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Women's Leadership During the COVID-19 Crisis

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Keywords: Gender, Politics, Health, COVID-19, Brazil

JEL Codes: J16, D72, D78, I18

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Abstract

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1 Introduction

It is well established in the literature that political leadership plays a crucial role in shaping social and economic outcomes (Jones and Olken, 2005; Yao and Zhang, 2015). During the COVID-19 pandemic, the response of leaders around the globe in dealing with the crisis varied remarkably (Piscopo, 2020). Moreover, this global health crisis has been particularly intense and persistent in developing countries such as Brazil, Mexico, and India, where national leaders dismissed the severity of the pandemic and failed to enforce measures to contain the spread of the virus. These trying times also brought to media's attention the fact that countries under the leadership of women performed far better than those led by men, as the results obtained by New Zealand, Germany, Taiwan and Bangladesh illustrate (Taub, 2020; Henley, 2020).

While several studies have documented that female empowerment improves social and economic outcomes, the role of female leadership in tackling global policy issues is not yet well understood (Hessami and da Fonseca, 2020). Moreover, to our knowledge, little is known about the role of women as policymakers in times of crisis. Despite the recent effort of numerous scholars, studies comparing COVID-19 responses in countries ruled by women and men have come to inconclusive results (e.g., Garikipati and Kambhampati, 2021; Piscopo, 2020). Using Brazil as a laboratory, this paper studies if municipalities led by women were less affected by the COVID-19 outbreak in 2020. In particular, we address and answer the following questions: Did municipalities governed by women have fewer deaths and hospitalizations due to COVID-19? Did female leaders respond differently to the crisis? If so, which policies they adopted that municipalities ruled by men did not? In which municipalities the importance of women as policymakers during a health crisis was magnified?

Identifying the effects of female leaders on policy outcomes is challenging because of municipality-specific factors that are related both to the presence of female leaders and the outcomes. To avoid biases caused by these factors, we implement a Regression Discontinuity (RD) design focusing on mixed-gender races. This method allows us to identify the effect of electing a female mayor on COVID-19 outcomes by comparing municipalities where a female candidate won against a male one by a narrow margin with the ones where the opposite occurred. To provide complementary evidence on our findings we estimate the effect of electing a female mayor using a dynamic local difference-in-difference approach using quarterly data and compare hospitalizations and deaths caused by Severe Acute Respiratory Infection (SARI) in municipalities with male and female mayors relatively to the figures before the COVID-19 outbreak.

We find that the presence of a female leader in Brazilian Municipalities had a negative, sizable, and significant impact on the number of COVID-19 deaths and hospitalizations per 100 thousand inhabitants. Our results show that electing a woman as a mayor causes a decrease from 46.9 to 51.0 COVID-19 hospitalizations per 100 thousand inhabitants, which represents 30.4 to 33.0 percent of the outcome average among the municipalities that elected a man. Similarly, we document a drop of 21.7 to 25.5 COVID-19 deaths per 100 thousand inhabitants decreases in municipalities that elected a woman, around 37.2 to 43.7 percent of the outcome average among the municipalities that elected a man. We also show that electing a female mayor causes a statistically significant in the number of non-pharmaceutical interventions (NPIs) enforced in the municipality in 2020. In particular, we show that female leaders are more likely to adopt mandatory use of face masks and forbid gatherings. In contrast, we do not find evidence that women increase investment in health care neither before nor after the pandemic outbreak. Finally, we show that these effects are stronger in municipalities where voters are more supportive of Brazilian President Jair Bolsonaro, who openly disavowed vaccines and NPIs during the pandemic. This finding exemplifies the role local leaders can play in counteracting bad policies implemented by populist leaders at the national level.

We perform a series of robustness checks. First, we document very similar point estimates using SARI deaths and hospitalizations as dependent variables, which are less likely to suffer from non-classical measurement error caused by strategic under reporting since they do not depend on a positive COVID-19 test for a diagnosis. Second, our point estimates are very similar using linear and quadratic RD polynomials and different bandwidths. Third, our estimates using a local difference-in-difference comparing changes in SARI outcomes before and after the pandemic outbreak in municipalities with males and females mayors provide qualitatively similar results.

Brazil is the ideal setting to understand the role of female leadership during the pandemic for several reasons. First, Brazil was severely hit by the first wave of COVID-19, with considerable variation in deaths and hospitalizations across municipalities (Souza et al., 2020). Second, Brazilian municipalities enjoy considerable autonomy to adopt policies. Finally, Brazil hosts many competitive local elections, providing statistical power to compare outcomes in mixed-gender close races, as previous works have successfully done.[1]

One possible concern is that mayors' characteristics that are relevant for policymaking could be driving our results (Alesina et al., 2019). In particular, the fact that female mayors tend to be more educated in Brazilian municipalities could be an issue (Arvate et al., 2017). We show that, in fact, there is a small and non-robust unbalance in both years of education and ideological preferences between female and male leaders. In order to verify if these characteristics are driving our results, we show that our findings do not change after accounting for them in our regressions. This suggests that the difference we document is likely driven by differences in non-observable traits between female and male leaders. We discuss some possible mechanisms in the results section.

Our paper contributes to several strands of the literature. First, we add to the extensive research investigating the role of women as policymakers. Previous work documented how female leadership decreases corruption and improves policy and economic outcomes in developing countries, but does not affect these outcomes in developed nations.[2] Closely related to

[1] As state capitals and municipalities with more than 200 thousand inhabitants may hold runoff elections, we exclude them from our estimating sample to ensure that our running variable determines the gender of the mayor and use a sharp RD design.

[2] Afridi et al. (2017) show that female mayors are less likely to be involved in corruption in India, and Decarolis et al. (2021) show that bureaucratic corruption is less intense among women in Italy and China. Chattopadhyay and Duflo (2004), Clots-Figueras (2011), Clots-Figueras (2012), Bhalotra and Clots-Figueras (2014), and Baskaran and Hessami (2018) show that female leadership improves policy outcomes in India. In contrast, Bagues and Campa (2021), Gago and Carozzi (2021), Casarico et al. (2021), and Ferreira and Gyourko (2014) show that female leadership has no impact on outcomes in Spain, Italy, and United States.

our work, Brollo and Troiano (2016) document that female mayors lead to better prenatal care delivery and are less likely to engage in corruption, and Barbosa (2017) finds that electing a woman as a mayor does not affect educational outcomes.

To the best of our knowledge, the role of women as policymakers in times of crisis and the political factors that magnify their influence on policy outcomes are not well understood so far. We make three contributions to this literature. First, we provide evidence that electing a female mayor improved health outcomes during a pandemic, showing that female leaders fared better than male ones in dealing with a major global issue. Second, we shed light on the conditions under which female leaders make a difference by showing that they improved outcomes during the pandemic in a context where they had limited influence on health outcomes before the health crisis. Third, we show that the benefits of female leadership are stronger where voters are more aligned with a populist president that denies the severity of the crisis, showing that female empowerment at the local level can counteract bad policies at the national level.

Our findings directly contribute to recent studies analyzing how female leadership affects policies related to COVID-19 and the pandemic severity, which documented mixed results. Piscopo (2020), Aldrich and Lotito (2020) and Windsor et al. (2020) find that countries led by women had similar COVID-19 mortality than those led by men. Abras et al. (2021) document a negative association between COVID-19 outcomes and female leadership attributed to differences in health systems where women rule, not their leadership. In contrast, Garikipati and Kambhampati (2021) show that countries led by women had better results than those led by men and attributes such differences to earlier adoption to NPIs by female leaders. Using across state-level data from the US, Sergent and Stajkovic (2020) show that states led by women had fewer COVID-19 deaths and earlier stay-at-home-orders. We complement this literature by estimating the impacts of female leadership on COVID-19 epidemiological outcomes using within-country data and a method with high internal validity, thus providing credible evidence on how women outshone men as leaders during the pandemic.

Our findings are also related to the literature investigating the broad consequences of female enfranchisement. Evidence from the US context shows that extending the franchise to women increased per capita government spending and decreased infant and maternal mortality (Lott and Kenny, 1999; Miller, 2008; Bhalotra et al., 2020). We complement this literature by showing that the importance of women's descriptive representation becomes especially relevant during a health crisis.

Finally, our paper adds to the literature investigating how attitudes of populist leaders such as Jair Bolsonaro (Brazil) and Donald Trump (United States) affect how citizens deal with the pandemic (Rafkin et al., 2021; Ajzenman et al., 2020; Mariani et al., 2020). By showing that female mayors decreased COVID-19 deaths and hospitalizations more intensively in municipalities where Bolsonaro had more support from voters, we emphasize the role local leaders with distinct policy preferences can play in countering bad policies at the national level.

The decrease in the mortality rates caused by the election of female mayors according to our most conservative estimates has a very large magnitude from a public policy perspective, as it corresponds to the average yearly homicide rate experienced by the municipalities in our sample between 2013 and 2016. If we extrapolate our more conservative estimates on the effect of female leadership on all Brazilian municipalities, one can quantify considerable economic benefits from increasing female representation. Back-of-the-envelope calculations suggest that, all else equal, if Brazil had half of its municipalities led by women, the COVID-19 death toll would have been 14.17% lower, saving around 75 thousand lives. Hence, policies that increase female representation in politics, such as gender quotas on candidates' lists, generate a double-dividend in moments of crisis: increasing welfare while promoting diversity.[3]

The remaining of this paper is organized as follows. Section 2 describes the institutional setting. Section 3 present our data sources and our research design. Section 4 presents our results and Section 5 concludes.

2 Background

In 2018, Brazil elected as president Jair Bolsonaro, a far-right politician. With an authoritarian leadership style, he has emphasized conservative family values and a strong economy during his administration (Barberia and Gómez, 2020). After the COVID-19 outbreak, Bolsonaro's presidency was marked by the reckless way it dealt with the crisis. The Brazilian federal government refused to follow international recommendations for the adoption of NPIs, declined to establish social distancing measures and to promote the use of facial coverage (Ferigato et al., 2020). He repeatedly criticized governors and mayors for closing businesses, and proposed restricting social isolation measures to the elderly (Economist, 2020b). He also attended large political gatherings (Marcelino and Slattery, 2020) and publicly undermined science several times during the pandemic, calling COVID-19 "just a sniffle" (Economist, 2020a), advocating the use of unproven drugs such as Hydroxychloroquine (Londoño and Simões, 2020) and, more recently, doubting vaccines' safety (Daniels, 2021).

Given the inadequate policy responses to the COVID-19 outbreak, Brazil has become one of the hot spots of the pandemic. By January of 2021, the country registered over 200 thousand deaths by COVID-19, equivalent to more than 10% of global deaths in a country with less than 3% of the worldwide population (Castro et al., 2021). This is reflected in one the highest mortality rates on the planet, which becomes even more salient after controlling for its population's gender and age composition (Hecksher, 2020). In response to the pressing needs of states and municipalities to enforce NPIs to control the severity of the pandemic, the Brazilian Federal Supreme Court, in April 2020, decided that the federal government could not unilaterally dismiss decisions adopted by local governments to fight the pandemic (Supremo Tribunal Federal, 2020). This provided local governments with both the legal autonomy and policy instruments to mitigate the spread of the disease, mostly through Brazil's Unified Health System - *Sistema Único de Saúde (SUS)*.

Since the 1988 Brazilian Constitution establishes free health care as a right, SUS targets free universal health coverage, which contrasts with the health systems of most developing countries (Bhalotra et al., 2019). The majority of the population rely on it for medical treatment, as only 28% of the Brazilians have private health insurance (IBGE, 2019). Mayors play an

[3] See Baltrunaite et al. (2019), Bhalotra et al. (2020), and Bagues and Campa (2021) for examples of policies that increase female representation in politics.

essential role in health policy, managing 20% of the SUS resources (Andrade and Lisboa, 2002). Municipalities usually administrate smaller public health units that complement the supply of services in larger state and federal hospitals. These small units are a relevant supplier of health services in Brazil, as more than 60% of the population use their services (Castro et al., 2019). Moreover, in line with the active role of mayors, health is usually a salient policy issue for voters during municipal elections (Boas et al., 2019).

3 Data and Empirical Strategy

3.1 Data

Epidemiological outcomes: Our main epidemiological outcomes comes from from the SIVEP-Gripe system, managed by Brazil's Ministry of Health - *Ministério da Saúde* (MS). We combine information from this dataset with census population accounts from Brazil's National Bureau of Statistics - *Instituto Brasileiro de Geografia e Estatística (IBGE)* - to compute the number of COVID-19 deaths and hospitalizations per 100 inhabitants at the municipality level, as it is standard in the epidemiology literature.

Policy outcomes: To construct our policy outcomes we use data from three distinct sources. First, we compute health care spending per capita by combining budgetary information from the SICONFI (Brazilian Public Sector Accounting and Tax Information System) managed by Brazil's National Treasury (STN) with IBGE's population accounts. Second, we compute the number of hospital beds and ICUs hospital beds per 100 thousand inhabitants combining data from MS's National Register of Health Establishments (CNES) with IBGE's population accounts. Finally, we use data that allows us to identify whether mayors adopted NPIs during the year of 2020, such as restricting entry in the municipality, limits on social gatherings, closure of non-essential businesses, compulsory use of masks, and reduced public transportation services. This information was obtained through a partnership between the research team from de Souza Santos et al. (2021) and Brazil's National Confederation of Municipalities. Between May and July, 2020, 72.3% of 5,568 mayors and the Federal District's government were surveyed via phone calls on local NPI policies related to the pandemic. More information on the methodology is available on de Souza Santos et al. (2021).

