

# Leadership & Gender Composition in Managerial Positions: Evidence from the Brazilian Public Sector

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## Abstract

Despite major progress in fighting gender inequality over the past sixty years, women remain heavily underrepresented at the top of the status distribution in both the public and private sectors. Surprisingly, very little evidence exists about how female leaders may curb the underrepresentation problem at top positions. Using a Regression Discontinuity Design on close elections in Brazil, I analyze how the election of a female mayor affects the gender composition gap among top municipal executives. I show that electing a female mayor in a close race increases the share of female managers by 17 %. This increase does not come at the cost of observed quality of employees. I also present evidence that public sector-specific and supply-side channels are unlikely to explain my findings; instead, an increase in gender-inclusive policies within female-led governments suggests that homophily may be a driver of the results.

**JEL Classification:** P16, J16, J71, J78

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# 1 Introduction

Over the past sixty years, most countries in the world have seen a reduction in gender gap indicators in their labor markets (Goldin [2014]). Despite this overall convergence, women remain heavily underrepresented in high status positions. In the private sector, as of 2020, only 37 of the companies on Fortune 500 were led by female CEOs <sup>1</sup>. In the public sector, the female share in managerial positions is still below 50% for both OECD (43 %, Figure 1) and non-OECD countries (33 %).

Given their position of power and discretion in decision making, leaders, defined as agents in charge of making human resources allocation decisions, are often pointed out as a potential path to reducing the top-position underrepresentation problem. In the past decade, several gender quotas <sup>2 3</sup> and other inclusive policies have been implemented in the hope that leadership changes can generate gender-inclusive spillovers to their subordinates. Yet, while the general literature on gender gaps in labor markets is extensive, the literature on gender gaps in top positions and their relationship with leadership is limited. This article seeks to contribute to this narrow field.

This article analyzes the impact of electing a female mayor on the composition gap among top managers in the local public sector. To evaluate this relation, I use electoral data from four local elections and labor market data from more than 5 500 Brazilian municipalities to implement a Regression Discontinuity design to assess the impact of a woman winning a close election on the gender composition of managers in the public sector at the local level. Furthermore, I analyze the channels that could affect the gender gap in these positions, differentiating between public sector specific mechanisms, supply and demand shifts.

In theory, female mayors can affect the managerial gender composition gap in ambiguous ways. If leaders (in this case, mayors) prefer working with employees of their own

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<sup>1</sup><https://fortune.com/2020/05/18/women-ceos-fortune-500-2020/>

<sup>2</sup>Idea International reports that, as of 2021, more than 130 countries have gender quotas in some form in their political system. For more see <https://www.idea.int/data-tools/data/gender-quotas/country-overview>

<sup>3</sup>Belgium, France, Germany, Iceland, India, Israel, Italy, Norway, Spain, Germany, and India have introduced some type of board gender quota for private companies, according to Bank [2015]

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gender (Currarini et al. [2009]), we may see that a switch to a female leader leads to a decrease in the gender composition gap (Matsa and Miller [2011]). If, however, the supply of qualified women on the local level is small or non-existent, a female politician may have no impact on reducing the gender inequality gap. Proponents of this theory have pointed out a few reasons to why supply may be limited at the top: For example, female workers may face more frequent career interruptions (Bertrand et al. [2010a]) or shy away from competitive work settings disproportionately more than men (Andersen et al. [2013], Flory et al. [2015]). Hence, a priori, the relationship between leadership and the gender composition of employees is unknown.

My results show that a woman winning a close mayoral race is associated with a significant 17 % increase in the share of female managers with temporary contracts at the local level. This increase represents 71 % of the gender composition gap. This result is robust to a series of robustness and falsification tests. It is strong enough to increase composition on the entire top quintile of wages in municipal public sectors. I interpret these results as evidence that direct supply-limiting mechanisms are not the main cause of the gender gap. Next, I evaluate the common concern on the gender equality literature that gender inclusiveness may come at the cost of less qualified employees. I show that the increase in managerial share doesn't seem to come at the expense of observable quality, as I find no effects on managers' average level of education.

Furthermore, I evaluate whether public sector-specific channels could explain my results. I show that the results are unlikely to be driven by differential characteristics associated with mayoral gender, asymmetries in policy preferences, patronage, or strategic behavior. Finally, I analyze if an indirect supply channel or demand channels could explain the increase in female managerial share. While I find limited evidence of an indirect supply channel, demand channels cannot be ruled out as drivers of my main results. I show that female mayors are indeed more concerned with gender equality, as they are significantly more likely to implement gender-inclusive policies. I interpret this as suggestive evidence that demand-side preferences may play a role in driving the gender composition gap. Finally,

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while analyzing effects on heads of local boards, I show that these effects are consistent with homophilic preferences of leaders and that, although not being the dominant effect, sector-specific supply limitations may be present. These results are important from the policy-making perspective, as changing the gender of leadership may, at least in this case, narrow the gender composition gap in top positions by 71 %, suggesting that gender quotas in leadership positions with discretion may trickle down to managerial positions narrowing representation gaps at the top.

This study provides three main contributions to the literature on female leadership and gender gaps in top positions. First, I analyze leadership in a context where leaders have complete discretion over the employee composition selection. This analysis is different from previous studies that focus exclusively on directors' board changes. While extremely relevant for the board quotas policy debate, conclusions from these analyses are drawn from cases where cases in which leaders have limited discretion to make decisions. Boards of directors often face internal company policies and labor market regulations, limiting their members' decision-making power. Applying conclusions drawn from contexts where female leaders have constrained discretion to other cases can lead to misleading predictions and incorrect policy recommendations, especially in circumstances where authors find that leadership has limited impacts (Bertrand et al. [2019]).

Second, to the best of my knowledge, this is the first study to use a Regression Discontinuity design to evaluate gender composition gaps in top managerial positions. So far, studies that have examined the relation between leadership and female employee share in top executive positions have used either instrumental variables to find null results (Bertrand et al. [2019]) or fixed-effects models to find positive impacts on the share of female employees (Matsa and Miller [2011]). In either case, the exogeneity of treatment is limited at best, and factors such as unobservable within-company institutional changes can confound the interpretation of results. Thus, finding an institutional setup where one can use a methodology that is not subject to these confounding factors is crucial for properly identifying effects, particularly given the contrasting nature of previous results in this literature. Third, due

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to the nature of my data and institutional setup, this study is able to analyze mechanisms behind the increase in female composition and show suggestive evidence that demand-side preferences drive the effect. Finally, this study contributes to the broad literature that studies the impact of electing female politicians by showing that beyond the impact that electing a female official has on politics and provision of public goods, electing female politicians also impacts the gender composition of top employees and the implementation of gender-inclusive policies in local public sectors.

This paper is organized as following: Section 2 presents a brief literature review on gender gaps in top positions and impacts of gender-mixed elections, Section 3 provides context for the Brazilian public sector and electoral system, Section 4 describes the data, Section 5 describes the methodology, Section 6 presents the results, Section 7 concludes.

## 2 Related Literature & Contribution

Several articles have examined the impact of having direct or indirect female superior over gender-based labor market outcomes of top employees in the private sector. While some studies in this area focus on promotion rates (Kunze and Miller [2017], Blau and DeVaro [2007], Kurtulus and Tomaskovic-Devey [2012]) others focus on wage gaps Flabbi et al. [2019]. Only two studies focus explicitly on composition at top positions: Matsa and Miller [2011] use a fixed-effects model to show evidence that, for U.S. companies in the period ranging from 1997 - 2009, the female share of directors is a significant positive predictor of the female share among top executives. Authors suggest that their results indicate that quota-style affirmative action policies, such as the one being implemented at the time in Norway, should have a significant impact over the gender composition of employees. Using a instrumental variable approach, Bertrand et al. [2019] evaluates the consequences of said policy for managerial gender composition and finds no effects. In both cases, impacts over the share of top-earning employees can be limited by lack of discretion of directors. Moreover, both of these methodologies do not control for potential unobservable within organization

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changes that could affect both boards and managers. This study makes three contributions to the discussion in this literature: First, it is the first work to analyze gender composition in top-earning positions in a context where leaders have full discretion. Second, it is the first to make this analysis using a regression discontinuity approach. Third, it is the first to, within the same context, analyze the driving mechanism of the change in composition.

This study is also related to the literature that analyzes the policy consequences of electing female politicians. Since Chattopadhyay and Duflo [2004] seminal paper showing that women invest more in the provision of public goods that affect their own gender this developed branch of literature has used mostly regression discontinuity designs to assess the influence of female politicians in several different areas such as education, health, labor markets and politics (Ferreira and Gyourko [2014], Clots-Figueras [2012], Clots-Figueras [2012], Bhalotra and Clots-Figueras [2014] Brollo and Troiano [2016], Arvate et al. [2021], Arvate et al. [2018], Wasserman [2018]). For example, Ferreira and Gyourko [2014] shows that for the U.S., women mayors exhibit similar spend patterns to those of men. Clots-Figueras [2012] show that female political representation increases the probability that an individual will attain primary education in urban areas, and Brollo and Troiano [2016] find that an increase in women's representation results in a reduction in neonatal mortality and strategic behavior. This article contributes to this literature not only by analyzing the consequences of female mayors for employment of top executives but also by analyzing consequences for gender policies.

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## 3 Context

### 3.1 Brazilian Public Sector

#### 3.1.1 Managers

Managers in local governments are responsible for leading and directing boards on various areas: from education to transportation, from health to gender equality. They represent the highest form of management of the Brazilian public sector. As such, they tend to be more educated and exhibit higher wages than the average public employee. Table 1 compares characteristics of managers in Brazilian municipalities with average characteristics of quintiles of public employees wage distribution. There are a few points to notice about this table. First, the average manager composition is similar to that of employees on the top quintile of the wage distribution regarding wages and education. On average, managers are paid a mean of 3.83 Brazilian minimum wages (R\$ 510,00 a month as of 2010 <sup>4</sup>) across municipalities, the top quantile of the wage distribution has a mean of 4.315 BRMW, indicating that managers are indeed on the top of the municipality wage distribution. Second, managers are also very similar to the top quintile in terms of educational outcomes. On average, the share of employees in a municipality that has completed elementary school or less is only 15.5% for managers and 16.2 % for the fifth quintile, 43 % for the employees on the first quintile. On the opposite end of the instruction composition, managers and the fifth quintile are also similar. On average across municipalities, 31.3 % of managers have completed superior education compared to 45.7 % of the members of the top quintile.

Where managers and the top quintile are very different, however, is on the contract type composition. Managers, on average, have a higher share of temporary contracts (55.3 %) than any other quintile of the wage distribution, including the top one. This is crucial for this study, as temporary contracts are those where mayors have a higher discretion over hiring and separation. Subsection 3.1.2 will provide a deeper discussion about differences in contract types.

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<sup>4</sup> 1 USD = R\$1.7438, hence \$ 293.10 as of January 2010

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Finally, it is crucial to notice the abrupt decline in female participation at higher quintiles of the wage distribution seen in public sectors across the world is also present in Brazilian municipalities. Female participation goes from a 68.9 % overrepresentation on the lowest quintile to an underrepresentation of 45.6 % on the highest one, a significant gap considering that women account for 52 % of the Brazilian population. Managers also display a significant gender gap: Only 41 % of them are women. This difference in composition is more striking when we look at characteristics within the managerial position (Figure 3). Female managers are clearly more educated than men: On average, female managers are more likely to have completed high school and superior education but less likely to have completed only elementary school or less. This suggests that a lack of qualified supply is not the main driver of the gender gap at a managerial position. Finally, it is worth noticing that despite being overqualified, female managers still face a wage gap of around 10 % even within the managerial position.

