Department of Economics- FEA/USP

Female Leadership and Early Childhood Education: Impacts on Access and Quality

ISABELA FERNANDES MATOS LIMA
PAULA CARVALHO PEREDA

WORKING PAPER SERIES Nº 2026-29

DEPARTMENT OF ECONOMICS, FEA-USP
WORKING PAPER Nº 2026-29

Female Leadership and Early Childhood Education: Impacts on Access and Quality

Isabela Fernandes Matos Lima (ifm.lima@usp.br)
Paula Carvalho Pereda (pereda@usp.br)

Abstract:

This paper investigates whether female political leadership affects access to and quality of early childhood education in Brazilian municipalities. We employ a regression discontinuity design exploiting close municipal elections between male and female candidates in the 2016 mayoral races. The results indicate that municipalities that narrowly elected a female mayor experienced a modest but statistically significant increase in daycare enrollment rates at the beginning of the term, suggesting a short-run expansion in access. In contrast, evidence regarding quality indicators, such as teacher qualifications and class size, is more limited and generally not robust across specifications.

Keywords: Elections, Female leadership, Childhood education

JEL Codes: J16, D72, I21, I28, C21

Female Leadership and Early Childhood Education: Impacts on Access and Quality

Isabela Fernandes Matos Lima* Paula Carvalho Pereda†

Abstract

This paper investigates whether female political leadership affects access to and quality of early childhood education in Brazilian municipalities. We employ a regression discontinuity design exploiting close municipal elections between male and female candidates in the 2016 mayoral races. The results indicate that municipalities that narrowly elected a female mayor experienced a modest but statistically significant increase in daycare enrollment rates at the beginning of the term, suggesting a short-run expansion in access. In contrast, evidence regarding quality indicators, such as teacher qualifications and class size, is more limited and generally not robust across specifications.

Keywords: Elections. Female leadership. Childhood education.

Área 1 - Economia.

*FEA-USP. Contact: ifm.lima@usp.br

†FEA-USP. Contact: pereda@usp.br

1. Introduction

Early childhood education plays a central role in children's cognitive and socioemotional development (Bernal and Fernández, 2012; Attanasio et al., 2012; Drange and Havnes, 2018). Despite its relevance, around 40% of preschool-aged children worldwide are not enrolled in early childhood education services; in low-income countries, this share reaches 80% (Devercelli, 2020). Expanding access and ensuring the quality of these services are therefore central public policy challenges.

In Brazil, the provision of daycare and preschool slots is largely the responsibility of municipal governments. Understanding how the characteristics of local leaders influence the provision of these services is therefore an empirically relevant question.

The international literature suggests that the gender of political leaders may affect patterns of public resource allocation (Chattopadhyay and Duflo, 2004; Clots-Figueras, 2012; Bhalotra and Clots-Figueras, 2014; Funk et al., 2015; Holman, 2014; Slegten et al., 2018). Against this backdrop, this paper investigates whether the presence of women at the head of the Brazilian municipal executive affects indicators of access and quality in early childhood education, focusing on daycare centers and preschools.

To identify the causal effects of female leadership, the study uses a regression discontinuity design, exploiting competitive municipal elections between candidates of different sexes. This strategy allows the comparison of municipalities that are similar in observable and unobservable characteristics, differing only in the sex of the winning candidate. The analysis combines electoral data from the Federal Superior Electoral Court (STF) with access and quality indicators for daycare centers and preschools from Fundação Abrinq, as well as data from the 2010 Population Census, which are used as control variables.

The results suggest that female mayors generate positive, though localized, effects on the expansion of access to daycare. In contrast, the evidence regarding the quality of early childhood education is more limited, indicating that female presence in the municipal executive does not automatically translate into generalized improvements in these indicators.

These findings speak to an international literature with heterogeneous results. In developing countries, studies show that local governments led by women tend to allocate more resources to care-related areas, such as health and education (Chattopadhyay and Duflo, 2004; Clots-Figueras, 2012; Bhalotra and Clots-Figueras, 2014). Additional evidence points to a stronger focus on social welfare policies, environmental protection, and fiscal adjustments (Funk et al., 2015; Holman, 2014; Slegten et al., 2018). However, in European countries, results are less consensual: positive effects on the provision of childcare services are found in Germany (Baskaran and Hessami, 2019), whereas null or mixed evidence emerges in Spain, Norway, and Italy, especially in the pre-pandemic period (Carozzi and Gago, 2023; Geys and Sørensen, 2019; Casarico et al., 2022).

One possible explanation for this heterogeneity is the strategic behavior of candidates. As argued by Fernandes (2024), when candidates compete against opponents of a different sex, they tend to adjust their political platforms: women begin to address issues traditionally associated with men, while men incorporate agendas such as health and education. This mechanism may attenuate observable differences in policies implemented after the election, particularly in contexts of high electoral competition.

This paper is organized into five sections in addition to this introduction. The first section describes the data used and presents a descriptive analysis of the sample. The second section discusses the empirical strategy and the conditions required for its validity. The third presents the main results of the analysis, along with robustness exercises using different specifications and bandwidths. The fourth explores additional results using alternative measures of early childhood education quality, such as the proportion of teachers with higher education and the average number of students per class. Finally, the paper concludes with final remarks.

2. Background

Although there are historical records of women's struggle for political representation since Ancient Greece, it was especially from the eighteenth century onward, with the rise of Enlightenment ideals, that this agenda began to be defended more systematically. The movement gained strength with the campaigns for women's suffrage in the late nineteenth and early twentieth centuries, intensifying from the 1970s onward (Falcão, 2019). By 1994, women had already secured voting rights in approximately 96% of the countries in the world (Ramirez et al., 1997).

In Brazil, the struggle for women's political participation began during the monarchical period (Duque, 2017). According to the Superior Electoral Court, the first state to institute equal suffrage was Rio Grande do Norte, with Law No. 660 of October 25, 1927. The first woman elected mayor in Brazil and in Latin America was Alzira Soriano de Souza, in the city of Lages, Rio Grande do Norte, in 1928 (Duque, 2017). However, only after the process of redemocratization, with the 1988 Constitution, did a more consistent increase in women's presence in municipal leadership occur: the proportion of elected female mayors rose from 3.4% in 1992 to 12.1% in 2012 (Duque, 2017).

Despite these advances, several barriers continue to limit women's participation in politics, including sexism, harassment, political violence, misogyny, and other forms of discrimination (Kgobe and Ramoroka, 2024). Pande and Ford (2014) classify these barriers into two types: taste-based discrimination and statistical discrimination. Taste-based discrimination is associated with social norms that attribute greater legitimacy to men in leadership positions, whereas statistical discrimination stems from a lack of information about women's capabilities as leaders. In the latter case, voters may base their decisions on beliefs about expected average performance, which tend to be distorted by the low female presence in political office.

In light of these barriers and persistent female underrepresentation, several countries have adopted quotas to expand women's participation in politics. Over the last two decades, more than half of the countries in the world have implemented some type of gender quota to regulate the composition of candidate lists (Pande and Ford, 2014). Evidence indicates that these mechanisms help increase women's presence in politics. Bagues and Campa (2021), for example, show that the adoption of quotas raises the share of female candidates to around 46%, in addition to attracting women with educational and professional qualifications that are often higher than those of the male candidates they replace (Besley et al., 2017).

The literature identifies three main types of political quotas. The first corresponds to voluntary party quotas, in which parties commit to nominating a given proportion of female candidates on their electoral lists. The second refers to legal candidate quotas, established by electoral legislation. The third consists of reserved seats, in which certain seats are allocated exclusively to women. In Latin America, quota systems began to expand in the 1990s. In Brazil, electoral legislation establishes that at least 30% of candidacies must be filled by women (Pande and Ford, 2014).

Despite the adoption of these measures, female representation in politics remains relatively low in many countries. Recent reports by the Inter-Parliamentary Union indicate that, in 2023, women held around 26% of parliamentary seats worldwide, reflecting gradual progress but still far from gender parity.

3. Data

The data used in this study include: (i) the results of the 2016 municipal elections; (ii) candidates' personal and party information; and (iii) municipal education indicators. The different databases were obtained from official institutions — the Superior Electoral Court (TSE) and Fundação Abrinq — and underwent specific filtering procedures to ensure the validity of the methodological design.

3.1 Electoral data

The electoral data used in this study were obtained from the open data repository of the Superior Electoral Court (TSE), the institution responsible for organizing, regulating, and overseeing the Brazilian electoral process. Three datasets related to the 2016 municipal elections were used: (i) the nominal voting data by municipality and electoral district, (ii) the candidate dataset, and (iii) the dataset containing information on the municipal electorate.

From these files, a database was constructed containing the elected candidate in each municipality, along with their main characteristics (gender, political party, and number of votes), the total number of eligible voters, and other relevant variables. For the purposes of the analysis, the dataset was filtered to retain only the first- and second-place candidates in each municipality, allowing for the calculation of the margin of victory and the implementation of identification strategies. The initial sample included the 5,567 Brazilian municipalities, excluding the Federal District, which does not participate in municipal elections.

Exclusion criteria were applied to ensure case comparability and the causal validity of the empirical identification. First, the 92 municipalities with more than 200,000 eligible voters that held a runoff election in 2016 were removed. This exclusion is intended to ensure that the treatment (the characteristics of the elected mayor) is defined based on the first-round result, avoiding potential biases related to differentiated electoral strategies between rounds. Next, three municipalities that did not have a valid contest for the office of mayor, either because they had only one candidate or no competition, were excluded. After these exclusions, the final sample consisted of 5,472 municipalities.