Baseline characteristics: To complement our analysis we obtained data on baseline characteristics from several sources. First, we use information from IBGE's MUNIC and MS's CNES to compute a set of policy and communication-related control variables at the municipality level before the 2016 election. Second, we compute a series of socioeconomic and demographic controls at the municipality level using the IBGE's census data. Third, using data about candidates' characteristics and vote shares from Brazil's Electoral Court, we compute mayor-level controls such as years of education, age and whether or not the candidate is a health sector worker. Finally, using Power and Rodrigues-Silveira (2019)'s party-level index from the 2016 election, we calculate the municipal ideological score.

Tables A1 and A2 in the appendix present the sources and describe our outcome and control variables respectively. Tables A3 and A4, in turn, present summary statistics for outcome and control variables divided into control and treatment municipalities.

3.2 Regression Discontinuity

Identifying the impact of a policymaker's gender on health outcomes and policy decisions is a challenging task. By simply comparing municipalities with mayors of different genders, we are likely to incur in endogeneity issues since our outcome variables might be correlated with variables that could also influence the mayor's gender, such as demographic features, political preferences, and attitudes towards women.

In order to measure the causal impact of having a female mayor on health outcomes and NPIs we rely on a sharp regression discontinuity (RD) strategy with the following specification:

$$y_{ms} = \alpha + \beta FemaleMayor_{ms} + f(FemaleVoteMargin_{ms}) + \gamma_s + \epsilon_{ms}, \quad (1)$$

where m denotes a municipality and s denotes a state. $FemaleVoteMargin_{ms}$ is the margin of victory of the winner female mayor candidate in the previous mixed-gender electoral race. $FemaleVoteMargin_{ms}$ will have positive values if the winner of the mixed-gender election was a female candidate and the second place was a male candidate, and negative values if the opposite takes place. The independent variable $FemaleMayor_{ms}$ is an indicator which takes value 1 if our running variable $FemaleVoteMargin_{ms} \geq 0$ and zero otherwise. Finally, γ_s is a state fixed-effects term.[4] We estimate our equation assuming that $f(.)$ is a flexible polynomial on both sides of the threshold. Following Gelman and Imbens (2019) we estimate only first and second-degree polynomials for the optimal bandwidth calculated using the non-parametric procedure from Calonico et al. (2014). Our coefficient of interest β measures the effect of having a female mayor on the outcome y_{ms}.

We choose a specification with state fixed-effects as our main one for several reasons. First, since treatment and control municipalities have similar frequency across states, we can increase the efficiency of our estimates without biasing them when adding fixed-effects (Calonico et al., 2019). Second, as governors have the autonomy to enforce NPIs in Brazil, we estimate our coefficients by comparing municipalities subject to the same state-level regulation. Third, as Brazil is a large continental country, we decrease the chance of comparing municipalities where the first and second COVID-19 waves started before and after the end of 2020.

3.3 Validity of the RD design

In order to interpret β as causal we must satisfy two conditions: (i) our treatment does not affect baseline covariates and (ii) there is no manipulation of the running variable around the cutoff. The first condition is equivalent to saying that our sample must be balanced for treated

[4]The fixed-effect term is added following the recommended approach in Calonico et al. (2019).

and untreated units in pre-determined municipality-specific characteristics. In Figure A1 we present the t-statistics and the standardized values of β in Equation 1 using our baseline covariates as dependent variables.[5] We find that all our baseline characteristics are balanced. Detailed results are presented in Table A5 in the appendix.

We also show in Figure A2 that our running variable, $FemaleVoteMargin_{ms}$, does not present any bunching near the threshold. This is verified using a McCrary test which yields a p-value of 0.30 and, therefore, fails to reject the null of no sorting in our running variable.[6]

3.4 Local Difference-in-Differences

To provide additional evidence we estimate the effect of electing a female mayor on health outcomes using a dynamic local difference-in-difference approach using quarterly data.[7] We compare SARI outcomes in municipalities with male or female mayors to the figures in the first quarter of 2020, the last quarter before the COVID-19 outbreak. Comparing SARI outcomes is important in order to rule out strategic under reporting, since they do not depend on a positive COVID-19 test for a diagnosis. They also allow us to monitor the pattern of hospitalizations and infections over time, since these numbers are available for multiple years.

Our estimating sample comprises of municipalities near the discontinuity before and after the pandemic outbreak in the first quarter of 2020. The neighborhood near the cutoff is given by the optimal bandwidth obtained in our RD estimations, in order to assure that treatment and control groups are comparable. Formally, we estimate the following regression model:

$$y_{mst} = \sum_{k \neq 2020.1} \beta_k \cdot FemaleMayor_{ms} + f_t(FemaleVoteMargin_{ms}) + \theta_{ms} + \lambda_{st} + \epsilon_{mst} \quad (2)$$

where θ_{ms} captures municipality fixed-effects and λ_{st} captures state-year-quarter fixed effects. To mirror our baseline RD specification in a dynamic setting, we control for $f_t(FemaleVoteMargin_{ms})$, a year-quarter specific polynomial in the vote-share of female candidates with parameters that vary flexibly for each municipality.

4 Results

In this section we discuss our main results and provide evidence that municipalities that elected female mayors in the 2016 election faced a less severe first wave of the pandemic in 2020. We also provide evidence that the adoption of specific policies can ex-plain these findings.

[5]Standardized coefficients are defined by $\tilde{\beta} = \frac{\beta}{\sigma_{covariate_{ms}}}$, where $\sigma_{covariate_{ms}}$ is the standard deviation of each covariate in the graph within the optimal bandwidth range.

[6]See McCrary (2008).

[7]See Leuven et al. (2007), Colonnelli et al. (2020) and Daniele and Giommoni (2021) for similar strategies.

COVID-19 deaths and hospitalizations. The first and second columns of Panel A in Table 1 report the RD estimates on, respectively, the number of COVID-19 deaths and hospitalizations per 100 thousand inhabitants using a linear polynomial. The third and fourth columns report the estimates on SARI deaths and SARI hospitalizations, respectively. Panel B repeats the structure of Panel A but using a quadratic polynomial.

In the first column we show that municipalities that elected a female mayor experienced 25.52 fewer deaths per 100 thousand inhabitants, an impact that is significant at 1% confidence levels. This corresponds to 43.7 percent of the outcome average among municipalities that elected a male mayor, according to the values in Table A3. In the second column of Panel A, we find a significant difference of 46.95 fewer hospitalizations per 100 thousand inhabitants, which accounts for 30.4 percent of the outcome average among the control municipalities. In the third and fourth columns we estimate the difference in SARI deaths and hospitalizations and document a difference of 19.90 fewer deaths and 48.05 fewer hospitalizations per 100 thousand inhabitants. These differences account for 24.65 percent of the average SARI deaths and 18.47 percent of the average SARI hospitalizations among the control municipalities. In Panel B, we report similar results using a quadratic polynomial specification.

Figure 1 shows graphically the effects described above. In subfigure (a) we present the RD plot for the impact of female mayors on COVID-19 deaths, displaying a negative difference between the linear fit lines in both sides of the threshold. The same pattern, displaying the point estimates found in Panel A of 1, can be seen in subfigures (b), (c) and (d) for, respectively, SARI deaths, COVID-19 hospitalizations and SARI hospitalizations per 100 thousand inhabitants. These effects are robust to different bandwidth lengths, including the CER and MSE optimal bandwidths from Calonico et al. (2014), as we show in Figure A3 in the Appendix.

To rule out the possibility that our results are caused by chance rather than an underlying causal relationship, we reproduce our estimates for different values of the threshold for the victory margin in Figure A4 in the Appendix. If the effect we estimate is indeed related to the presence of a female mayor, we expect to find a negative and significant coefficient only at the true threshold. This is exactly what the figures show: the largest and most precisely coefficients are at the true threshold.

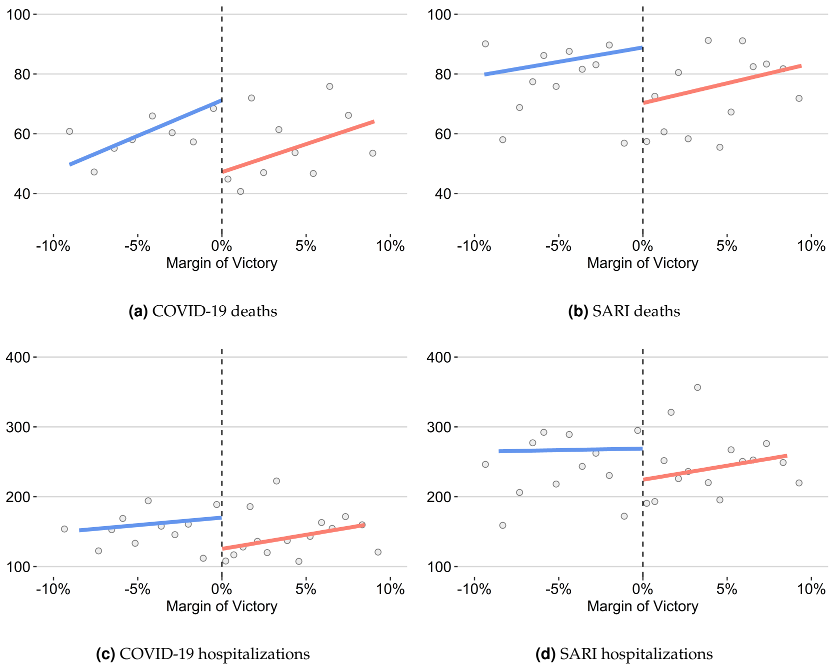
If we take the quotient between our treatment effects on COVID-19 hospitalization and deaths per 100 thousand inhabitants, they imply COVID-19 fatality rates of 50%, which overestimates the actual COVID-19 fatality rates by a considerable amount but are in line with the estimates of 40% documented by the medical literature (de Souza et al., 2021). Such high COVID-19 fatality rates are not surprising in the SIVEP-Gripe data for two reasons. First, our death numbers account for both hospitalized and non-hospitalized patients. Second, in contrast to death figures, our hospitalization numbers account only for patients with a positive COVID-19 test, which likely underestimates the actual case base because of asymptomatic cases and low testing rates in Brazil (Hasell et al., 2020).

Table 1: Impact of female leadership on COVID-19 deaths and cases - RD estimates

	COVID-19 deaths per 100k pop.	COVID-19 hospitalizations per 100k pop.	SARI deaths per 100k pop.	SARI hospitalizations per 100k pop.
Panel A: Linear specification				
RD Estimator	-25.526	-46.9558	-19.9059	-48.0531
Robust p-value	0.0014***	0.015**	0.032**	0.08*
Robust conf. int.	[-41.1545, -9.8975]	[-84.6665, -9.2452]	[-38.1193, -1.6925]	[-101.7278, 5.6216]
CCT-Optimal BW	9.054	8.478	9.4189	8.5657
Eff. Number Obs.	508	484	524	487
Panel B: Quadratic specification				
RD Estimator	-21.7457	-51.0762	-20.6654	-58.6977
Robust p-value	0.015**	0.02**	0.04**	0.056*
Robust conf. int.	[-39.2945, -4.1969]	[-94.1926, -7.9597]	[-40.5064, -0.8243]	[-118.8668, 1.4713]
CCT-Optimal BW	15.81	15.6721	15.9106	16.7521
Eff. Number Obs.	792	786	797	816

Notes: This table reports our RD estimates of the effect of female mayors on the number of deaths and hospitalizations by COVID-19 and SARI per hundred thousand inhabitants in 2020 in Brazilian municipalities. Note that COVID-19 numbers are a subset of SARI numbers. Estimation proceeded over the 1222 municipalities in our mixed-gender elections sample. Panel A shows the results for a first-degree polynomial estimation. Panel B shows the results for a second-degree polynomial estimation. Optimal bandwidths following Calonico et al. (2014) were chosen to minimize the mean squared error of the local polynomial RD point estimator. Following that same work, we report robust-bias corrected p-values and 95% CIs. All estimates account for state fixed-effects following Equation 1. Coefficients significantly different from zero at 99% (***), 95% (**) and 90% (*) confidence level.

