-ballot elections - those that follow the rule where a second election is held between the two most voted candidates when none of them has obtained a majority in the initial election - are used by many countries in Latin America (for both local and national elections), in French presidential elections, in the United States gubernatorial primaries, and in Italian local elections. Single-ballot elections are, nonetheless, more ubiquitous around the world. They are normally justified on the basis of the higher financial costs of running two elections instead of just one. The theoretical literature, however, points to higher levels of information disclosure in dual-ballot elections that would benefit voters (Piketty, 2000; Martinelli, 2006), allowing elections to better aggregate preferences. Yet the objective implications of the two systems for both voters' and parties' decisions are not well understood empirically.

On the one hand, dual-ballot elections normally expose voters to a longer period of advertisement and, through first round outcomes, provide valuable information about other voters' preferences and candidates' electoral performance. *Coeteris paribus*, we would think these voters are more informed than those under the single round system. Indeed, the empirical literature has shown that both length of advertisement (Da Silveira and De Mello, 2011) and campaign spending (Levitt, 1994) have a positive effect on election outcomes in general. If a dual-ballot system allows voters to properly screen candidates, parties may respond to that fielding politicians of higher quality, reinforcing the likelihood that voters will choose better candidates.

On the other hand, a longer electoral period and the requirement to vote in two elections may demand more attention and motivation from voters, discouraging participation in the electoral process. It could also be meaningless, when the extra signals produced render those previously held uninformative. Moreover, the signal-to-noise ratio of campaigns can even be reduced in a set up with a larger number of candidates[1] and campaign activities. Aware of this, parties would not be as concerned with the quality of politicians they have and this behaviour would attract more and more politicians of inferior quality.

This ambiguity calls for a careful empirical analysis that, to the best of my knowledge, the literature still lacks. The ethical impossibility of randomising the assignment of electoral rules to municipalities represents an obvious empirical challenge. Differences in candidates fielded and elected across different municipalities could be incorrectly attributed to the elec-

[1] On average, a higher number of candidates is fielded in dual-ballot elections (Fujiwara, 2011).

toral system when, in reality, municipalities that adopt a certain rule have unique features that are correlated with certain types of politicians and policy outcomes. Even though observable factors can be controlled for, there will always remain unobservables that can compromise a causal interpretation of these effects.

By using a quasi-natural experiment that follows from the allocation threshold of single- and dual-ballot elections to Brazilian municipalities, based on electorate size, I can assess the causal effects of the adoption of a dual-ballot system, relative to single-ballot, in a host of relevant outcomes.

First, I verify whether observable candidates' characteristics differ under the two electoral rules. Second, to evaluate unobservable characteristics that are relevant for policy-making, I also compare politicians' performance in office. This can be achieved by analysing policy outcomes for which the response time of the targeted population is short enough to be observed between elections, such as health care. Following the literature, I also analyse performance in terms of the potential politicians have in attracting discretionary transfers to their constituency.

The main finding of the paper is that female candidates appear less often in the top two and top three positions in the first round of dual-ballot elections. The data supports the interpretation that this difference is not due to gender discrimination but rather associated to underlying political skills, specially experience in mayoral elections. This result is in line with Bhalotra, Clots-Figueras and Iyer (2017) who find an increase in the participation of women candidates from major political parties in elections that follow a female victory. Most importantly, they also show that this effect is primarily driven by prior candidates contesting again.

Perhaps surprisingly, other observable characteristics - namely age, schooling, and occupational skill level - are not statistically different between the two systems for none of the adopted definitions of effective candidates.[2] In addition, differences in campaign spending and fundraising are also not found.

In general, female candidates absence from dual-ballot elections could be explained through three channels involved in the candidacy process: (i) the woman has to be willing to put herself forward as a candidate; (ii) the party has to offer support by placing her in the ballot; and (iii) voters need to be willing to vote for both men and women. In the case analysed here, the same parties appear in top positions in both systems but female candidates are fielded at a higher rate in single-ballot elections. An evidence that these parties may not discriminate female candidates *per si*. The same is true for the voter perspective. Because the identification strategy holds municipalities characteristics constant, single- and dual-ballot voters should have similar gender preferences for candidates. Therefore, channels (ii) and

[2] Those with a non-zero chance of winning or going to the second round.

(iii) do not offer a plausible explanation for my results. Channel (i) does not seem to be the strongest mechanism behind my findings either. I present evidence[3] that dual-ballot elections consist of a tougher political process and, as such, may repeal the participation of women, who normally avoid competitive environments, specially those of mixed gender. However, female candidates appear at the same rate in lower ranked positions in both systems, revealing that women may actually be willing to participate of dual-ballot elections too, something that downplays this mechanism.

In terms of unobservable characteristics, mayors elected in dual-ballot municipalities are more likely to attract discretionary transfers of capital to their municipalities, but only in election years when they are eligible for re-election. Furthermore, these municipalities do not present any differences in health outcomes, as measured by the share of non-premature births and the share of mothers with at least one prenatal visit during the mayor's term. These politicians try re-election and are elected at the same rate as in single-ballot, pointing to the interpretation that dual-ballot requires an additional effort from mayors at this stage. If dual-ballot mayors actually performed better than their single-ballot counterparts in general, performance differences should also have been found for term-constrained mayors. Based on this idea, throughout the paper, I provide evidence that supports the view that the political skills required from candidates in order to enter dual-ballot elections are not necessarily associated with higher quality and that female entry is barred because of these very same skills.

This paper has intersections with a number of different strands of the literature. First, it is related to an empirical literature that has tried to assess the effects of electoral rules on politicians' performance in office. Persson, Tabellini and Trebbi (2003) do a cross-country analysis to verify the effects of a host of electoral rules on corruption. They verify that countries that switch from strictly majoritarian to strictly proportional elections present smaller levels of corruption, even though the effect is small. Gagliarducci, Nannicini and Naticchioni (2011) compare the performance of candidates elected under majoritarian and proportional systems in Italy and show that representatives elected under majority field more bills and are less absent from Congress. This paper compares politicians fielded and elected through two different majoritarian systems instead. Dual-ballot elections not only change the formal way under which votes are translated into a winner, but also consist of an experimental setting where voters and politicians are also exposed to new sets of information. Therefore, has different features to be explored.

Second, there is also a small literature in political science (Fulton, 2014; Roberts, Seawright and Cyr, 2012) that has described how proportional representation electoral systems are associated with greater legislative representation of women relative to majoritarian sys-

[3] De Mello, Firpo and Chamon (2009) also provide evidence in this direction.

tems. My findings detect differences in representation within majoritarian systems and in executive positions.

Third, it is also related to the economic literature on gender differences in politics (Brollo and Troiano, 2016; Anzia and Berry, 2011; Bhalotra and Clots-Figueras, 2014). This literature uses samples of elections where women have closely won/lost against male candidates to show that female politicians perform better in office and are less corrupt, on average. I provide new evidence about gender differences at the stage of candidacy for an election and how electoral rules may pose extra barriers to women's political advancement.

Lastly, the closest paper to mine is Nannicini, Bordignon and Tabellini (2016). They show municipalities that choose mayors using dual-ballot systems face less volatility in property taxes. This is due to the fact that in dual-ballot elections centre parties make coalitions with extremist parties [4] - in which case there is an adaption of policies towards the positions of extremist parties - less often than in single round elections, where extremist parties can threaten the victory of centre parties by dividing minority voters. In this case, policies are enacted as a result of strategic considerations induced by the system at the time of the election and are indirectly related to politicians quality. In this paper, I focus on a previous stage: the one in which citizens choose to run for office and the party selects who to support. I use this to infer about the effects of a dual-ballot system on the characteristics of those fielded. I further analyse intermediary policy outcomes, that are plausibly not affected by political ideology, only to try to assess unobserved features that parties may take into account in this selection process.

The paper is organised as follows. In Section 2 I describe in detail my identification strategy, the datasets used and the institutional background of the elections considered. Section 3 contains the results of all estimations and discusses some of the possible mechanisms leading to the results found. Section 4 concludes the paper. All tables and figures are presented in an appendix.

2 Institutional Background, Data and Estimation Framework

2.1 Data

Election outcomes and candidates' characteristics - Data on mayoral elections, number of registered voters and candidates' characteristics are available from the electoral authority (Tribunal Superior Eleitoral - TSE) for the election years 2000, 2004, 2008, 2012 and 2016.

[4] This is also related to a theoretical literature on dual-ballot elections that points to gains in efficiency given by the separation between the "communicative" and "decision-making" functions of voting (Martinelli, 2002; Piketty, 2000; Bouton, 2013).

These data, however, need to be matched over the years as to verify previous positions held by the candidates. I developed an algorithm to identify the same candidates over time: (i) for the years where identification numbers for candidates were available, they were used to make these connections (ii) for the elections where they were not available, I assume a candidate with the same name at the same city at different points in time is the same person. Since this is administrative data, there are some inconsistencies such as misspelled or incomplete names. A partial matching algorithm was used to identify these cases and the results eyeballed so as to verify the valid matches. Candidates' characteristics available in this dataset include date of birth, gender, education, occupation and reported wealth.

Discretionary transfers - Data on discretionary transfers are available from balance sheets reported by the municipalities to the Brazilian National Treasury (Tesouro Nacional). This information is available for all the years up to 2015. Following Brollo and Troiano (2016), I use discretionary transfers of capital as a measure of politician ability to attract resources to the municipality. To get a measure of non-discretionary transfers, I subtract transfers of capital from the total of capital resources the municipality had.

Health Outcomes - Information on all births and number of mother's prenatal visits are provided by the Information System on Live Births (SINASC), available on DataSUS, a system managed by the Ministry of Health. These data are available for all years since 2000 up to 2015. I extract two variables from them: the share of non-premature births and the share of mothers who had at least one prenatal visit during pregnancy.

Campaign spending and donations - This information is also available from TSE, the electoral authority. Candidates are required to report in detail the amount and the sources of donations received and how they were spent. All donations are aggregated into the following categories: those raised in campaign events (*Events*), voters donations (*Voters*), party funding (*Party*), public funding (*Public Funding*) and those for which the source was not identified (*Not Identified*). It is not possible to do the same with spending because candidates report the figures labelled by loose multiple categories over the years, which makes it difficult to rationalise them into meaningful groups. I therefore explore only the overall total spent by the candidates.

Municipalities' characteristics - The 2000 Census conducted by the national statistics office IBGE (*Instituto Brasileiro de Geografia e Estatística*) is used to obtain detailed characteristics of municipalities at the baseline year. These variables describe voters education, income distribution, demographics and municipalities' infrastructure. For a list of the variables and their definitions see Table 2.

2.2 Estimation framework

Brazil is a federation with 26 states and a federal district politically organised in 5567 municipalities. Voting is compulsory for all citizens aged 18 years or over, but the vote is voluntary for those aged 16-17 or above 70 years of age. Participation in elections is normally high due to this feature.

Each municipality chooses a new mayor and local legislature every four years. Since 1998 mayors are allowed to run for a second term. The constitution establishes a threshold of 200,000 registered voters to determine whether a municipality holds a dual- (with plurality rule) or a single-ballot in mayoral elections. In dual-ballot elections municipalities above this threshold have a second election with the top two candidates of the first round when none of them has obtained more than 50% of the valid votes. This threshold generates a discontinuity that randomly assigns single- and dual-ballot elections to municipalities sufficiently close to it. That is, those municipalities should be similar to each other in both observables and unobservables, with the only difference coming from the discontinuous implementation of distinct electoral systems.[5]

More formally, let V_{it} be the RDD running variable for municipality i in the election at time t. V_{it} is a variable centered at the threshold and, thus, denotes the distance from the threshold and has positive values for municipalities with dual-ballot and negative values for municipalities with single-ballot. The treatment effect in a close neighbourhood of the threshold on outcome Y_{it} is given by:

$$TE = \lim_{v_{it} \downarrow 0} E[y_{it}|v_{it}] - \lim_{v_{it} \uparrow 0} E[y_{it}|v_{it}] \tag{1}$$

Under the assumption that the conditional expectation of y_{it} on v_{it} is continuous, the first term on the right-hand side converges to the expected outcome for a dual-ballot municipality, which has as many voters as the single-ballot municipality. Similarly, the single-ballot municipality converges to the expected outcome of a dual-ballot municipality under the same conditions.