To allow merging across the different datasets, municipal names had to be standardized. Manual corrections were made in cases of spelling or accentuation discrepancies. The matching procedure was based on municipality name and state. This matching enabled the integration of electoral information with electorate data, including the number of voters and candidate identification variables such as gender and political party.

The final database resulting from this integration serves as the starting point for merging with municipal indicators of early childhood education coverage.

3.2 Educational indicators

Information on early childhood education coverage was obtained from the *Observatório da Criança e do Adolescente*, maintained by Fundação Abrinq. This non-profit civil society organization annually provides social and educational indicators disaggregated by municipality, including the net enrollment rate in daycare centers and preschools.

The net daycare enrollment rate calculated by Abrinq is defined as follows:

$$\text{Net daycare enrollment rate} = \frac{\text{Enrollments of children aged 0–3 in daycare centers}}{\text{Population aged 0–3}}$$

Fundação Abrinq computes this indicator based on microdata from the School Census (INEP) and population estimates produced by the Brazilian Institute of Geography and Statistics (IBGE) and sent to the Federal Court of Accounts (TCU), stratified by age. The same procedure is used to calculate the net enrollment rate in preschools (ages 4 to 5). The institution notes that, due to the attendance of children from neighboring municipalities, values may exceed 100% in some cases.

In addition to municipal enrollment rates, other complementary indicators provided by Abrinq for the period 2013 to 2020 were used, such as the average number of students per class and the proportion of teachers with complete higher education in daycare centers and preschools.

To link these data to the electoral data, a matching procedure across the distinct databases was performed. Since the only common variable across the datasets was the municipality name, an orthographic standardization routine was implemented once again. To increase matching reliability, the state abbreviation (UF) was added using the municipality IBGE code from the `geobr` package as the merge key. After including the municipality IBGE code in the dataset, the remaining matchings were performed based on this variable.

3.3 Descriptive Analysis

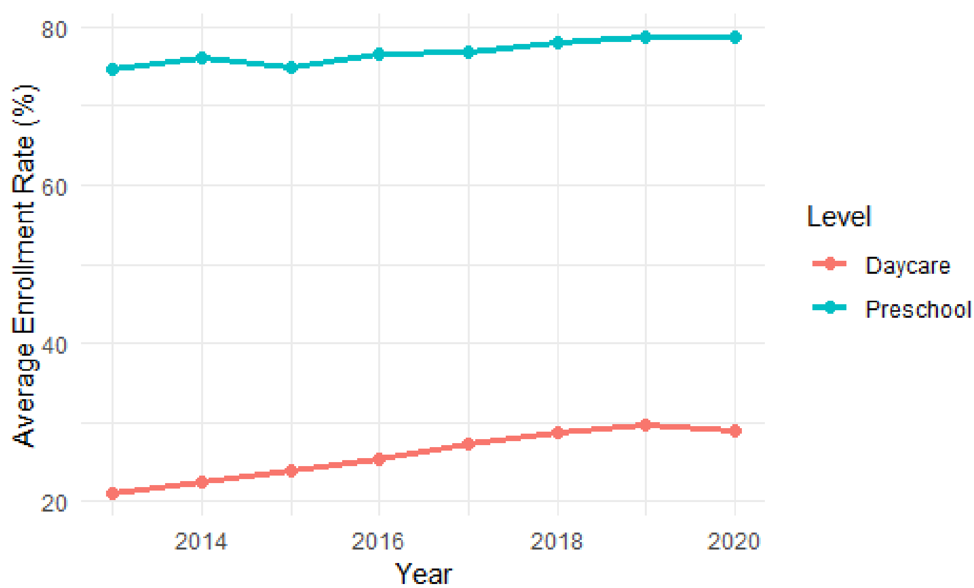
The evolution of the gross enrollment rate in the stages of early childhood education in Brazil — daycare (*cre*) and preschool (*pre*) — between 2013 and 2020 is illustrated in Figure 1.

A trend of continuous growth in the net daycare enrollment rate can be observed, with an increase from approximately 21% to around 30% between 2013 and 2019. This growth, although modest, points to gradual progress in expanding the supply of places in this stage, which has historically been characterized by low coverage. By contrast, the preschool enrollment rate remained stable and high, fluctuating between 75% and 79% over the same period. This difference across stages reinforces the need for specific policies for daycare centers, given the greater difficulty of access and the potential impact on educational equity and support for the labor market participation of mothers with young children.

Although the general trend from 2013 to 2019 was one of continuous growth in daycare enrollment, there was a small decline between 2019 and 2020 (from 29.6% to 28.9%). In the case of preschool, the rate remained stable. Although small, this reduction in daycare rates interrupts a stable or upward trajectory and should be understood in the context of the COVID-19 pandemic.

During 2020, many municipalities faced restrictions such as temporary school closures, suspension of in-person enrollment, and, consequently, delays in children's entry into early childhood education. Therefore, this decline does not necessarily reflect a contraction in the supply of places, but rather a disruption that must be interpreted with caution. This is the reason for excluding the last year of the mayors' term from the sample in the subsequent stages of this study (2020).

Figure 1: Net Enrollment Rate between 2013 and 2020



Note: The net daycare coverage rate used in the figure follows Fundação Abrinq's methodology. The evolution presented reflects the application of this formula for each year over the period 2013–2020.

Table 1 presents the evolution of the main daycare indicators between 2013 and 2019, comparing municipalities in which men and women were elected. The results reveal two relevant regularities.

First, municipalities begin the period with very similar levels. At baseline, the average daycare enrollment rate is virtually identical for municipalities later governed by men (21.54%) and women (21.82%). The same pattern holds for the proportion of teachers with higher education (approximately 49% in both cases) and for the student-to-class ratio (around 16 students per class). This suggests that there were no systematic prior differences between the groups, reducing the risk of initial selection bias in the comparison.

Second, a parallel growth trajectory in the indicators is observed over time, with moderate and consistent increases in both groups. Between 2017 and 2019, the enrollment rate rises from 25.30% to 27.43% in municipalities governed by men, while in municipalities governed by women it increases from 25.55% to 27.56%. The magnitude and pace of expansion are very similar. The same occurs for the proportion of teachers with higher education: in both groups there is a substantial increase between the baseline and 2017, followed by another rise up to 2019, with values converging to approximately 72–73%. The student-to-class ratio remains relatively stable over the period, varying only within the expected bounds of demographic dynamics and installed capacity.

Overall, the results indicate that the evolution of daycare indicators between 2013 and 2019 is very similar between municipalities that elected men and those that elected women, both in average levels and in temporal trajectories. This evidence reinforces the appropriateness of the empirical strategy comparing groups close to the threshold of electoral victory by gender, suggesting that any effects estimated later are not the result of systematic prior differences, but rather of the subsequent political experience.

Table 1: Evolution of Daycare Indicators (Municipal Average), 2013–2019 – Municipalities with Gender-Contested Elections

Variable	Baseline	2017	2018	2019
Man Elected				
Enrollment rate (%)	21.54	25.30	26.56	27.43
	(15.49)	(16.68)	(16.95)	(16.95)
Teachers with Higher Education (%)	49.95	63.32	58.94	73.22
	(30.11)	(27.07)	(30.79)	(24.65)
Student-to-class ratio	16.02	17.32	15.97	16.63
	(7.27)	(7.30)	(6.67)	(5.99)
Woman Elected				
Enrollment rate (%)	21.82	25.55	26.93	27.56
	(14.55)	(15.52)	(15.98)	(16.04)
Teachers with Higher Education (%)	48.38	63.58	59.76	72.31
	(30.06)	(27.10)	(30.95)	(24.15)
Student-to-class ratio	16.11	17.19	15.77	16.42
	(7.22)	(6.55)	(6.61)	(5.35)
Number of municipalities	1218	1218	1218	1218

Note: The sample includes only gender-contested races, that is, elections in which the top two candidates are of different sexes. In each cell, the top line reports the variable mean, and the bottom line (in parentheses) reports the standard deviation. The baseline corresponds to the average of the variables over the previous term (2013–2016).

Table 2 presents the evolution of preschool indicators. As in the case of daycare, the results reveal very similar patterns across the two groups. Initial levels (baseline) are virtually identical for municipalities that later elected men and women. The average preschool enrollment rate is 74.54% in municipalities with male-elected mayors and 74.85% in municipalities with female-elected mayors. The proportion of teachers with higher education also starts at very similar levels (61.4% versus 60.7%). The student-to-class ratio shows little variation across groups, standing at around 17 students per class. These patterns further reinforce the evidence that the groups were balanced before the election.

Throughout the period analyzed, the enrollment rate evolves similarly in both groups, with slight growth between 2017 and 2019: in municipalities governed by men, from 74.40% to 76.27%; and in those governed by women, from 74.95% to 75.36%. The difference is small, and both trajectories are consistent with national trends of stabilization in preschool coverage. Teacher qualification shows positive and parallel evolution. Between baseline and 2019, the proportion of teachers with higher education increases by approximately 15 percentage points in both groups, reaching 76–77%. The student-to-class ratio remains highly stable over the period in both groups, fluctuating around 17 students per class, with no clear trend toward either reduction or increase.