### **3.1.2 Hirings and Separations**

Brazilian Municipalities are responsible for the provision of a broad range of public goods in areas such as health and education. Funding for this provision comes primarily from state and federal governments through direct transfers Ferraz and Finan [2011]. Consequently, not only do mayors have a lot of discretion for policy implementation and budget use, but local public sectors represent a large share of the total public sector employment: 56 percent as of 2014.

Selection processes for most public sector jobs generally follow a direct and objective, albeit slow, selection criteria called "Concurso Publico" (public civil service exams). First, applicants for a position present their credentials and undertake formal examination, which varies considerably across jobs and sectors, taking the form of written or oral tests. Candidates are then ranked based on grades obtained in these examinations, with the ones with the highest grades being offered the position. Public Servants hired through these civil service exams face considerable stability on the job: They acquire tenure after only three



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years on the position and can only be fired upon proof of severe misconduct.

To allow elected public officials to have some discretion over the hirings of members of their offices, the Brazilian constitution also allows hirings to be done without public civil service exams through temporary contracts. In the case of this type of contract, mayors have almost full discretion in the selection. This type of hiring is restricted to some top positions and is rather dynamic, as selection criteria don't have to follow any rules. Job stability is also non-guaranteed, with individuals in these positions facing separation laws similar to those in the private sector.

Figure 2 displays separations and hirings for the managerial position at the municipality level over the period of my analysis (2004 - 2018). There are three points to notice about this figure: First, most of the movement of separations and hirings is driven by managers with temporary contracts, displaying the dynamism of this type of contract. Second, hirings tend to happen in the first year of the electoral cycle (2005, 2009, 2013, 2017) and separations on the last (2004, 2008, 2012, 2016). This reinforces the idea that temporary contracted managers are associated with a choice of the elected politician, as their movement closely follows the electoral cycle.

Finally, managers who enter and exit the public sector through civil service exams also exhibit a small cyclicity. This is not unexpected; employees have discretion to leave the position anytime they desire and may choose to do so more frequently at the of an electoral cycle. Furthermore, although mayors have officially no discretion on who to hire on public civil service exams, they do have discretion on when to hold these examinations and when to hire. Hence the small cyclicity observed on the stable contract manager time series should not be seen as an issue.

## 3.2 Brazilian Electoral System

Brazil is a democratic country with all of its 5,570 municipalities being governed by a mayor elected every four years in direct elections. Municipalities with more than 200,000 registered voters feature a run-off in case no candidate receives a single majority in the first round.

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Elections are typically held in October with the elected candidate taking charge in office alongside members of its government on the first of January of the following year. Mayors are term-limited and are allowed to be in office for a maximum of two consecutive terms (eight years).

Given the system of direct transfers, mayors have a considerable discretion over the spending of municipality funds and hiring for board compositions. As in most areas of Brazilian politics women are extremely underrepresented politically on the mayoral position. On average in my sample, only slightly more than 26% of elections have a female candidate and only 9% have a female winner. I will focus on the consequences of electing these mayors.

## 4 Data

### 4.1 RAIS

RAIS is an administrative dataset reporting all formal work contracts in Brazil, and it is managed by the Brazilian Ministry of Labor (MTE). As one of the main sources of data for the analysis of Brazilian labor markets, it provides information on wages, hours worked, hiring and separation dates, demographic characteristics (gender, age, and education) for all formal private and public sector workers. I use this information to restrict my analysis to temporary managerial contracts where the employer is the local government.

Crucial to this study, each employer-employee match is classified into an occupation, which falls into one of the 2,511 categories (Classificação Brasileira de Ocupações 2002 (CBO)). I rely on this classification to define managers, and since this classification was created in 2002, I start my analysis on the subsequent year.

### 4.2 Electoral Data

I obtain publicly-available electoral records for the 2000, 2004, 2008, 2012 and 2016 municipal elections from the Brazilian Superior Court (TSE), the highest judicial body of the

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Brazilian Electoral Justice. This dataset provides information on election results, both for mayoral and local councils candidates. It also includes information on essential demographic characteristics such as age, race, and gender.

To conduct my analysis, I first exclude municipalities with a run-off. Using the information on gender, I then restrict my sample to municipalities with at least one female candidate. Then, I construct a variable that equals the the share of vote of the most voted female candidate minus the share of vote of the most voted male candidate to be used as the running variable in my analysis. Other methodological details are discussed on section ??.

### 4.3 Complementary Datasets

I obtained two datasets publicly available from the Brazilian Institute of Geography and Statistics (IBGE) for auxiliary analysis. First, I use data from the Brazilian Census in 2000 and 2010 to construct my covariates. To evaluate gender-related policies, I use Perfil Município for the years of 2005, 2009, and 2013. This dataset is a policy survey sent to high public executives on local governments. In these particular years, the survey possessed an appendix asking additional questions related to gender policies.

I extract four particular indicator variables of interest from this dataset. First, a variable that indicates if a municipality has a local woman's rights council. In these types of councils, members of local public administration meet with ordinary citizens to discuss policies related to woman's rights. Although these councils have no legislative power, suggestions made here can be later implemented as policies by the municipality.

Second, I extract a variable that indicates if a municipality has a women's rights board. Boards are areas of the government responsible for implementing policies for a certain topic. Nonetheless, the definition of "area" is arbitrary. Local governments can report any group of people as a board, even if they are subjected to other administrative areas. Hence, I also extract a variable that reports boards if that administration has a board with an independent budget, which I interpret as a more objective indicator of an area of that government being committed to women's rights. Third, I also extract a variable that indicates if

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a municipality has a gender equality bill. These bills are official documents with clear policy goals to be adopted by the municipal administration. Although the implementation of these policies is not binding, the document itself can be interpreted statement of commitment to the gender equality cause. Finally, I match these indicators to mayors elected in the year previous to the survey.

I also use data from the System of Information about Public Educational Budget (SIOPE) and System of Information about Public Health Budget (SIOPS). SIOPE/SIOPS are federal administrative systems whose purpose is to record local educational and health funds spending. Crucially for this study, these systems record names for all heads of boards of education, health, and finance of municipalities for all years in my sample. Using these names, I predict the gender of these executives by comparing it to data on the number of females and males with the same name in Brazil from the IBGE's 2010 Census. I consider a name to be female or male when its frequency in the census related to that gender is higher than 90 % .

## 5 Methodology

Identifying the impacts of electing female politicians on labor market outcomes may be a challenging task. Simply comparing municipalities with a female mayor with those with a male mayor is likely to generate biased estimates due to endogeneity issues. For example, municipalities with a female mayor are likely to be more liberal, which tends to enact policies that reduce the gender gap. Ideally, to analyze the role of gender on the composition gap in managerial positions, we would like to randomly expose some municipalities to female mayors while keeping others unexposed. Unfortunately, this design is not feasible. Nonetheless, given the institutional setup in Brazil, it is still possible to use a regression discontinuity design to make causal inferences.

To do so, I first restrict my sample to electoral races where only one female candidate is present. This is equivalent to 89 % of races in my final sample, and it is necessary to

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interpret the results as a close female victory versus a close female loss. I then calculate the margin of victory/loss between the female candidate and the most voted non-female candidate in a certain municipality. Using this margin of victory of a female candidate as the running variable, I compare the gender composition of managers in municipalities where a female candidate barely won versus a female candidate barely lost.

Formally, I am interested in estimating the difference in potential outcome in mixed-gender races, that is  $E(\tau_{i,t}(1) - \tau_{i,t}(0) | i \in \Omega)$  where  $\tau(1)$  is the potential outcome if the mayor is a woman and  $\tau(0)$  if it is not. Unfortunately, at a given point in time, we cannot observe both potential outcomes. That is the observed outcome is:  $\tau_{i,t} = \tau_{i,t}(1) * F_{it} + \tau_{i,t}(0) * (1 - F_{it})$ , where  $F_{it}$  defines the treatment status:  $F_{it} = 1$  if mayor is a woman,  $F_{it} = 0$  otherwise. Hence, our object of interest is the ATE =  $E(\tau_{i,t}(1) - \tau_{i,t}(0))$ . We define treatment for mixed gender races:

$$FemaleWinner_{it} = 1 \{MVF_{it} > 0\} \quad (1)$$

Where  $MVF_{it}$  is the female candidate margin of victory in municipality  $i$  and electoral year  $t$ <sup>5</sup> and  $1[\cdot]$  is the indicator function. Hence, this variable will take positive values if the mixed-gender electoral race resulted in a female mayor winner and negative if it resulted in a male mayor winner. When  $MVF_i = 0$ , the gender of the mayor  $F_i$  sharply changes from zero to one. If we then assume that potential outcomes are a continuous function of the running variable at the threshold, the LATE for our female sample will be:

$$\gamma_F = E(\tau_{i,t}(1) - \tau_i(0) | MVF_i = 0) = \lim_{x \uparrow MVF_i} Y_i - \lim_{x \downarrow MVF_i} Y_i \quad (2)$$

In order to estimate  $\gamma_F$  I use a local linear regression approach as proposed by Imbens and Lemieux [2008], where I restrict our sample to municipalities in the interval  $MVF_i \in [-h, +h]$  and estimates the model:

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<sup>5</sup> $MVF_i$  is specified as the vote share of the female candidate minus the vote share of the most voted male candidate

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$$Y_{it} = \beta_0 + \beta_1 MVF_i + \beta_2 FemaleWinner_t + \beta_3 MVF_i \cdot FemaleWinner_t + \mu_t + \varepsilon_{it} \quad (3)$$

Where the coefficient of interest is  $\beta_2$ . Following the most recent developments in the literature, I implement local polynomial Regression Discontinuity (RD) point estimates with robust bias-corrected confidence intervals and inference procedures developed by Calonico et al. [2019] Calonico et al. [2014]. To compute the bandwidth  $h$ , I use one common CER-optimal bandwidth selector for the RD treatment effect estimate. However, my main results are also robust to CER-sum bandwidths and MSE optimal selectors. Standard errors are clustered at the municipal level.

The identification strategy relies on the hypothesis that absent of treatment, the running variable would be continuous around the cut-off. To provide evidence in favor of this hypothesis Figure 4 shows a series of regression discontinuity estimates on municipality characteristics around the bandwidth specified on my main specification of section 6. With no estimate being significantly different from zero, I conclude that there is no evidence of a discontinuous jump around the cut-off for these characteristics. Figure 5 performs the same analysis but for local public sector characteristics on the year prior to the elections. Within the bandwidth of my main results, municipalities that elect a male mayor and those that elect a female mayor are not significantly different in terms of share of temporary contracts, the share of female workers, the share of managers, among others. Since municipalities on both sides of the cut-off are not significantly different in terms of public sector attributes and overall characteristics, I conclude that it is reasonable to assume smoothness around the cut-off in the absence of the treatment.

Furthermore, I also test manipulation of the running variable using a McCrary test, as suggested by McCrary [2008]. Figure 6 displays the result of the test. I fail to reject the hypothesis of continuity of the running variable around the cut-off. This test, along with the balance test of my covariates, increase the confidence that my estimates are respecting the

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necessary conditions for a causal effect interpretation.