The continuity assumption depends on two facts: the non-existence of (i) manipulation in the allocation of single- and dual-ballot rules across municipalities and (ii) other treatments based on the same threshold. As discussed in Fujiwara (2011), this threshold is arbitrary and is not used as a cutoff for the assignment of any other treatment. All the municipalities comply with the rule, and therefore, the regression discontinuity design is sharp.

Following the literature, two different methods are used to estimate average treatment effects (ATE): a p-order polynomial fitted on either side of the threshold and a local polynomial regression.

[5] This feature has been used for identification before by Fujiwara (2011) for Brazil, and Nannicini, Bordignon and Tabellini (2016) for Italy.

Let $v_{it} = \#voters_{it} - 200,000$ be the number of registered voters centered around the cutoff in municipality i in time t, then a p-order polynomial can be estimated through:

$$y_{it} = \sum_{k=0}^{p} \beta_k v_{it}^k + \tau_{it} \sum_{k=0}^{p} \gamma_k v_{it}^k + \mu_t + \varepsilon_{it} \tag{2}$$

where y_{it} is the outcome of interest in municipality i in time period t, τ_{it} is a dummy that is one when the municipality follows a dual-ballot system, μ_{it} are year fixed effects and standard errors are clustered at the municipality level as the same city can be observed multiple times. γ_0 is the treatment effect, that is, it measures the jump around the cutoff between the two groups of municipalities.

Following Imbens and Lemieux (2008), the local linear regression approach sets $p = 1$ in equation (2) above and restricts the sample to municipalities in the optimal interval $v_{it} \in [-b, +b]$ computed using Imbens and Kalyanaraman (2012). Again, γ_0 is the treatment effect at the threshold $v_{it} = 0$.

2.3 Validity Tests

The identification strategy is based on the fact that the population threshold used to assign the treatment is arbitrary and, as such, observable and unobservable characteristics of municipalities close enough to this threshold should be statistically similar.

If this assumption holds, there should not be any discontinuities around the threshold for any of the municipalities' characteristics we can observe. Therefore, using a wide array of variables extracted from the Census 2000 and that characterise well a municipality in terms of income, education and infrastructure I assess the validity of this assumption.

These tests are reported in Table 1 and can also be confirmed by visual inspection of Figures 1, 2 and 3. All variables, including the share of women in the population, are balanced across the cut-off. Overall, there are no differences in education levels, income, unemployment, as well as sanitation and eletricity services.

These results are corroborated by McCrary (2008)'s continuity test. In principle, politicians could manipulate the number of registered voters in a municipality to induce the application of their most preferred electoral rule. McCrary (2008)'s continuity test verifies whether there is any random sorting of municipalities at the cutoff. The idea of the test is that with sorting the density of the running variable would not be continuous. It tests the null hypothesis of continuity of the running variable density by implementing kernel local linear regressions separately on both sides of the threshold. Figure 7 displays the results. The estimated discontinuity is 0.5360 with a standard error of 0.4481 (seeAs it can be seen, there is no evidence of discontinuities in the number of voters around the cutoff.

Taken together, these results suggest that the running variable of the RDD does not show

any evidence of manipulation and can be safely used as a local source of exogenous variation in the neighbourhood of the threshold that allocates electoral rules to municipalities.

2.4 Sample selection and descriptive analysis

Pooling the data of the five electoral cycles produces a sample of over 23,297 elections conducted in a single-ballot system and 259 under dual-ballot.[6] However, because RDD assumptions hold only for those municipalities in the close neighbourhood of the threshold, I reduce the sample to those within 75,000 voters from the zero cutoff [7] and calculate the optimal bandwidth using by Imbens and Kalyanaraman (2012). The effective sample size used is composed by 308 elections, with 97 of them following dual-ballot.

In this sample, dual-ballot elections have 0.94 more candidates on average and a maximum number of 13 candidates. Whereas in the full sample, there are 3.54 more candidates on average and the maximum number goes up to 14. In fact, dual-ballot has been shown to have a causal effect on the number of candidates fielded in an election (see (Fujiwara, 2011; Nannicini, Bordignon and Tabellini, 2016)).

Since the goal here is to compare candidates' characteristics on both sides of the discontinuity, it is important to investigate what the implications of a higher number of candidates are for the distribution of quality and how a fair comparison between the two systems can be performed.

Vote shares obtained by a candidate reflect many dimensions of quality, such as party affiliation, experience, valence, campaign spending and so on. However, vote shares in dual-ballot elections are on average lower than in single-ballot because (i) more candidates enter the competition and (ii) some citizens vote for their preferred candidate even when she is not likely to win (sincere voting) -- as there will be a second round where they can vote making strategic considerations. Hence, the strategic voting component of vote shares is different in each system.

Empirical distributions of aggregate vote shares, broken down by candidates' ranking, are presented in Figure 4. If we take the sum of vote shares of the two first-placed candidates in each system, as displayed in Panel (a), the average for single-ballot is 0.76 and for dual-ballot it goes down to 0.72 and has a larger variance, making the difference in means significant. Medians, in turn, are 0.77 and 0.71, respectively, confirming the left skewness of the single-ballot distribution. Both distributions are bimodal. Importantly, dual-ballot presents a longer left tail, illustrating the fact that dual-ballot allows for the entry of candidates that receive very small vote shares and, as we will see later, compare very poorly in terms of observables

[6] My data differ from the one used in Fujiwara (2011) by two elections. While he includes electoral cycles from 1996 to 2008, I include electoral cycles from 2000 to 2012. A dataset containing all elections in 1996 is currently not available from TSE.

[7] This was the greatest threshold used in Fujiwara (2011).

to other candidates in the race.

Panel (c) shows that we only get an approximation between the aggregate vote shares of the two systems when considering the aggregate of the four first-placed candidates in dual-ballot against the two first-placed in single-ballot.

In the smaller sample of 97 dual-ballot races, there were 43 outright victories and first-round first-placed candidates won in 39 of those with a second round. In the full sample, that was 111 and 108, respectively. In other words, dual-ballot races normally go to a second round but first-round winners often win the election.

Figure 6 displays the distribution of the number of elections a municipality has been running dual-ballot within our sample of five electoral races. Because the sample has been reduced to those close to the threshold, we observe only a few cases where the municipalities had a dual-ballot system over all five elections. The bulk of them are newly converted municipalities or have been in the system for two or three races. Therefore, this paper can not say much about the long term effects of the adoption of a dual-ballot system.

We would like to infer what the average quality of groups of candidates fielded under each system is, but there are candidates who enter the election just targeting a non-zero probability of a positive vote share, no matter how small it is. This can be seen in Figure 5 which displays the aggregate of vote shares of fourth and lower placed candidates in the two systems. Clearly, the density of zeros or near zero vote shares is higher in dual-ballot elections. Therefore, to make meaningful comparisons between groups it is necessary to find some criteria that determine who the effective candidates are in both types of elections. In the next section, I discuss the problems arising from this sort of classifications and identify the ones to be used here.

2.5 Selecting comparable groups of candidates

There is a fundamental problem about comparing the quality of candidates between the two systems. Dual-ballot elections and their lower barriers to entry attract candidates who would not have entered the election if it was not for the dual-ballot rule. These new entrants can be either of high or low quality and make it to the top three candidates, depending on voters' strategies.

If we take the full pool of candidates who enter dual-ballot elections and compare their quality with those in single-ballot, it could be the case that non-effective candidates - those with no chance of getting a positive share of votes if voters had no incentives to vote sincerely - would weight down the average quality, producing a result where dual-ballot candidates would be worse on average, even if some group of top candidates are better than their single-ballot counterparts. The problem is that, *a priori*, we cannot judge by the election results who the effective candidates would be in each of the systems.

When there is a risk of upset victory in a dual-ballot election, a potentially effective candidate could get a relatively low share of votes because voters coordinate to give outright victory to a candidate that is more likely to win the election and avoid the victory of a Condorcet loser in a second round. However, as Bouton and Gratton (2015) show, this is an equilibrium only for dual-ballot elections with a threshold below 50%. Here, all the elections have a threshold of 50% for outright victory. Therefore, we can discard the possibility that dual-ballot elections present effective candidates with low vote shares just due to strategic considerations.

Hence, if the case of upset victory can be ruled out, it is likely that candidates who get very low vote shares in dual-ballot elections are those who enter the race just because the chance of a non-zero vote share is higher. They are likely to be candidates who would perform as badly or worse in single-ballot elections, so we get to observe them only in dual-ballot elections.

Based on the arguments above, assume that election results are a good ex-ante measure of how likely the candidate is to be a serious contestant in an election (ideally we would look at polls held at the beginning of the electoral period, but that is not available for most of the municipalities). We can then have an idea of which candidates are more likely to be in the effective group. Note that by doing this, we do not need the assumption to hold for each candidate's ranking. We just need that the group of top ranked candidates are the same ex-ante and ex-post. The group of non-effective candidates is then composed by those who get a very small share of votes relative to the other candidates of the system they are competing on.

Based on this argument, we cannot reach a definitive concept of candidate effectiveness for both systems, but we can compare different combinations of best ranked candidates. Throughout the paper I compare the groups of top two placed candidates in both systems and the top two in single-ballot and top three in dual-ballot.

3 Results

3.1 Are candidates different over observable characteristics?

In this section I evaluate dual-ballot treatment effects over candidates' age, gender, schooling, and occupational skill levels. I will refer to these variables as observable characteristics throughout the text.

Occupational skill levels are used to differentiate those engaged in occupations that require the execution of a more complex range of tasks. These are here classified according to the four skill levels of the International Standard Classification of Occupations 2008 (International Labour Organization, 2012). Candidates belonging to the fourth skill level nor-

mally have a university degree and perform complex tasks in a specialised field that demands problem-solving and decision-making in addition to creativity.[8] Examples of professionals in this category are musicians, medical practitioners, computer systems analysts, etc. A dummy identifying candidates in this skill level, called *High skill*, is used to compare candidates who fall into this category across the two electoral systems.

For all the outcomes and different samples of interest I run a non-parametric model, using Imbens and Kalyanaraman (2012) to select the optimal bandwidth, and a parametric RDD spline polynomial of 3rd and 4th orders -- considering the sample of municipalities that are 75,000 voters away from the zero cutoff. Standard errors are clustered at the municipality level to account for any type of serial correlation and year fixed effects control for year-specific characteristics of elections.

I start by showing the results for the sample that includes all candidates running in an election. Panel A in Table 3 demonstrates that, overall, there are no statistically significant effects when we go from single- to dual-ballot in any of the characteristics or specifications considered. Similarly, when the set of top ranked candidates in each election is excluded the same results are verified (Panel B in Table 3).

As previously discussed, to try to account for the fact that some of the candidates attracted by lower barriers to entry in dual-ballot elections may pull down the overall average quality, I now consider different groups of candidates in each side of the discontinuity. My assumption is that relative low shares of votes in the first round of dual-ballot elections are not given by strategic considerations, but rather reflect voters' preferences. Therefore, my measures of effectiveness are based on the candidates who have a considerable relative large share of the votes in each election.

In Panel A of Table 4 I use the subsample of top two candidates in both systems. Remarkably, the probability of a woman appearing in the top two of a dual-ballot election is 10 to 30 percentage points lower, depending on the bandwidth and specification. Out of an already low baseline mean for female candidates in single-ballot of 11 percent. Whereas no statistically significant differences are found with respect to age, schooling or skill, which implies that the additional women fielded under single-ballot are at least as good as their male counterparts in dual-ballot over these three dimensions.