Table 2: Evolution of Preschool Indicators (Municipal Average), 2013–2019 – Municipalities with Gender-Contested Elections

Variable	Baseline	2017	2018	2019
Man Elected				
Enrollment rate (%)	74.54	74.40	75.02	76.27
	(16.02)	(17.96)	(18.21)	(19.57)
Teachers with Higher Education (%)	61.43	66.17	68.22	76.16
	(26.41)	(25.48)	(25.24)	(22.09)
Student-to-class ratio	17.26	17.15	17.14	17.10
	(3.20)	(3.38)	(3.25)	(3.23)
Woman Elected				
Enrollment rate (%)	74.85	74.95	75.29	75.36
	(16.56)	(18.64)	(17.90)	(19.05)
Teachers with Higher Education (%)	60.66	66.69	68.85	77.44
	(26.43)	(25.03)	(24.88)	(22.33)
Student-to-class ratio	17.43	17.13	17.15	17.14
	(3.16)	(3.28)	(3.16)	(3.23)
Number of municipalities	1218	1218	1218	1218

Note: The sample includes only gender-contested races, that is, elections in which the top two candidates were of different sexes. In each cell, the top line reports the variable mean, and the bottom line (in parentheses) reports the standard deviation. The baseline corresponds to the average of the variables over the previous term (2013–2016).

4. Empirical Strategy

Identifying the causal impact of the sex of a policymaker on indicators of access to and quality of educational services aimed at early childhood is a complex task. Simply comparing municipalities with mayors of different sexes would likely entail endogeneity problems stemming from non-random treatment selection, since the outcome variable may be correlated with observable and unobservable characteristics that may also influence the sex of the mayor.

To measure the causal impact of having a female mayor on access and quality outcomes in daycare centers and preschools, we exploit a regression discontinuity (RD) strategy. The empirical strategy compares municipalities in which the female candidate won by narrow margins with municipalities in which the male candidate won by similarly narrow margins.

The model is specified as follows:

$$Y_{ms} = \alpha + \beta_1 D_{ms} + F(MV_{ms}) + \gamma_s + \varepsilon_{ms}$$

where m denotes a municipality and s a state. D_{ms} takes the value of one if the election winner is a female candidate and zero otherwise. β_1 is the coefficient of interest and captures the effect of a female mayor on the outcome variable Y_{ms}.

MV_{ms} is the margin of victory of the winning candidate in the previous mixed-gender electoral race, being positive if the election winner is a female candidate and the runner-up is a male candidate, and negative if the opposite occurs. The cutoff point of the design is $MV_{ms} = 0$. Finally, γ_s is a state fixed-effects term, intended to control for time-invariant characteristics at the state level.

Following Gelman and Imbens (2017), we estimate local specifications, using the optimal bandwidth selected by the procedure of Calonico et al. (2014).

To interpret the estimated coefficient β as a causal effect in the regression discontinuity design (RDD), two conditions must be satisfied: (i) the treatment cannot affect predetermined covariates; and (ii) there can be no manipulation of the running variable in the vicinity of the threshold.

(i) Predetermined covariates: This is verified by testing for balance in observable municipal characteristics around the cutoff. Table 3 shows that none of the differences is statistically significant. Therefore, there is no evidence of discontinuity in the selected covariates, indicating that municipalities just above and just below the threshold are comparable.

Table 3: Balance Test for Predetermined Covariates around the Cutoff (RDD) – Gender-Contested Races

Variable	Mean	Estimate	SE	p-value
Urban population (%)	61.714	1.546	2.901	0.594
Average income	385.887	33.311	25.060	0.184
Illiteracy (%)	18.847	-0.305	1.569	0.846
Children aged 0 to 5 (%)	9.522	-0.393	0.282	0.164
Municipal GDP per capita (in R$)	11585.825	-828.084	1611.247	0.607
Women (%)	49.367	0.400	0.249	0.109

Note: The means reported are not weighted by municipal population, since the RDD balance test is conducted at the treatment unit level (municipality), assigning equal weight to each observation.

(ii) No manipulation of the running variable: This is assessed using the McCrary density test, estimated via local polynomial regression with a triangular kernel. The robust test does not reject the null hypothesis of continuity in the density of the female candidate's margin of victory at the cutoff ($T = 1.536$; $p = 0.125$). In addition, the binomial diagnostics produced by the procedure itself show balanced proportions of observations to the left and right of the threshold in multiple symmetric windows, reinforcing the absence of strategic manipulation of the margin of victory.

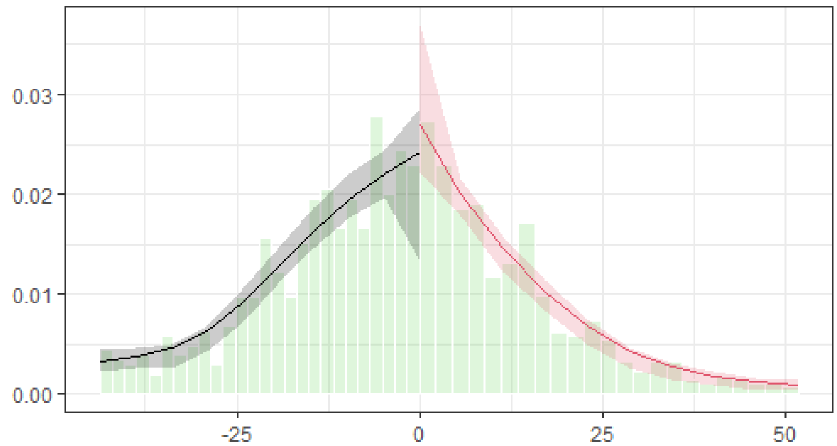


Figure 2: McCrary Test

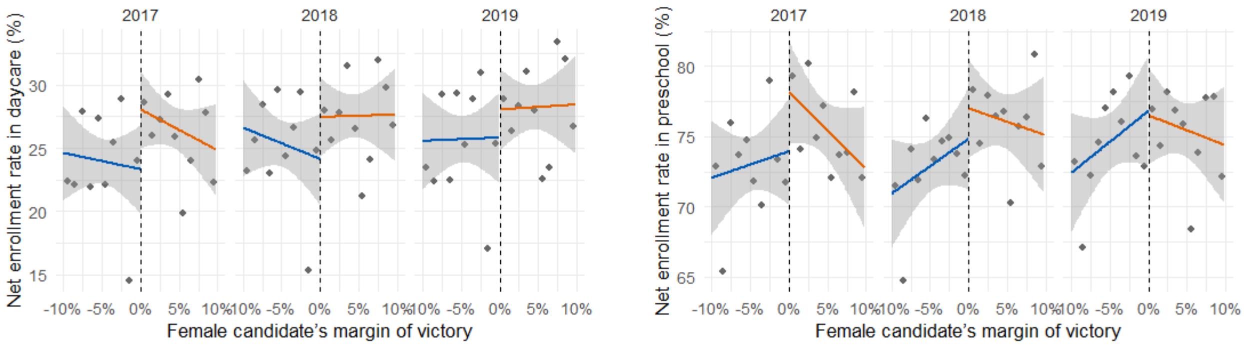
Note: The graph presents the estimation of the McCrary manipulation test (`rddensity`), which verifies whether there is a discontinuity in the density of the running variable — here, the female candidate's margin of victory — exactly at the cutoff point (0). The robust test does not reject the null hypothesis of no discontinuity in density at the cutoff ($T = 1.54$, $p = 0.125$). Total number of observations: 1218, with 687 to the left and 531 to the right of the cutoff.

5. Results

5.1 Average Effects

A clear increase can be observed in the level of the daycare enrollment rate immediately to the right of the female-victory threshold in the years following the elections. Figure 3 visualizes the relationship between the female margin of victory and the net enrollment rate in daycare centers and preschools during the first three years of the term and, more intuitively, the discontinuity at the cutoff point.

Figure 3: Discontinuity in Net Enrollment Rates around the Electoral Margin



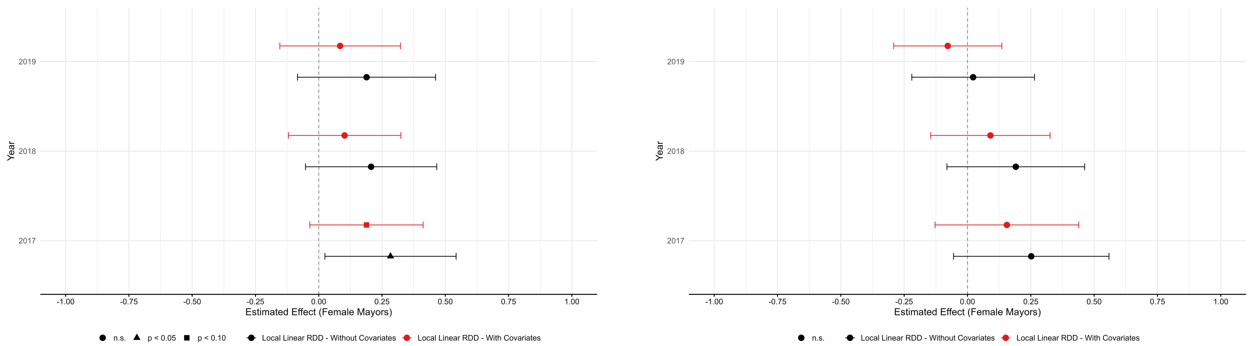
(a) Daycare centers

(b) Preschools

Note: The graphs present binned averages of the outcome variable along the female candidate's margin of victory, with a linear fit estimated separately on each side of the cutoff point. The vertical line indicates the electoral cutoff point ($MV = 0$). The graphs are presented for a symmetric window around the cutoff for illustrative purposes.