Figure 1: Impact of female leadership on COVID-19 and SARI deaths and hospitalizations per 100,000 inhabitants in 2020



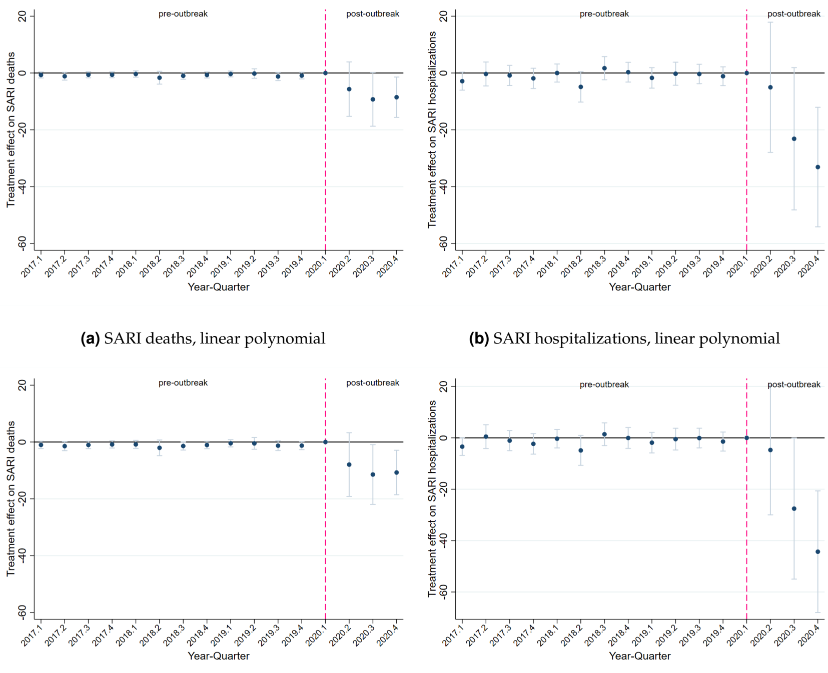
(a) COVID-19 deaths **(b)** SARI deaths

(c) COVID-19 hospitalizations **(d)** SARI hospitalizations

Notes: This figure shows graphically the effect of female mayors on the number of deaths and hospitalizations by COVID-19 and SARI per hundred thousand inhabitants in 2020 in Brazilian municipalities. Note that COVID-19 numbers are a subset of SARI numbers. Subfigure (a) presents the RD plot for COVID-19 deaths. Subfigure (b) presents the RD plot for SARI deaths. Subfigure (c) presents the RD plot for COVID-19 hospitalizations. Subfigure (d) presents the RD plot for SARI hospitalizations. Plots were generated accordingly to Calonico et al. (2015). We use a linear specification and a uniform kernel. Following Calonico et al. (2014), the optimal bandwidths were chosen to minimize the mean squared error of the local polynomial RD point estimator. All estimates account for state fixed-effects following Equation 1. For more details on these estimates see Table 1 Panel A.

Local DID. To provide complementary evidence on the effect of female mayors on health outcomes during the pandemic, we also estimate local difference-in-differences regressions following Equation 2. The results are presented in Figure 2.[8] It displays four graphs reporting the effects of electing a female mayor in the 2016 election over the year-quarters between 2017.1-2020.4 using the first quarter of 2020 as the reference period. Each specification uses the sample of the RD specification in the third and fourth columns of Table 1 that has the same outcome and polynomial specification. The results show that the election of a female mayor has no effect on SARI deaths and hospitalizations until the first quarter of 2020, suggesting that differences in health policies before the outbreak are unlikely explain our effects. After the outbreak of the COVID-19 pandemic the effects become negative and significant. More interestingly, they are monotonically increasing overtime, following the pattern of SARI outcomes after the outbreak as documented by previous papers (Ajzenman et al., 2020). This result also motivates the parallel trends hypothesis in our setting, suggesting that SARI outcomes of municipalities that elected male or female mayors in 2016 would evolve similarly in the absence of the pandemic.

Figure 2: Impact of female leadership on COVID-19 deaths and cases - Dynamic local DID estimates



(a) SARI deaths, linear polynomial

(b) SARI hospitalizations, linear polynomial

(c) SARI deaths, quadratic polynomial

(d) SARI hospitalizations, quadratic polynomial

Notes: This figure displays four graphs reporting the effects of electing a female mayor in the 2016 election across the year-quarters between 2017.1-2020.4 and their 90% confidence interval. Treatment effects are estimated using quarterly data from 2017.1 to 2020.4. The local DID regression model has the form $y_{mst} = \sum_{k \neq 2020.1} \beta_k \cdot FemaleMayor_{ms} + f_t(FemaleVoteMargin_{ms}) + \theta_{ms} + \lambda_{st} + \epsilon_{mst}$ where θ_{ms} captures municipality fixed-effects and λ_{st} captures state-year-quarter fixed effects. $FemaleMayor_{ms} = \mathbb{1}(FemaleVoteMargin_{ms})$ is an indicator variable equal to one when the municipality m in state s selected a woman as a mayor in 2016. To mirror our baseline RD specification in a dynamic setting, we control for $f_t(FemaleVoteMargin_{ms}) = f_t(FemaleVoteMargin_{ms}) \cdot \mathbb{1}(FemaleVoteMargin_{ms} > 0) + f_t(FemaleVoteMargin_{ms}) \cdot \mathbb{1}(FemaleVoteMargin_{ms} < 0)$, a year-quarter specific polynomial in the vote-share of female candidates with parameters that vary flexibly for municipalities that elected a man and a woman as a mayor in 2016. Treatment effects are normalized concerning the first quarter of 2020, the last quarter before the COVID-19 outbreak. Each local DID specification uses the sample of the RD baseline estimates with the same outcome and RD polynomial that is reported in table 1. We cluster standard errors at the municipality level.

[8] Coefficients and standard errors are reported in Table A14.

Policies. After documenting that municipalities led by women fared better than those led by men during the pandemic, we investigate which policy choices can explain this. First, we verify whether female mayors increased health care investment compared to their male counterparts both before and after the COVID-19 outbreak. Second, we investigate whether female mayors adopted more NPIs during the pandemic.

Table 2 displays the effect of having a female mayor on health investments and NPIs. Panel A reports health investment-related outcomes, divided into pre and post-pandemic outbreak outcomes. In the first column, we report the effect on the share of municipal spending dedicated to health issues between 2016 and 2019. In the second and third columns, we present the effects on the change between Jan 2017 and Jan 2020 in the number of total and ICU hospital beds per 100 thousand inhabitants, respectively. The fourth column shows the same outcome as the first one, but for the year of 2020. The fifth and sixth columns show, respectively, estimates for the variation in total and ICU beds between February and December 2020. Results in Panel A show that the presence of a female leader is not associated with any changes in those outcomes, which suggests that they are unlikely to be driving our previous results.

Panel B of Table 2 reports the RD estimates for NPIs. In the first column, we report our effects using the total number of interventions as the outcome. In the second through sixth columns, the outcomes are indicator variables for, respectively, enforcing facial covering, forbidding public gatherings, adopting *cordons sanitaires*, closing non-essential businesses, and reducing the frequency of public transportation. Results reported in this panel suggest that the enforcement of NPIs is the likely mechanism explaining the difference in deaths and hospitalizations documented in Table 1. In the first column we show that, on average, municipalities ruled by women adopted 0.371 more NPIs than those electing a man. This effect is significant and represents an increase of around 10 percent compared to the number of interventions adopted in the control municipalities. In the second through fourth columns we document, respectively, that women are 8 percentage points (p.p) more likely to adopt compulsory face-covering, 5.5 p.p. more likely to forbid agglomerations and 14 p.p. more likely to establish *cordons sanitaires* in their municipalities. Results in the remaining columns, however, are not significant. These results are displayed graphically in Figure A5. The effects of electing a female mayor on epidemiological outcomes and adoption of NPIs are consistent with the recent evidence showing that such measures decrease the severity of the pandemic (Mitze et al., 2020; Lyu and Wehby, 2020).[9]

Mayor's characteristics. While our RD-design accounts for municipality-specific omitted variables, it does not control for individual characteristics of the mayor that are relevant for policymaking, such as age (Alesina et al., 2019), education (Besley et al., 2011) and party-ideology (Pettersson-Lidbom, 2008). To evaluate this possibility, we test whether women that win a close race against men are different in a series of observable characteristics in Table A10. The results suggest a difference in the level of education which is not robust to a quadratic

[9]We provide several robustness checks in the Appendix. In Table A9 we show that both the adoption of face covering and prohibition of social gatherings are robust to a specification with a local quadratic fit. Estimates are also robust to different bandwidth lengths (Figure A6) and placebo checks present the expected pattern from a true causal relation (Figure A7).

Table 2: Impact of female leadership on health investment and non-pharmaceutical interventions, RDD estimates

	Panel A: Health Investment					
	Pre-Outbreak			Post-Outbreak		
	Δ Health spending (share of total spd.)	Δ Total hosp. beds per 100k pop.	Δ ICU hosp. beds per 100k pop.	Δ Health spending (share of total spd.)	Δ Total hosp. beds per 100k pop.	Δ ICU hosp. beds per 100k pop.
RD Estimator	-0.005	-9.992	-0.372	0.004	-3.212	-0.084
Robust p-value	0.678	0.281	0.235	0.749	0.519	0.89
Robust conf. int.	[-0.0273, 0.0178]	[-28.1529, 8.168]	[-0.9858, 0.2418]	[-0.0207, 0.0288]	[-12.9813, 6.5565]	[-1.2766, 1.1078]
CCT-Optimal BW	15.95	19.075	8.094	22.881	12.062	11.66
Eff. Number Obs.	745	871	472	753	626	613

	Panel B: Non-Pharmaceutical Interventions					
	Number of NPIs	Face covering required	Gatherings prohibition	*Cordon sanitaire*	Closure of non-essentials	Public transport restriction
RD Estimator	0.371	0.08	0.055	0.14	-0.071	0.131
Robust p-value	0.057*	0.04**	0.066*	0.083*	0.414	0.221
Robust conf. int.	[-0.0109, 0.7538]	[0.0038, 0.1569]	[-0.0037, 0.1143]	[-0.0184, 0.298]	[-0.2396, 0.0986]	[-0.0783, 0.3395]
CCT-Optimal BW	10.254	15.671	9.479	12.224	10.053	10.784
Eff. Number Obs.	353	499	341	395	349	361

Notes: This table reports our RD estimates of the association between female mayors and several outcomes. The level of observation is the municipality. Panel A reports results on health investment-related outcomes. This panel is divided into pre and post pandemic outbreak outcomes. In the first column of Panel A, the outcome is the variation in the share of municipal spending dedicated to health issues between 2016 and 2019. In the second column, the outcome is the variation of total hospital beds per 100k inhabitants between Jan 2017 and Jan 2020; in the third column, the ICU hospital beds per 100k inhabitants variation between Jan 2017 and Jan 2020. The fourth column reports the estimate of the variation in the share of municipal spending dedicated to health issues between 2019 and 2020. Lastly, the fifth and sixth columns show estimates for the variation of hospital beds per 100k inhabitants between Feb 2020 and Dec 2020 - total beds and ICU beds, respectively. Panel B describes results for the main non-pharmaceutical interventions adopted by mayors until July 2020. The first column outcome is the total number of NPIs adopted. The remaining columns are dummies variables indicating whether a specific NPI was adopted. In any case, we are estimating a first-degree polynomial using a uniform kernel. Optimal bandwidths following Calonico et al. (2014) were chosen to minimize the mean squared error of the local polynomial RD point estimator. Following that same work, we report robust-bias corrected p-values and 95% CIs. All estimates account for state fixed-effects following Equation 1. Coefficients significantly different from zero at 99% (***), 95% (**) and 90% (*) confidence level.

polynomial and a difference in party ideology that is. In order better understand the mechanism behind our main effects, we run our main specification accounting for these two covariates following Calonico et al. (2019). We show that our results are robust to controlling for education and ideology of the mayor in Tables A11 and A12, suggesting that our findings are driven by female mayors' non-observable characteristics.

Under-reporting and measurement error. One concern is that strategic under-reporting of COVID-19 cases and deaths could be somehow driving our results. We believe it is unlikely that measurement error caused by strategic under-reporting of COVID-19 explains our results for two main reasons. First, as shown in Table 1, estimates using broad SARI outcomes, which do not depend on COVID-19 testing, are similar to those using COVID-19 outcomes. Second, there should be more intense under-reporting among women than men to rationalize our results, which seems unlikely given the evidence from several countries, including Brazil, suggesting that women are, on average, less corrupt than men (Brollo and Troiano, 2016; Afridi et al., 2017; Decarolis et al., 2021).

Potential explanations. As previously documented by Funk and Gathmann (2014), women tend to have stronger preferences over health care investments. However, it is unlikely that this explains our results because health investment per capita did not increase after electing a woman either before or after the COVID-19 outbreak. Olcaysoy Okten et al. (2020) documents that women adhere more to social distancing and hand-washing than men during the pandemic, suggesting more subtle preference features are likely to explain the choices of female leaders.

Croson and Gneezy (2009) surveys the evidence studying gender differences in preferences and conclude that women are usually more risk-averse and less overconfident than man. Higher risk-aversion may explain why female leaders adopted more NPIs than male ones to mitigate death risks during the pandemic. The absence of policy and economic effects before the pandemic could be consistent with risk aversion if pre-pandemic health risks were low or budget constraints prevented increases in health care investment. Lower overconfidence and more weight to scientific advice among female leaders may also explain why they are enforcing more NPIs despite similar healthcare investments prior to the pandemic.

Woman leadership and support for President Bolsonaro. As a final step in our analysis, we investigate whether popular support to president Bolsonaro, who openly disavowed NPIs during the pandemic, influenced the effects of female leadership. More precisely, we compare the effect of electing a female mayor on our epidemiological and policy outcomes in municipalities above and below the median of the distribution of Bolsonaro's vote share in the 2018 election.

On one hand, it is reasonable to expect that in places where Bolsonaro had stronger support, citizens tended to be more dismissive of the negative externalities of COVID-19 (Ajzenman et al., 2020). In this case, local leaders had an incentive to enforce NPIs in order to minimize the adverse effects of the pandemic, since the local population is less likely to voluntarily adopt these measures. On the other hand, a high vote share in Bolsonaro in 2018 can be understood by incumbents as a public signal of citizens' preferences which, in turn, may lead mayors to align themselves with the president. Which incentive is stronger for female candidates is the empirical question we aim to answer in this section.