Since two candidates go to the second round in dual-ballot, three candidates normally

[8] The other three skill levels are:

1. Skill level 1: Occupations that require basic or no education and involve the performance of simple and manual tasks. Examples: Office cleaners, kitchen assistants.
2. Skill level 2: Occupations that require basic education and involve operating machinery or electronic equipment. Examples: Bus drivers, police officers, hairdressers.
3. Skill level 3: Normally requires a university degree and involve the execution of complex tasks in a specialised field. Examples: Legal secretaries, shop managers, computer support technicians.

contest the elections more closely, while this is true for only two candidates in single-ballot elections. To account for that, I amplify the sample to the top three candidates in dual-ballot against the top two in single-ballot. As displayed in Panel B of Table 4, the number of female candidates in dual-ballot races increases but is still lower, on average, when compared to single-ballot, around 10 to 23 percentage points. Again, no differences are verified in the other observable characteristics considered.

As the previous results have shown, there is no discontinuity in in the full sample of female candidates fielded in each electoral system, the discontinuity is verified only in the subsamples of effective candidates. That is, women are fielded at the same rate in both systems, but do not get into the elite group as often.

To shed some light on this outcome, I take the subsample containing only female candidates and check for discontinuities in the same characteristics: education, experience and skill. The results are shown in Panel A of Table 7. Essentially, there are no detectable discontinuities between characteristics of women fielded in the two systems, except that they seem to be older, on average. I also do the same analysis for the sample containing only males. Panel B in Table 7 display the results. Male candidates, in turn, present the same observable characteristics in both systems, on average. This finding aligns with the argument that dual-ballot may demand more experience from politicians, but only for women this requirement is reflected in age. This would be consistent with both parties disproportionally requiring more experience from women than men, or just a reflection of late entry of women in politics.

To sum up, the only significant treatment effect observed thus far is that dual-ballot races have comparatively less female candidates competing in top positions, despite presenting the same observable characteristics. There seems to be a convergence in all the other observable dimensions in both electoral rules, something that indicates parties' selection process may already be driven by these criteria in general. The question that remains to be answered is whether this result can be attributed to large parties' gender preferences or to some underlying candidates' characteristics that are associated to gender. This question cannot obviously be answered directly, but in the next sections additional results help excluding mechanisms that could be at play.

3.2 Do dual-ballot candidates spend more in their political campaigns?

A second round election in Brazil implies additional 28 days of rallies, debates and production of ads for radio and tv. This longer advertisement period should also shift the amount of resources necessary to run a political campaign, as compared to single-ballot. Candidates should, therefore, be able to raise a large amount of funds to make up for these extended costs; an skill that should account for another dimension of candidates' quality that parties

may observe.

To test this proposition, I verify whether there is any dual-ballot effect on candidates' campaign funds and spending. The results are displayed in Table 6. First, there are no statistically significant differences between the total spent in single-ballot relative to that of dual-ballot elections (*Total spending*). The same is true for the total spent in single-ballot compared to that of a first round in dual-ballot (*Total spending 1st round*). The total spent in the second round of dual-ballot compared with the monthly average spent in single-ballot elections is also statistically similar (*Total spending 1st/2nd round*).

The aggregate of funds raised in both first and second rounds seem to be larger in dual-ballot, although not statistically significant (*Fundraising total*). When broken down by rounds, there are small and non-significant differences between single-ballot and dual-ballot first round (*Fundraising total 1st round*), but large positive differences between first (monthly average) and second rounds in each system, respectivelly (*Fundraising total 1st/2nd round*).

In short, there are no differences in the total of resources raised and spent in the two systems, on average. Candidates seem to keep the same pace of spending in the second round and may transfer resources from first to second rounds.

To have a more precise idea of candidates fundraising abilities I also check for discontinuities in the following sources of funding: events, voters, companies, public funding[9], party funding and unknown sources. The results are presented in Table 3. They show that either candidates do not focus differently in any donor groups and/or none of the donors seem to take system into account when giving money to campaigns.

All in all, candidates follow a similar path of spending and fundraising in their campaigns despite dual-ballot elections lasting longer. This suggests that candidates have, on average, the same fundraising abilities in the two systems but may require additional political skills to compensate for the supposedly more demanding campaign in dual-ballot. In the next section, I assess whether political characteristics and redistributive politics play a role in balancing these differences.

3.3 Are candidates different over political characteristics?

Table 8 displays the analysis of discontinuity in key variables characterising the political process underlying each of the systems: experience as a candidate in mayoral elections, reelection entry, reelection rates and competitiviness.

The variable experience in mayoral elections counts how many times the politician has been a candidate in a mayoral race at that municipality up to the most recent election. Remarkably, there is a large number of politicians who compete more than twice in the sample.

[9]In Brazil, parties receive public resources to fund political campaigns, proportional to the number of representatives they have in the lower chamber.

Around 29 percent has competed at least once, 10 percent twice and 3 percent three or four times. [10] The results in the first line of Table 8 show that candidates in dual-ballot elections have participated of 0.26 to 0.36 more elections on average when compared to single-ballot elections, which have an average of 0.52 elections. At the same time, both systems do not present any significant differences between a mayor running for reelection (*Incumbent race*) or being reelected (*Reelection win*). A visual representation of these estimates is in Figure 8.

This speaks to the absence of women in dual-ballot elections to the extent to that the presence of more experienced male politicians may repeal the chance of entry of new female candidates, given that women do not have had much tradition in politics. It remains to be seen whether this is a result that persists in the long run, in which case part of this effect could be attributed to plain gender discrimination.

Figure 9 displays the average share of women fielded in each system over time in the sample of elections used here. When considering all those fielded, independently of ranking, this average is statistically the same in all years, except in 2000, when it is higher. When including only candidates in the top two positions, this average becomes significantly lower for dual-ballot from 2004 to 2012, but displaying a smooth growth in women participation until catching up in 2016. A finding that aids the view that the experience may be a requirement of a more demanding political process and not related to gender per si. As the time passes, more politically experienced women may become available to contest dual-ballot elections in top positions. It is important to highlight, however, how low the participation of women still is in both systems, not going over 15% in any period. Something that indicates a slow process of change and that political experience may consist in a strong barrier to entry.

I also investigate whether there are signs of tougher competition in dual-ballot elections that is reflected in vote shares. I first compare the margin of votes of all candidates over the next-placed candidate in the first round of the two systems. As it can be seen in line (2) of Table 8, there are small and no significant differences between the two systems. However, when comparing the margin of victory of the first ranked candidate in single-ballot and that of the second round of dual-ballot, I find that this margin is lower for the latter. This is a somewhat surprising result since the higher number of candidates in single-ballot, as compared to the second round of dual- ballot elections, would tend to smooth these margins across candidates. This provides evidence that dual-ballot elections tend to be closer than single-ballot in this context, something that could also explain why women are not seen as often at the top positions in dual-ballot elections.

This interpretation is aligned with experimental evidence that has identified reduction of

[10] Candidates of elections in 2000 are not included in this sample because our data covers all races between 2000 and 2016 and therefore is truncated on the left. however, the possibility of reelection was approved only in 1997 and, therefore, candidates should not be repeatedly competing in the elections not taken into account.

women's performance in competitive settings, that becomes more severe in mixed gender environments (Gneezy, Niederle and Rustichini, 2003). However, female candidates appear at the same rate in lower positions being fielded by minor parties. This demonstrates that women's entry issue may be more related to parties' endorsement than with their choices of whether to compete or not. The stronger presence of men in these elections may in itself be a repulsing factor for the entry of women, as found in Gagliarducci and Paserman (2012), where female mayors are less likely to finish their mandate when a council is composed solely by male politicians.

In short, the interpretation that receives more support from the data is that there are underlying unobserved political skills associated to entry in dual-ballot elections that not only women seem to lack but also inexperienced male politicians. This is backed by the fact that large parties are willing to field women in single-ballot elections, despite still not in parity with male candidates.

3.4 Are dual-ballot politicians different in terms of performance?

Health outcomes - One dimension over which the performance of politicians has been evaluated is health outcomes. As Fujiwara (2010) and Brollo and Troiano (2016) point out, the population responses to investment in health are fast and relevant enough so they can be evaluated in the short spam of time between different terms, and is one of the few outcomes that are available at the municipality level. Additionally, resources allocated to health in municipalities are tied to population size and income per capita, so it should be homogenous across municipalities in this aspect, even though the mayor has discretionary power in the allocation of these resources. A considerable large share of the population depend on public health care in Brazil (Sistema Unico de Saude -- SUS), about 75% of the population according to the Household Surveys [11] data. This number has also been constant over the last decade.

Panel B in Table 9 displays treatment effects over two baseline variables characterising health outcomes: any prenatal visits---the share of mothers who had at least one prenatal visit during pregnancy---and non-premature births, defined as the share of births from pregnancies of 37 weeks or above. Considering the possible existence of political cycles in policy investment so as to improve electoral chances close to elections, I split the four-year term into the sum of the first three years, second and third years and election year -- the fourth and last year of the term --, respectively.

The effects of dual-ballot in these variables are numerically small and statistically insignificant. These results are, however, also compatible with both a more effective allocation of health resources and/or a higher share of resources destined to this end by male mayors

[11] Pesquisa Nacional por Amostra de Domicilios -- PNAD.

in dual-ballot municipalities. This is true because the presence of female mayors brings up the average health outcomes in single-ballot elections. Therefore, this result does not refute the case for candidates of higher quality in dual-ballot elections.

Discretionary transfers of capital - As in Brollo and Troiano (2016), I use discretionary transfers of capital as a measure of politicians' ability to attract resources to the municipality, since they depend on agreements (convenios) made between the municipality and federal or state governments. The same pattern of non-significance is observed for discretionary transfers of capital in Panel A of Table 10. Despite not significant, dual-ballot municipalities still display a large negative effect on the discretionary transfers mayors are able to attract in the first three years of their mandate. Something that is reverted in the election year, when transfers of capital are much larger and significant relative to single-ballot. In terms of economic magnitude, our results show that dual-ballot mayors attract 36 percent more transfers for capital investment than their single-ballot counterparts. Overall, there seems to be a net positive higher value of transfers to dual-ballot municipalities.

Is it that other political incentives affect candidates' performance or candidates elected in dual-ballot elections really have differential characteristics that make them perform better? Term-constrained candidates that still perform better in dual-ballot elections would speak to the hypothesis that the system selects better candidates -- namely, career concerned -- or at least keeps checks and balances that hold politicians more accountable. To investigate this channel, I exclude term constrained candidates from the sample and run the same specifications. Now, discretionary transfers in election years are large and significant in some of the specifications with a greater sample size. Whereas non-discretionary transfers and overall discretionary transfers remain the same. Since candidates are equally likely to run for re-election and win on both sides of the discontinuity, the higher share of transfers attracted by dual-ballot may be be an extra effort required by the system itself. This supports the idea that dual-ballot elections may require higher political skills that are translated into policies with electoral goals.

3.5 Discussion

The previous results indicate that politics in general attracts the same type of citizens in terms of observable characteristics. That is, candidates are required to have a college degree and/or an occupation that qualifies them to the position. Parties' selection of candidates must therefore be made based on other grounds.

The problem with analysing unobserved quality of politicians based on performance is differentiating moral hazard aspects from adverse selection. It remains to be seen whether politicians are ex-ante of higher-quality, and voters can observe that only in dual-ballot elections, or there are embedded accountability mechanisms that forces them to perform better.

But, in either case, these are features that single-ballot elections seem to lack. The pool of more experienced candidates in dual-ballot, their political campaign strategy and timing of policies with clear electoral goals, support the idea that the screening process in this system, together with the quality of competitors, are more enhanced than in single-ballot.