## 6 Results

In this section, I present my results for the analysis of the consequences of electing politicians on female managerial share. Section 6.1 presents my main results, discusses its interpretations, and examines robustness checks. Section 6.3 analyzes the role of possible public sector specific mechanisms in explaining my results. Finally, section 6.2 investigates other mechanisms that are not unique to the public sector in explaining results.

### 6.1 Main Results

#### 6.1.1 Female Managerial Composition

Table 2 displays local linear regression discontinuity estimates for the impact of winning a mixed-gender election on the share of female managers <sup>6</sup> at the end of the first year of government at the municipality level. Odd columns report results for linear specifications; even columns report results for quadratic specifications. When using a general Convergence Error Ratio bandwidth selector method, a woman’s victory in a close election is associated with a 7.0 percentage point increase in female managers’ share. The magnitude of the effects are meaningful: 17.5 % increase in the share of female from a mean of 40.6 % or 70.9% of the 9.4 percentage points composition gap. This effect can also be seen in the total number of female managers, as displayed in Table 5, suggesting that the driving mechanism is not simply a disproportionally shrink in government size.

As a robustness check, column three displays the estimates one common CER-optimal bandwidth selector for the sum of regression estimates. The bandwidth size is

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<sup>6</sup>More precisely: total female managers with temporary contracts with the municipality/total managers with temporary contracts with the municipality

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very similar to the original CER selector. Once again, a woman victory in a close election is associated with a 7.0 percentage points increase in the share of female managers, a magnitude similar to the original CER case. The negligible difference between estimates is reassuring that the bandwidth selector algorithm is not driving both magnitude and significance of my results.

A larger difference between estimates is found when we compare different functional forms. A quadratic local linear estimate leads to an 11 percentage points estimate. Even though this estimate has a slightly greater magnitude than the linear estimate, an intuition for this difference can be found in Figure 7. Data appears to follow a linear path around the cut-off. Hence, a quadratic polynomial tends to overestimate the impact of a female mayor. For the rest of this study, I will report local linear and quadratic estimates. Nonetheless, results are generally robust to other polynomials (and bandwidths), and additional robustness checks can be found in Figure 8.

To test if my estimates are indeed capturing the causal effect of a female winning a close race on the share of female managers, I estimate the effect of a female victory on the managerial share one year before the election. Finding null effects increases the validity of my estimates. Table 3 follows the exact structure of table 2 but shows estimates for the female managerial composition one year before the election. None of the specifications display significant estimates, and the magnitude and signs differ from post-election effects. This table should be interpreted as suggestive evidence that my regressors are not capturing a spurious relation.

Figure 9 presents a broader way to make use of time on the analysis of effects. I present estimates for effects of electing a female politician on a close race on the share of female managers from 3 years prior to the election to 4 years after it. For the pre-election period, no estimate is significant at 95 % confidence level, with some being negative. The electoral year,  $t = 0$ , sees a positive estimate. Since this estimation is made for a period post-election and represents the share of female managers at the end of the previous administration that will continue to the next administration, one shouldn't necessarily expect it to be zero.



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At the end of the first electoral year,  $t = 1$ , we see the effect already discussed in Table 2. At this point, the new administration already had one complete year to make hirings and separations. An estimate of similar magnitude and size can be seen for the second year of the administration, a result that increases the causal interpretation of these results. For the third and fourth years, results are still positive albeit non-significant. Considering the positive effects on the last year, it is possible that electing a female politician has an impact that extrapolates the term of the elected mayor. A explanation for this decline in estimates on the third year is that managers are anticipating the end of the government by leaving one year early. Another theory is that female managers leave to participate in state-level positions since gubernatorial elections take place two years after local ones. One way or another, the effect on the first two years is clear.

Next, I evaluate if characteristics associated with being a female mayor are driving the results. Since male and female politicians differ in terms of both observable and unobservable characteristics, it is relevant to investigate if results are driven by characteristics that are associated with gender in this context. For example, anecdotal evidence suggests that female politicians are more educated and tend to be associated more frequently with left-leaning parties. To evaluate this question, I use a regression discontinuity model with the same running variable (margin of votes) but replace the outcome variable by an indicator that takes the unitary value if the winner mayor possesses a certain characteristic.

Results for this analysis can be found in Figure 10. Characteristics are grouped into three categories: Educational, Marital, and Political. Winning female mayors are very similar to winning male mayors in most observable characteristics: Politically, close female victories are not associated with a significantly higher probability of the winner belonging to any of the major Brazilian political parties.<sup>7</sup> In terms of marital status, these two groups also do not significantly differ in the probability of being single, married or having other marital statuses.<sup>8</sup>

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<sup>7</sup>Major political parties in Brazil defined as PT, PSDB, PMDB.

<sup>8</sup>Even though one may find these results surprising considering how males and females differ in these characteristics on the Brazilian population, these results are similar to the ones reported in Arvate et al. [2021]

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Closely elected male and female mayors present different educational characteristics, where close female winners are almost 20 percentage points more likely to have a college degree. To evaluate if this is a driver of my main results, I include this (and other characteristics) as a control in my main specification. When I include only educational characteristics, point estimate drops to .5 percentage points. This result is still significant at 10 % significance level, which suggests that education may be responsible for explaining part of the effect of the increased female managerial composition. However, most of the effect still seems to be explained by pure gender differences.

Two follow-up questions of interest are: (1) How meaningful is this effect for the entire public sector? And (2) Does this increase in representation at the top generate a trickle-down effect? Table 4 attempts to answer these questions. When I analyze the composition of all temporary workers, including managers, we see that the close election of a female mayor is associated with a 3.3 percentage points increase in female composition (column 1, panel A). This effect is considerably smaller than the effect on managers (described in table 2), yet significant at 10 % significance level. When we analyze the effect by quintiles of the wage distribution, we see that all quintiles exhibit positive coefficients. These coefficients are statistically significant for the second, fifth quintiles and the entire distribution. When we managers are excluded from the analysis (Panel B), results lose significance and considerable change magnitude (from 0.041 to - 0.001 p.p.), suggesting that managers mainly drive the effect on the top quantile. In other words, effects for the managerial position are so meaningful that they completely drive results for the fifth quintile and significantly affect the result for the entire public sector. These results are also relevant to mitigate concerns of the relevancy of managers in this context: Even if one is still skeptical of the role played by managers on the local public sector in Brazil, electing a female politician has an impact on the entire distribution.

Results may lead one to conclude that closely electing a female politician leads to a trickle-down effect, where female mayors hire more female managers and these managers hire more female employees. Nonetheless, Panel B may show that this interpretation is

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precipitated. Effect for the entire public sector, as well as the first four quintiles, remain positive, albeit non-significant. Hence, despite these results suggesting that there may be an effect, it is impossible to statistically claim that electing a female politician leads to a trickle-down effect.

Having established that a female victory on a close election is associated with a significantly, both statistically and economically, a higher share of female managers, it is important to discuss the implications of this result for the causes of the gender composition gap. First, I interpret this result as evidence that mechanisms that imply that a change in leadership would not lead to a change in composition in top positions are not binding in this case.<sup>9</sup> Do these results necessarily consist of evidence of taste-based discrimination? Although a similar claim has been made elsewhere in this literature, I take a more conservative approach, and on sections 6.3 and 6.2 I analyze several different mechanisms that could explain these results.

### 6.1.2 Effects on Managers Quality

A general concern of the affirmative action literature is that a focus inequality may come at a cost in terms of the quality of employees. For example, female mayors could give preference to managers from their own gender even if they are not the most qualified for the position, promoting equality but reducing managerial quality. This quality reduction is unlikely in this case, given that, in my sample, women managers are on average more educated than their male counterparts (Figure 3). Yet, the pool of candidates may differ from managers actually hired, leading the overall effect to be unknown. Given that manager is a high-skill occupation, an obvious choice as a proxy to quality is to use educational composition.

Table 6 - Panel A displays estimates for the impact on the educational composition of all employees. On average, managers are less likely to have completed elementary school

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<sup>9</sup>For example, career interruptions due to childbearing may limit women's professional advancements (Bertrand et al. [2010b]), this, in turn, may lead to a limited supply of female candidates in top positions. We may also observe limited supply because women may shy away from competition for promotions (Niederle and Vesterlund [2007]). However, if limited supply is the cause we observe a gender gap in top positions, changing a mayor should not directly reduce the gap.

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or less by 3.2 percentage points on governments where a female mayor had a close victory. They are also more likely to have at least a high school degree but less likely to have at least a college degree. None of these coefficients are significant, and magnitudes also indicate that there seems to be no reason to believe that the narrowing of the gender gap is coming at the cost of efficiency for managerial employees.

One possible concern with the analysis presented in Panel A is that female mayors are favoring female managers, but this effect is averaged across all managers leading to null effects. To mitigate these concerns, Table 6 - Panel B displays estimates for the impact on the educational composition of female employees. On average, women are less likely to only have completed elementary school or less by 1.2 percentage points on governments led by a female mayor. They are also more likely to have graduated college but less likely to have graduated high school. None of these results are significant, providing further evidence that, in this context, there is no reason to believe that female leaders are favoring women in detriment to the quality of public service provision.<sup>10</sup>

To conclude my analysis of managerial quality, I examine the impact of gender on the probability of being reelected. This analysis assumes that if managers hired by female mayors lower the quality of public service provision through managers, female mayors should face significantly lower reelection probabilities. One limitation of this analysis is that it is possible that despite managers providing lower-quality public goods, female mayors are still able to make up in other areas to the extent that there are no electoral consequences of these managerial practices. However, this is unlikely to be the case if managers are extremely less qualified. Table 7 displays the analysis of reelection probabilities. The dependent variable is an indicator variable for reelection, and the running variable is still the margin of votes of

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<sup>10</sup>These results also mitigate concerns that results are driven by gender asymmetries in patronage. Colonnelli et al. [2020] have already shown that Brazilian mayors engage in patronage by hiring managers with temporary contracts. If female mayors are more likely to engage in patronage than their male counterparts, electing a female mayor could reduce the gender composition gap at the managerial position. However, if this mechanism was the main driver of results, one would expect the quality of female managers to go drastically down with the election of female employees. Furthermore, Brollo and Troiano [2016] suggests that if anything, women are less likely to engage in strategic behavior. I analyze other public sector specific mechanisms in section 6.3.

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the most voted female candidate. A female victory is associated with a non-significant 3.6 % decrease in reelection probability. This analysis, along with the previous ones, at least suggests that even if there is an impact on the quality of employees, it is unlikely to be one of a meaningful economic magnitude.

## 6.2 Supply and Demand Mechanisms

As mentioned previously, it is precipitated to interpret the reduction in the gender composition gap as direct evidence of demand side preferences. This section examines if supply side or demand side could explain the reduction in this gap.

### 6.2.1 Demand Side Preferences

If male mayors hire more male employees because they prefer working with managers of their own gender, switching to a female mayor may reduce the composition gap. Alternatively, suppose women are indeed being discriminated against in the Brazilian public sector, and female mayors are willing to remediate this issue. In both cases, one expects female mayors to also act against discrimination in other areas. To analyze this mechanism, I examine if female mayors are more likely to implement gender equality policies. This shouldn't be interpreted as a sufficient condition for taste-base or statistical discrimination. Finding that female mayors implement more gender-inclusive policies does not imply that previous results are driven by taste base discrimination. Yet, finding that women are not more likely than men to pass such policies would provide suggestive evidence that taste-based discrimination is not the driving mechanism. In this sense, one can interpret gender-inclusive policies as a necessary but not sufficient condition for taste-based discrimination.