In Table 3 we provide evidence that the effect of female leadership is stronger in municipalities where the support for President Bolsonaro is higher.[10] In Panel A we investigate the heterogeneous effect in municipalities where the population strongly supports Bolsonaro. Results in the first and second columns show that electing a woman caused, respectively, a decrease of 42.49 and 80.53 in COVID-19 deaths and hospitalizations per 100 thousand in this subset of municipalities. The results are similar for SARI outcomes. Finally, the estimate in the fifth column shows that women in these municipalities adopt 0.425 more NPIs than than men on average. In Panel B we present the results of similar exercises for municipalities where President Bolsonaro enjoys lower support. We find that the difference in these outcomes is not statistically significant between municipalities ruled by women and men in this sample. Except for the numbers of NPIs, these results are robust to a local quadratic specification as shown in Table A13 in the appendix.

The findings above highlight that the role of female leaders is magnified when the population is susceptible to be misled by populist national leaders, such as the case of Bolsonaro and his voters. When faced with the decision between enforcing health measures against COVID-19 or trying to conquer the votes of local Bolsonaro supporters, our results suggest that female mayors were more likely to prioritize measures that can save lives.

[10] We define high and low support as having, respectively, a vote share above or below the median.

Table 3: Impact of female leadership according to President Bolsonaro support

	COVID-19 deaths per 100k pop.	COVID-19 hospitalizations per 100k pop.	SARI deaths per 100k pop.	SARI hospitalizations per 100k pop.	Number of NPIs
Panel A: Above median					
RD Estimator	-42.4906	-80.5309	-30.3938	-96.7758	0.4259
Robust p-value	0.0001***	0.014**	0.019**	0.034**	0.08*
Robust conf. int.	[-67.019, -17.9622]	[-144.6325, -16.4292]	[-55.7461, -5.0416]	[-186.3234, -7.2281]	[-0.0533, 0.905]
CCT-Optimal BW	9.0354	8.739	11.4588	9.4088	10.5465
Eff. Number Obs.	236	227	267	240	210
Panel B: Below median					
RD Estimator	-10.2105	-9.5123	-23.0019	-12.2503	0.2519
Robust p-value	0.5765	0.2835	0.34	0.2424	0.3994
Robust conf. int.	[-46.0458, 25.6247]	[-26.8966, 7.872]	[-70.2493, 24.2455]	[-32.7891, 8.2885]	[-0.334, 0.8378]
CCT-Optimal BW	8.1987	8.9333	10.2634	10.2952	7.9198
Eff. Number Obs.	256	271	306	306	123

Notes: This table reports our RD estimates of the effect of female mayors on few COVID-19 and SARI related outcomes accordingly to Jair Bolsonaro's support across municipalities in the Brazilian 2018 presidential election's second round. The four first columns show our primary outcomes: the number of hospitalizations and deaths by COVID-19 and SARI per hundred thousand inhabitants in 2020 - note that COVID-19 numbers are a subset of SARI numbers. The last column shows the estimate for the number of adopted non-pharmaceutical interventions in the municipality until July 2020. Panel A shows results for municipalities with Bolsonaro's vote-share above (or equal) to Bolsonaro's median municipal vote share. Panel B shows results for municipalities with Bolsonaro's vote-share below Bolsonaro's median municipal vote-share. In both cases, we estimate a first-degree polynomial using a uniform kernel. Optimal bandwidths following Calonico et al. (2014) were chosen to minimize the mean squared error of the local polynomial RD point estimator. Following that same work, we report robust-bias corrected p-values and 95% CIs. All estimates account for state fixed-effects following Equation 1. Coefficients significantly different from zero at 99% (***), 95% (**) and 90% (*) confidence level.

5 Conclusion

In this paper we have shown that the election of female mayors caused a large, negative, and significant decrease in the number of deaths and hospitalizations from COVID-19 during the first wave of the pandemic in Brazil. Moreover, we show that these effects are stronger in municipalities where Brazil's far-right president, who publicly disavowed the importance of non-pharmaceutical interventions, had a higher vote share in the 2018 election. Finally, we presented suggestive evidence that enacting more NPIs is likely the mechanism explaining our results.

Our findings raise some questions for future research. First, our results open an exciting avenue for future works investigating female leadership after controlling the health crisis. More specifically, it is interesting to investigate whether female leaders also performed better than their male counterparts in accelerating vaccination programs and promoting economic recovery after the pandemic.

Second, our results also raise whether we should expect female leadership to fare better also in the private sector. Even though there is suggestive evidence that perceived over-performance of female corporate leaders increased during the COVID-19 health crisis, the public and private sector incentives are arguably different. Therefore, there is room to investigate if such perceived performance translates into better outcomes in the private sector during a crisis. More specifically, future research could investigate whether companies led by women had higher profits and healthier employees than those led by men during these difficult times.

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Appendix

Figures

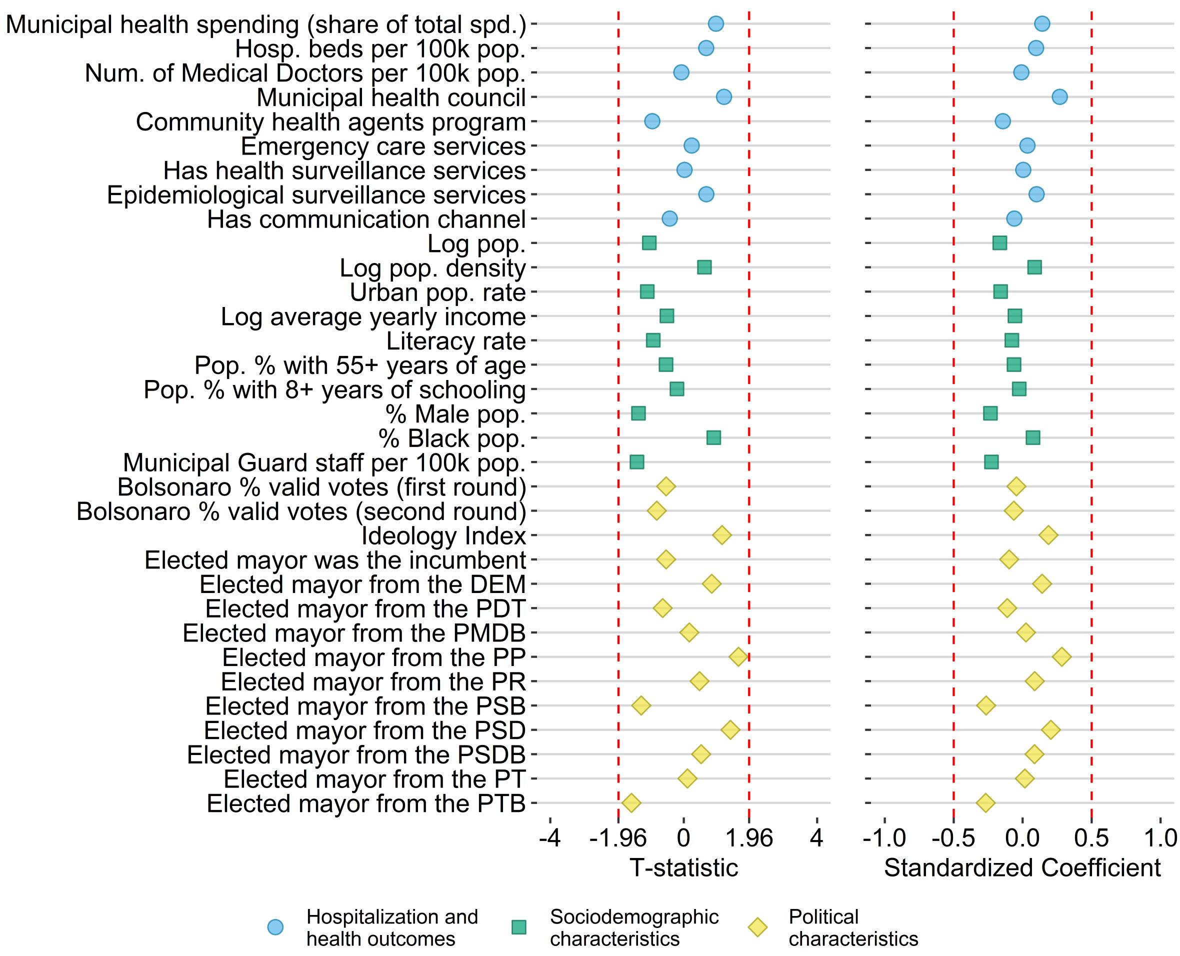
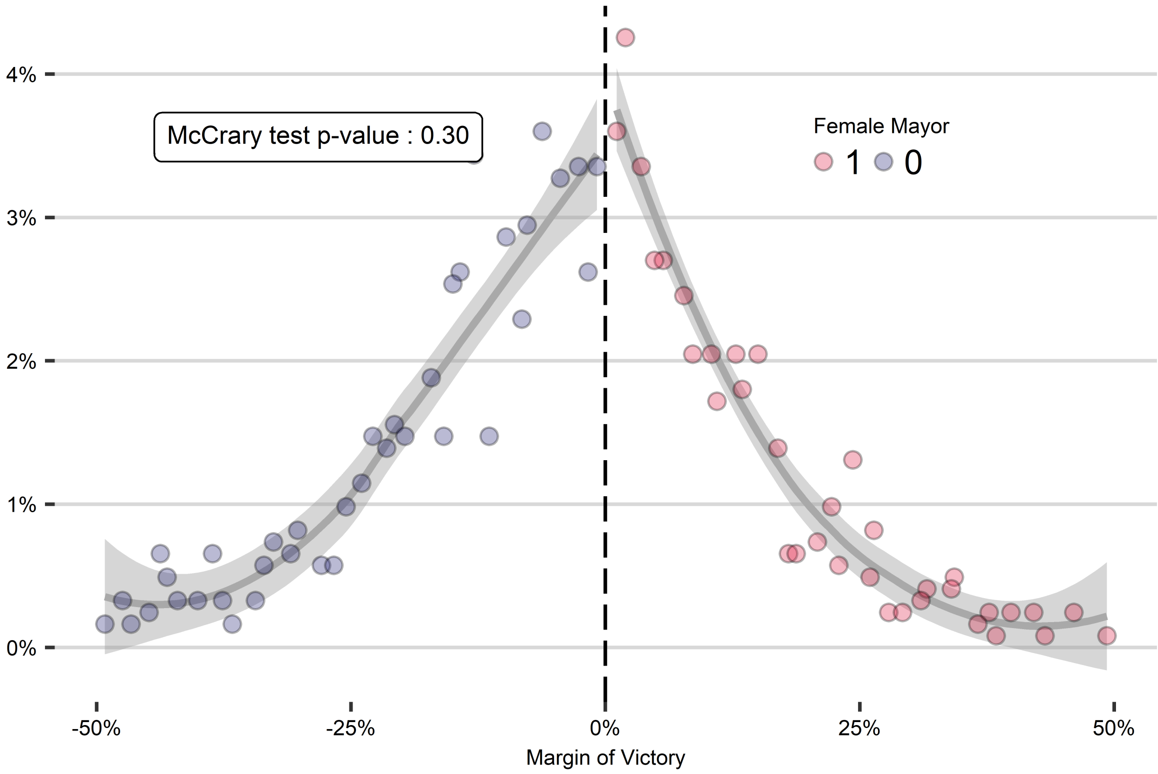


Figure A1: Baseline covariate balance around the threshold

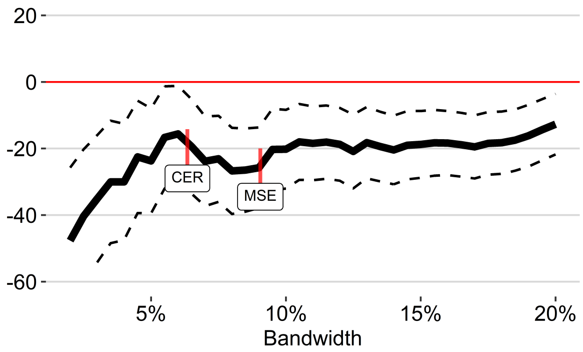
Notes: This figure displays the robust-bias corrected t-statistics and standardized coefficients from our baseline covariates' balance RD estimates. For each indicated variable we run a RD with linear polynomial and uniform kernel specification. Optimal bandwidths following Calonico et al. (2014) were chosen to minimize the mean squared error of the local polynomial RD point estimator. All estimates account for state fixed-effects following Equation 1. In the t-statistics graph we indicate the 5% significance level thresholds in red. For more details on these estimations see Tables A5 and A7. For variables' description see Table A2.

Figure A2: McCrary Test

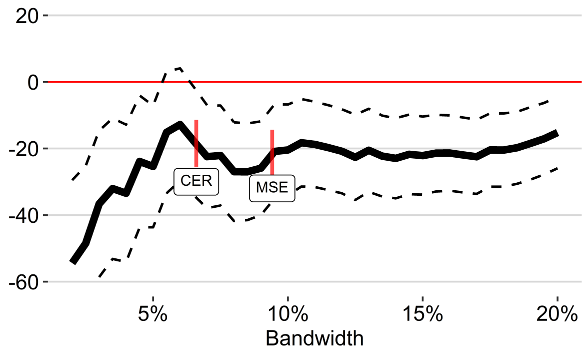


Notes: This figures displays the McCrary density test for the running variable around the cutoff (McCrary, 2008).