The results found for women can emerge from a series of mechanisms. First, it could be a result of party discrimination, because parties decide how to allocate candidates. In the sample of elections considered here, major parties are equally present in top positions in both systems. These parties field female candidates more often in single-ballot elections, so the reduction in the proportion of women we observe in dual-ballot top positions does not seem to be consistent with discrimination, unless parties hold gender bias that are specific to dual-ballot elections. The absence of women is more consistent with parties' beliefs that dual-ballot requires more politically experienced candidates, who are able to win a more demanding election with limited campaign spending and strategically acquire and apply resources when in office targeting political goals. A question that cannot be answered in our setting is whether these requirements are disproportional towards women, because we do not observe the pool of women candidates within each party.

Second, there could be a shorter supply of female politicians in municipalities with dual-ballot elections, even in municipalities with the same proportion of women in the population, on average . That is, women may perceive dual-ballot elections as being more difficult to enter, at least competing through major parties, and may prefer other occupations or alternative public positions Casas-Arce and Saiz (2015), such as local legislatures. However, the similarity in the presence of female candidates representing minor parties is an indication that this is perhaps not a major factor contributing to the results found.

Third, it could also be a result of voters' gender discrimination. My identification strategy accounts for pre-existing gender preferences of the electorate in both sides of the discontinuity. However, voters in dual-ballot elections are subject to a different incentive system that can trigger more discrimination. It might just be more difficult to identify a high-quality female candidate in a dual-ballot setting. This is because people observe the average quality and number of candidates that are fielded in dual-ballot elections over time and they know there is a recurring group of low-quality candidates that make screening more difficult. They just associate women to this group; a sort of pooling equilibrium for women and low-quality male candidates. This would feed back into parties' beliefs that voters tend to prefer male candidates in dual-ballot elections. Nonetheless, it is hard to believe that a major party label would not differentiate a female candidate, even in dual-ballot elections.

For minor parties, the pool of possible candidates is normally composed by underrepresented groups of the population. For example, unionised parties such as PSTU (United Socialist Workers' Party) normally field candidates of working class and participate more often of dual-ballot elections. Moreover, there is evidence in the literature that women tend

to be allocated to positions already known to be difficult to win Sanbonmatsu (2002); Murray (2008); Casas-Arce and Saiz (2015), something that would also explain why minor parties field more women in general. After all, they do not target a victory anyway. It is just that in dual-ballot the probability of a party getting zero votes is lower, making it less prone to shame.

Finally, in terms of the strategic components of dual-ballot elections, threads posed to the victory of mainstream parties by small and/or extremist parties are reduced and, as a result, their bargaining power to influence policy positions of major parties are also reduced (Nannicini, Bordignon and Tabellini, 2016). This factor would work towards the creation of a more permissive and stable environment for policy positions. It would not, however, interfere to a greater extent with the types of politicians elected or the type of performance analysed here, because the competition is moved towards other grounds.

3.6 External validity

The RD empirical strategy is valid for municipalities with a population of around 200,000 voters. That is, municipalities that have just switched to dual-ballot or are close to. It is possible that the results found do not generalise to the rest of Brazilian municipalities.

The longer the time the municipality has been running elections under the dual-ballot system, the more adapted parties can become to the rules, as well as voters, and have a better understanding of the types of candidates each election requires. It is hard to say whether these differences may just fade over time, as part of a natural adaption to the new system. On the other hand, this initial condition could create a persistent gender gap in dual-ballot elections, independently of the characteristics that gave rise to it.

Despite this, the results obtained here speak to the analysis of whether electoral races under rules that supposedly allow for better screening of candidates are worth their costs. It is true that candidates spend, on average, the same financial resources in campaigning, but there are other non-monetary costs such as the time spent in the process, the higher number of candidates to choose from, the enhancement of underrepresentation of women and, more generally, the creation of barriers to entry of newly minted candidates.

My results show that, in practice, the types of candidates elected in each of these systems are virtually the same, with the drawback that dual-ballot mayors may need to make more use of political strategies, such as redistributive politics, to win elections.

In fact, dual-ballot major benefits seem to be related to its strategic components that allow voters to communicate policy preferences. Piketty (2000) defends with theoretical arguments the communicative function of runoff systems in that they allow citizens to vote in extreme candidates in the first round in order to send messages to their most preferred candidate so they can adjust their policies. In contrast, Bouton (2013), theoretically argues

that runoff systems with a threshold below 50 percent may lead to the systematic victory of the Condorcet loser in an election with three candidates. Additionally, Nannicini, Bordignon and Tabellini (2016) shows empirically that extremist voters have a lower bargaining power in dual-ballot relative to single-ballot and, as a consequence, have less influence in policies that are implemented by mainstream parties.

4 Conclusion

This paper has analysed whether there are differences in the selection process of candidates, both by parties and voters, when there is a change from single- to dual-ballot elections under plurality rule. The identification strategy makes use of the quasi-random assignment of these electoral rules to assume that municipalities with population in the neighbourhood of the 200,000 voters threshold of assignment are similar in a number of characteristics. This assumption is verified by balance tests for a host of characteristics. McCrary's test confirms the assumption that there is no manipulation in population counts as to induce a municipality to hold elections in a given system.

Candidates' observable characteristics such as occupational skill level, education and age are statistically the same in both systems for different selections of candidates by political strength. Surprisingly, however, there is a gender gap between the two: dual-ballot elections are less likely to have a woman in top positions, as defined by the share of votes obtained in the election.

To investigate whether the gender gap found is due to discrimination or there are other underlying skills that could well be required from both men and women in dual-ballot races, I also look at more specific political characteristics and some nuances of the electoral process. Dual-ballot elections have candidates with a larger experience in mayoral elections, a factor that can be an advantage when competing in parties' primaries but can also repeal other politicians from entry. The low historical presence of women in politics makes experience an important additional barrier to the entry of female candidates.

There is evidence in the literature that women get lower donations in electoral campaigns and, in general, have less resources to spend. The lack of access to financial resources is seen as major contributing factor for not winning an election and could therefore influence parties decisions. I test whether dual-ballot candidates actually raise and spend more money when compared to those in single-ballot. In fact, there are no detectable differences on what is donated and spent across the two systems, even when considering that second round elections would demand more resources. This finding might impose even more strain on the participation of women, not only through the additional difficulties in gathering donations, but also by having to win an election that has already, on average, less resources per day of

campaign.

To further understand these differences in the two systems reflected in the lack of female candidates in dual -ballot, I also look at the performance of winner candidates in office. Following the previous literature Ferraz and Finan (2008); Brollo and Troiano (2016); Gagliarducci and Paserman (2012), I consider a variable that reflects candidates' abilities to attract resources to the municipality - discretionary transfers of capital - and a variable that reflects the effectiveness in the application of non-discretionary resources -prenatal visits and non-premature births. Dual-ballot mayors attract more discretionary transfers of capital only in election years when they can run for reelection. It appears to be a compensatory policy for the comparatively low resources to spend in the campaign. In terms of health outcomes, there are no detectable differences.

All in all, these results are consistent with differentiation of candidates induced by the electoral system over directly unobservable characteristics that are reflected in the lower participation of women in dual-ballot elections.

This paper exploited the mechanisms behind the supply side of politicians in dual-ballot elections but has not said anything about how voters respond to the lengthier electoral process and how this feeds back into politicians and party's strategies. Do they tend to participate more or less of the electoral process in the dual-ballot system? Because dual-ballot favours experienced politicians and require more strategic moves - such as attracting more discretionary transfers -- it is also important to verify whether these characteristics are also associated with more cases of corruption or are beneficial to the municipalities following the rule.

In terms of public policy, improvements over candidates' characteristics and/or performance induced by simply changing electoral systems might be desirable in any circumstances where welfare gains would be superior to the costs of setting up the new electoral process. Understanding all these interactions between electoral systems and mechanisms that induce politicians to perform better is an exciting avenue for future research.

Tables

Table 1: Balance tests on municipalities' baseline characteristics.

Panel A: Schooling.

	(1) Mean	(2) BW	(3) OLS	(4) Spline 3rd	(5) Spline 4th	(6) Optimal BW	(7) Half Optimal BW
Illiterates	0.0910	15820.94	−0.0034	0.0028	0.0011	0.0089	−0.0028
	[0.0539]	(308)	[0.0081]	[0.0105]	[0.0159]	[0.0178]	[0.0151]
Primary school	0.4401	21925.30	−0.0034	−0.0070	−0.0037	−0.0192	0.0049
	[0.0748]	(308)	[0.0081]	[0.0272]	[0.0333]	[0.0292]	[0.0169]
Secondary School	0.2594	24621.21	−0.0034	0.0057	0.0046	−0.0047	0.0105
	[0.0657]	(308)	[0.0081]	[0.0253]	[0.0305]	[0.0232]	[0.0155]
Tertiary School	0.0614	23889.06	0.0129	0.0131	0.0140	0.0075	0.0184
	[0.0341]	(308)	[0.0086]	[0.0128]	[0.0149]	[0.0125]	[0.0164]
Observations	211		308	308	308	82	40

Panel B: Income and demographics.

	(1) Mean	(2) BW	(3) OLS	(4) Spline 3rd	(5) Spline 4th	(6) Optimal BW	(7) Half Optimal BW
Unemployed	0.5421	19184.65	−0.0174**	0.0307	0.0279	0.0327	0.0102
	[0.0548]	(308)	[0.0085]	[0.0196]	[0.0248]	[0.0236]	[0.0121]
Per capita income	611.2953	16780.72	−0.0174**	100.6014	128.3677	67.4590	94.2142**
	[210.4976]	(308)	[0.0085]	[75.3298]	[86.9779]	[85.5042]	[44.7340]
Women	0.5101	34859.90	−0.0174**	−0.0016	−0.0010	−0.0010	0.0018
	[0.0076]	(308)	[0.0085]	[0.0030]	[0.0037]	[0.0025]	[0.0018]
Urban	0.9451	17450.52	−0.0007	−0.0077	−0.0067	−0.0075	−0.0313
	[0.0630]	(308)	[0.0132]	[0.0162]	[0.0226]	[0.0218]	[0.0271]
Observations	211		308	308	308	58	34

Panel C: Sanitation.

	(1) Mean	(2) BW	(3) OLS	(4) Spline 3rd	(5) Spline 4th	(6) Optimal BW	(7) Half Optimal BW
Running water	0.9002	25260.67	0.0219	0.0375	0.0254	0.0030	0.0183
	[0.1210]	(308)	[0.0221]	[0.0486]	[0.0739]	[0.0463]	[0.0615]
Bathroom and running water	0.8805	24844.01	0.0219	0.0371	0.0286	0.0062	0.0198
	[0.1377]	(308)	[0.0221]	[0.0541]	[0.0824]	[0.0527]	[0.0243]
Eletricity	0.9868	20292.11	0.0219	0.0021	0.0056	0.0011	0.0006
	[0.0304]	(308)	[0.0221]	[0.0062]	[0.0115]	[0.0098]	[0.0052]
Sewerage supply	0.0467	24352.83	−0.0128	−0.0114	−0.0109	0.0032	−0.0043
	[0.0802]	(308)	[0.0142]	[0.0273]	[0.0478]	[0.0300]	[0.0479]
Observations	211		308	308	308	86	40

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in brackets. Sample size in parenthesis.

Note: Column (1) displays the corresponding variable mean and standard deviation (in square brackets) in single-ballot elections. Column (2) displays the optimal bandwidth value obtained through Imbens and Kalyanaraman (2012) and the sample size used in the calculation is displayed below in parenthesis. Columns (4) and (5) display parametric estimates considering polynomial splines of 3rd and 4th order, respectively, using a sample of municipalities within a 75,000 voters distance from the zero cutoff. Column (3) displays baseline OLS results using the same sample. Columns (6) and (7) display non-parametric estimates with samples restricted to the optimal bandwidth in (2) and half of it, respectively. See Table 2 for definitions.

Table 2: Definition of municipalities' baseline characteristics.