According to the RDD estimates, municipalities that elected a female mayor did, on average, record a higher net enrollment rate in daycare centers. Figure 4a presents the RDD estimates for the net daycare enrollment rate, year by year, using a linear polynomial, both in the model without covariates and in the model with covariates. The results show a statistically significant impact at the 5% level at the beginning of the term (2017), suggesting an immediate effect of electing women on the expansion of early childhood education. For 2018 and 2019, although the coefficients remain positive, the confidence intervals include zero, indicating a lack of statistical significance. The inclusion of covariates does not alter the significance pattern of the results: the impact for 2017 remains significant, but at the 10% level. Figure 4b presents the estimates for preschools. The coefficients are all positive, indicating a possible increase in the preschool enrollment rate following the election of a female mayor; however, none of the models display statistical significance.

Figure 4: Impact of Female Leadership on Enrollment Rates by Educational Stage



(a) Daycare centers

(b) Preschools

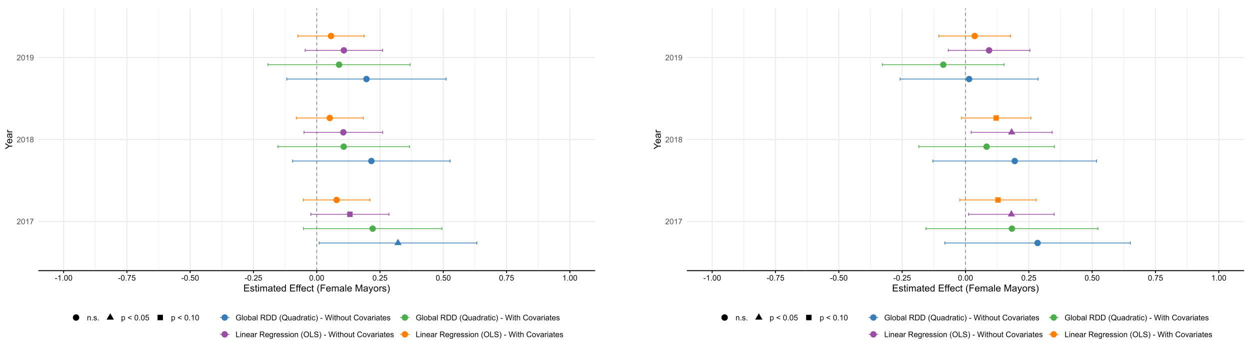
Note: All estimates use standardized coefficients to allow comparisons across years. Statistical significance is indicated based on the 1%, 5%, and 10% levels. The complete table with estimated coefficients, robust standard errors, p-values, confidence intervals, and information on the optimal bandwidth (CCT) is reported in the Appendix.

Taken together, the graphical and statistical evidence suggests that female mayors tend to expand access to daycare centers at the beginning of their term, even if the visual magnitude of the effect appears to persist over time. The empirical results are consistent with the literature: while some studies document educational gains associated with female representation in public office (Clots-Figueras, 2012), others in different contexts do not find effects on the provision of childcare services (**?**Carozzi and Gago, 2023). In Brazil, the expansion of daycare places depends heavily on intergovernmental regulation and financing (Cruz et al., 2014), which reduces the short-term room for maneuver available to female mayors.

5.2 Robustness

Different specifications: The effect observed in the daycare net enrollment rate in the year following the elections remains significant. The preschool enrollment rate, which had previously shown no statistical significance, becomes significant under alternative specifications, suggesting a relationship between municipalities led by women and higher preschool enrollment as well. Figure 5 presents four alternative models — a quadratic specification, with and without covariates, and a global linear regression, also with and without covariates. The aim is to verify the sensitivity of the results to different functional forms and specifications.

Figure 5: Impact of Female Leadership on Enrollment Rate, by Year and across Different Specifications



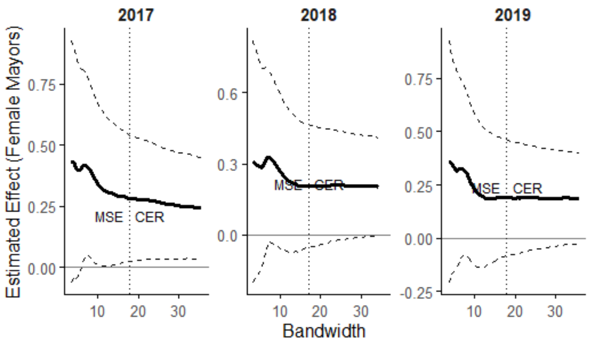
(a) Daycare centers

(b) Preschools

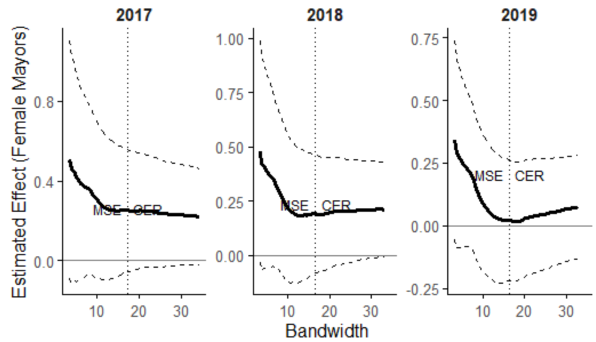
Note: All estimates use standardized coefficients to allow comparisons across years. Statistical significance is indicated based on the 1%, 5%, and 10% levels. The complete table with estimated coefficients, robust standard errors, p-values, and confidence intervals is reported in the Appendix.

Different bandwidths: With regard to the daycare enrollment rate, in 2017 the confidence interval remains entirely above zero for all bandwidths close to the optimal values (MSE and CER), indicating statistically significant evidence with a positive effect, although the magnitude is highly sensitive to smaller bandwidths. For preschools, only in 2017 is there some indication of a more robust effect — and even then the magnitude is small. These robustness curves, varying h systematically around the optimal bandwidth suggested by the MSE method, were estimated to verify whether the results depend on bandwidth choice. The model is a local linear RDD, with a triangular kernel, bias correction, and manually varied bandwidth h.

Figure 6: Impact of Female Leadership on Enrollment Rate, by Year: Bandwidth Sensitivity Analysis



(a) Daycare centers



(b) Preschools

Note: The thick black line shows the estimated effect for different bandwidths. The dashed lines correspond to 90% confidence intervals. The dotted vertical lines indicate the optimal bandwidths selected by the MSE (Mean Squared Error) and CER (Coverage Error Rate) criteria.

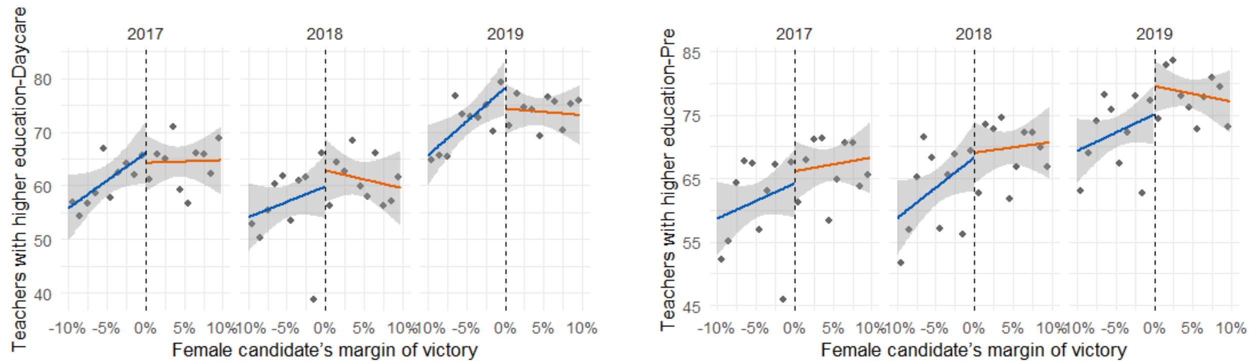
5.3 Other Outcomes

Proportion of teachers with complete higher education: There is no clear pattern in the educational composition of the daycare teaching staff in terms of higher education, but a positive impact may emerge in the medium term in preschools, possibly reflecting gradual adjustments in the personnel management of these institutions. The discontinuity graph shows more clearly that in 2019 the curves to the right of the cutoff shift to higher levels.

Figure 7: Discontinuity in the Proportion of Teachers with Higher Education around the Electoral Margin

(a) Daycare centers

(b) Preschools

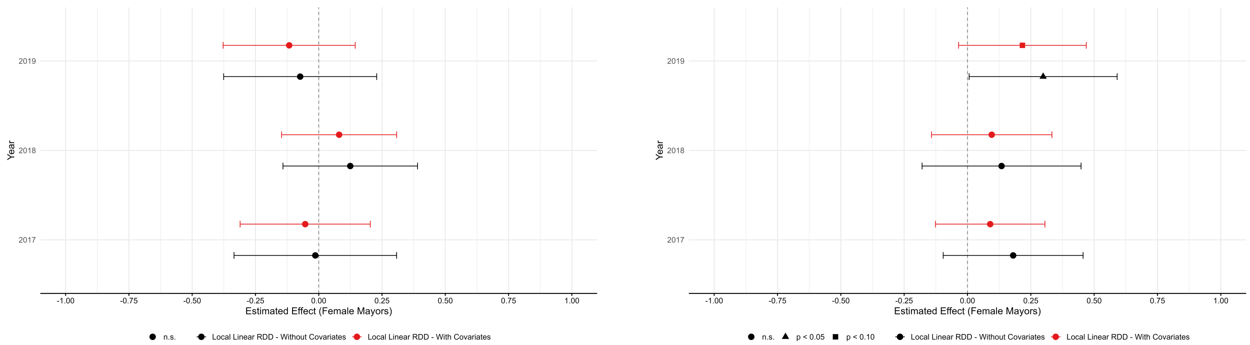


Note: The graphs present binned averages of the proportion of teachers with higher education along the female candidate's margin of victory, with a linear fit estimated separately on each side of the cutoff point. The vertical line indicates the cutoff point ($MV = 0$). The graphs are presented for a symmetric window around the cutoff for illustrative purposes.