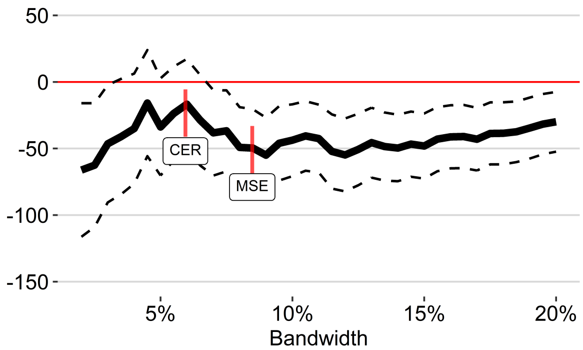
Figure A3: Bandwidth robustness test



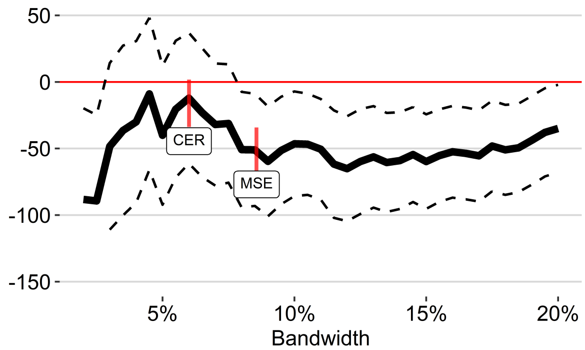
(a) COVID-19 deaths



(b) SARI deaths



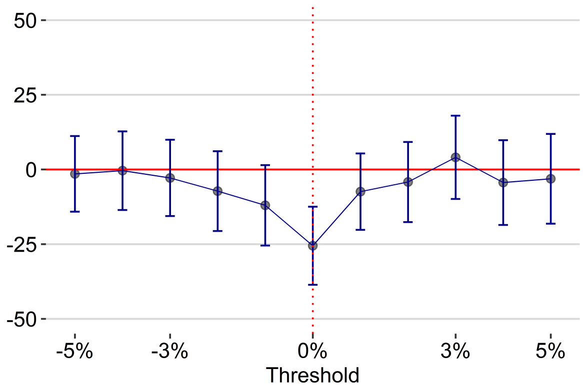
(c) COVID-19 hospitalizations



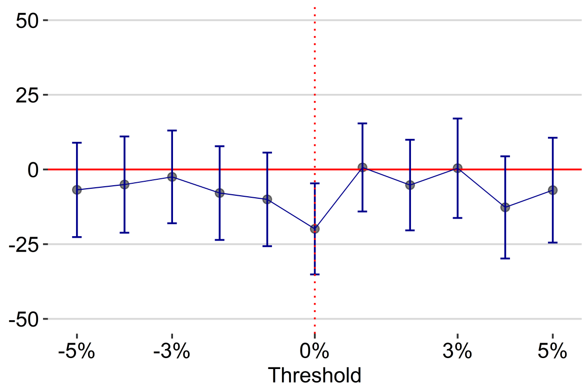
(d) SARI hospitalizations

Notes: This figure displays the bandwidth robustness tests for the effect of female mayors on the number of deaths and hospitalizations by COVID-19 and SARI. Variables are measured in numbers per hundred thousand inhabitants in 2020. Note that COVID-19 numbers are a subset of SARI numbers. Subfigure (a) presents estimates for COVID-19 deaths. Subfigure (b) presents the estimates for SARI deaths. Subfigure (c) presents the estimates for COVID-19 hospitalizations. Subfigure (d) presents the estimates for SARI hospitalizations. We use a linear polynomial and a uniform kernel RD specification. CER and MSE optimal bandwidths are indicated in the figures (Calonico et al., 2014). Following this same work, 90% robust-bias corrected intervals are displayed. All estimates account for state fixed-effects following Equation 1.

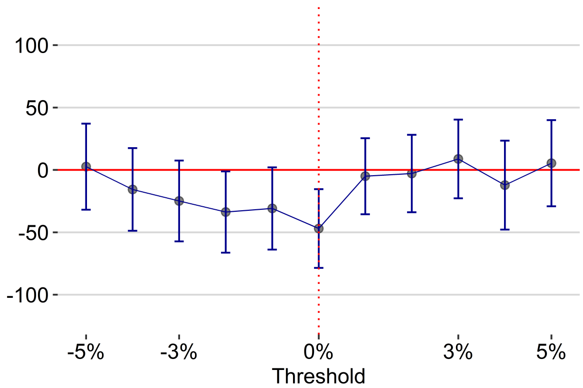
Figure A4: Placebo tests around the threshold



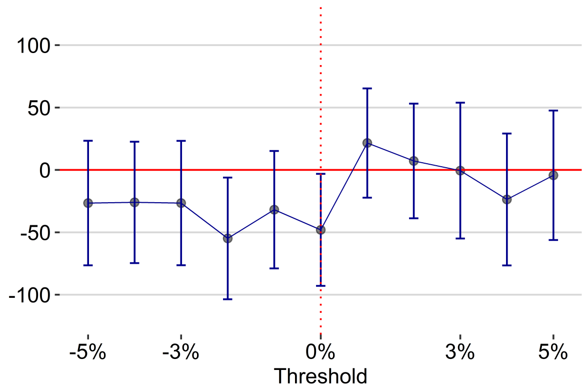
(a) COVID-19 deaths



(b) SARI deaths



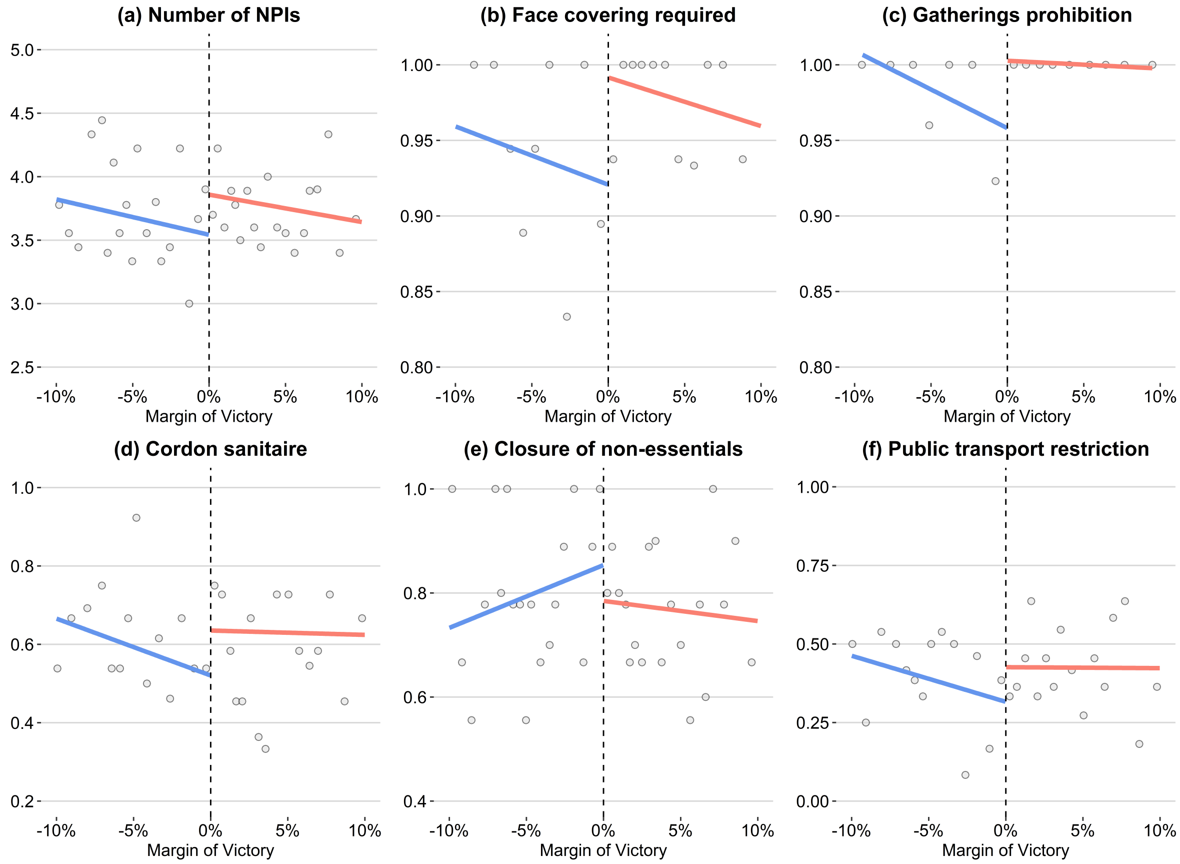
(c) COVID-19 hospitalizations



(d) SARI hospitalizations

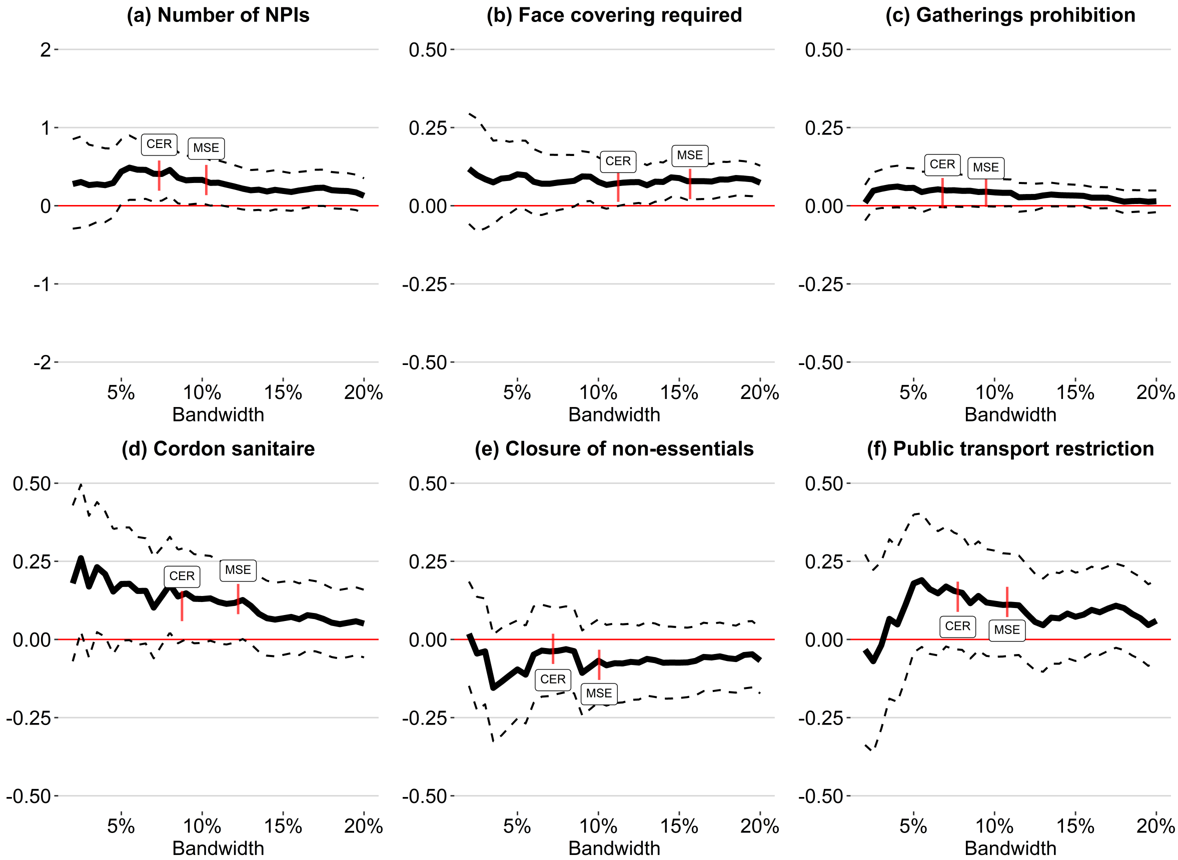
Notes: This figure displays the effect of female mayors on the number of deaths and hospitalizations by COVID-19 and SARI for different (and placebo) cutoffs. Variables are measured in numbers per hundred thousand inhabitants in 2020. Note that COVID-19 numbers are a subset of SARI numbers. Subfigure (a) presents estimates for COVID-19 deaths. Subfigure (b) presents the estimates for SARI deaths. Subfigure (c) presents the estimates for COVID-19 hospitalizations. Subfigure (d) presents the estimates for SARI hospitalizations. We use a linear polynomial and a uniform kernel RD specification. Optimal bandwidths following Calonico et al. (2014) were chosen to minimize the mean squared error of the local polynomial RD point estimator. Following that same work, 90% robust-bias corrected intervals are displayed. All estimates account for state fixed-effects following Equation 1.