To make this analysis, I use data from the municipal government policy survey described in section 4.3. I present results for the probability of observing four types of gender policies on local governments: Creation of women's rights council (Panel A), creation of a woman's rights right board (Panel B), creation of a woman's rights board with independent

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budget (Panel C) and creation a municipal plan for gender equality (Panel D). Table 8 follows the same structure as others in this article.

First, it is important to notice that all coefficients are positive, suggesting a positive relation between electing a female politician and the probability of observing these gender policies. Panel A shows the probability of observing a women's rights council one year after the election. A close female victory is associated with an average of 10.8 percentage points, or a 57.4 % of the mean, increase on the probability of seeing one of these councils post-election.

Panel B shows effects on the probability of observing a woman's rights board. All specifications display positive, albeit non-significant results. It is possible that women do not create more gender-related boards than men. Another possibility is that given the lack of precise definition of the word "board" in this context and the self-declared nature of this survey, mayors report any organization related with gender equality as a "board". Panel C displays more objective ways to define a board, that is, an organization within the local governments with their own budget. In this case, we see that a close victory by a woman is associated with a significant increase of 5.3 percentage points, or 91 % of the mean, in the probability of observing these boards.

Finally, I analyze the probability of observing a municipal plan of gender equality. A close victory by a woman is associated with an increase of 1.98 percentage points, or 37.8 % of the mean, of observing such policy. Point estimates are large, but the coefficient is not significant due to large standard errors, independently of the specification chosen.

There are three ways to interpret these results. First, one can conclude that increase in demand comes from the need of female workers to participate and implement these councils and boards. This interpretation is unlikely for two reasons: First, while boards with their own budgets could potentially use this budget to hire more female managers, councils don't have this power, as they only serve as organizations where members of the elected government and citizens discuss and suggest policies. Hence, it is unlikely that a larger share of municipalities with councils is hiring more managers to work with gender policies directly. Second, gender boards, organizations that potentially would demand new managers, are present only on

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a small share of municipalities (5.81 %), making it unlikely to drive the demand. Hence, I interpret these results as suggestive evidence that the increase in the share of female managers is a consequence of a stronger desire of female mayors to create a more gender-inclusive government.

An alternative way to interpret these results is as evidence of the presence of discrimination in a municipality, and female mayors' commitment to reduce it. If male mayors discriminate and female mayors act on a way to try to reduce gender gaps, or even simply do not engage in discrimination we expect to see an increase on the female share of managers after the election of a women. Nonetheless, these results are also compatible with a gender homophily theory. Homophily refers to a tendency of various types of individuals to associate with others who are similar to themselves (Currarini et al. [2009]), and it may impact hiring decisions through networking. If this association makes women care disproportionately more about gender inequalities, then homophily may also lead to an increase in policies in that field.

To detangle between these two demand-side channels I use data of gender of different boards' heads. Assume that discrimination by male mayors is the main reason for the increase in share of female managers when a female mayor is elected. Then we would expect to see a larger increase in areas in which there is a stronger stigma against women (finance, comptroller general) and no effects in areas women are historically overrepresented (health, education). If homophily is the reason why we see a higher share of females among managers then we would expect to see positive for health and education.

Table 9 presents this analysis. Column (1) shows results for the increase in probability of observing a female as the head of the local board of education. Columns (2), (3), (4) perform the same analysis for the board of health, finance and municipal comptroller general. A female close victory is associated with a significant 10 percentage points increase in the probability of observing a female head of board of education and a significant 20 percentage points increase in the probability of observing a female head of board of health. In comparasion, no significant effects are found for head of board of finance or municipal

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comptroller general, areas in which woman are underrepresented by more than 20 percentage points .

Given that effects are observed in areas where stigmatization of female abilities, and likely discrimination, is relative smaller, I interpret these results as suggestive evidence that homophily, and not discrimination, is the main channel driving my results. However, it is important to recognize the limitations of this type of analysis. Since heads of boards are a subset of managers, these two samples can be different and effects may differ across them.

Another interesting result of Table 9 is the estimate for head of board of finance and comptroller general. In the case of both an homophily and discrimination based increases, we would expect these coefficients to be positive. One possible explanation for these null results are sector-specific limitation in supply. That is, if mayors prefer to hire or promote heads within their networks but they are not enough qualified female applicants, it is possible that the hiring will happen within the opposite gender. The same logic can be applied for the comptroller general position. Either way, analysis in this section finds suggestive evidence that necessary conditions for demand side mechanisms, especially homophilic networks, to be present. I analyze theories that could lead to a supply side shift in the next section.

### **6.2.2 Supply Side Preferences**

One reason why we might observe an increase in the share of female managers may be supply-related preferences. For example, suppose women find it more desirable to work for other women. In that case, a female mayor may increase the number of applicants for positions in that given government. In this case, even if the demand or the hiring process is completely indifferent to gender, we would see a narrowing of the gender composition gap. This mechanism is particularly relevant as supply has already been pointed by theoretical models as one of the reasons for women overrepresentation in other areas of the public sector (Fontaine et al. [2019])

To test this hypothesis, I look at stable public servants. As previously mentioned, once hired, this type of employee quickly obtains tenure and faces considerable stability.



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Given the inability of municipal governments to unilaterally separate jobs of public servants with this type of contract, I analyze the gender composition of continuing workers with this type of contract at the end of the first year of the electoral cycle. Table 10 shows this analysis. When using a linear specification, a close female victory is associated with an increase in the share of continuing female public servants with stable contracts of 4.3 percentage points. The estimates' magnitude is smaller for the quadratic form, columns (3) and (4) display results for a CER-sum bandwidth. In all cases, albeit positive, estimates are not significant and with a magnitude between one-third and half of the main result, showing that this channel cannot explain the larger part of the estimated effect.

These results seem to suggest that it is unlikely that a supply shift fully explains the increase in female share. It is important, however, to consider two issues on the interpretation of these results. First, the positive sign may capture the decisions of promoting already stable public servants to managerial positions and reporting them as still on the same contract. This could lead to positive estimates if we believe that women are disproportionately more likely to promote women. Second, this is a different category of workers, particularly less dynamic than managers with temporary contracts. It is possible that women still prefer being part of governments led by women, but this preference is not strong enough to impact the decision to change jobs or retire once on the job. One way or another, the small non-significant magnitude of the estimates indicates that while a small supply effect may exist, it is unlikely to be the main driver of results.

### **6.3 Public Sector Specific Mechanisms**

In this section, I evaluate if public sector specific mechanisms could drive the increase in female managers' composition. My analysis shows that differences in strategic behavior, or public goods provision are unlikely to explain results fully.

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### 6.3.1 Differences in Strategic Behaviour

Next, I evaluate if strategic could potentially explain these results. It already has been shown, for a subsample of the data used in this study, that women hire fewer overall temporary workers due to their lower engagement in strategic behavior (Brollo and Troiano [2016]). If male mayors hire more temporary managers due to strategic behavior and these managers are more likely to be male, strategic behavior could explain the results. Finally, I analyze if female managers have fewer total temporary managerial workers on table 5 and if this possible reduction in total temporary manager workers is what leads to an increase in the share of female workers. I find that on average, female lead governments have 7.13 more temporary managers per ten thousand habitants. One way to conciliate this with Brollo and Troiano [2016] is that even though female mayors may have fewer total temporary workers, they employ more total temporary managers. I conclude that strategic behavior is unlikely to explain the increase in the share of female temporary managers.

### 6.3.2 Differences in Public Goods Provision

Another public sector specific mechanism of interest concerns the increase of demand for areas of public goods provision that are female-dominated. There is broad evidence that men and women act differently as policymakers, especially regarding good public provision. For example, women policymakers are associated with higher educational (Clots-Figueras [2012]) and health outcomes (Bhalotra and Clots-Figueras [2014], Brollo and Troiano [2016]). If to do so, women hire more employees in these areas, and employees in these areas are disproportionately more likely to be female; an increase in the supply of public goods in these areas by local governments may lead to an increase in demand for female workers, including managers. Unfortunately, we do not observe the area of managerial workers. I do observe, however, the area of other public sector workers. If the female mayors really hire more managers in these areas, you would expect to see an impact not only for managers but also for other workers. I will analyze this channel next.

Table 11 show the effect of a close female victory on the share of workers of areas that

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previous literature has already shown to be disproportionately impacted by a women victory: education and healthcare. Columns 1 and 2 show the effect on the share of workers in this area respective to the total number of workers at the end of the first year of government. Columns 3 and 4 perform the same analysis but for the logarithm of the total number of workers. Not only are coefficients non-significant but also negative, suggesting that although previous literature finds an association between female mayors and an increase in quality of these public services, this doesn't necessarily translate into more workers in this area. Hence, similar to other public sector specific mechanisms, differences in public service provision are also unlikely to explain the increase in female managerial composition.

## 7 Conclusion

This article analyzes the underrepresentation of women in top positions. In Brazil, as in most countries in the world, women are underrepresented in top positions in the public sector. To the best of my knowledge, this is the first work to have exogenous variation on the leadership position and find that changes in leadership have significantly reduces the gender composition gap in top positions.

I present evidence that electing a female mayor in a close electoral race increases the share of female managers by 17 %. This result is robust to a series of falsification and robustness checks. The positive impact on the female share can, in fact, be extended to the entire top quintile of the public sector distribution. I show that there is no evidence that this decrease in the gender composition gap comes at the cost of the quality of managers: A close female victory leads to managers who are as just as educated as the managers in a close male victory.

I show that supply-side preferences are unlikely to be the main driver for the results, as stable public servants do not significantly choose to supply more work for female-led government. I also present evidence that this result is unlikely to be explained by gender-specific mayoral characteristics or by increases in demand for managers in sectors where

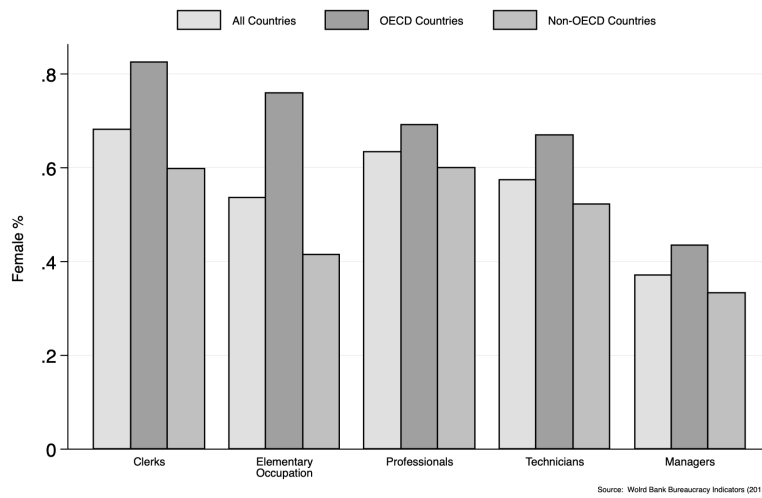
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women are overrepresented. Instead, a demand-side preference channel in which a female mayor demands more female managers due to homophilic preferences is supported by my data. These results also point to the potential of sector-specific supply limitations to reduce the leaders' impact.