The victory of a female mayor does not generate a significant change in the proportion of teachers with higher education in municipal daycare centers, but in 2019 a positive and statistically significant effect is observed in preschools, indicating that, by the end of the third year of the term, municipalities that elected a woman exhibit a slightly higher proportion of teachers with higher education in preschools. The RDD estimates in Figure 8 show that for the remaining years, the coefficients remain close to zero and the confidence intervals include the null value, indicating the absence of an identifiable causal effect at the cutoff in both stages of early childhood education.

Figure 8: Impact of Female Leadership on the Proportion of Teachers with Complete Higher Education, by Year

(a) Daycare centers (b) Preschools



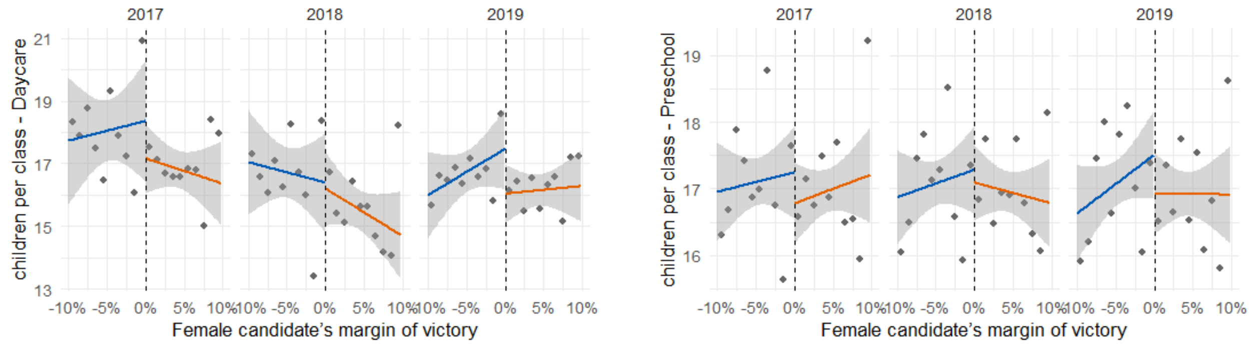
Note: All estimates use standardized coefficients to allow comparisons across years. Statistical significance is indicated at the 1%, 5%, and 10% levels. The complete table with estimated coefficients, robust standard errors, *p*-values, confidence intervals, and information on the optimal bandwidth (CCT) is reported in the Appendix.

Although few studies specifically address the relationship between female mayors and teacher qualifications in daycare centers and preschools, the broader education literature analyzes teacher qualifications extensively. In the Brazilian case, federal regulations, funding arrangements, and the provision of specific training for early childhood education create institutional inertia that makes rapid changes in staff composition difficult (Malta Campos et al., 2006) — which is why effects on qualification tend to emerge slowly and heterogeneously. Brazil is one of the few countries in which the minimum required training for early childhood teachers is limited to upper-secondary education (Brasil. Ministério da Educação. Secretaria de Educação Básica, 2009). Although teacher qualification levels have been improving, early childhood education teachers still lack specialized training (Runke Huang, 2025).

Number of students per class: There may be no robust evidence that female mayors alter class size in daycare centers and preschools during their term. There is a suggestive, though inconclusive, pattern indicating that, if there is an effect, it is small.

Figure 9: Discontinuity in the Number of Students per Class around the Electoral Margin

(a) Daycare centers (b) Preschools

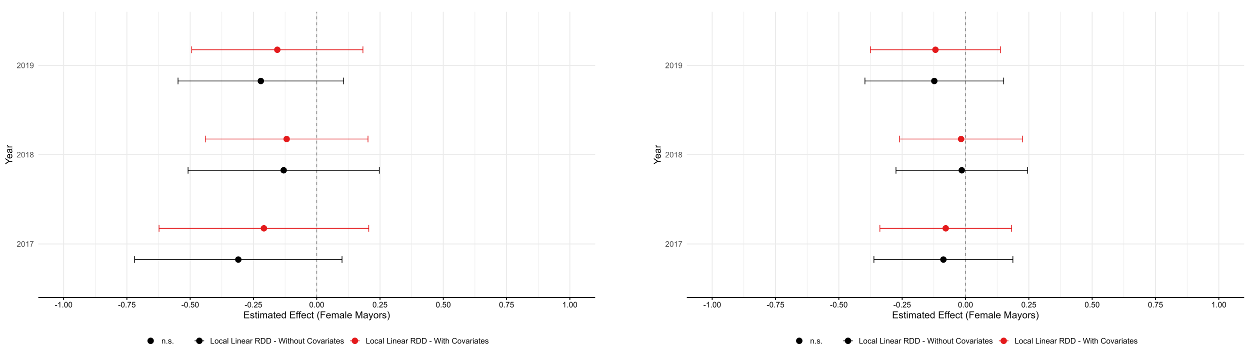


Note: The graphs present binned averages of the proportion of teachers with higher education along the female candidate's margin of victory, with a linear fit estimated separately on each side of the cutoff point. The vertical line indicates the cutoff point ($MV = 0$). The graphs are presented for a symmetric window around the cutoff for illustrative purposes.

In the local linear RDD, the estimated coefficients are negative in all years and at both levels of schooling, suggesting a possible tendency toward slightly smaller classes in municipalities governed by women, but the confidence intervals indicate statistical insignificance.

Figure 10: Impact of Female Leadership on the Number of Students per Class, by Year

(a) Daycare centers (b) Preschools



Note: All estimates use standardized coefficients to allow comparisons across years. Statistical significance is indicated at the 1%, 5%, and 10% levels. The complete table with estimated coefficients, robust standard errors, p-values, confidence intervals, and information on the optimal bandwidth (CCT) is reported in the Appendix.

Although there are no recent studies directly analyzing the relationship between female mayors and reductions in the number of students per class, it is important to recognize that this indicator is a determinant of early childhood education quality. A lower number of children per teacher and, consequently, smaller class sizes have positive effects on children's development (Bowne et al., 2017; Runke Huang, 2025), mainly due to improvements in teacher–student interactions (Vernon-Feagans et al., 2018; Vitiello et al., 2020). In this sense, even if the results do not detect a robust effect of female leadership on the number of students per class, the variable remains relevant: changes in this indicator represent a potential channel for quality improvement, and the absence of impact may indicate structural barriers that do not easily change in the short run.

According to the robustness exercises, municipalities that elected a female mayor recorded, on average, a higher proportion of teachers with higher education in preschools during the three subsequent years of the term. The robustness results also reveal a previously hidden significance: municipalities that elected a female mayor recorded, on average, smaller classes in daycare centers in 2018. Across bandwidth variations, the pattern for the proportion of teachers with higher education is much more unstable, and for the number of students per class, the results are not robust. These robustness tests for the remaining outcomes related to early childhood education quality are reported in the Appendix.

6. Final Remarks

The effects tend to point toward greater access to early childhood education in municipalities governed by women, accompanied by an indication — albeit fragile — of smaller class sizes and gradual improvement in teacher qualifications over the term. These patterns suggest that, even in the absence of robust effects, female mayors may prioritize dimensions associated with expanding service provision, whereas structural changes, such as the composition of the teaching staff, appear to respond more slowly.

The limited robustness of these results should be interpreted in light of the fact that the estimations are based on relatively small samples, determined by the bandwidths of the discontinuity design, which results in high standard errors and limits the statistical power of the tests. However, the width of the confidence intervals themselves prevents us from ruling out moderate-sized effects in these areas, especially for enrollment rates and class size. Thus, although the strict causal evidence is limited, the overall set of results points to plausible directions through which female representation may affect early childhood education management.

In addition, the Brazilian institutional context is characterized by federal regulations, dependence on intergovernmental transfers, and rigidity in personnel management, all of which limit municipalities' capacity to intervene in the short run. Accordingly, the findings suggest that, although female mayors may promote specific advances, broader transformation in early childhood education is also likely to depend on structural factors and sustained policy efforts.

References

Attanasio, O., DiMaro, V., and Vera-Hernández, M. (2012). Community nurseries and the nutritional status of poor children. evidence from colombia. *The Economic Journal*.

Bagues, M. and Campa, P. (2021). Can gender quotas in candidate lists empower women? evidence from a regression discontinuity design. *Journal of Public Economics*, 194:104315.

Baskaran, T. and Hessami, Z. (2019). Competitively elected women as policy makers. CESifo Working Paper Series 8005, CESifo.

Bernal, R. and Fernández, C. (2012). Subsidized childcare and child development in colombia: Effects of hogares comunitarios de bienestar as a function of timing and length of exposure. *Social science medicine (1982)*, 97.

Besley, T., Folke, O., Persson, T., and Rickne, J. (2017). Gender quotas and the crisis of the mediocre man: Theory and evidence from sweden. *American Economic Review*, 107(8):2204–42.