Variable	Description
Illiterate	Share of the population aged 18 or above that cannot read or write.
Primary School	Share of the population aged 18 or above with at least primary education.
Secondary School	Share of the population aged 18 or above with at least secondary education.
Tertiary School	Share of the population aged 25 or above with at least a university degree.
Unemployed	Share of the population aged 18 or above who were unemployed.
Per Capita Income	Average per capita for income.
Women	Share of women in the population.
Urban	Share of the population living in urban areas.
Running water	Share of households with water supply.
Bathroom and running water	Share of households with water supply and a bathroom.
Eletricity	Share of households with eletricity.
Sewerage supply	Share of households with sewerage supply.

Note: This table shows the definition of the variables used to measure schooling, income and sanitation at the municipality level. Variables are defined as in the 2000 Census.

Table 3: Dual-ballot treatment effects on candidates' observable characteristics.

Panel A: Sample includes all candidates in both single- and dual-ballot races.

	(1) Mean	(2) BW	(3) OLS	(4) Spline 3rd	(5) Spline 4th	(6) Optimal BW	(7) Half Optimal BW
Female	0.1079	26822.65	−0.0505	−0.0983	−0.0979	−0.0766	−0.0539
	[0.3104]	(1461)	[0.0354]	[0.0631]	[0.0813]	[0.0506]	[0.0709]
Age	49.8504	24122.24	−0.0505	1.5877	0.4159	1.0060	−0.6161
	[10.6737]	(1461)	[0.0354]	[2.6489]	[3.1055]	[2.3052]	[1.2402]
University Degree	0.7019	31496.82	−0.0505	−0.0822	−0.1389	−0.1436	−0.0146
	[0.4577]	(1461)	[0.0354]	[0.1274]	[0.1456]	[0.0997]	[0.0620]
High Skill	0.6218	19791.07	0.0481	0.0548	−0.0144	0.0414	0.0066
	[0.4852]	(1461)	[0.0426]	[0.1049]	[0.1335]	[0.0997]	[0.1531]
Observations	936		1461	1461	1461	339	181

Panel B: Sample excludes top two and three candidates in single- and dual-ballot races, respectively.

	(1) Mean	(2) BW	(3) OLS	(4) Spline 3rd	(5) Spline 4th	(6) Optimal BW	(7) Half Optimal BW
Female	0.1029	33361.95	0.0045	0.0029	0.0545	−0.0020	0.0906
	[0.3041]	(752)	[0.0532]	[0.0893]	[0.1089]	[0.0706]	[0.0885]
Age	48.8971	22200.00	0.0045	2.9944	0.3439	3.0693	0.8956
	[10.7334]	(752)	[0.0532]	[3.8555]	[4.6021]	[3.7320]	[1.8572]
University Degree	0.6388	24132.24	0.0045	−0.1826	−0.1736	−0.1338	−0.0325
	[0.4808]	(752)	[0.0532]	[0.1464]	[0.1812]	[0.1375]	[0.0775]
High Skill	0.5456	20789.34	0.0046	0.0113	−0.0952	−0.0065	−0.2042
	[0.4984]	(752)	[0.0680]	[0.1445]	[0.1990]	[0.1373]	[0.2088]
Observations	515		752	752	752	178	93

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in brackets. Sample size in parenthesis.

Note: Column (1) displays the corresponding variable mean and standard deviation (in square brackets) in single-ballot elections. Column (2) displays the optimal bandwidth value obtained through Imbens and Kalyanaraman (2012) and the sample size used in the calculation is displayed below in parenthesis. Columns (4) and (5) display parametric estimates considering polynomial splines of 3rd and 4th order, respectively, using a sample of municipalities within a 75,000 voters distance from the zero cutoff. Column (3) displays baseline OLS results using the same sample. Columns (6) and (7) display non-parametric estimates with samples restricted to the optimal bandwidth in (2) and half of it, respectively. See Section 3.1 for a definition of high skill.

Table 4: Dual-ballot treatment effects on candidates' observable characteristics.

Panel A: Subsample of top two ranked candidates in both single- and dual-ballot races.

	(1) Mean	(2) BW	(3) OLS	(4) Spline 3rd	(5) Spline 4th	(6) Optimal BW	(7) Half Optimal BW
Female	0.1140	26380.17	−0.1078*	−0.2199**	−0.3074***	−0.1952**	−0.2577**
	[0.3182]	(615)	[0.0590]	[0.0896]	[0.1093]	[0.0812]	[0.1006]
Age	51.0166	21059.50	−0.1078*	1.3246	0.8900	1.1463	−2.0160
	[10.4957]	(615)	[0.0590]	[2.8500]	[3.3837]	[2.6262]	[1.7522]
University Degree	0.7791	26827.01	−0.1078*	0.0367	−0.1243	−0.0643	0.0350
	[0.4153]	(615)	[0.0590]	[0.1644]	[0.1738]	[0.1501]	[0.0752]
High Skill	0.7150	34166.69	0.0657	0.1306	0.0423	0.0633	0.0800
	[0.4520]	(615)	[0.0794]	[0.1515]	[0.1916]	[0.1098]	[0.1534]
Observations	421		615	615	615	242	114

Panel B: Subsample of top two and top three ranked candidates in single- and dual-ballot races, respectively.

	(1) Mean	(2) BW	(3) OLS	(4) Spline 3rd	(5) Spline 4th	(6) Optimal BW	(7) Half Optimal BW
Female	0.1140	27292.10	−0.1055**	−0.1967**	−0.2340**	−0.1638**	−0.1959*
	[0.3182]	(709)	[0.0530]	[0.0935]	[0.1144]	[0.0697]	[0.0987]
Age	51.0166	35036.14	−0.1055**	0.1460	0.2439	−1.0555	−2.3156
	[10.4957]	(709)	[0.0530]	[2.7042]	[3.2674]	[1.9185]	[1.5255]
University Degree	0.7791	26577.84	−0.1055**	0.0188	−0.1601	−0.1022	−0.0161
	[0.4153]	(709)	[0.0530]	[0.1522]	[0.1687]	[0.1265]	[0.0725]
High Skill	0.7150	33480.04	0.0666	0.0707	−0.0080	0.0242	0.0419
	[0.4520]	(709)	[0.0677]	[0.1397]	[0.1686]	[0.0966]	[0.1345]
Observations	421		709	709	709	296	135

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in brackets. Sample size in parenthesis.

Note: Column (1) displays the corresponding variable mean and standard deviation (in square brackets) in single-ballot elections. Column (2) displays the optimal bandwidth value obtained through Imbens and Kalyanaraman (2012) and the sample size used in the calculation is displayed below in parenthesis. Columns (4) and (5) display parametric estimates considering polynomial splines of 3rd and 4th order, respectively, using a sample of municipalities within a 75,000 voters distance from the zero cutoff. Column (3) displays baseline OLS results using the same sample. Columns (6) and (7) display non-parametric estimates with samples restricted to the optimal bandwidth in (2) and half of it, respectively. See Section 3.1 for a definition of high skill.

Table 5: Dual-ballot treatment effects on observable candidates' characteristics by gender.

Panel A: All female candidates in both single- and dual-ballot races.

	(1) Mean	(2) BW	(3) OLS	(4) Spline 3rd	(5) Spline 4th	(6) Optimal BW	(7) Half Optimal BW
Age	47.8119	30201.10	1.3894	12.6594**	5.7498	8.9580*	1.3894
	[8.7060]	(162)	[2.9905]	[5.8162]	[5.4215]	[4.6990]	[2.9905]
University Degree	0.7822	22937.81	1.3894	0.2446	−0.0815	0.2335	0.2509*
	[0.4148]	(162)	[2.9905]	[0.2141]	[0.2725]	[0.1859]	[0.1420]
High Skill	0.5644	33472.27	0.1179	−0.1956	−0.3894	−0.2429	−0.1409
	[0.4983]	(162)	[0.1387]	[0.2557]	[0.3200]	[0.2013]	[0.3174]
Observations	101		162	162	162	76	30

Panel B: All male candidates in both single- and dual-ballot races.

	(1) Mean	(2) BW	(3) OLS	(4) Spline 3rd	(5) Spline 4th	(6) Optimal BW	(7) Half Optimal BW
Age	50.0970	22712.83	−0.7783	0.0091	0.0558	0.6205	−0.7783
	[10.8662]	(1299)	[1.2710]	[2.6314]	[3.0899]	[2.1613]	[1.2710]
University Degree	0.6922	26540.53	−0.7783	−0.1276	−0.1274	−0.1584	−0.0431
	[0.4619]	(1299)	[1.2710]	[0.1366]	[0.1547]	[0.1106]	[0.0630]
High Skill	0.6287	19565.27	0.0439	0.0869	0.0405	0.0670	0.0460
	[0.4834]	(1299)	[0.0467]	[0.0968]	[0.1121]	[0.0892]	[0.1368]
Observations	835		1299	1299	1299	291	159

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in brackets. Sample size in parenthesis.

Note: Column (1) displays the corresponding variable mean and standard deviation (in square brackets) in single-ballot elections. Column (2) displays the optimal bandwidth value obtained through Imbens and Kalyanaraman (2012) and the sample size used in the calculation is displayed below in parenthesis. Columns (4) and (5) display parametric estimates considering polynomial splines of 3rd and 4th order, respectively, using a sample of municipalities within a 75,000 voters distance from the zero cutoff. Column (3) displays baseline OLS results using the same sample. Columns (6) and (7) display non-parametric estimates with samples restricted to the optimal bandwidth in (2) and half of it, respectively. See Section 3.1 for a definition of high skill.

Table 6: Dual-ballot treatment effects on campaign donations and spending.

	(1) Mean	(2) BW	(3) OLS	(4) Spline 3rd	(5) Spline 4th	(6) Optimal BW	(7) Half Optimal BW
Total spending 1st round	1.5936	24606.31	−0.8073***	−0.0930	−0.1557	−0.1555	−0.4627
	[1.7184]	(499)	[0.2923]	[0.5174]	[0.6049]	[0.4864]	[0.5577]
Total spending 1st/2nd round	0.5312	25575.12	−0.8073***	−0.0006	−0.1466	−0.0073	−0.1727
	[0.5728]	(487)	[0.2923]	[0.2300]	[0.2616]	[0.2094]	[0.1174]
Total spending	1.8251	26482.71	−0.8073***	0.1606	−0.0944	0.1357	−0.6747**
	[1.8846]	(417)	[0.2923]	[0.6049]	[0.7093]	[0.5935]	[0.3042]
Fundraising total 1st round	1.4019	22399.17	−0.8073***	0.0232	0.1211	0.0542	−0.5448**
	[1.6042]	(518)	[0.2923]	[0.4879]	[0.6139]	[0.4765]	[0.2597]
Fundraising total 1st/2nd round	0.4673	27873.58	−0.8073***	0.2707	0.1928	0.2607	−0.0548
	[0.5347]	(518)	[0.2923]	[0.2243]	[0.2817]	[0.1862]	[0.1051]
Fundraising total	1.6721	24737.74	−0.4497	0.3049	0.4446	0.3633	0.1192
	[1.9320]	(518)	[0.3289]	[0.6184]	[0.7567]	[0.5746]	[0.7599]
Observations	358		518	518	518	146	70

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in brackets. Sample size in parenthesis.

Note: Column (1) displays the corresponding variable mean and standard deviation (in square brackets) in single-ballot elections. Column (2) displays the optimal bandwidth value obtained through Imbens and Kalyanaraman (2012) and the sample size used in the calculation is displayed below in parenthesis. Columns (4) and (5) display parametric estimates considering polynomial splines of 3rd and 4th order, respectively, using a sample of municipalities within a 75,000 voters distance from the zero cutoff. Column (3) displays baseline OLS results using the same sample. Columns (6) and (7) display non-parametric estimates with samples restricted to the optimal bandwidth in (2) and half of it, respectively.

Table 7: Dual-ballot treatment effects on sources of campaign funding for top two candidates.

Panel A: Campaign funding (per capita) raised in the first round.