These results have direct implications for the problem of female underrepresentation in top positions. First, to the more than 50% of countries in which women are underrepresented in public sector managerial positions, it suggests that promoting female leaders, through either quotas or elections, may reduce the gender composition gap. Second, results also imply that these gains in equality come at no cost of quality. Third, to the private sector, it suggests that policies that increase female presence in leadership positions with discretion, such as certain gender board quotas or female entrepreneurship promoting policies, may have positive spillovers to top executives. Finally, results also show that despite these positive spillovers, policymakers should not abandon policies that target sectors in which women are underrepresented, as supply limitations can reduce leaders' impact.

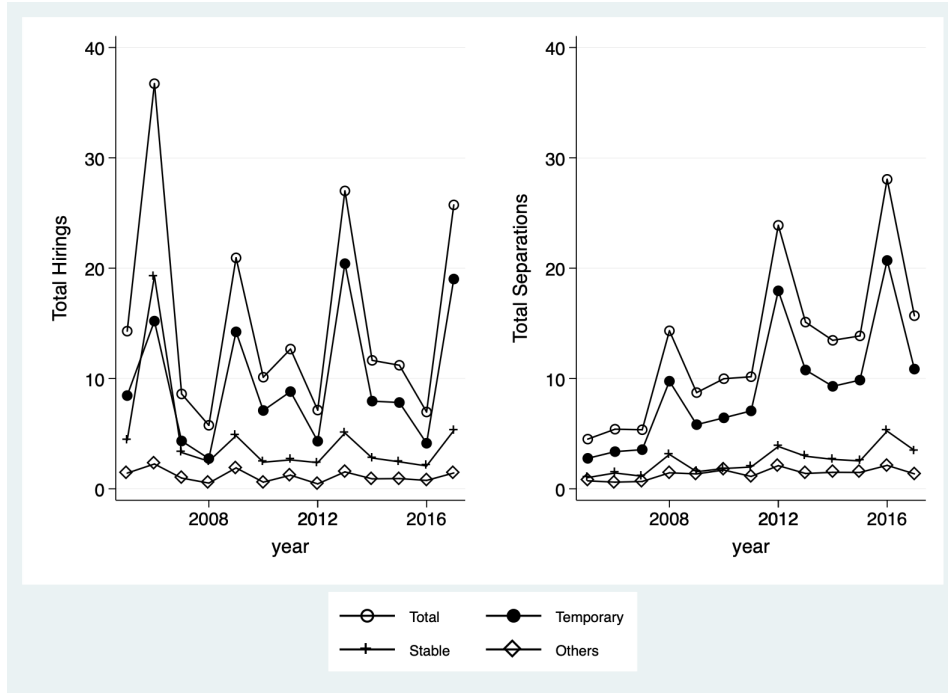
# Figures

Figure 1: Average Share of Female in the Public Sector by Occupation type



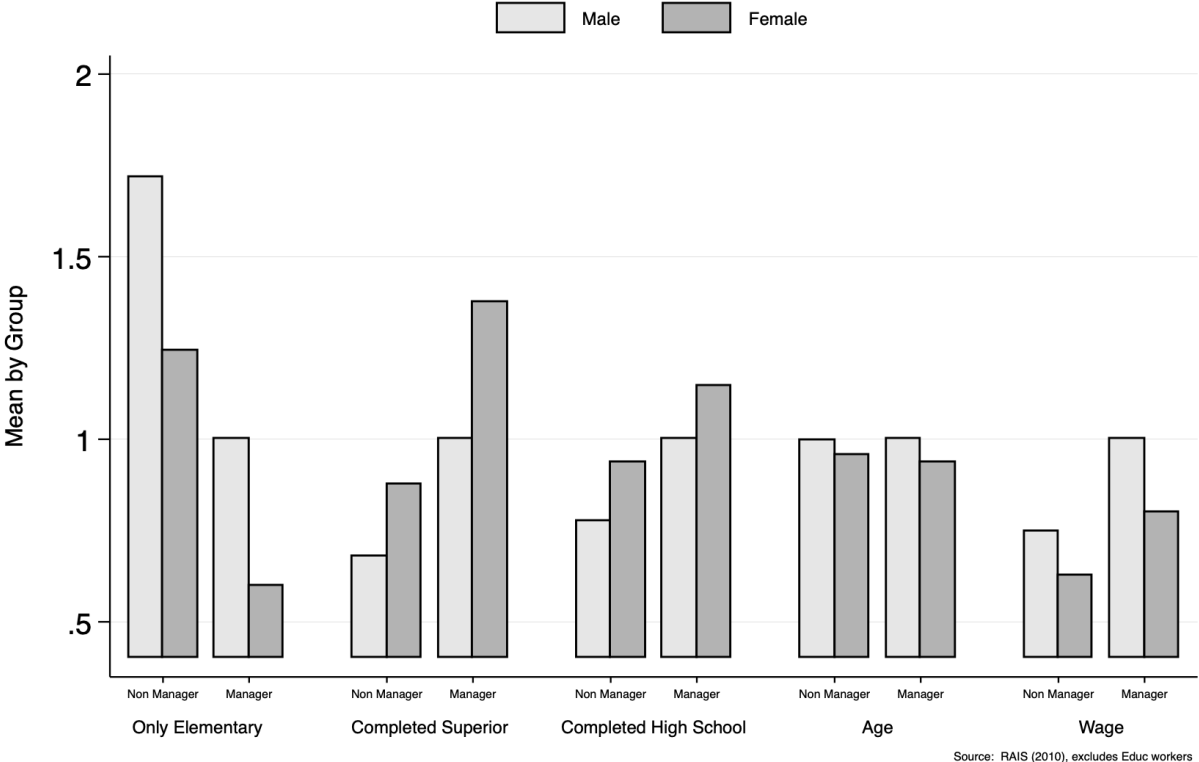
Note: Figure displays average share of female in national public sectors for OECD and non-OECD countries for 2012. OECD partner countries included as non-OECD countries.

Figure 2: Hirings and Separations by Contract type per Year



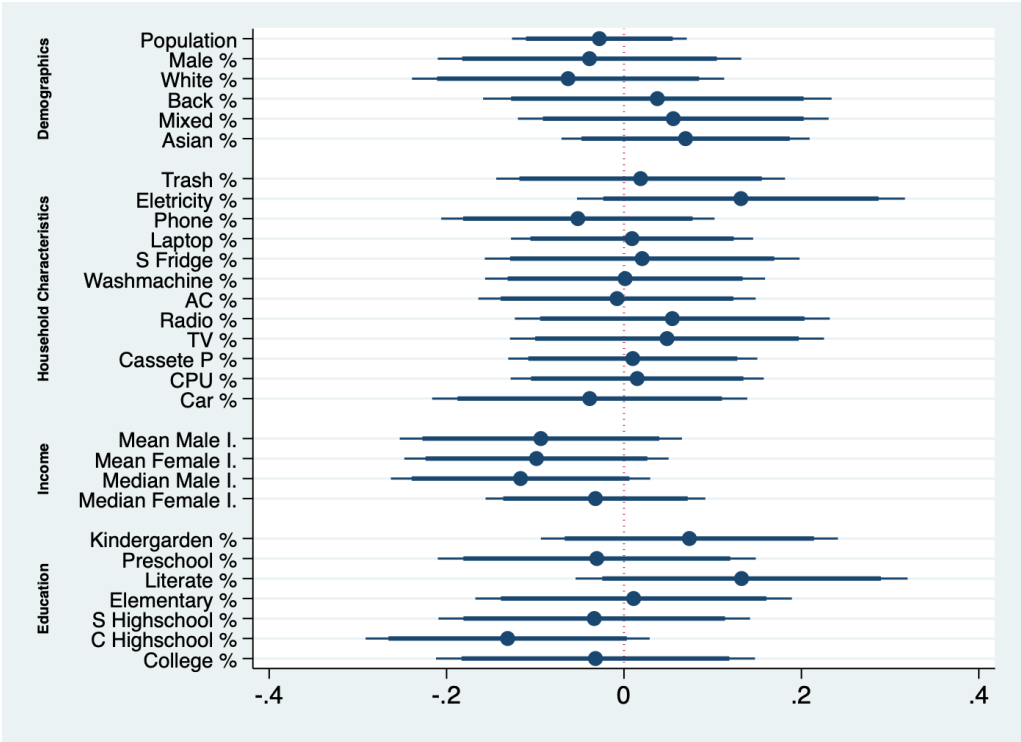
Note: Figure displays total hirings and separations of managers by contract type per year. Stable contracts defined as RAIS contract type code 30 or 31.

Figure 3: Managers Characteristics by Gender



Note: Figure displays mean characteristics by group, using male managers as reference. Figure excludes educational workers, who tend to be overrepresented in municipalities since elementary education is a Municipality competency in Brazil.

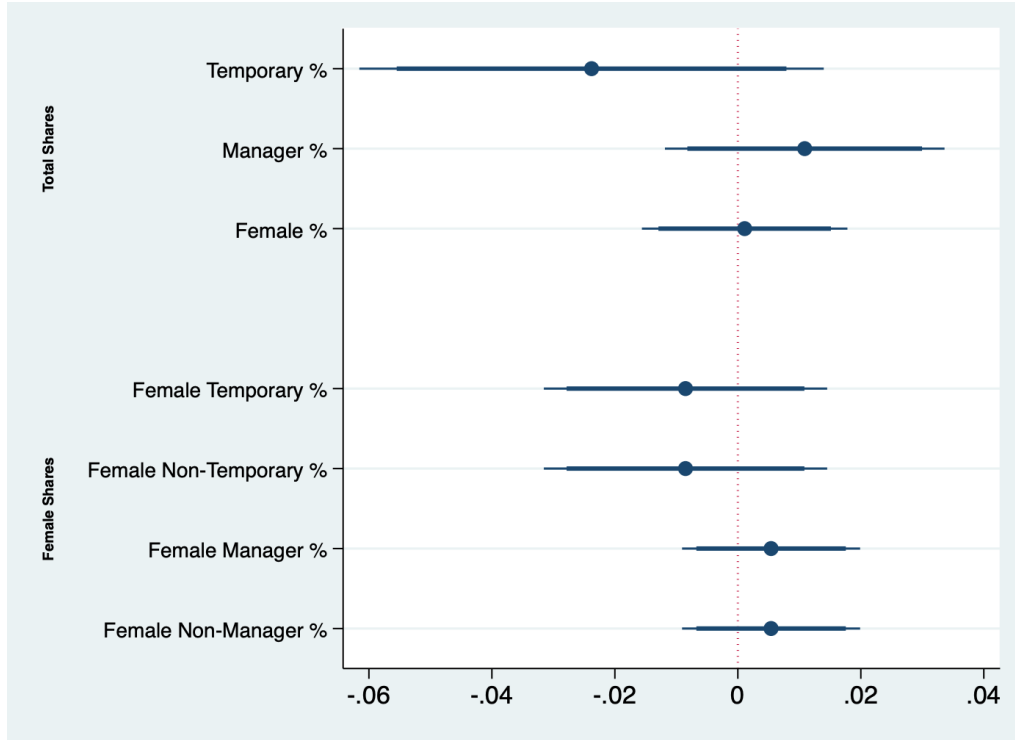
Figure 4: Smoothness around the Cut-off for Covariates at Municipal Level



Note: Figure displays results obtained by estimating RD models with margin of win of the female candidate as running variable on different municipality level characteristics. Models use Triangular Kernel, Linear Polynomial and bandwidth selected using methodology proposed by Calonico et al. [2019], Calonico et al. [2014] for main results, [-0.106,0.106] . Standard errors clustered at municipality level. Thin lines indicate 95 % confidence intervals, thicker lines indicate 90 % confidence intervals.