Bhalotra, S. and Clots-Figueras, I. (2014). Health and the political agency of women. *American Economic Journal: Economic Policy*, 6(2):164–97.

Bowne, J., Magnuson, K., Schindler, H., Duncan, G., and Yoshikawa, H. (2017). A meta-analysis of class sizes and ratios in early childhood education programs: Are thresholds of quality associated with greater impacts on cognitive, achievement, and socioemotional outcomes? *Educational Evaluation and Policy Analysis*, 39:407–428.

Brasil. Ministério da Educação. Secretaria de Educação Básica (2009). *Política de educação infantil no Brasil: Relatório de avaliação*. MEC/SEB and Unesco, Brasília.

Calonico, S., Cattaneo, M. D., and Titiunik, R. (2014). Robust nonparametric confidence intervals for regression-discontinuity designs. *Econometrica*, 82(6):2295–2326.

Carozzi, F. and Gago, A. (2023). Who promotes gender-sensitive policies? *Journal of Economic Behavior Organization*, 206:371–405.

Casarico, A., Lattanzio, S., and Profeta, P. (2022). Women and local public finance. *European Journal of Political Economy*, 72:102096.

Chattopadhyay, R. and Duflo, E. (2004). Women as Policy Makers: Evidence from a Randomized Policy Experiment in India. *Econometrica*, 72(5):1409–1443.

Clots-Figueras, I. (2012). Are female leaders good for education? evidence from india. *American Economic Journal: Applied Economics*, 4(1):212–44.

Cruz, M. d. C. M. T., Farah, M. F. S., and Sugiyama, N. B. (2014). Normatizações federais e a oferta de matrículas em creches no brasil. *Estudos em Avaliação Educacional*, 25(59):202–241.

Devercelli, Amanda E.; Beaton-Day, F. (2020). Better jobs and brighter futures: Investing in childcare to build human capital. *World Bank, Washington, DC*.

Drange, N. and Havnes, T. (2018). Early childcare and cognitive development: Evidence from an assignment lottery. *Journal of Labor Economics*, 37.

Duque, D. V. A. (2017). Mulheres prefeitas e educação infantil: uma evidência empírica para os municípios brasileiros.

Falcão, M. A. C. (2019). Lugar de mulher é na política: Impactos da eleição de mulheres prefeitas no brasil. Dissertação (mestrado em economia), Universidade Federal do Rio de Janeiro, Instituto de Economia, Rio de Janeiro. Programa de Pós-Graduação em Economia.

Fernandes, M. (2024). When women run against men: Evidence from political platforms. Job Market Paper.

Funk, P., Gathmann, C., Fumagalli, C., and Pijoan-Mas, J. (2015). Gender gaps in policy making: evidence from direct democracy in switzerland. *Economic Policy*, 30(81):141–181.

Gelman, A. and Imbens, G. (2017). Why high-order polynomials should not be used in regression discontinuity designs. *Journal of Business Economic Statistics*, 37.

Geys, B. and Sørensen, R. (2019). The impact of women above the political glass ceiling: Evidence from a norwegian executive gender quota reform. *Electoral Studies*, 60:102050.

Holman, M. R. (2014). Sex and the city: Female leaders and spending on social welfare programs in u.s. municipalities. *Journal of Urban Affairs*, 36(4):701–715.

Kgobe, F. and Ramoroka, T. (2024). Understanding women's representation and participation in local government planning: a 2000 -2021 south african trend analysis. *International Journal of Research in Business and Social Science (2147-4478)*, 13:354–363.

Malta Campos, M., Füllgraf, J., and Wiggers, V. (2006). Brazilian early childhood education quality: some research results. *Cadernos de Pesquisa*, 36:87–128.

Pande, R. and Ford, D. (2014). Gender quotas and female leadership: A review. Working Papers id:5945, eSocialSciences.

Ramirez, F. O., Soysal, Y. N., and Shanahan, S. (1997). The changing logic of political citizenship: Cross-national acquisition of women's suffrage rights, 1890–1990. *American Sociological Review*, 62(5):735–745.

Runke Huang, H. Z. e. I. S. (2025). Qualidade nas salas de aula da pré-escola chinesa: seus fatores de influência estrutural e associações com o desenvolvimento infantil. *Early Education and Development*, 36:1674 – 1694.

Slegten, C., Geys, B., and Heyndels, B. (2018). Sex differences in budgetary preferences among flemish local politicians. *Acta Politica*, 54.

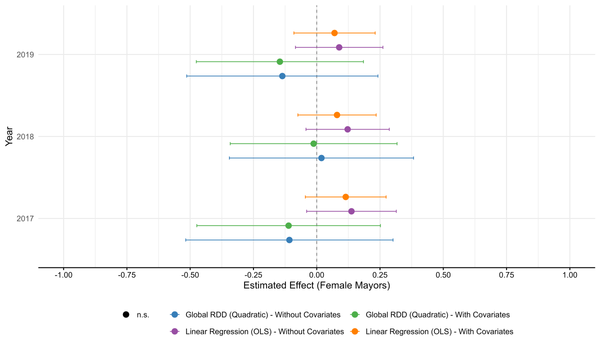
Vernon-Feagans, L., Mokrova, I., Carr, R., Garrett-Peters, P., and Burchinal, M. (2018). Cumulative years of classroom quality from kindergarten to third grade: Prediction to children's third grade literacy skills. *Early Childhood Research Quarterly*, 47.

Vitiello, V., Basuel, N., White, E., Vick Whittaker, J., Ruzek, E., and Pianta, R. (2020). The transition from pre-k to kindergarten: Parent, teacher, and administrator perspectives. *HS Dialog: The Research to Practice Journal for the Early Childhood Field*, 23.

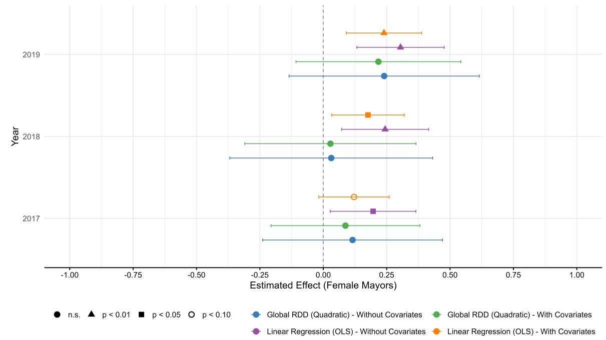
03

Appendix Figures and Tables

Figure A1: Impact of Female Leadership on the Proportion of Teachers with Complete Higher Education, by Year and across Different Specifications



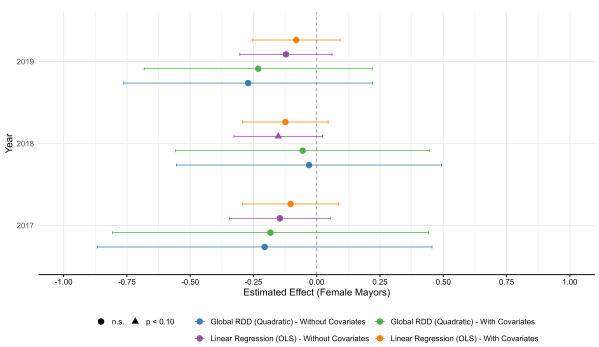
(a) Daycare centers



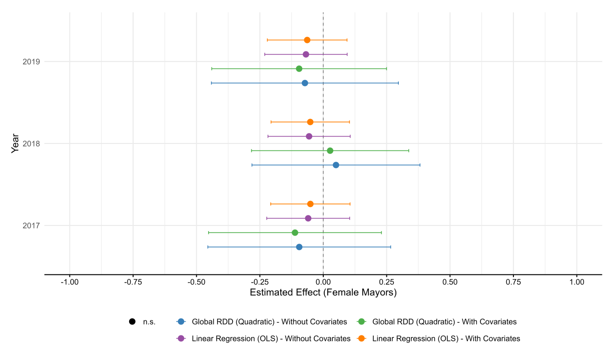
(b) Preschools

Note: All estimates use standardized coefficients to allow comparisons across years. Statistical significance is indicated based on the 1%, 5%, and 10% levels. The complete table with estimated coefficients, robust standard errors, *p*-values, and confidence intervals is reported in the Appendix.

Figure A2: Impact of Female Leadership on the Number of Students per Class, by Year and across Different Specifications



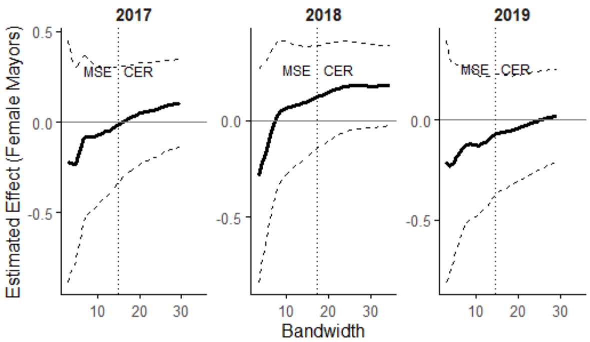
(a) Daycare centers



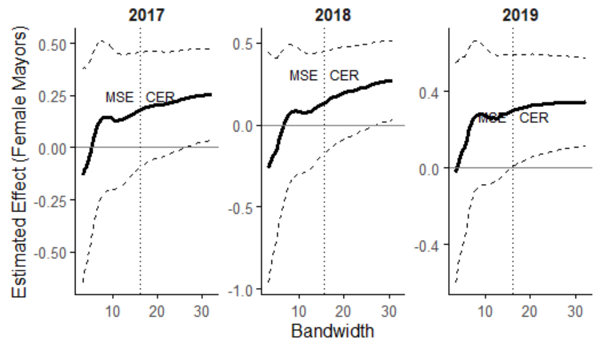
(b) Preschools

Note: All estimates use standardized coefficients to allow comparisons across years. Statistical significance is indicated based on the 1%, 5%, and 10% levels. The complete table with estimated coefficients, robust standard errors, *p*-values, and confidence intervals is reported in the Appendix.