	(1) Mean	(2) BW	(3) OLS	(4) Spline 3rd	(5) Spline 4th	(6) Optimal BW	(7) Half Optimal BW
Events	0.0196	22740.40	−0.0179	−0.0111	−0.0460	−0.0245	−0.0085
	[0.1173]	(467)	[0.0172]	[0.0304]	[0.0339]	[0.0228]	[0.0204]
Voters	0.2891	26616.29	−0.0179	−0.0801	−0.0018	−0.0562	−0.0476
	[0.3622]	(467)	[0.0172]	[0.1208]	[0.1804]	[0.1089]	[0.0794]
Companies	0.4894	20056.32	−0.0179	0.0789	0.0971	0.0833	−0.2719**
	[0.8542]	(467)	[0.0172]	[0.2671]	[0.3493]	[0.2732]	[0.1350]
Public funding	0.0076	20816.63	−0.0179	−0.0054	−0.0069	−0.0063	0.0076
	[0.0986]	(467)	[0.0172]	[0.0150]	[0.0170]	[0.0067]	[0.0080]
Party funding	0.2816	19036.88	−0.0179	0.1652	0.2484	0.2651*	−0.1252
	[0.6116]	(467)	[0.0172]	[0.1278]	[0.1775]	[0.1508]	[0.0900]
Unknown	0.0063	7086.51	0.0068	−0.0072	0.0121	0.0002	0.0001
	[0.0989]	(467)	[0.0064]	[0.0099]	[0.0131]	[0.0002]	[0.0003]
Observations	327		467	467	467	41	19

Panel B: Campaign funding (per capita) raised in the election.

	(1) Mean	(2) BW	(3) OLS	(4) Spline 3rd	(5) Spline 4th	(6) Optimal BW	(7) Half Optimal BW
Events	0.0215	32912.35	−0.0287	−0.0245	−0.0688	−0.0427	−0.0435
	[0.1231]	(467)	[0.0204]	[0.0399]	[0.0435]	[0.0255]	[0.0355]
Voters	0.3619	32879.41	−0.0287	−0.1231	−0.0441	−0.0430	0.0078
	[0.4526]	(467)	[0.0204]	[0.1346]	[0.1943]	[0.1148]	[0.0901]
Companies	0.5620	21228.35	−0.0287	0.3074	0.5451	0.4938	−0.1573
	[0.9738]	(467)	[0.0204]	[0.3488]	[0.4770]	[0.4054]	[0.1533]
Public funding	0.0078	22013.48	−0.0287	−0.0045	−0.0064	−0.0065	0.0069
	[0.0987]	(467)	[0.0204]	[0.0151]	[0.0171]	[0.0067]	[0.0081]
Party funding	0.3188	23050.91	−0.0287	0.3034*	0.2995	0.1863	−0.1014
	[0.7171]	(467)	[0.0204]	[0.1567]	[0.2203]	[0.1283]	[0.1054]
Unknown	0.0063	7594.75	0.0069	−0.0072	0.0120	0.0002	0.0001
	[0.0989]	(467)	[0.0064]	[0.0099]	[0.0131]	[0.0002]	[0.0003]
Observations	327		467	467	467	43	21

Panel B: Campaign funding (per capita) raised in the first round of single-ballot (monthly average) against the second round of dual-ballot.

	(1) Mean	(2) BW	(3) OLS	(4) Spline 3rd	(5) Spline 4th	(6) Optimal BW	(7) Half Optimal BW
Events	0.0065	19681.78	−0.0073	0.0069	−0.0161	−0.0066	0.0010
	[0.0391]	(467)	[0.0059]	[0.0144]	[0.0117]	[0.0067]	[0.0070]
Voters	0.0964	16246.58	−0.0073	−0.0738	−0.0640	−0.0521	−0.0114
	[0.1207]	(467)	[0.0059]	[0.0507]	[0.0666]	[0.0622]	[0.0303]
Companies	0.1631	19823.29	−0.0073	0.2332	0.3336	0.3026	−0.0152
	[0.2847]	(467)	[0.0059]	[0.1807]	[0.2438]	[0.2164]	[0.0652]
Public funding	0.0025	20993.23	−0.0073	−0.0018	−0.0029	−0.0021	0.0024
	[0.0329]	(467)	[0.0059]	[0.0050]	[0.0056]	[0.0022]	[0.0027]
Party funding	0.0939	21581.31	−0.0073	0.1316**	0.0843	0.1159	−0.0094
	[0.2039]	(467)	[0.0059]	[0.0644]	[0.0868]	[0.0689]	[0.0383]
Unknown	0.0021	8251.18	0.0023	−0.0024	0.0039	0.0000	−0.0000
	[0.0330]	(467)	[0.0021]	[0.0033]	[0.0044]	[0.0000]	[0.0001]
Observations	327		467	467	467	45	25
R^2			0.016	0.018	0.022	0.072	0.126

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in brackets. Sample size in parenthesis.

Note: Column (1) displays the corresponding variable mean and standard deviation (in square brackets) in single-ballot elections. Column (2) displays the optimal bandwidth value obtained through Imbens and Kalyanaraman (2012) and the sample size used in the calculation is displayed below in parenthesis. Columns (4) and (5) display parametric estimates considering polynomial splines of 3rd and 4th order, respectively, using a sample of municipalities within a 75,000 voters distance from the zero cutoff. Column (3) displays baseline OLS results using the same sample. Columns (6) and (7) display non-parametric estimates with samples restricted to the optimal bandwidth in (2) and half of it, respectively.

Table 8: Dual-ballot treatment effects on political characteristics.

	(1) Mean	(2) BW	(3) OLS	(4) Spline 3rd	(5) Spline 4th	(6) Optimal BW	(7) Half Optimal BW
Experience in Mayoral elections	0.5173	18665.06	−0.1248	0.2458**	0.2632**	0.1927	0.3679**
	[0.8239]	(1251)	[0.0865]	[0.1193]	[0.1205]	[0.1204]	[0.1573]
Margin of votes (1st round)	0.1195	27371.89	−0.0389***	−0.0528*	−0.0001	−0.0232	−0.0242
	[0.1248]	(1163)	[0.0129]	[0.0314]	[0.0345]	[0.0251]	[0.0306]
Margin of votes (1st SB vs 2nd DB)	0.1750	23046.05	−0.1145**	−0.1991***	−0.1210	−0.1145**	−0.1145**
	[0.1534]	(264)	[0.0439]	[0.0744]	[0.0903]	[0.0439]	[0.0439]
Incumbent race	0.3388	31660.89	−0.1145**	0.2007	0.1568	−0.0198	0.0144
	[0.4746]	(267)	[0.0439]	[0.1934]	[0.2151]	[0.1524]	[0.1113]
Reelection Win	0.2240	35966.01	−0.1145**	−0.0424	−0.1744	−0.0583	0.0490
	[0.4181]	(267)	[0.0439]	[0.1875]	[0.2154]	[0.1479]	[0.1100]

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in brackets. Sample size in parenthesis.

Note: Column (1) displays the corresponding variable mean and standard deviation (in square brackets) in single-ballot elections. Column (2) displays the optimal bandwidth value obtained through Imbens and Kalyanaraman (2012) and the sample size used in the calculation is displayed below in parenthesis. Columns (4) and (5) display parametric estimates considering polynomial splines of 3rd and 4th order, respectively, using a sample of municipalities within a 75,000 voters distance from the zero cutoff. Column (3) displays baseline OLS results using the same sample. Columns (6) and (7) display non-parametric estimates with samples restricted to the optimal bandwidth in (2) and half of it, respectively.

Table 9: Dual-ballot treatment effects on health outcomes.

	(1) Mean	(2) BW	(3) OLS	(4) Spline 3rd	(5) Spline 4th	(6) Optimal BW	(7) Half Optimal BW
Non-premature births	0.3991	20556.50	−0.0035	0.0051	0.0083	0.0045	−0.0014
	[0.2605]	(259)	[0.0039]	[0.0058]	[0.0066]	[0.0054]	[0.0055]
Any prenatal visits	0.6294	20238.87	−0.0035	0.0053	0.0056	0.0071	−0.0013
	[0.4109]	(259)	[0.0039]	[0.0081]	[0.0088]	[0.0088]	[0.0040]
Non-premature births (3 years)	0.4586	21293.10	−0.0035	0.0069	0.0104	0.0054	−0.0045
	[0.3281]	(259)	[0.0039]	[0.0077]	[0.0088]	[0.0072]	[0.0052]
Any prenatal visits (3 years)	0.6963	20278.54	−0.0035	0.0070	0.0085	0.0090	−0.0022
	[0.4410]	(259)	[0.0039]	[0.0092]	[0.0096]	[0.0094]	[0.0043]
Non-premature births (2nd and 3rd years)	0.4598	21402.52	−0.0035	0.0072	0.0095	0.0061	−0.0039
	[0.3296]	(259)	[0.0039]	[0.0072]	[0.0079]	[0.0065]	[0.0047]
Any prenatal visits (2nd and 3rd years)	0.6969	20262.91	−0.0035	0.0058	0.0066	0.0070	−0.0033
	[0.4414]	(259)	[0.0039]	[0.0087]	[0.0093]	[0.0092]	[0.0042]
Non-premature births (election year)	0.4998	23324.97	−0.0035	0.0001	0.0034	0.0013	−0.0010
	[0.0051]	(117)	[0.0039]	[0.0025]	[0.0028]	[0.0020]	[0.0015]
Any prenatal visits (election year)	0.9718	25087.39	0.0024	−0.0017	−0.0076	0.0069	−0.0082
	[0.0246]	(117)	[0.0083]	[0.0145]	[0.0163]	[0.0139]	[0.0103]

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in brackets. Sample size in parenthesis.

Note: Column (1) displays the corresponding variable mean and standard deviation (in square brackets) in single-ballot elections. Column (2) displays the optimal bandwidth value obtained through Imbens and Kalyanaraman (2012) and the sample size used in the calculation is displayed below in parenthesis. Columns (4) and (5) display parametric estimates considering polynomial splines of 3rd and 4th order, respectively, using a sample of municipalities within a 75,000 voters distance from the zero cutoff. Column (3) displays baseline OLS results using the same sample. Columns (6) and (7) display non-parametric estimates with samples restricted to the optimal bandwidth in (2) and half of it, respectively.

Table 10: Dual-ballot treatment effects on transfers for capital investment.

Panel A: Transfers for capital investment for the full sample of municipalities.

	(1) Mean	(2) BW	(3) OLS	(4) Spline 3rd	(5) Spline 4th	(6) Optimal BW	(7) Half Optimal BW
Discretionary transfers	11.2495	20198.71	0.7054	0.7177	0.4819	1.0945	−0.6584
	[7.4749]	(259)	[0.5963]	[1.2574]	[1.1731]	[1.0130]	[1.1002]
Non-discretionary transfers	9.7850	26258.37	0.7054	1.2183	1.4717	1.3093	−0.2304
	[7.0049]	(259)	[0.5963]	[2.4039]	[2.8766]	[1.9703]	[1.0876]
Discretionary transfers (3 years)	10.9158	24598.71	0.7054	−1.5162	−2.5059	−0.5637	0.2314
	[7.3710]	(259)	[0.5963]	[2.1963]	[2.7931]	[2.1687]	[0.7887]
Non-discretionary transfers (3 years)	9.3919	25862.92	0.7054	1.0124	1.7797	1.1275	−0.2315
	[6.9197]	(259)	[0.5963]	[2.4183]	[2.9401]	[1.9959]	[1.0914]
Discretionary transfers (election year)	14.4140	21211.90	0.7054	0.4458	−0.7116	0.8725	0.9104
	[3.5504]	(117)	[0.5963]	[1.1797]	[1.0613]	[0.8948]	[0.8030]
Non-discretionary transfers (election year)	11.6159	22662.32	−1.0449	−0.5182	0.0560	−0.3493	−2.1525
	[5.0868]	(117)	[1.7881]	[2.7917]	[3.1884]	[2.3069]	[3.1675]

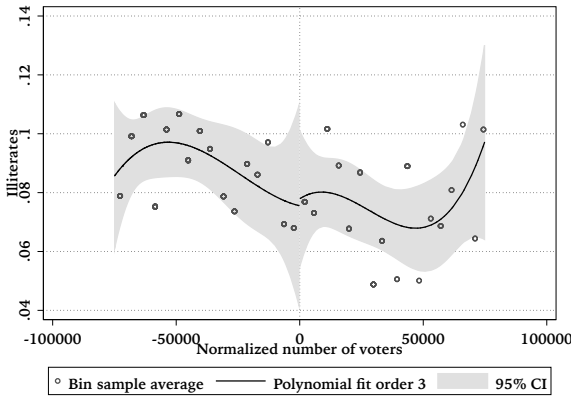
Panel B: Transfers for capital investment in municipalities with first-term mayors.