Figure 5: Smoothness around the Cut-off for Covariates at Local Public Sector



Note: Figure displays results obtained by estimating RD models with margin of win of the female candidate as running variable on different local public sector level characteristics. Models use Triangular Kernel, Linear Polynomial and bandwidth selected using methodology proposed by Calonico et al. [2019], Calonico et al. [2014] for main results, [-0.116,0.116]. Standard errors clustered at municipality level. All percentages calculated over total number of local public sector employees. Thin lines indicate 95 % confidence intervals, thicker lines indicate 90 % confidence intervals.

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.5182089	.6461088

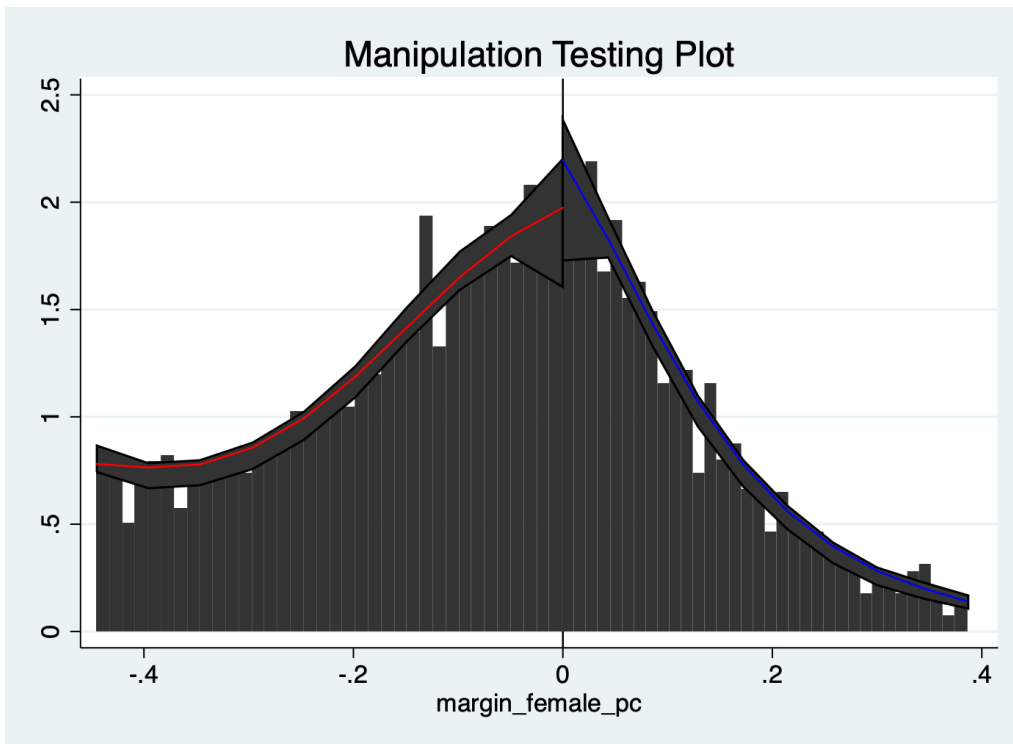
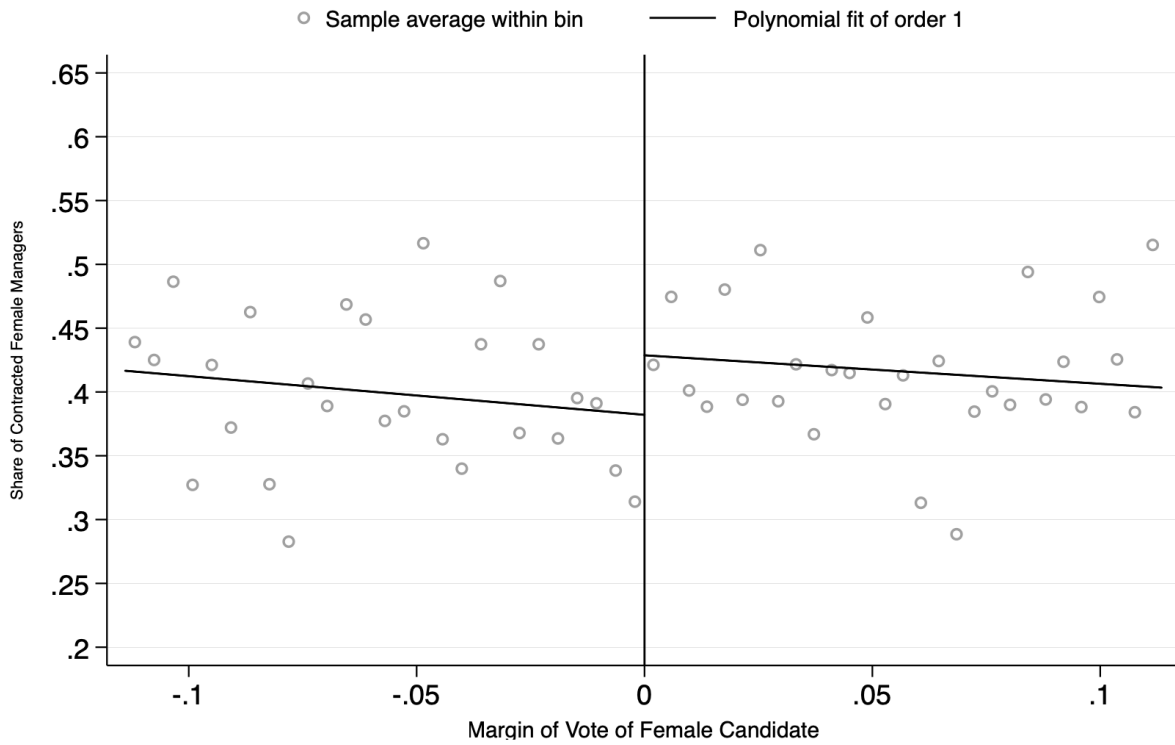


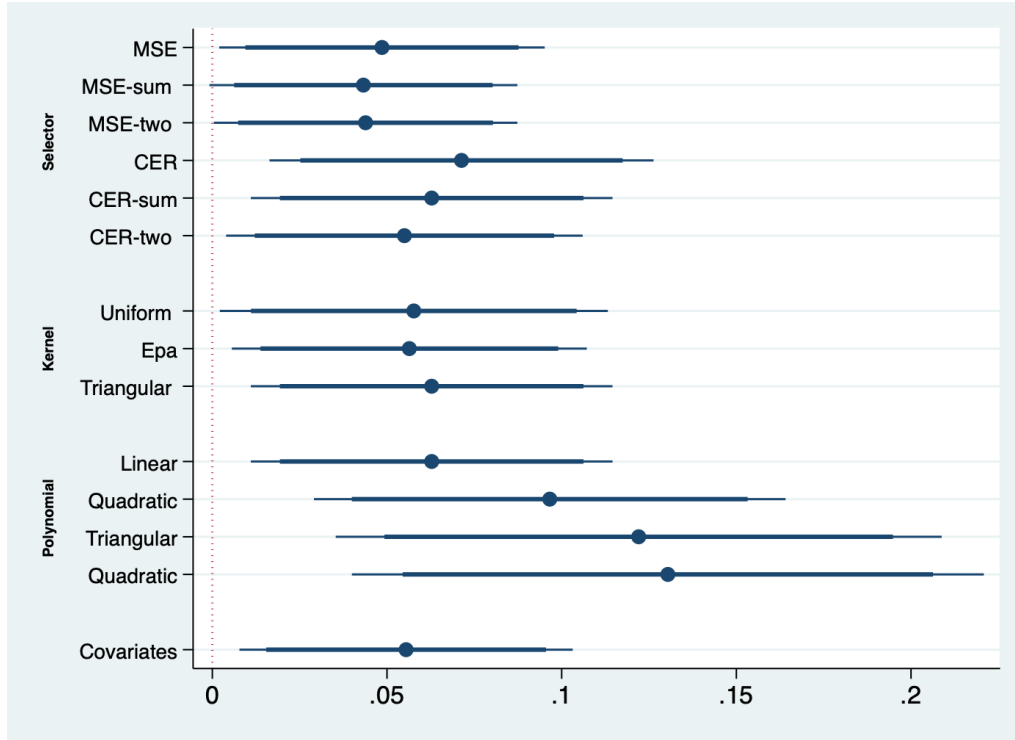
Figure 6: Mccrary test

Figure 7: Regression Discontinuity using CER Bandwidth



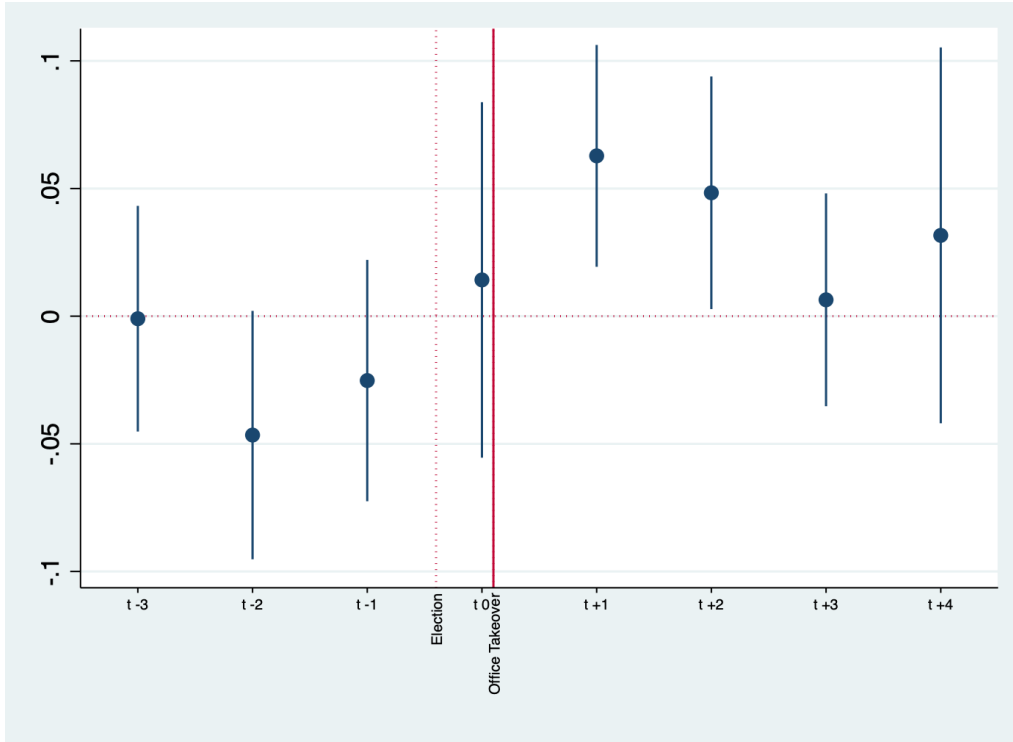
Note: Figure displays results obtained by estimating RD models with margin of win of the female candidate as running variable on share of female temporary managers as dependent variable. Models use Triangular Kernel, Linear Polynomial and bandwidth selected using methodology proposed by Calonico et al. [2019], Calonico et al. [2014] for main results,  $[-0.116, 0.116]$ . Standard errors clustered at municipality level. All percentages calculated over total number of local public sector employees. Thin lines indicate 95 % confidence intervals, thicker lines indicate 90 % confidence intervals.