Figure A5: NPIs RD Plots



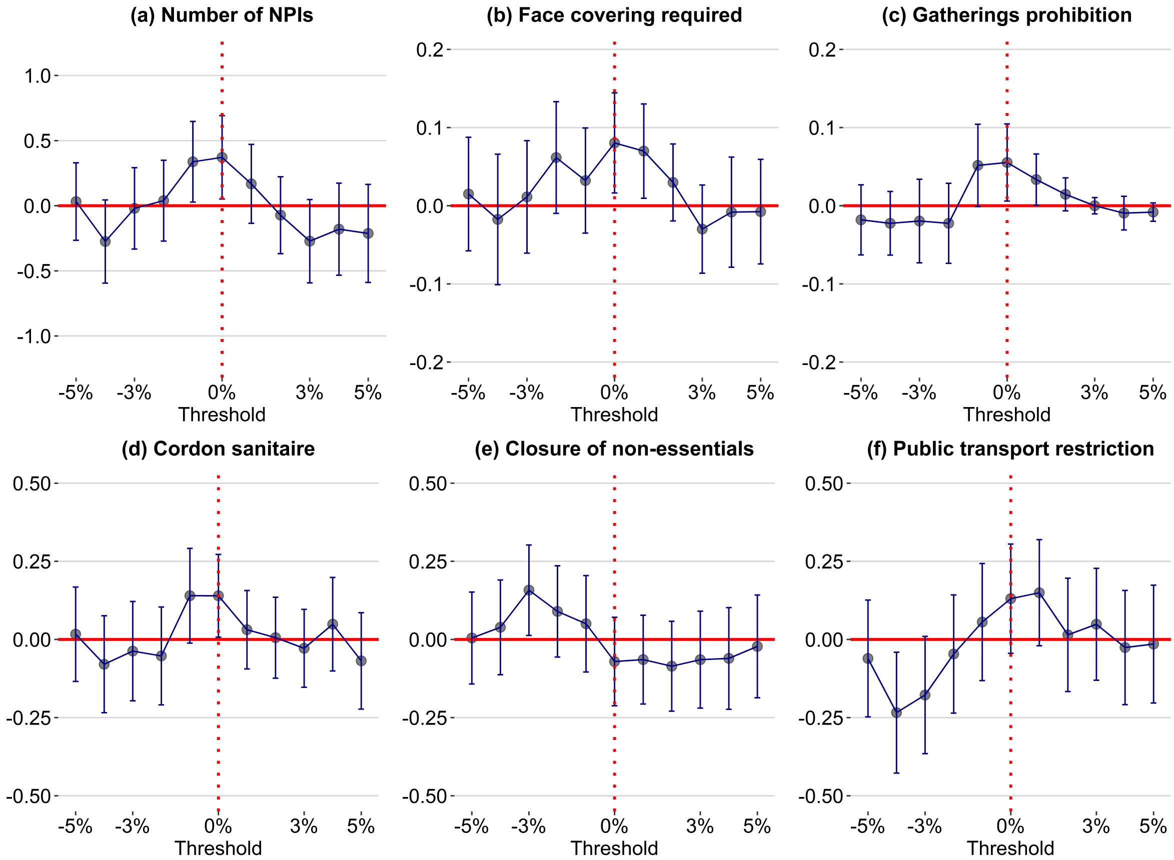
Notes: This figure displays the RD plots for the effect of female mayors in Brazilian municipalities on several non-pharmaceutical interventions outcomes. Figure (a) displays the results for the total number of NPIs adopted; (b) for the adoption of face covering requirement; (c) for the prohibition of gatherings; (d) for the adoption of a *cordon sanitaire*; (e) for the closure of non-essential business; and (f) for the restriction of public transportation. Plots were generated accordingly to Calonico et al. (2015). We use a linear specification and a uniform kernel. Following Calonico et al. (2014), the optimal bandwidths were chosen to minimize the mean squared error of the local polynomial RD point estimator. All estimates account for state fixed-effects following Equation 1. For more details on these estimates see 2 Panel B.

Figure A6: NPIs Bandwidth Robustness



Notes: This figure displays the bandwidth robustness tests for the effect of female mayors in Brazilian municipalities on several non-pharmaceutical interventions outcomes. We use a linear polynomial and uniform kernel RD specification, while varying the bandwidth. Figure (a) displays the results for the total number of NPIs adopted; (b) for the adoption of face covering requirement; (c) for the prohibition of gatherings; (d) for the adoption of a *cordon sanitaire*; (e) for the closure of non-essential business; and (f) for the restriction of public transportation. CER and MSE optimal bandwidths are indicated in the figures (Calonico et al., 2014). Following this same work, 90% robust-bias corrected confidence intervals are displayed. All estimates account for state fixed-effects following Equation 1.

Figure A7: NPIs Placebo Thresholds



Notes: This figure displays the effect of female mayors in Brazilian municipalities on several non-pharmaceutical interventions outcomes for different (and placebo) cutoffs. Figure (a) displays the results for the total number of NPIs adopted; (b) for the adoption of face covering requirement; (c) for the prohibition of gatherings; (d) for the adoption of a *cordon sanitaire*; (e) for the closure of non-essential business; and (f) for the restriction of public transportation. We use a linear polynomial and uniform kernel RD specification. Optimal bandwidths following Calonico et al. (2014) were chosen to minimize the mean squared error of the local polynomial RD point estimator. Following that same work, 90% robust-bias corrected confidence intervals are displayed. All estimates account for state fixed-effects following Equation 1.

Tables

Table A1: Data Description: Epidemiological and policy outcomes

Variable	Description	Source
COVID-19 deaths per 100k pop.	Number of COVID-19 deaths in 2020	SIVEP[1]
COVID-19 hospitalizations per 100k pop.	Number of COVID-19 hospitalizations in 2020	SIVEP
SARI deaths per 100k pop.	Number of SARI deaths in 2020	SIVEP
SARI hospitalizations per 100k pop.	Number of SARI hospitalizations in 2020	SIVEP
Number of NPIs	Total number of adopted NPIs until July 2020	CNM-Survey[2]
Face covering required	Dummy indicating adoption until July 2020	CNM-Survey
Gatherings prohibition	Dummy indicating adoption until July 2020	CNM-Survey
Cordon sanitaire	Dummy indicating adoption until July 2020	CNM-Survey
Closure of non-essentials	Dummy indicating adoption until July 2020	CNM-Survey
Public transport restriction	Dummy indicating adoption until July 2020	CNM-Survey
ΔHealth municipal spending (2016-19)	Share of total municipal spending dedicated to health issues (variation from 2016 to 2019)	SICONFI[3]
ΔHosp. beds per 100k pop. (2017-2020)	Total hosp. beds variation from Jan 2017 to Jan 2020	CNES[4]
ΔICU beds per 100k pop. (2017-2020)	ICU beds variation from Jan 2017 to Jan 2020	CNES
ΔHealth municipal spending (2019-2020)	Share of total municipal spending dedicated to health issues (variation from 2019 to 2020)	SICONFI
ΔHosp. beds per 100k pop. (Fev-Dec20)	Total hosp. beds variation from Feb 2020 to Dec 2020	CNES
ΔICU hosp. beds per 100k pop. (Fev-Dec20)	ICU beds variation from Feb 2020 to Dec 2020	CNES
Mayor's years of schooling	Mayor's years of schooling when elected	TSE[5]
Mayor's Age	Mayor's years of age when elected	TSE
Healthcare professional	Dummy indicating if the mayor is a healthcare professional	TSE
Mayor's party ideology*	Mayor's party ideology index when elected. Varies from -1 (far-left) to 1 (far-right)	BLS[6]

Notes: All variables are aggregated at the municipal level.
* This variable differs from the Ideology Index shown in Table A2 Panel C. The former measures the mayor's party ideology; the second is a measure of municipal ideology.
[1] *Sistema de Informação de Vigilância de Gripe* (Flu Surveillance Information System) from the Brazilian Ministry of Health.
[2] *Survey da Confederação Nacional dos Municípios* (Brazilian Confederation of Municipalities survey) (de Souza Santos et al., 2021)
[3] *Sistema de Informações Contábeis e Fiscais do Setor Público Brasileiro* (Brazilian Public Sector Accounting and Tax Information System) from the Brazilian National Treasury.
[4] *Cadastro Nacional de Estabelecimentos de Saúde* (National Register of Health Establishments) from the Brazilian Ministry of Health.
[5] *Tribunal Superior Eleitoral* (Brazilian Electoral Court), the Brazilian electoral authority.
[6] The Brazilian legislative survey (Power and Rodrigues-Silveira, 2019).

Table A2: Data Description: Baseline Covariates

Variable	Description	Source
Panel A: Hospitalization and health outcomes		
Municipal health spending	Avg. share of municipal spending dedicated to health issues across 2013-16	SICONFI[1]
Hosp. beds per 100k pop.	Total hosp. beds in Jan 2017	CNES[2]
Num. of Medical Doctors per 100k pop.	Number of MDs in 2014	IBGE[3]
Municipal health council	Dummy indicating the existence in 2014	IBGE
Municipal health fund	Dummy indicating the existence in 2014	IBGE
Community health agents program	Dummy indicating the existence in 2014	IBGE
Emergency care services	Dummy indicating the existence in 2014	IBGE
Has health surveillance services	Dummy indicating the existence in 2014	IBGE
Epidemiological surveillance services	Dummy indicating the existence in 2014	IBGE
Has communication channel	Dummy indicating the existence in 2014	IBGE
Panel B: Sociodemographic characteristics		
Population	Estimated population in 2020	IBGE
Population density	Estimated population density in 2020	IBGE
Urban pop. rate	Fraction of municipal population regarded as urban in 2017	IBGE
Average yearly income	GDP per capita in 2018	IBGE
Literacy rate	% of literate pop. in 2010	IBGE 2010 Census[4]
Pop. % with 55+ years of age	% of pop. with 55+ years of age in 2010	IBGE 2010 Census
Pop. % with 8+ years of schooling	% of pop. with 8+ years of schooling in 2010	IBGE 2010 Census
% Male pop.	% of pop. that was male in 2010	IBGE 2010 Census
% Black pop.	% of black pop. in 2010	IBGE 2010 Census
Municipal guard staff per 100k pop.	Number of municipal guards in 2014	IBGE
Panel C: Political characteristics		
Bolsonaro % valid votes (first round)	Bolsonaro's vote-share in the 2018 Brazilian presidential first round election	TSE
Bolsonaro % valid votes (second round)	Bolsonaro's vote-share in the 2018 Brazilian presidential second round election	TSE[5]
Ideology Index*	Municipal ideological score in 2016. Varies from -1 (far-left) to 1 (far-right)	TSE/BLS[6]
Elected mayor was the incumbent	Dummy indicating if the elected candidated was the incumbent	TSE
Elected mayor was from some party**	Ten different dummies each indicating if the elected candidated was from a given party**	TSE

Notes: All variables are aggregated at the municipal level.
* This variable differs from the "Mayor's party ideology" shown in Table A1. The former measures municipal ideology; the second measures the mayor's party ideology.
** DEM, PDT, PMDB, PP, PR, PSB, PSD, PSDB, PT or PTB.
[1] *Sistema de Informações Contábeis e Fiscais do Setor Público Brasileiro* (Brazilian Public Sector Accounting and Tax Information System) from the Brazilian National Treasure.
[2] *Cadastro Nacional de Estabelecimentos de Saúde* (National Register of Health Establishments) from the Brazilian Ministry of Health.
[3] *Instituto Brasileiro de Geografia e Estatística* (Brazil's National Bureau of Statistics).
[4] IBGE's demographic census in 2010. It is the most recent available country-covering census in Brazil.
[5] *Tribunal Superior Eleitoral* (Brazilian Electoral Court), the Brazilian electoral authority.
[6] The Brazilian legislative survey (Power and Rodrigues-Silveira, 2019).

Table A3: Summary Statistics: Epidemiological and policy outcomes

	Male			Female			Full Sample				
Variable	N	Mean	Sd	N	Mean	Sd	Mean	Sd	Min	Median	Max
COVID-19 deaths per 100k pop.	686	58.69	47.02	528	57.47	47.3	58.16	47.13	0	48.8	358.79
COVID-19 hospitalizations per 100k pop.	686	154.53	129.44	528	149.4	125.31	152.3	127.63	0	124.69	1299.44
SARI deaths per 100k pop.	686	80.73	59.36	528	79.05	56.12	58.16	47.13	0	48.8	358.79
SARI hospitalizations per 100k pop.	686	260.14	194.06	528	252.96	191.91	152.3	127.63	0	124.69	1299.44
Number of NPIs	454	3.72	0.93	339	3.76	0.89	3.74	0.91	0	4	5
Face covering required	452	0.96	0.18	337	0.97	0.17	0.97	0.18	0	1	1
Gatherings prohibition	452	0.97	0.17	338	1	0.05	0.98	0.13	0	1	1
Cordon Sanitaire	454	0.59	0.49	339	0.6	0.49	0.59	0.49	0	1	1
Closure of non-essentials	452	0.79	0.41	338	0.77	0.42	0.78	0.41	0	1	1
Public transport restriction	445	0.43	0.5	333	0.43	0.5	0.43	0.5	0	0	1
ΔHealh per capita spending (2016 to 2019)	665	141.89	136.01	500	153.46	152.72	146.86	143.47	-611.95	127.07	1287.9
ΔHosp. beds per 100k pop. (Jan 2017 to Jan 2020)	688	-2.11	69.32	532	-2.7	50.29	-2.37	61.73	-448.37	0	1204.2
ΔICU hosp. beds per 100k pop. (Jan 2017 to Jan 2020)	688	0.09	1.36	532	0.12	2.09	0.1	1.72	-14.79	0	33.66
ΔHealth per capita spending (2019 to 2020)	573	185.26	129.14	422	187.44	186.19	149.51	-977.27	166.96	1737.22	
ΔHosp. beds per 100k pop. (Feb 2020 to Dec 2020)	689	5.76	35.54	533	4.65	31.8	5.28	33.95	-475.51	0	338.84
ΔICU hosp. beds per 100k pop. (Feb 2020 to Dec 2020)	689	0.72	4.85	533	0.47	3.65	0.61	4.36	-1.91	0	67.65
Mayor's years of schooling	689	13.24	3.39	533	14.78	2.26	13.91	3.05	0	16	16
Mayor's Age	689	48.63	10.96	533	47.84	10.3	48.29	10.68	21	48	88
Healthcare professional	689	0.08	0.27	533	0.1	0.3	0.09	0.29	0	0	1
Mayor's party ideology	689	0.28	0.37	533	0.29	0.36	0.28	0.37	-0.84	0.42	0.76

Notes: This table reports the summary statistics for our epidemiological and policy outcomes. Variables' description in Table A1.