	(1) Mean	(2) BW	(3) OLS	(4) Spline 3rd	(5) Spline 4th	(6) Optimal BW	(7) Half Optimal BW
Discretionary transfers	8.8783	32234.27	0.1901	0.3141	1.1695	0.8175	1.1701
	[8.1251]	(91)	[0.3343]	[0.7328]	[0.7406]	[0.5667]	[1.0578]
Non-discretionary transfers	7.7169	27391.21	0.1901	2.2137	0.4023	0.3054	−0.7342
	[7.2791]	(91)	[0.3343]	[1.7903]	[1.2885]	[1.4465]	[0.8364]
Discretionary transfers (3 years)	8.7493	32678.30	0.1901	0.1336	1.0432	0.5741	0.1660
	[8.0104]	(91)	[0.3343]	[0.7317]	[0.6916]	[0.5475]	[0.3578]
Non-discretionary transfers (3 years)	7.5571	27786.77	0.1901	2.3314	0.9430	0.2077	−1.0827
	[7.1491]	(91)	[0.3343]	[1.7491]	[1.5187]	[1.3130]	[0.8544]
Discretionary transfers (election year)	15.3340	18576.04	0.1901	5.6883***	7.6140***	2.9985	0.6255
	[1.0154]	(28)	[0.3343]	[0.7192]	[1.6457]	[1.6196]	[0.7999]
Non-discretionary transfers (election year)	12.0976	10839.17	2.1985	5.6553	3.1832	6.2464	–
	[3.9729]	(28)	[2.8372]	[5.9781]	[8.8505]	[3.6229]	[.]

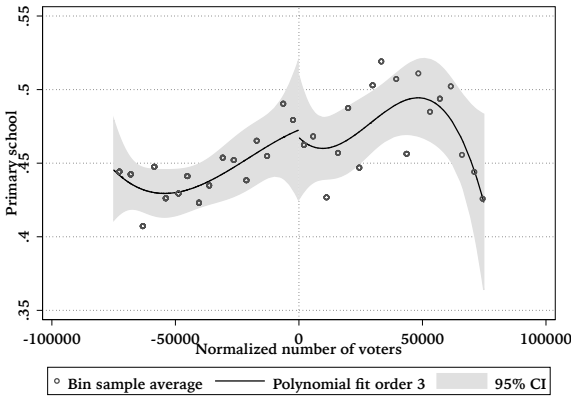
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in brackets. Sample size in parenthesis.

Note: Column (1) displays the corresponding variable mean and standard deviation (in square brackets) in single-ballot elections. Column (2) displays the optimal bandwidth value obtained through Imbens and Kalyanaraman (2012) and the sample size used in the calculation is displayed below in parenthesis. Columns (4) and (5) display parametric estimates considering polynomial splines of 3rd and 4th order, respectively, using a sample of municipalities within a 75,000 voters distance from the zero cutoff. Column (3) displays baseline OLS results using the same sample. Columns (6) and (7) display non-parametric estimates with samples restricted to the optimal bandwidth in (2) and half of it, respectively.

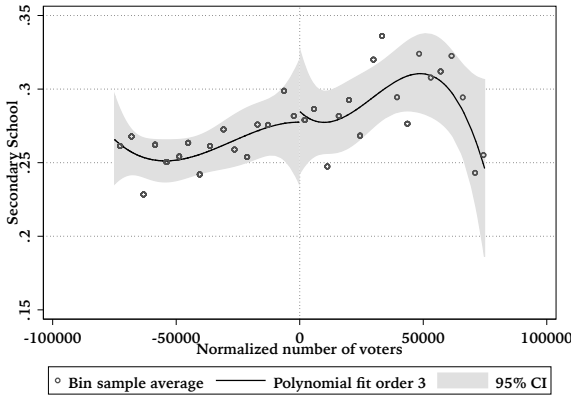
5 Figures



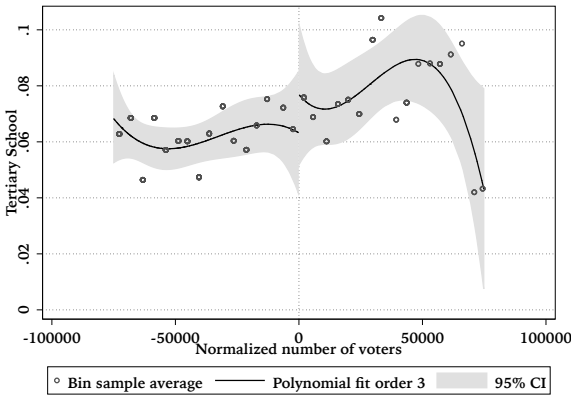
(a) Share of illiterates (age 18+)



(b) Share of people with basic education (age 18+)



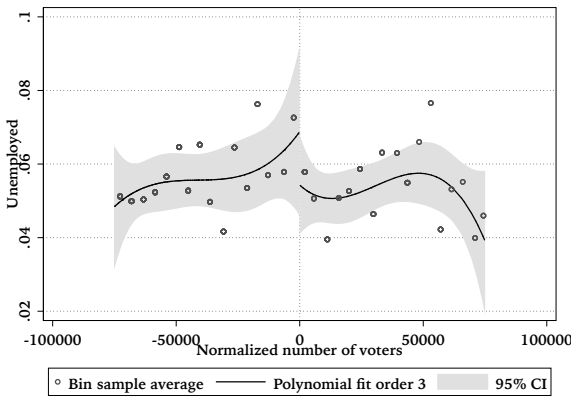
(c) Share of people with secondary education (age 18+)



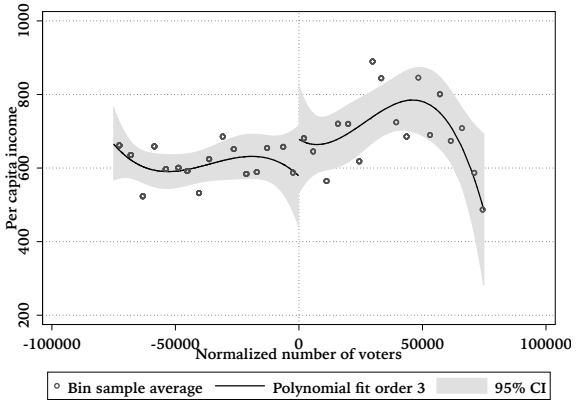
(d) Share of people with tertiary education (age 25+)

Figure 1: Balance tests for municipality characteristics: schooling.

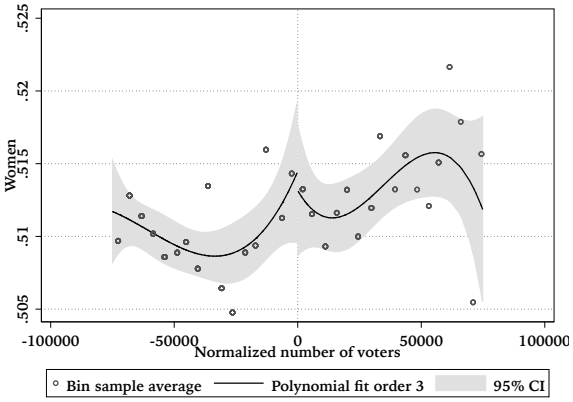
Note: Variables extracted from the 2000 Census. This sample considers all municipalities within a 75,000 distance from the threshold for visualisation purposes. Scatter points are averaged over 327 voters, as determined by Imbens and Lemieux (2008).



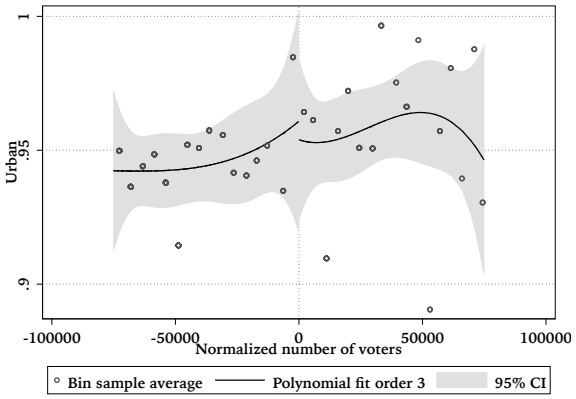
(a) Share unemployed (age 18+).



(b) Per capita income



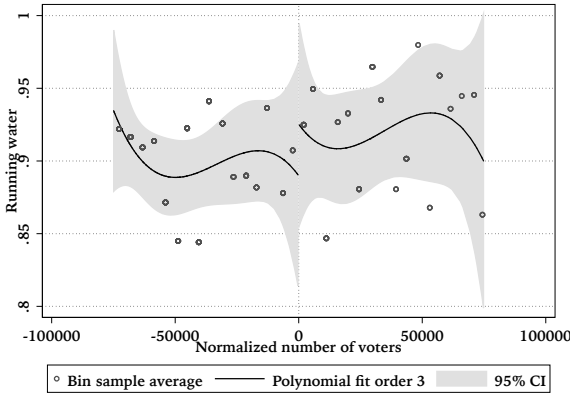
(c) Share of women in the population



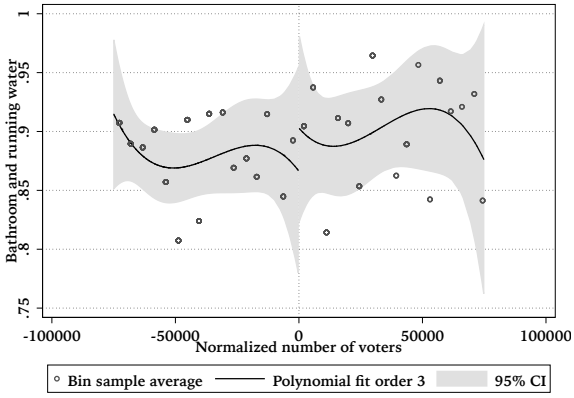
(d) Share of population living in urban area

Figure 2: Balance tests for municipality characteristics: income and demographics.

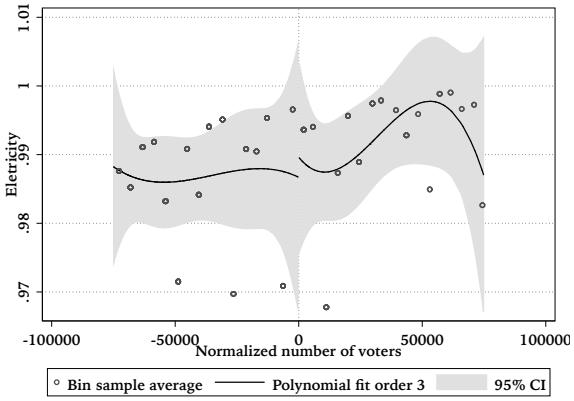
Note: Variables extracted from the 2000 Census. See 2 for definitions. This sample considers all municipalities within a 75,000 distance from the threshold for visualisation purposes. Scatter points are averaged over 327 voters, as determined by Imbens and Kalyanaraman (2012).