Figure 8: Robustness Check for Estimates



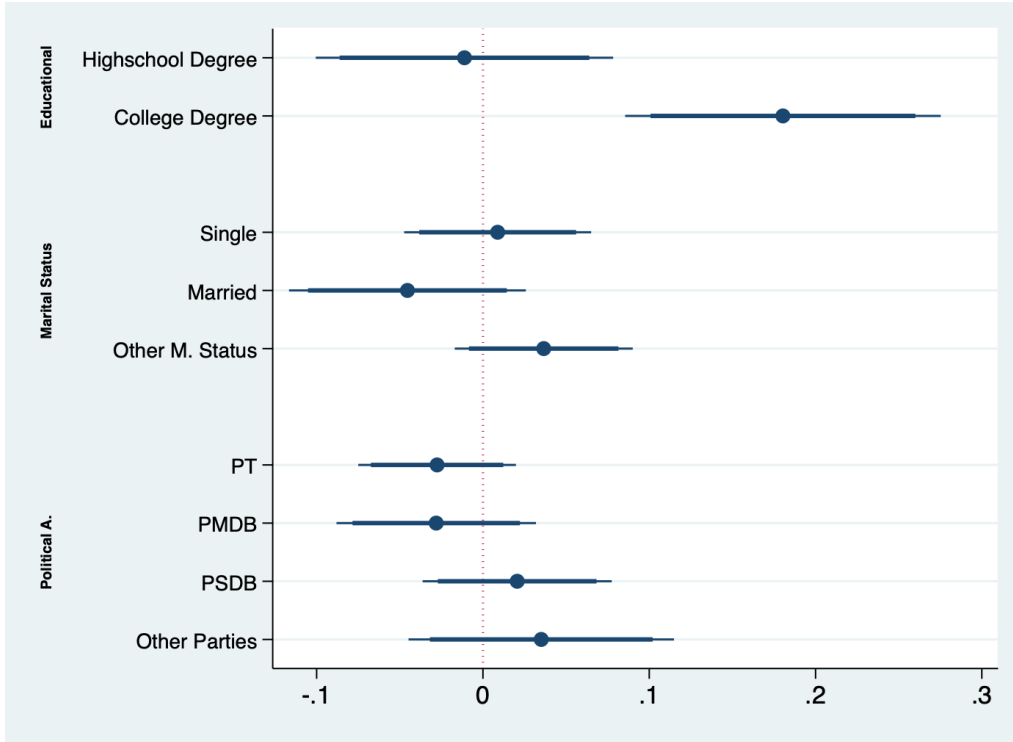
Note: Figure displays changes in specifications to the preferred model that uses CER selector, Triangular Kernel and Linear Polynomial. For example, uniform kernel uses CER selector, Linear Polynomial but uniform Kernel. Standard errors clustered at municipality level. Thin lines indicate 95 % confidence intervals, thicker lines indicate 90 % confidence intervals.

Figure 9: Effects Over Time



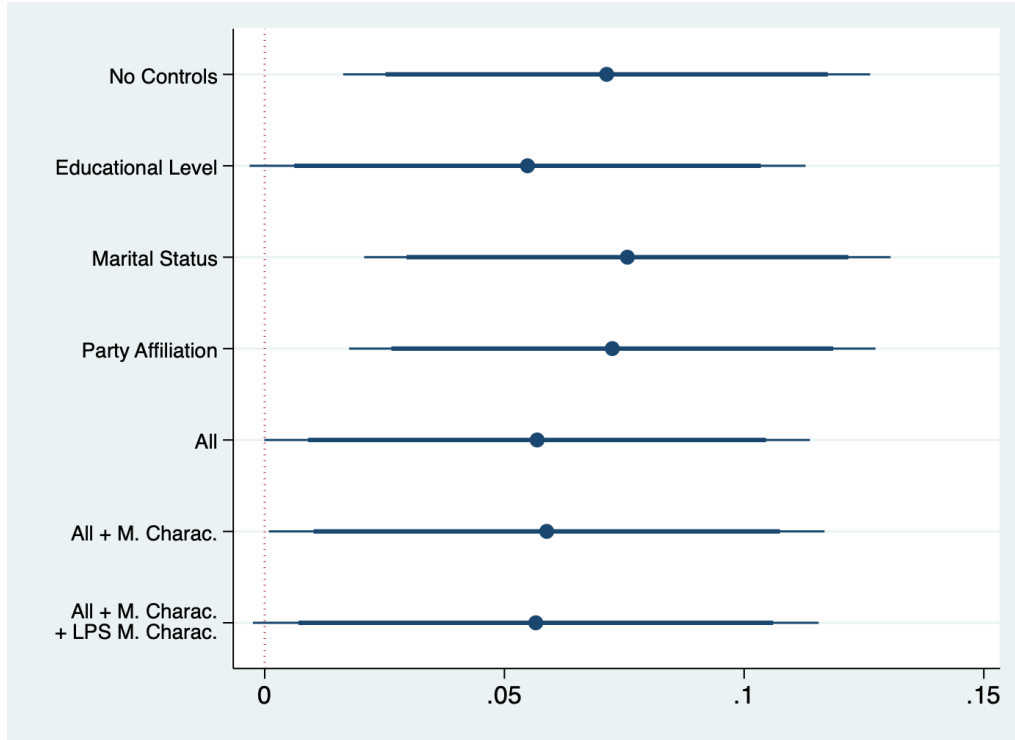
Note: Figure displays yearly effects of electing a female mayor on share of female temporary managers using electoral year as  $t = 0$ . Share of Female Managers calculated using the stock of contracts on 31st of December of each year. Standard errors clustered at municipality level. Lines indicate 95 % confidence intervals.

Figure 10: Characteristics associated with a female win



Note: Figure displays RD estimates using margin of votes of the female candidate as the running variable and different indicator variables for educational, marital status and political characteristics as dependent variable. Thin lines indicate 95 % confidence intervals, thicker lines indicate 90 % confidence intervals. Standard errors clustered at municipality level.

Figure 11: Estimates Sensitivity to inclusion of politicians characteristics



Note: Figure sensitivity to the inclusion of individual politician characteristics. All models estimated using CER selector method, triangular kernel and linear polynomial. Standard errors clustered at municipality level.

## Tables

Table 1: Managers Compared to Quintiles of Wage Distribution on the Public Sector

	Managers	1st Q	2nd Q	Wage Quint.. 3rd Q	4th Q	5th Q
<i>General:</i>						
- Wage (BRMW)	3.830	1.043	1.349	1.637	2.130	4.315
- % Female	0.414	0.689	0.626	0.506	0.435	0.456
- Age	41.710	38.273	40.435	41.311	41.645	41.570
- % Manager	1.000	0.053	0.047	0.053	0.067	0.141
- % Full Time	0.838	0.844	0.851	0.839	0.819	0.758
<i>Education:</i>						
- % Elementary Comp. or less	0.155	0.430	0.474	0.444	0.371	0.162
- % HS Comp. or more	0.807	0.507	0.469	0.503	0.578	0.808
- % at least Superior Comp. or more	0.313	0.043	0.047	0.070	0.133	0.457
<i>Contract Type:</i>						
- Stable	0.377	0.634	0.720	0.734	0.727	0.636
- Temporary	0.553	0.218	0.157	0.157	0.174	0.257
- Other	0.070	0.148	0.123	0.109	0.099	0.107
<i>Years on Position:</i>						
- < than 1	0.191	0.211	0.126	0.111	0.101	0.136
- 2 to 5	0.539	0.431	0.332	0.306	0.295	0.348
- > than 5	0.270	0.359	0.542	0.582	0.604	0.515

Note: Table displays mean of municipalities average for each variable for the year of 2010. Columns (2) - (6) indicate quintiles of wage distribution in the local public sector. Stable contracts defined as RAIS contract type equal to categories 30 or 31. Full-time workers defined as those with contracts with more than 40 work hours a week. Wages displayed as a function of Brazilian federal minimum wages.



Table 2: Impact on Share of Female Managers

	(1)	(2)	(3)	(4)
	% Female	% Female	% Female	% Female
<i>Win</i>	0.070** (0.029)	0.125*** (0.042)	0.070** (0.029)	0.081** (0.033)
Mean	0.406	0.406	0.406	0.406
Selector	cerrd	cerrd	cersum	cersum
Polynomial	Linear	Quadratic	Linear	Quadratic
Bandwidth	0.116	0.120	0.115	0.205
$N_b$	1317	1343	1308	1960
N	3286	3286	3286	3286

Note: Female share defined as female temporary employees over total temporary employees one year after electoral race. Sample restricted to mixed gender elections with one female candidate. Triangular Kernel used to to construct the local-polynomial estimator. Standard errors clustered at municipality level in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 3: Impact on Share of Female Managers (Placebo)

	(1)	(2)	(3)	(4)
	% Female	% Female	% Female	% Female
<i>Win</i>	-0.023 (0.030)	0.013 (0.040)	-0.027 (0.028)	0.000 (0.038)
Mean	0.391	0.391	0.391	0.391
Selector	cerrd	cerrd	cersum	cersum
Polynomial	Linear	Quadratic	Linear	Quadratic
Bandwidth	0.121	0.150	0.142	0.170
N_b	929	1100	1064	1200
N	2233	2233	2233	2233

Note: Female share defined as female temporary employees over total temporary employees one year prior to electoral race. Sample restricted to mixed gender elections with one female candidate. Triangular Kernel used to to construct the local-polynomial estimator. Standard errors clustered at municipality level in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 4: Impacts by Quintiles of Wage Distribution

	(1)	(2)	(3)	(4)	(5)	(6)
	All	1st Quint	2nd Quint	3rd Quint	4th Quint	5th Quint
<i>Panel A: All Temporary workers</i>						
<i>Win</i>	0.033*	0.024	0.048*	0.020	0.014	0.041*
	(0.019)	(0.026)	(0.029)	(0.027)	(0.025)	(0.024)
Mean	0.565	0.643	0.600	0.547	0.524	0.480
Bandwidth	0.093	0.098	0.096	0.105	0.112	0.111
$N_b$	1529	1602	1299	1513	1634	1612
N	4661	4661	3889	4175	4303	4252
<i>Panel B: Temporary without Managers</i>						
<i>Win</i>	0.028	0.014	0.042	0.037	0.010	-0.001
	(0.021)	(0.028)	(0.032)	(0.028)	(0.028)	(0.027)
Mean	0.584	0.650	0.609	0.561	0.545	0.513
Bandwidth	0.094	0.098	0.099	0.112	0.116	0.124
$N_b$	1515	1534	1262	1510	1606	1652
N	4594	4499	3741	4015	4131	4049