Table A4: Summary Statistics: Baseline Covariates

	Male			Female			Full Sample				
Variable	N	Mean	Sd	N	Mean	Sd	Mean	Sd	Min	Median	Max
Panel A: Hospitalization and health outcomes											
Municipal health spending (share of total spd.)	684	0.23	0.04	527	0.24	0.04	0.23	0.04	0.03	0.23	0.5
Hosp. beds per 100k pop.	688	127.6	156.26	532	127.19	150.83	127.42	153.86	0	100.98	1415.12
Num. of Medical Doctors per 100k pop.	684	81.28	64.67	529	85.27	62.04	83.02	63.54	0	67.91	715.91
Municipal health council	689	1	0.05	533	1	0	1	0.04	0	1	1
Municipal health fund	689	1	0	533	1	0	1	0	1	1	1
Community health agents program	689	0.73	0.45	533	0.72	0.45	0.73	0.45	0	1	1
Emergency care services	689	0.85	0.36	533	0.87	0.33	0.86	0.35	0	1	1
Has health surveillance services	689	0.99	0.09	533	0.99	0.1	0.99	0.09	0	1	1
Epidemiological surveillance services	683	0.95	0.21	528	0.97	0.18	0.96	0.2	0	1	1
Has communication channel	689	0.97	0.18	533	0.97	0.17	0.97	0.18	0	1	1
Panel B: Sociodemographic characteristics											
Population	689	30117.4	121440.7	533	23933.4	43106.7	27420.09	95546.05	1118	11320.5	2886698
Population density	689	96.9	540	533	90.7	306.3	94.17	453.01	0.04	24.69	11670.9
Urban pop. rate	689	46.33	33.73	533	46.93	33.34	46.59	33.55	0	52.54	98.6
Average yearly income	689	21748.9	24653.3	533	22080.9	33115	21893.7	28640.83	5062.94	14119.61	583171.85
Literacy rate	689	0.814	0.099	533	0.816	0.094	0.81	0.1	0.53	0.82	0.98
Pop. % with 55+ years of age	689	0.158	0.041	533	0.158	0.039	0.16	0.04	0.05	0.16	0.31
Pop. % with 8+ years of schooling	689	0.336	0.091	533	0.337	0.085	0.34	0.09	0.12	0.33	0.66
% Male pop.	689	0.507	0.016	533	0.506	0.015	0.51	0.02	0.46	0.51	0.59
% Black pop.	689	0.571	0.223	533	0.571	0.219	0.57	0.22	0.02	0.63	0.93
Municipal guard staff per 100k pop.	687	20.16	58.33	531	28.41	80.04	23.76	68.74	0	0	660.35
Panel C: Political characteristics											
Bolsonaro % valid votes (first round)	689	0.349	0.196	533	0.348	0.187	0.35	0.19	0.03	0.32	0.81
Bolsonaro % valid votes (second round)	689	0.418	0.231	533	0.417	0.22	0.42	0.23	0.04	0.38	0.88
Ideology Index	689	0.23	0.13	533	0.23	0.13	0.23	0.13	-0.32	0.24	0.64
Elected mayor was the incumbent	633	0.27	0.44	500	0.22	0.41	0.25	0.43	0	0	1

Notes: This table reports the summary statistics for our baseline covariates. For parties' variables summary statistics see Table A6. For covariates variables description see Table A2.

Table A5: Formal Continuity-Based Analysis for Covariates (Full Mixed Races Sample)*

Variable	RD Estimator	Robust Inference p-value	Robust Inference Conf. Int.	CCT-Optimal Bandwidth	Eff. Number Observations
Panel A: Hospitalization and health outcomes					
Municipal health spending (share of total spd.)	0.006	0.333	[-0.0063, 0.0185]	10.685	577
Hosp. beds per 100k pop.	14.967	0.501	[-28.6405, 58.5744]	10.167	558
Num. of Medical Doctors per 100k pop.	-0.627	0.942	[-17.5521, 16.2974]	14.914	752
Municipal health council	0.011	0.227	[-0.0068, 0.0286]	13.580	702
Community health agents program	-0.064	0.346	[-0.197, 0.0691]	12.605	651
Emergency care services	0.012	0.813	[-0.0882, 0.1123]	12.843	667
Has health surveillance services	0.000	0.982	[-0.0315, 0.0322]	14.850	757
Epidemiological surveillance services	0.020	0.499	[-0.0385, 0.079]	13.793	701
Has communication channel	-0.011	0.675	[-0.0604, 0.0391]	14.818	755
Panel B: Sociodemographic characteristics					
Log pop.	-0.180	0.302	[-0.5215, 0.1617]	8.853	502
Log pop. density	0.126	0.535	[-0.2713, 0.523]	9.577	537
Urban pop. rate	-5.367	0.274	[-14.9861, 4.2524]	14.669	749
Log average yearly income	-0.040	0.614	[-0.1943, 0.1148]	10.510	580
Literacy rate	-0.008	0.360	[-0.0238, 0.0087]	11.537	612
Pop. % with 55+ years of age	-0.003	0.595	[-0.0117, 0.0067]	12.830	667
Pop. % with 8+ years of schooling	-0.002	0.840	[-0.0239, 0.0194]	10.686	584
% Male pop.	-0.004	0.175	[-0.0091, 0.0017]	9.837	548
% Black pop.	0.017	0.368	[-0.0194, 0.0524]	9.880	549
Municipal Guard staff per 100k pop.	-15.579	0.161	[-37.357, 6.199]	11.361	601
Panel C: Political characteristics					
Bolsonaro % valid votes (first round)	-0.009	0.599	[-0.0408, 0.0236]	10.899	591
Bolsonaro % valid votes (second round)	-0.014	0.420	[-0.0495, 0.0206]	10.750	586
Ideology Index	0.024	0.250	[-0.017, 0.0654]	10.765	586
Elected mayor was the incumbent	-0.042	0.599	[-0.1991, 0.115]	10.389	530

Notes: This table displays the RD balance test for our baseline covariates. For each indicated variable we run a RD with linear polynomial and uniform kernel specification. Optimal bandwidths following Calonico et al. (2014) were chosen to minimize the mean squared error of the local polynomial RD point estimator. Following that same work, we report robust-bias corrected p-values and 95% CIs. All estimates account for state fixed-effects following Equation 1. Variables' description are in Table A2.
* For the RD balance test for the parties' dummies see Table A7.

Table A6: Summary Statistics: Parties' variables

	Male			Female			Full Sample				
Party	N	Mean	Sd	N	Mean	Sd	Mean	Sd	Min	Median	Max
DEM	689	0.05	0.21	533	0.06	0.23	0.05	0.22	0	0	1
PDT	689	0.06	0.23	533	0.05	0.23	0.06	0.23	0	0	1
PMDB	689	0.18	0.38	533	0.2	0.4	0.18	0.39	0	0	1
PP	689	0.09	0.29	533	0.08	0.26	0.09	0.28	0	0	1
PR	689	0.06	0.23	533	0.08	0.27	0.07	0.25	0	0	1
PSB	689	0.08	0.26	533	0.08	0.27	0.08	0.27	0	0	1
PSD	689	0.1	0.3	533	0.11	0.31	0.1	0.3	0	0	1
PSDB	689	0.15	0.36	533	0.13	0.34	0.14	0.35	0	0	1
PT	689	0.04	0.19	533	0.05	0.21	0.04	0.2	0	0	1
PTB	689	0.04	0.2	533	0.05	0.22	0.05	0.21	0	0	1

Notes: This table displays summary statistics for parties' dummies variables. Each party dummy indicates if the elected mayor in 2016 municipal election was from a given party.

Table A7: Parties Balance Table

	RD	Robust Inference		CCT-Optimal	Eff. Number
Party	Estimator	p-value	Conf. Int.	Bandwidth	Observations
DEM	0.031	0.400	[-0.0416, 0.1041]	9.911	549
PDT	-0.026	0.529	[-0.1051, 0.054]	12.325	636
PMDB	0.009	0.867	[-0.1011, 0.12]	12.107	629
PP	0.079	0.100	[-0.0153, 0.1742]	9.884	549
PR	0.022	0.635	[-0.0679, 0.1112]	8.136	474
PSB	-0.071	0.203	[-0.1793, 0.038]	10.040	554
PSD	0.062	0.161	[-0.0248, 0.1495]	14.414	737
PSDB	0.030	0.601	[-0.0828, 0.1431]	11.369	602
PT	0.003	0.910	[-0.0524, 0.0588]	14.512	742
PTB	-0.055	0.117	[-0.1248, 0.0139]	9.548	536

Notes: This table displays the RD balance test for the partie's dummies variables. Each party variable is a dummy indicating if the elected mayor in 2016 municipal election was from a given party. For each of these variables we run a RD with linear polynomial and uniform kernel specification. Optimal bandwidths following Calonico et al. (2014) were chosen to minimize the mean squared error of the local polynomial RD point estimator. Following that same work, we report robust-bias corrected p-values and 95% CIs. All estimates account for state fixed-effects following Equation 1. Variables' description are in Table A2 Panel C.

Table A8: States Balance Table

State	RD Estimator	Robust Inference p-value	Robust Inference Conf. Int.	CCT-Optimal Bandwidth	Eff. Number Observations
AC	-0.001	0.924	[-0.0248, 0.0225]	18.067	849
AL	0.018	0.489	[-0.0335, 0.0701]	14.048	722
AM	-0.015	0.387	[-0.0489, 0.019]	12.102	628
AP	0.010	0.467	[-0.0168, 0.0366]	16.398	814
BA	-0.068	0.135	[-0.1569, 0.0211]	14.130	724
CE	0.019	0.547	[-0.0431, 0.0814]	14.160	724
ES	-0.010	0.428	[-0.0356, 0.0151]	7.934	470
GO	0.044	0.168	[-0.0184, 0.1056]	10.775	586
MA	0.029	0.490	[-0.0534, 0.1115]	12.504	647
MG	0.045	0.355	[-0.0504, 0.1407]	12.862	668
MS	-0.009	0.601	[-0.0449, 0.026]	12.458	644
MT	-0.052	0.102	[-0.1146, 0.0104]	11.333	601
PA	-0.041	0.159	[-0.0981, 0.0161]	15.163	772
PB	-0.016	0.693	[-0.0975, 0.0649]	10.684	584
PE	-0.035	0.308	[-0.1031, 0.0325]	12.283	636
PI	-0.039	0.264	[-0.1074, 0.0294]	18.713	868
PR	0.037	0.206	[-0.0201, 0.0933]	11.240	600
RJ	0.020	0.255	[-0.0144, 0.0545]	10.185	561
RN	0.019	0.623	[-0.0573, 0.0956]	13.296	692
RO	-0.025	0.139	[-0.059, 0.0082]	13.618	702
RR	-0.016	0.277	[-0.0448, 0.0128]	8.086	473
RS	-0.009	0.816	[-0.0803, 0.0633]	12.992	679
SC	0.012	0.714	[-0.0529, 0.0773]	14.343	734
SE	0.036	0.165	[-0.0147, 0.0862]	11.130	599
SP	0.093	0.080*	[-0.0111, 0.198]	10.421	568
TO	0.011	0.622	[-0.0327, 0.0548]	11.208	599

Notes: This table displays the RD balance test for the state's dummies variables. Each state variable is a dummy indicating if the elected mayor in 2016 municipal election was from a given state. For each of these variables we run a RD with linear polynomial and uniform kernel specification. Optimal bandwidths following Calonico et al. (2014) were chosen to minimize the mean squared error of the local polynomial RD point estimator. Following that same work, we report robust-bias corrected p-values and 95% CIs. No controls are included.

Table A9: Impact of female leadership on health investment and non-pharmaceutical interventions, RDD estimates - Robustness using quadratic specification

	Panel A: Investment in Health					
	Pre-Outbreak			Post-Outbreak		
	Δ Health spending (share of total spd.)	Δ Total hosp. beds per 100k pop.	Δ ICU hosp. beds per 100k pop.	Δ Health spending (share of total spd.)	Δ Total hosp. beds per 100k pop.	Δ ICU hosp. beds per 100k pop.
RD Estimator	-0.001	-9.549	-0.375	0.004	-3.64	-0.212
Robust p-value	0.934	0.35	0.228	0.752	0.554	0.785
Robust conf. int.	[-0.02, 0.0184]	[-29.572, 10.4732]	[-0.9849, 0.2352]	[-0.0219, 0.0303]	[-15.7007, 8.4212]	[-1.7386, 1.3138]
CCT-Optimal BW	20.295	24.072	16.241	29.326	18.348	13.424
Eff. Number Obs.	837	977	809	828	860	693

	Panel B: Non-Pharmaceutical Interventions					
	Number of NPIs	Face covering required	Gatherings prohibition	*Cordon sanitaire*	Closure of non-essentials	Public transport restriction
RD Estimator	0.308	0.086	0.068	0.141	-0.106	0.109
Robust p-value	0.168	0.058*	0.043**	0.144	0.253	0.321
Robust conf. int.	[-0.1302, 0.7468]	[-0.0031, 0.1752]	[0.0021, 0.1335]	[-0.0481, 0.3303]	[-0.2875, 0.0757]	[-0.1068, 0.3257]
CCT-Optimal BW	17.295	27.093	20.06	20.231	15.186	21.621
Eff. Number Obs.	533	658	567	572	487	589

Notes: This table reports our RD estimates of the association between female mayors and several outcomes. The level of observation is the municipality. Panel A reports results on health investment-related outcomes. This panel is divided into pre and post pandemic outbreak outcomes. In the first column of Panel A, the outcome is the variation in the share of municipal spending dedicated to health issues between 2016 and 2019. In the second column, the outcome is the variation of total hospital beds per 100k inhabitants between Jan 2017 and Jan 2020; in the third column, the ICU hospital beds per 100k inhabitants variation between Jan 2017 and Jan 2020. The fourth column reports the estimate of the variation in the share of municipal spending dedicated to health issues between 2019 and 2020. Lastly, the fifth and sixth columns show estimates for the variation of hospital beds per 100k inhabitants between Feb 2020 and Dec 2020 - total beds and ICU beds, respectively. Panel B describes results for the main non-pharmaceutical interventions adopted by mayors until July 2020. The first column outcome is the total number of NPIs adopted. The remaining columns are dummies variables indicating whether a specific NPI was adopted. In any case, we are estimating a second-degree polynomial using a uniform kernel. Optimal bandwidths following Calonico et al. (2014) were chosen to minimize the mean squared error of the local polynomial RD point estimator. Following that same work, we report robust-bias corrected p-values and 95% CIs. All estimates account for state fixed-effects following Equation 1. Coefficients significantly different from zero at 99% (***), 95% (**) and 90% (*) confidence level.