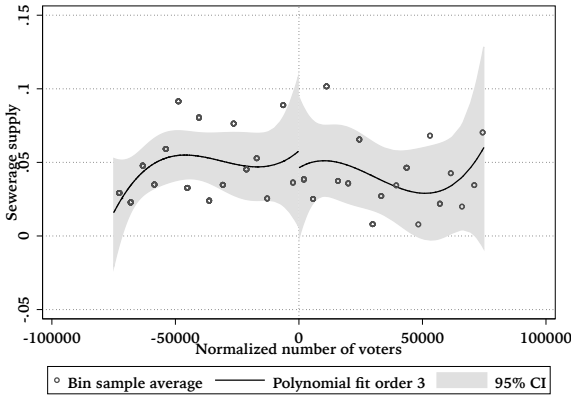
(a) Share of population with running water and bathroom



(b) Share of population with waste collection service



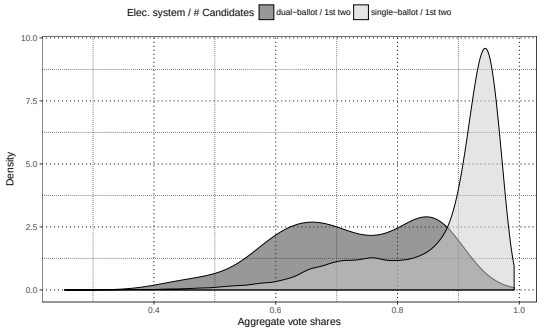
(c) Share of population with eletricity



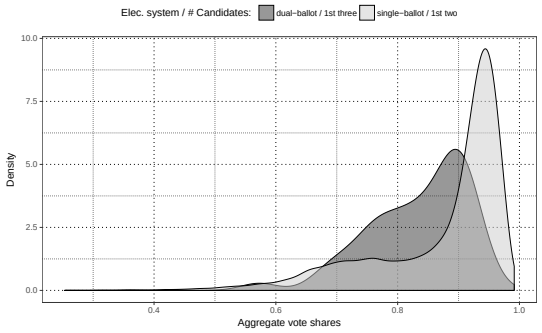
(d) Share of population with running water and sanitation

Figure 3: Balance tests for municipality characteristics: infrastructure.

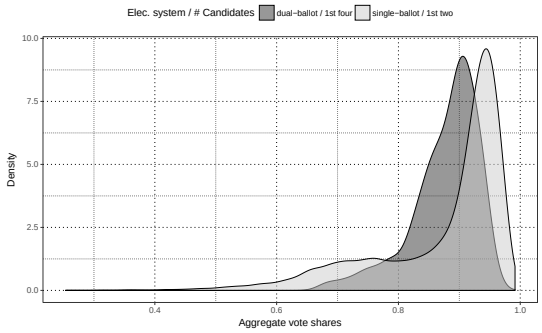
Note: Variables extracted from the 2000 Census. See 2 for definitions. This sample considers all municipalities within a 75,000 distance from the threshold for visualisation purposes. Scatter points are averaged over 327 voters, as defined by Imbens and Kalyanaraman (2012).



(a) Density of the aggregate vote shares of top two ranked candidates in single- and dual-ballot races.



(b) Density of the aggregate vote shares of top two and three ranked candidates in single- and dual-ballot races, respectively.



(c) Density of the aggregate vote shares of top two and top four ranked candidates in single- and dual-ballot races, respectively.

Figure 4: Distribution of vote shares in single- and dual-ballot elections

Note: This sample considers all municipalities within a 75,000 distance from the threshold and all mayoral election held from 2000 to 2016.

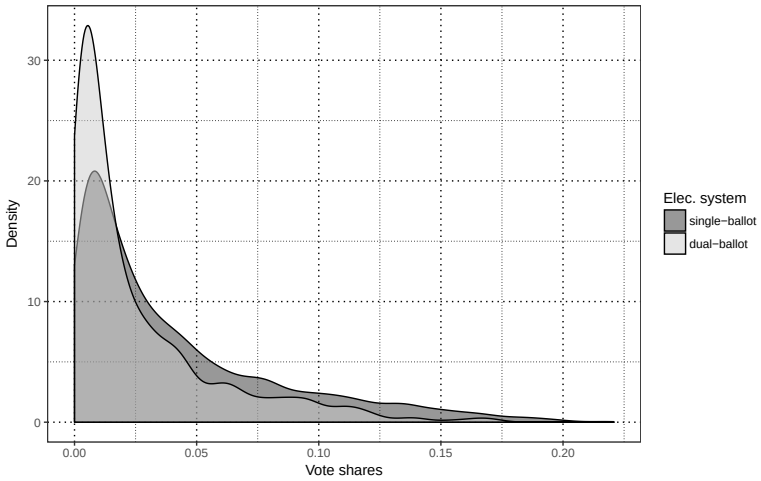


Figure 5: Density of aggregate vote shares of fourth or lower placed candidates

Note: The x-axis considers the sum of vote shares of fourth and lower placed candidates. This sample considers all mayoral races between 2000 and 2016 and municipalities within a 75,000 voters distance from the threshold.

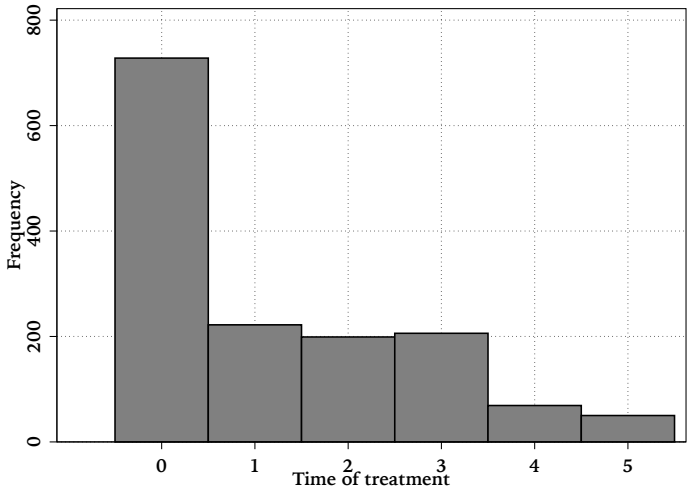


Figure 6: Distribution of the number of elections since conversion to dual-ballot.

Note: This sample considers all mayoral races between 2000 and 2016 and municipalities within a 75,000 voters distance from the threshold. Therefore, five means the municipality has ran elections under dual-ballot in all races in the sample. Conversely, zero means the municipality has ran all elections under single-ballot.

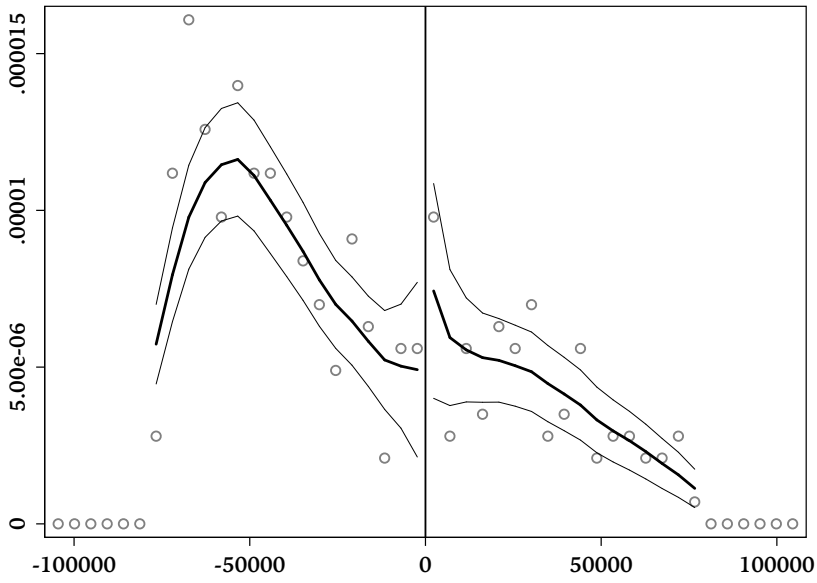
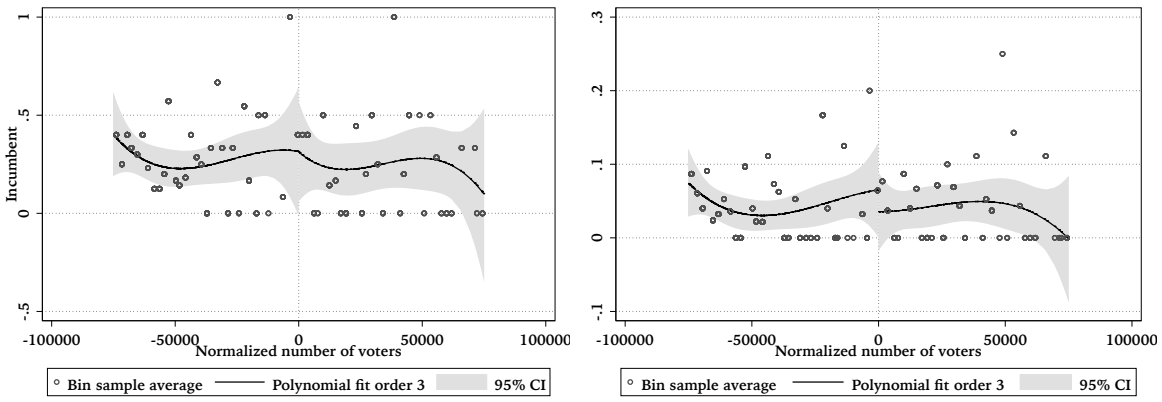


Figure 7: McCrary's continuity test for the number of voters in a municipality

Note: Kernel estimation of the density of the number of voters centered around the 200,000 threshold of dual-ballot allocation. Point estimate of discontinuity: .5360 with standard error .4481. Optimal bin-width and bin-size follows McCrary (2008). This sample considers all mayoral races between 2000 and 2016 and municipalities within a 75,000 distance from the threshold for visualisation purposes. Test results do not vary with the sample considered.

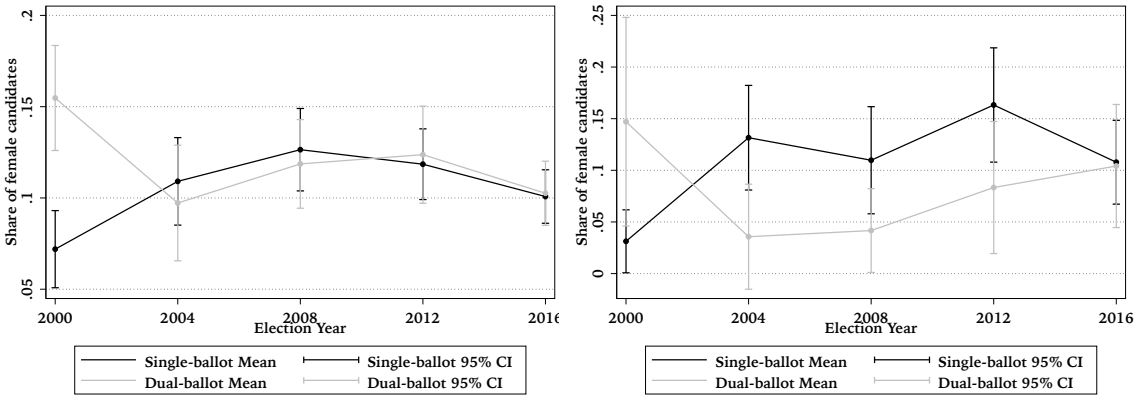


(a) Discontinuity in incumbency.

(b) Discontinuity in re-election.

Figure 8: Discontinuity in the outcomes of the elections.

Note: This sample considers all mayoral races between 2000 and 2016 and municipalities within a 75,000 voters distance from the threshold.



(a) Share of female candidates in each type of election over time.

(b) Share of female candidates in a top two position in each type of election over time.

Figure 9: Share of female candidates in dual-ballot vs Single-ballot.

Note: This sample considers all mayoral races between 2000 and 2016 and municipalities within a 75,000 voters distance from the threshold.

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