Figure A3: Impact of Female Leadership on the Proportion of Teachers with Complete Higher Education, by Year: Bandwidth Sensitivity Analysis



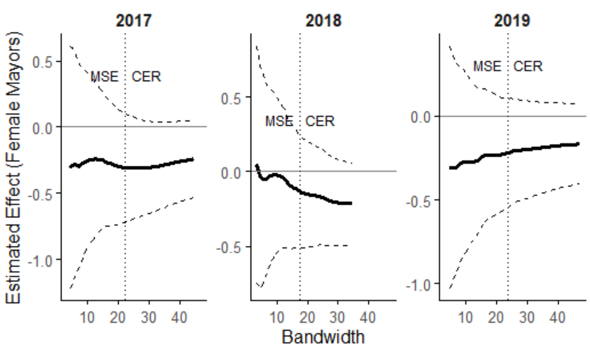
(a) Daycare centers



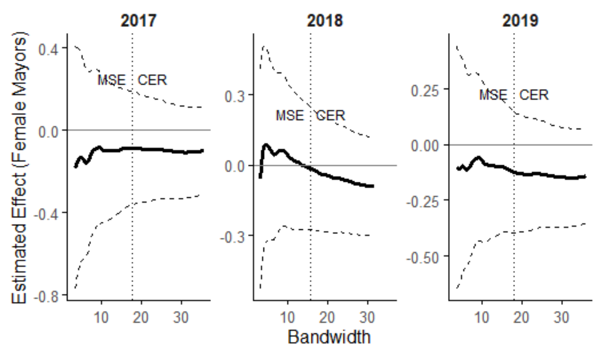
(b) Preschools

Note: The thick black line shows the estimated effect for different bandwidths. The dashed lines correspond to the 90% confidence intervals. The dotted vertical lines indicate the optimal bandwidths selected by the MSE (Mean Squared Error) and CER (Coverage Error Rate) criteria.

Figure A4: Impact of Female Leadership on the Number of Students per Class, by Year: Bandwidth Sensitivity Analysis



(a) Daycare centers



(b) Preschools

Note: The thick black line shows the estimated effect for different bandwidths. The dashed lines correspond to the 90% confidence intervals. The dotted vertical lines indicate the optimal bandwidths selected by the MSE (Mean Squared Error) and CER (Coverage Error Rate) criteria.

Table B1: Effect of Electing Female Mayors on Daycare Enrollment Rates (2017–2019)

Statistic	2017	2018	2019
Local RDD (`rdrobust`, CCT-optimal bandwidth)			
Without covariates			
Estimator / Coef.	0.283**	0.207	0.189
Standard error	0.132	0.132	0.139
Robust p-value	0.032	0.118	0.174
Robust conf. interval	[0.02, 0.54]	[-0.05, 0.47]	[-0.08, 0.46]
CCT-optimal BW	17.73	17.21	17.89
Effective N	805	792	806
With covariates			
Estimator / Coef.	0.189*	0.102	0.085
Standard error	0.114	0.113	0.122
Robust p-value	0.099	0.367	0.487
Robust conf. interval	[-0.04, 0.41]	[-0.12, 0.32]	[-0.15, 0.32]
CCT-optimal BW	15.87	15.48	17.13
Effective N	760	742	791
Global RDD (quadratic polynomial)			
Without covariates			
Estimator / Coef.	0.321**	0.216	0.196
Standard error	(0.159)	(0.159)	(0.161)
Robust p-value	0.043	0.174	0.221
Robust conf. interval	[0.01, 0.63]	[-0.10, 0.53]	[-0.12, 0.51]
CCT-optimal BW	[L: 25.9 | R: 38.4]	[L: 25.4 | R: 37.1]	[L: 30.4 | R: 45.2]
Effective N	540 / 444	534 / 444	566 / 461
With covariates			
Estimator / Coef.	0.221	0.107	0.088
Standard error	(0.140)	(0.133)	(0.143)
Robust p-value	0.113	0.422	0.538
Robust conf. interval	[-0.05, 0.49]	[-0.15, 0.37]	[-0.19, 0.37]
CCT-optimal BW	[L: 23.1 | R: 35.0]	[L: 24.6 | R: 36.9]	[L: 27.3 | R: 40.1]
Effective N	504 / 419	524 / 434	548 / 452
Global linear regression (`lm`)			
Without covariates			
Estimator / Coef.	0.131*	0.105	0.107
Standard error	0.079	0.079	0.078
Robust p-value	0.096	0.186	0.170
Robust conf. interval	[-0.02, 0.29]	[-0.05, 0.26]	[-0.05, 0.26]
CCT-optimal BW	-	-	-
Effective N	-	-	-
With covariates			
Estimator / Coef.	0.079	0.052	0.056
Standard error	0.067	0.067	0.067
Robust p-value	0.241	0.445	0.398
Robust conf. interval	[-0.05, 0.21]	[-0.08, 0.18]	[-0.07, 0.19]
CCT-optimal BW	-	-	-
Effective N	-	-	-

Table B2: Effect of Electing Female Mayors on Preschool Enrollment Rates (2017–2019)

Statistic	2017	2018	2019
Local RDD (`rdrobust`, CCT-optimal bandwidth)			
Without covariates			
Estimator / Coef.	0.252	0.191	0.022
Standard error	0.157	0.139	0.124
Robust p-value	0.108	0.169	0.857
Robust conf. interval	[-0.06, 0.56]	[-0.08, 0.46]	[-0.22, 0.26]
CCT-optimal BW	17.30	16.66	16.42
Effective N	794	781	776
With covariates			
Estimator / Coef.	0.155	0.090	-0.078
Standard error	0.145	0.120	0.109
Robust p-value	0.283	0.452	0.474
Robust conf. interval	[-0.13, 0.44]	[-0.15, 0.33]	[-0.29, 0.14]
CCT-optimal BW	16.77	16.46	17.23
Effective N	783	777	793
Global RDD (quadratic polynomial)			
Without covariates			
Estimator / Coef.	0.285	0.194	0.014
Standard error	(0.187)	(0.165)	(0.139)
Robust p-value	0.128	0.239	0.918
Robust conf. interval	[-0.08, 0.65]	[-0.13, 0.52]	[-0.26, 0.29]
CCT-optimal BW	[L: 26.5 | R: 39.1]	[L: 25.7 | R: 38.1]	[L: 26.7 | R: 42.9]
Effective N	544 / 448	539 / 444	545 / 448
With covariates			
Estimator / Coef.	0.183	0.083	-0.088
Standard error	(0.173)	(0.137)	(0.123)
Robust p-value	0.290	0.542	0.474
Robust conf. interval	[-0.16, 0.52]	[-0.18, 0.35]	[-0.33, 0.15]
CCT-optimal BW	[L: 25.5 | R: 36.8]	[L: 29.1 | R: 44.5]	[L: 28.9 | R: 46.0]
Effective N	538 / 444	555 / 458	555 / 458
Global linear regression (`lm`)			
Without covariates			
Estimator / Coef.	0.181**	0.182**	0.093
Standard error	0.086	0.082	0.082
Robust p-value	0.036	0.026	0.258
Robust conf. interval	[0.01, 0.35]	[0.02, 0.34]	[-0.07, 0.25]
CCT-optimal BW	-	-	-
Effective N	-	-	-
With covariates			
Estimator / Coef.	0.128*	0.121*	0.036
Standard error	0.077	0.070	0.072
Robust p-value	0.095	0.084	0.614
Robust conf. interval	[-0.02, 0.28]	[-0.02, 0.26]	[-0.10, 0.18]
CCT-optimal BW	-	-	-
Effective N	-	-	-

Table B3: Effect of Electing Female Mayors on the Proportion of Teachers with Higher Education in Daycare Centers (2017–2019)