Table A10: Mayor's characteristics balance around the threshold

	Mayor's years of schooling	Mayor's Age	Healthcare professional	Mayor's party ideology
Panel A: Linear specification				
RD Estimator	0.9535	-0.6532	-0.0207	0.1011
Robust p-value	0.044**	0.7	0.68	0.099*
Robust conf. int.	[0.0261, 1.881]	[-3.9316, 2.6253]	[-0.118, 0.0767]	[-0.0189, 0.2211]
CCT-Optimal BW	13.6258	13.0304	12.3187	10.7246
Eff. Number Obs.	703	681	636	585
Panel B: Quadratic specification				
RD Estimator	0.2496	-1.0919	0.0012	0.1183
Robust p-value	0.7	0.627	0.985	0.067*
Robust conf. int.	[-1.0024, 1.5016]	[-5.4941, 3.3102]	[-0.1259, 0.1283]	[-0.008, 0.2446]
CCT-Optimal BW	16.2465	15.3507	16.4033	20.5549
Eff. Number Obs.	811	780	814	905

Notes: This table reports our RD estimates of the association between female mayors and four outcomes. In the first column, the outcome variable is the mayor's years of schooling. In the second column, the outcome variable is the mayor's age. The third column show results for a dummy indicating if the mayor is a healthcare professional. In the fourth and last column, the outcome variable is a mayor's party ideology index that varies from -1 (far-left) to 1 (far-right). Panel A shows the results for a first-degree polynomial estimation. Panel B shows the results for a second-degree polynomial estimation. Every specification uses a uniform kernel. Optimal bandwidths following Calonico et al. (2014) were chosen to minimize the mean squared error of the local polynomial RD point estimator. Following that same work, we report robust-bias corrected p-values and 95% CIs. All estimates account for state fixed-effects following Equation 1. Coefficients significantly different from zero at 99% (***), 95% (**) and 90% (*) confidence level.

Table A11: Impact of female leadership on COVID-19 deaths and cases, RDD estimates - Robustness controlling for mayor's characteristics

	COVID-19 deaths per 100k pop.	COVID-19 hospitalizations per 100k pop.	SARI deaths per 100k pop.	SARI hospitalizations per 100k pop.
Panel A: Linear specification				
RD Estimator	-26.2774	-46.1559	-20.6819	-50.4271
Robust p-value	0.0001***	0.015**	0.025**	0.063*
Robust conf. int.	[-41.8046, -10.7502]	[-83.4677, -8.8441]	[-38.7906, -2.5733]	[-103.5197, 2.6655]
CCT-Optimal BW	9.0783	8.5562	9.4467	8.7588
Eff. Number Obs.	510	486	525	492
Panel B: Quadratic specification				
RD Estimator	-23.4372	-51.5783	-21.6216	-61.5871
Robust p-value	0.009***	0.02**	0.03**	0.046**
Robust conf. int.	[-41.1054, -5.7691]	[-95.1134, -8.0433]	[-41.3816, -1.8615]	[-121.9694, -1.2049]
CCT-Optimal BW	15.5193	15.2278	15.97	16.4266
Eff. Number Obs.	779	769	799	808

Notes: This table reports our RD estimates of the effect of female mayors on the number of deaths and hospitalizations by COVID-19 and SARI per hundred thousand inhabitants in 2020 in Brazilian municipalities. Note that COVID-19 numbers are a subset of SARI numbers. Estimation proceeded over the 1222 municipalities in our mixed-gender elections sample. Panel A shows the results for a first-degree polynomial estimation. Panel B shows the results for a second-degree polynomial estimation. Optimal bandwidths following Calonico et al. (2014) were chosen to minimize the mean squared error of the local polynomial RD point estimator. Following that same work, we report robust-bias corrected p-values and 95% CIs. All estimates controls for mayor's party ideology and mayor's years of schooling. Following Equation 1, all estimates also account for state fixed-effects. Coefficients significantly different from zero at 99% (***), 95% (**) and 90% (*) confidence level.

Table A12: Impact of female leadership on health investment and non-pharmaceutical interventions, RDD estimates - Robustness controlling for mayor's characteristics

	Panel A: Investment in Health					
	Pre-Outbreak			Post-Outbreak		
	Δ Health spending (share of total spd.)	Δ Total hosp. beds per 100k pop.	Δ ICU hosp. beds per 100k pop.	Δ Health spending (share of total spd.)	Δ Total hosp. beds per 100k pop.	Δ ICU hosp. beds per 100k pop.
RD Estimator	-0.004	-13.512	-0.314	0.005	-2.736	-0.216
Robust p-value	0.704	0.165	0.29	0.651	0.567	0.719
Robust conf. int.	[-0.0266, 0.018]	[-32.5942, 5.5701]	[-0.8956, 0.2674]	[-0.0182, 0.0292]	[-12.101, 6.6286]	[-1.3929, 0.9611]
CCT-Optimal BW	16.884	17.545	8.251	25.797	12.866	11.671
Eff. Number Obs.	767	839	486	795	668	614

	Panel B: Non-Pharmaceutical Interventions					
	Number of NPIs	Face covering required	Gatherings prohibition	*Cordon sanitaire*	Closure of non-essentials	Public transport restriction
RD Estimator	0.377	0.089	0.062	0.147	-0.085	0.121
Robust p-value	0.053*	0.027**	0.05**	0.066*	0.33	0.253
Robust conf. int.	[-0.0045, 0.7577]	[0.0101, 0.1675]	[-1e-04, 0.1232]	[-0.0098, 0.3044]	[-0.2554, 0.0859]	[-0.0862, 0.3281]
CCT-Optimal BW	10.256	14.954	8.604	12.86	9.873	11.025
Eff. Number Obs.	353	478	315	417	347	366

Notes: This table reports our RD estimates of the association between female mayors and several outcomes. The level of observation is the municipality. Panel A reports results on health investment-related outcomes. This panel is divided into pre and post pandemic outbreak outcomes. In the first column of Panel A, the outcome is the variation in the share of municipal spending dedicated to health issues between 2016 and 2019. In the second column, the outcome is the variation of total hospital beds per 100k inhabitants between Jan 2017 and Jan 2020; in the third column, the ICU hospital beds per 100k inhabitants variation between Jan 2017 and Jan 2020. The fourth column reports the estimate of the variation in the share of municipal spending dedicated to health issues between 2019 and 2020. Lastly, the fifth and sixth columns show estimates for the variation of hospital beds per 100k inhabitants between Feb 2020 and Dec 2020 - total beds and ICU beds, respectively. Panel B describes results for the main non-pharmaceutical interventions adopted by mayors until July 2020. The first column outcome is the total number of NPIs adopted. The remaining columns are dummies variables indicating whether a specific NPI was adopted. In any case, we are estimating a first-degree polynomial using a uniform kernel. Optimal bandwidths following Calonico et al. (2014) were chosen to minimize the mean squared error of the local polynomial RD point estimator. Following that same work, we report robust-bias corrected p-values and 95% CIs. All estimates controls for mayor's party ideology and mayor's years of schooling. Following Equation 1, all estimates also account for state fixed-effects. Coefficients significantly different from zero at 99% (***), 95% (**) and 90% (*) confidence level.

Table A13: Impact of female leadership according to President Bolsonaro support - Robustness using quadratic specification

	COVID-19 deaths per 100k pop.	COVID-19 hospitalizations per 100k pop.	SARI deaths per 100k pop.	SARI hospitalizations per 100k pop.	Number of NPIs
Panel A: Above median					
RD Estimator	-43.94	-94.2421	-34.3556	-105.2422	0.4094
Robust p-value	0.003***	0.012**	0.027**	0.047**	0.156
Robust conf. int.	[-72.5556, -15.3243]	[-167.321, -21.1632]	[-64.7128, -3.9984]	[-209.0672, -1.4173]	[-0.1567, 0.9755]
CCT-Optimal BW	15.4581	14.2121	16.6763	14.2337	18.2582
Eff. Number Obs.	351	326	370	327	305
Panel B: Below median					
RD Estimator	-2.5373	-11.3022	-2.9495	-13.2701	0.5405
Robust p-value	0.8033	0.671	0.8085	0.7242	0.1016
Robust conf. int.	[-22.5075, 17.4329]	[-63.4439, 40.8395]	[-26.7999, 20.901]	[-86.9758, 60.4356]	[-0.1066, 1.1877]
CCT-Optimal BW	15.2442	13.8614	14.3811	15.4596	11.4536
Eff. Number Obs.	421	388	399	427	163

Notes: This table reports our RD estimates of the effect of female mayors on few COVID-19 and SARI related outcomes accordingly to Jair Bolsonaro's support across municipalities in the Brazilian 2018 presidential election's second round. The four first columns show our primary outcomes: the number of hospitalizations and deaths by COVID-19 and SARI per hundred thousand inhabitants in 2020 - note that COVID-19 numbers are a subset of SARI numbers. The last column shows the estimate for the number of adopted non-pharmaceutical interventions in the municipality until July 2020. Panel A shows results for municipalities with Bolsonaro's vote-share above (or equal) to Bolsonaro's median municipal vote share. Panel B shows results for municipalities with Bolsonaro's vote-share below Bolsonaro's median municipal vote-share. In both cases, we estimate a second-degree polynomial using a uniform kernel. Optimal bandwidths following Calonico et al. (2014) were chosen to minimize the mean squared error of the local polynomial RD point estimator. Following that same work, we report robust-bias corrected p-values and 95% CIs. All estimates account for state fixed-effects following Equation 1. Coefficients significantly different from zero at 99% (***), 95% (**) and 90% (*) confidence level.

Table A14: Impact of female leadership on COVID-19 deaths and cases: local DID estimates using quarterly data also shows negative effects

	SARI deaths per 100k pop		SARI hospitalizations per 100k pop	
	(1)	(2)	(3)	(4)
Female Mayor × Post Outbreak	-7.096	-9.018	-19.470	-24.444
	[3.038]**	[3.417]***	[9.325]**	[10.737]**
Bandwidth	9.419	15.911	8.566	16.752
Observations	8048	12288	7456	12576
Num. of municipalities	503	768	466	786
R-squared	0.551	0.566	0.657	0.645
Municipality FEs	Yes	Yes	Yes	Yes
State-Year-Quarter FEs	Yes	Yes	Yes	Yes
Year-Quarter FEs × Polynomial	Yes	Yes	Yes	Yes
Polynomial	Linear	Quadratic	Linear	Quadratic

Notes: This table displays estimates of the effect of electing a female mayor in the 2016 election across from a local differences in differences (DID) specification using quarterly data. The local DID regression model has the form $y_{mst} = \beta \cdot FemaleMayor_{ms} \cdot Post\_Outbreak_t + f_t(FemaleVoteMargin_{ms}) + \theta_{ms} + \lambda_{st} + \epsilon_{mst}$ where θ_{ms} captures municipality fixed-effects and λ_{st} captures state-year-quarter fixed effects. $FemaleMayor_{ms} = \mathbb{1}(FemaleVoteMargin_{ms} > 0)$ is an indicator variable equal to one when the municipality m in the state s elected a woman as a mayor in 2016. $Post\_Outbreak_t = \mathbb{1}(t > 2020.1)$ is an indicator variable that equals one after the first quarter of 2020, the last quarter after the COVID-19 outbreak. To mirror our baseline RD specification in a dynamic setting, we control for $f_t(FemaleVoteMargin_{ms}) = f_t(FemaleVoteMargin_{ms}) \cdot \mathbb{1}(FemaleVoteMargin_{ms} > 0) + f_t(FemaleVoteMargin_{ms}) \cdot \mathbb{1}(FemaleVoteMargin_{ms} < 0)$, a year-quarter specific polynomial in the vote-share of female candidates with parameters that vary flexibly for municipalities that elected a man and a woman as a mayor in 2016. Each local DID specification uses the sample of the RD baseline estimates with the same outcome and RD polynomial that is reported in table 1. We display clustered standard errors at the municipality level between squared brackets. Coefficients significantly different from zero at 99% (***), 95% (**), and 90% (*) confidence levels.