Note: Female share defined as female temporary employees over total temporary employees one year prior to electoral race. Panel A includes managers in all quintiles. Sample restricted to mixed gender elections with one female candidate. Triangular Kernel used to construct the local-polynomial estimator. Standard errors clustered at municipality level in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 5: Impact of Female Victory on Temporary Workers Composition

	(1)	(2)	(3)
	Total p/10k	Female p/10k	Male p/10k
<i>Win</i>	7.133 (5.253)	4.202 (2.851)	2.886 (2.498)
Mean	13.417	6.453	6.964
Selector	cerrd	cerrd	cerrd
Bandwidth	0.105	0.110	0.099
$N_b$	1940	2014	1834
N	5261	5261	5261

Note: Table displays RD estimates for total, male and female temporary employees per 10,000 habitants . Sample restricted to mixed gender elections with one female candidate. Triangular Kernel and linear function used to construct the local estimate. Standard errors clustered at municipality level in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 6: Impact on Educational Outcomes

	(1)	(2)	(3)
	% Elementary	% Graduated HS	% Graduated Coll
<i>Panel A: All Managers</i>			
<i>Win</i>	-0.032 (0.025)	0.013 (0.027)	-0.003 (0.037)
Mean	0.127	0.835	0.342
Bandwidth	0.114	0.113	0.084
$N_b$	1287	1282	993
N	3266	3266	3266

*Panel B: Female Managers*

<i>Win</i>	-0.012 (0.022)	-0.006 (0.026)	0.008 (0.046)
Mean	0.078	0.890	0.406
Bandwidth	0.111	0.114	0.084
$N_b$	1067	1086	833
N	2778	2778	2778

Note: Table displays RD estimates for share of workers with different educational levels. Column (1) estimates the impact of a female victory on share of workers with at most elementary education. Columns (2) and (3) estimate the impact of a female victory on share of workers with at least secondary and tertiary education respectively. Sample restricted to mixed gender elections with one female candidate. Triangular Kernel, CER selector method and linear function used to construct the local estimate. Standard errors clustered at municipality level in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 7: Impact of Female Victory on Reelection Probability

	(1)	(2)	(3)	(4)
	Reelected %	Reelected %	Reelected %	Reelected %
<i>Win</i>	-0.036 (0.040)	-0.033 (0.048)	-0.036 (0.039)	-0.036 (0.046)
Mean	0.172	0.172	0.172	0.172
Selector	cerrd	cerrd	cersum	cersum
Polynomial	Linear	Quadratic	Linear	Quadratic
Bandwidth	0.101	0.151	0.108	0.171
N_b	1472	1975	1546	2155
N	3967	3967	3967	3967

Triangular Kernel, CER selector method and linear function used to to construct the local estimate. Politicians matched accross electoral cycles using CPF. Standard errors clustered at municipality level in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 8: Impact of Female Victory on Gender Policies

	(1)	(2)	(3)	(4)
<i>Panel A: Councils</i>				
<i>Win</i>	0.108*** (0.0342)	0.107*** (0.0363)	0.103*** (0.0328)	0.110*** (0.0388)
Mean	0.188	0.188	0.188	0.188
Bandwidth	0.0884	0.186	0.0976	0.157
N_b	1346	2365	1463	2118
Selector	cerrd	cerrd	cersum	cersum
<i>Panel B: Boards</i>				
<i>Win</i>	0.0400 (0.0467)	0.0495 (0.0577)	0.0396 (0.0470)	0.0495 (0.0581)
Mean	0.239	0.239	0.239	0.239
Bandwidth	0.0841	0.122	0.0827	0.120
N_b	1303	1744	1292	1723
Selector	cerrd	cerrd	cersum	cersum
<i>Panel C: Independent Budget</i>				
<i>Win</i>	0.0528** (0.0226)	0.0609** (0.0291)	0.0597** (0.0243)	0.0627** (0.0281)
Mean	0.0581	0.0581	0.0581	0.0581
Bandwidth	0.113	0.107	0.0829	0.122
N_b	1083	1027	832	1144
Selector	cerrd	cerrd	cersum	cersum
<i>Panel D: Municipal Plan</i>				
<i>Win</i>	0.0198 (0.0224)	0.0286 (0.0301)	0.0200 (0.0228)	0.0253 (0.0291)
Mean	0.0523	0.0523	0.0523	0.0523
Bandwidth	0.107	0.126	0.103	0.137
N_b	1573	1790	1516	1919
Selector	cerrd	cerrd	cersum	cersum

Note: "Councils" denote indicator variable for municipalities who declare to have a Public Council to debate woman's rights. "Boards" denote indicator variable for municipalities who declare to have a specific board to implement gender equality policies. "Independent Budget" denotes variable for gender equality board with independent budget. Finally, "Municipal plan" represent indicator variable for municipalities who declare to have a formal municipal plan for gender equality. Standard errors clustered at municipality level in parentheses. Odd columns use local linear specification, evens use local quadratic.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 9: Impact on Gender of Head of Board

	(1)	(2)	(3)	(4)
	Share Female	Share Female	Share Female	Share Female
<i>Win</i>	0.100* (0.058)	0.203*** (0.071)	-0.045 (0.065)	-0.028 (0.058)
Board	Education	Health	Finance	Compt. Gen.
Mean	0.702	0.479	0.304	0.268
Selector	cerrd	cerrd	cerrd	cerrd
Polynomial	Linear	Linear	Linear	Linear
Bandwidth	0.119	0.099	0.103	0.115
$N_b$	1068	855	953	1035
N	2549	2383	2557	2534

Triangular Kernel, CER selector method and linear function used to construct the local estimate. Standard errors clustered at municipality level in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$



Table 10: Impact on Share of Stable Female Managers

	(1)	(2)	(3)	(4)
	% Female	% Female	% Female	% Female
<i>Win</i>	0.043 (0.054)	0.029 (0.066)	0.051 (0.050)	0.033 (0.064)
Mean	0.516	0.516	0.516	0.516
Selector	cerrd	cerrd	cersum	cersum
Polynomial	Linear	Quadratic	Linear	Quadratic
Bandwidth	0.091	0.132	0.105	0.141
$N_b$	787	1077	900	1145
N	2451	2451	2451	2451

Triangular Kernel, CER selector method and linear function used to to construct the local estimate. Dependend variable defined as share of stable female managers excluding new hirings at the end of first year of term. Stable managers defined as manangers with RAIS contract type code 30 and 31. Standard errors clustered at municipality level in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 11: Impact of Female Victory on Areas of Public Goods Provision

	(1)	(2)	(3)	(4)
	Educational %	Healthcare %	Educational (Ln)	Healthcare (Ln)
<i>Win</i>	-0.015 (0.013)	0.000 (0.001)	-0.036 (0.115)	0.043 (0.105)
Mean	0.251	0.020	4.727	2.333
Selector	cerrd	cerrd	cerrd	cerrd
Polynomial	Linear	Linear	Linear	Linear
Bandwidth	0.099	0.133	0.095	0.116
N_b	1800	2275	1664	1668
N	5168	5168	4934	4197

Triangular Kernel, CER selector method and linear function used to construct the local estimate. Standard errors clustered at municipality level in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

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# A Appendix

Table 12: Characteristics by Electoral Race

	(1)	(2)	(3)	(4)	(5)	(6)
Total Population	30506.6 (184920.7)	19739.8 (30247.3)	23266.3 (36000.1)	22621.1 (34982.5)	24803.2 (37053.6)	18770.0 (26218.6)
Total Voters.	23208.7 (142601.7)	15089.4 (22262.9)	17885.8 (26280.1)	17394.1 (25621.2)	19948.7 (28803.8)	15097.2 (20348.2)
Male %	0.508 (0.0177)	0.508 (0.0174)	0.508 (0.0181)	0.508 (0.0180)	0.508 (0.0184)	0.508 (0.0180)
Electricity %	0.869 (0.165)	0.868 (0.165)	0.853 (0.171)	0.854 (0.171)	0.868 (0.161)	0.860 (0.163)
White %	0.526 (0.255)	0.525 (0.256)	0.471 (0.245)	0.477 (0.246)	0.500 (0.246)	0.490 (0.246)
Income Total	14193.2 (95799.4)	8765.7 (14351.3)	10170.4 (16834.5)	9923.8 (16428.7)	11098.4 (17560.3)	8197.0 (12379.7)
Income Mean	371.1 (171.6)	365.7 (164.4)	354.8 (171.8)	356.4 (172.1)	376.9 (172.3)	350.5 (176.1)
Mean Male I.	433.5 (222.9)	426.7 (214.1)	411.6 (222.1)	413.9 (222.9)	440.2 (223.7)	409.6 (233.3)
Mean Female I.	270.9 (104.9)	266.8 (97.94)	262.9 (103.0)	263.4 (102.2)	274.4 (103.1)	254.4 (90.09)
Income Median	205.8 (72.69)	203.4 (69.01)	199.8 (70.25)	200.2 (69.64)	207.8 (70.97)	195.0 (61.78)
Median Male I.	234.3 (99.86)	231.2 (95.64)	224.2 (96.11)	224.9 (95.28)	235.9 (95.32)	219.8 (84.94)
Median Female I.	169.2 (42.17)	167.5 (38.51)	167.7 (40.17)	167.5 (39.45)	170.0 (41.16)	162.3 (31.83)
Observations	27485	27108	6985	6206	3266	1306
Run-off	Yes	No	No	No	No	No
Single Gender Race	Yes	Yes	No	No	No	No
Multiple F. Cand.	Yes	Yes	Yes	No	No	No
Unreported Managers	Yes	Yes	Yes	Yes	No	No
Outside Bandwidth	Yes	Yes	Yes	Yes	Yes	No

Municipality Characteristics by electoral race. Standard deviation in parenthesis



Table 13: Robustness Checks for Impact on Head of Board Gender

	(1)	(2)	(3)	(4)
<i>Panel A: Education Board</i>				
<i>Win</i>	0.100* (0.0576)	0.115 (0.0727)	0.100* (0.0575)	0.113 (0.0735)
Mean	0.702	0.702	0.702	0.702
Bandwidth	0.119	0.165	0.120	0.161
N_b	1068	1357	1069	1341
Selector	cerrd	cerrd	cersum	cersum
<i>Panel B: Education Board</i>				
<i>Win</i>	0.203*** (0.0708)	0.263*** (0.0917)	0.189*** (0.0678)	0.238*** (0.0829)
Mean	0.479	0.479	0.479	0.479
Bandwidth	0.0986	0.123	0.109	0.155
N_b	855	1003	924	1215
Selector	cerrd	cerrd	cersum	cersum
<i>Panel C: Finance Board</i>				
<i>Win</i>	-0.0445 (0.0649)	-0.0163 (0.0800)	-0.0352 (0.0667)	0.0227 (0.0864)
Mean	0.304	0.304	0.304	0.304
Bandwidth	0.103	0.147	0.0975	0.127
N_b	953	1266	912	1119
Selector	cerrd	cerrd	cersum	cersum
<i>Panel D: Compt. General</i>				
<i>Win</i>	-0.0283 (0.0582)	-0.00727 (0.0779)	-0.0298 (0.0578)	-0.0147 (0.0751)
Mean	0.268	0.268	0.268	0.268
Bandwidth	0.115	0.146	0.117	0.158
N_b	1035	1245	1043	1305
Selector	cerrd	cerrd	cersum	cersum

Standard errors clustered at municipality level in parentheses. Odd columns use local linear specification, evens use local quadratic.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$