Statistic	2017	2018	2019
Local RDD (`rdrobust`, CCT-optimal bandwidth)			
Without covariates			
Estimator / Coef.	-0.013	0.125	-0.073
Standard error	0.164	0.136	0.154
Robust p-value	0.934	0.359	0.635
Robust conf. interval	[-0.33, 0.31]	[-0.14, 0.39]	[-0.38, 0.23]
CCT-optimal BW	14.85	17.33	14.67
Effective N	648	794	660
With covariates			
Estimator / Coef.	-0.053	0.081	-0.117
Standard error	0.131	0.116	0.133
Robust p-value	0.684	0.487	0.381
Robust conf. interval	[-0.31, 0.20]	[-0.15, 0.31]	[-0.38, 0.14]
CCT-optimal BW	18.32	20.79	16.75
Effective N	735	872	729
Global RDD (quadratic polynomial)			
Without covariates			
Estimator / Coef.	-0.108	0.019	-0.136
Standard error	(0.209)	(0.186)	(0.193)
Robust p-value	0.605	0.920	0.481
Robust conf. interval	[-0.52, 0.30]	[-0.35, 0.38]	[-0.51, 0.24]
CCT-optimal BW	[L: 20.0 | R: 28.5]	[L: 19.7 | R: 31.0]	[L: 20.1 | R: 28.9]
Effective N	416 / 352	457 / 394	429 / 367
With covariates			
Estimator / Coef.	-0.111	-0.012	-0.146
Standard error	(0.185)	(0.168)	(0.168)
Robust p-value	0.548	0.942	0.387
Robust conf. interval	[-0.47, 0.25]	[-0.34, 0.32]	[-0.48, 0.18]
CCT-optimal BW	[L: 20.6 | R: 28.7]	[L: 20.4 | R: 31.5]	[L: 23.5 | R: 34.4]
Effective N	423 / 355	465 / 399	476 / 390
Global linear regression (`lm`)			
Without covariates			
Estimator / Coef.	0.137	0.122	0.089
Standard error	0.090	0.084	0.088
Robust p-value	0.129	0.146	0.315
Robust conf. interval	[-0.04, 0.31]	[-0.04, 0.29]	[-0.08, 0.26]
CCT-optimal BW	-	-	-
Effective N	-	-	-
With covariates			
Estimator / Coef.	0.115	0.080	0.070
Standard error	0.081	0.079	0.082
Robust p-value	0.160	0.310	0.391
Robust conf. interval	[-0.05, 0.27]	[-0.07, 0.23]	[-0.09, 0.23]
CCT-optimal BW	-	-	-
Effective N	-	-	-

Table B4: Effect of Electing Female Mayors on the Proportion of Teachers with Higher Education in Preschools (2017–2019)

Statistic	2017	2018	2019
Local RDD (`rdrobust`, CCT-optimal bandwidth)			
Without covariates			
Estimator / Coef.	0.180	0.135	0.299**
Standard error	0.141	0.160	0.149
Robust p-value	0.201	0.401	0.045
Robust conf. interval	[-0.10, 0.46]	[-0.18, 0.45]	[0.01, 0.59]
CCT-optimal BW	16.06	15.44	16.17
Effective N	759	741	769
With covariates			
Estimator / Coef.	0.090	0.096	0.217*
Standard error	0.110	0.121	0.129
Robust p-value	0.416	0.430	0.092
Robust conf. interval	[-0.13, 0.31]	[-0.14, 0.33]	[-0.04, 0.47]
CCT-optimal BW	19.07	20.91	17.28
Effective N	828	875	791
Global RDD (quadratic polynomial)			
Without covariates			
Estimator / Coef.	0.116	0.031	0.240
Standard error	(0.181)	(0.204)	(0.191)
Robust p-value	0.523	0.877	0.210
Robust conf. interval	[-0.24, 0.47]	[-0.37, 0.43]	[-0.14, 0.62]
CCT-optimal BW	[L: 20.5 | R: 30.6]	[L: 20.8 | R: 31.1]	[L: 20.8 | R: 31.3]
Effective N	462 / 395	472 / 401	473 / 399
With covariates			
Estimator / Coef.	0.087	0.028	0.218
Standard error	(0.150)	(0.172)	(0.166)
Robust p-value	0.559	0.870	0.190
Robust conf. interval	[-0.21, 0.38]	[-0.31, 0.37]	[-0.11, 0.54]
CCT-optimal BW	[L: 22.1 | R: 32.0]	[L: 22.5 | R: 32.2]	[L: 23.2 | R: 33.4]
Effective N	492 / 408	498 / 415	505 / 417
Global linear regression (`lm`)			
Without covariates			
Estimator / Coef.	0.197**	0.244***	0.305***
Standard error	0.086	0.088	0.088
Robust p-value	0.023	0.005	0.001
Robust conf. interval	[0.03, 0.37]	[0.07, 0.42]	[0.13, 0.48]
CCT-optimal BW	-	-	-
Effective N	-	-	-
With covariates			
Estimator / Coef.	0.121*	0.176**	0.239***
Standard error	0.071	0.073	0.076
Robust p-value	0.087	0.016	0.002
Robust conf. interval	[-0.02, 0.26]	[0.03, 0.32]	[0.09, 0.39]
CCT-optimal BW	-	-	-
Effective N	-	-	-

Table B5: Effect of Electing Female Mayors on the Number of Students per Class in Daycare Centers (2017–2019)

Statistic	2017	2018	2019
Local RDD (`rdrobust`, CCT-optimal bandwidth)			
Without covariates			
Estimator / Coef.	-0.310	-0.131	-0.221
Standard error	0.209	0.193	0.167
Robust p-value	0.138	0.498	0.186
Robust conf. interval	[-0.72, 0.10]	[-0.51, 0.25]	[-0.55, 0.11]
CCT-optimal BW	22.34	17.43	23.53
Effective N	863	797	900
With covariates			
Estimator / Coef.	-0.209	-0.119	-0.156
Standard error	0.211	0.164	0.173
Robust p-value	0.323	0.469	0.367
Robust conf. interval	[-0.62, 0.21]	[-0.44, 0.20]	[-0.49, 0.18]
CCT-optimal BW	19.66	22.60	19.82
Effective N	807	914	824
Global RDD (quadratic polynomial)			
Without covariates			
Estimator / Coef.	-0.206	-0.030	-0.271
Standard error	(0.337)	(0.267)	(0.251)
Robust p-value	0.542	0.910	0.280
Robust conf. interval	[-0.87, 0.46]	[-0.55, 0.49]	[-0.76, 0.22]
CCT-optimal BW	[L: 21.2 | R: 28.4]	[L: 21.4 | R: 29.2]	[L: 24.3 | R: 33.5]
Effective N	458 / 377	484 / 406	501 / 413
With covariates			
Estimator / Coef.	-0.183	-0.056	-0.231
Standard error	(0.319)	(0.256)	(0.230)
Robust p-value	0.566	0.828	0.315
Robust conf. interval	[-0.81, 0.44]	[-0.56, 0.45]	[-0.68, 0.22]
CCT-optimal BW	[L: 20.8 | R: 27.9]	[L: 21.4 | R: 29.3]	[L: 25.7 | R: 36.3]
Effective N	453 / 375	484 / 406	520 / 427
Global linear regression (`lm`)			
Without covariates			
Estimator / Coef.	-0.146	-0.152*	-0.122
Standard error	0.102	0.089	0.093
Robust p-value	0.152	0.089	0.190
Robust conf. interval	[-0.34, 0.05]	[-0.33, 0.02]	[-0.30, 0.06]
CCT-optimal BW	-	-	-
Effective N	-	-	-
With covariates			
Estimator / Coef.	-0.103	-0.124	-0.081
Standard error	0.097	0.086	0.089
Robust p-value	0.288	0.152	0.360
Robust conf. interval	[-0.29, 0.09]	[-0.29, 0.05]	[-0.26, 0.09]
CCT-optimal BW	-	-	-
Effective N	-	-	-

Table B6: Effect of Electing Female Mayors on the Number of Students per Class in Preschools (2017–2019)

Statistic	2017	2018	2019
Local RDD (`rdrobust`, CCT-optimal bandwidth)			
Without covariates			
Estimator / Coef.	-0.087	-0.015	-0.123
Standard error	0.140	0.133	0.140
Robust p-value	0.533	0.912	0.378
Robust conf. interval	[-0.36, 0.19]	[-0.27, 0.24]	[-0.40, 0.15]
CCT-optimal BW	17.84	15.82	17.90
Effective N	806	756	806
With covariates			
Estimator / Coef.	-0.078	-0.017	-0.119
Standard error	0.133	0.124	0.131
Robust p-value	0.556	0.888	0.365
Robust conf. interval	[-0.34, 0.18]	[-0.26, 0.23]	[-0.38, 0.14]
CCT-optimal BW	17.68	15.53	17.58
Effective N	805	744	801
Global RDD (quadratic polynomial)			
Without covariates			
Estimator / Coef.	-0.095	0.050	-0.072
Standard error	(0.184)	(0.169)	(0.188)
Robust p-value	0.607	0.767	0.701
Robust conf. interval	[-0.46, 0.27]	[-0.28, 0.38]	[-0.44, 0.30]
CCT-optimal BW	[L: 22.7 | R: 32.3]	[L: 19.7 | R: 29.4]	[L: 21.3 | R: 30.4]
Effective N	500 / 415	456 / 393	480 / 405
With covariates			
Estimator / Coef.	-0.112	0.027	-0.095
Standard error	(0.174)	(0.158)	(0.176)
Robust p-value	0.522	0.865	0.589
Robust conf. interval	[-0.45, 0.23]	[-0.28, 0.34]	[-0.44, 0.25]
CCT-optimal BW	[L: 23.1 | R: 33.4]	[L: 20.0 | R: 29.5]	[L: 21.3 | R: 30.7]
Effective N	504 / 418	460 / 396	479 / 404
Global linear regression (`lm`)			
Without covariates			
Estimator / Coef.	-0.059	-0.056	-0.068
Standard error	0.083	0.083	0.083
Robust p-value	0.476	0.499	0.410
Robust conf. interval	[-0.22, 0.10]	[-0.22, 0.11]	[-0.23, 0.09]
CCT-optimal BW	-	-	-
Effective N	-	-	-
With covariates			
Estimator / Coef.	-0.051	-0.051	-0.063
Standard error	0.080	0.079	0.080
Robust p-value	0.524	0.516	0.429
Robust conf. interval	[-0.21, 0.11]	[-0.21, 0.10]	[-0.22, 0.09]
CCT-optimal BW	-	-	-
Effective N	-	-	-