Fighting Violence Against Women: The Role of Female Political Representation

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Abstract

We investigate the effect of women's political leadership in local government on homicide and violence against women. Using a regression discontinuity design we compare Brazilian municipalities where a female candidate barely won to those where a female candidate barely lost mayoral elections. Having a female mayor reduces homicide rate of women by 20% and violence (physical, psychological, sexual) by 40%. These results are not due to pre-existing municipalities characteristics or other observable mayor characteristics. Overall, our findings provide compelling evidence that women holding office are effective in addressing violence against women.

Keywords: female politicians, gender, femicide, violence, Brazil, RDD
JEL classification: J16, D72, K42, N36

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1. Introduction

There is a growing body of academic research studying the effect of female political representation on policy decisions and outcomes suggesting that female policymakers are more socially oriented than male ones (Hessami and da Fonseca, 2020; Brollo and Troiano, 2016; Bruce et al., 2022). In this paper, we provide evidence of the effect of female political representation on violence. In particular, we analyze whether the gender of the policymaker affects violence against women (i.e., femicide, physical violence, psychological violence and sexual violence) by focusing on mixed-gender electoral races in Brazilian municipalities.

As emphasized by the United Nations in its sustainable development goal, "eliminating all forms of violence against all women and girls in the public and private spheres" is a crucial objective to achieve gender equality and empower all women and girls. Official statistics provide a clear picture of this global tragedy. One in three women worldwide experience physical or sexual violence affecting both women's well-being and their participation in society and politics.[1] Moreover, more than 50% of homicides with female victims are perpetrated by intimate partners or other family members.[2] Despite being a global issue, violence against women is much more prevalent in low and lower-middle income countries and regions, forcing many countries to adopt specific legislation to criminalize femicide and gender-based violence. For instance in Brazil, according to official statistics, a woman is killed every two hours and assaulted every 15 seconds (Cerqueira and Bueno, 2020).

Over the past few decades, the share of women in politics has significantly increased in almost every country, shaping social and economic policy (Hessami and da Fonseca, 2020). Several empirical and experimental studies have documented that female empowerment and political representation affect policy decisions and outcomes, favoring social policies and interventions and reducing corruption and bribing (Chattopadhyay and Duflo, 2004; Brollo and Troiano, 2016; Eckel and Grossman, 2008). More limited is the evidence about the impact of female representation on crimes, and more specifically how it can affect crime against women. Theoretically, one can expect female representatives

[1] According to the UN 736 million women (roughly 30%) have been subjected to physical and/or sexual violence at least once in their life

[2] In 2017, according to the United Nations Office on Drugs and Crime (UNODC), 87,000 women were intentionally killed.

to influence violence against women via a number of mechanisms. First, female politicians could favor policies that deter violence and increase awareness about this issue. Second, the presence of female leaders could directly affect crime through a "role-model" effect. Third, law enforcement could become more sympathetic toward female victims (e.g., attitudes or incentives). Finally, female officials might differ in their policy preferences in building a peaceful and equitable society: having a less adverse environment could give female victims greater self-confidence and a lower tolerance for being badly treated.

Identifying the causal effects of female leaders on violence is challenging because there could be municipality characteristics that are correlated with both the likelihood of having a female leader and violence against women. Therefore, we apply a regression discontinuity (RD) design focusing on close elections in Brazilian municipalities (2004–2016) assuming that municipalities where a female candidate won against a man by a narrow margin represent a good counterfactual for those municipalities where the opposite occurred (i.e., a male candidate won against a woman by a narrow margin) (Lee et al., 2004).

We find that the presence of a female mayor in Brazilian municipalities is associated with a significant and sizable reduction in femicide and violence against women: a 17% to 22% reduction in femicide and a 30% to 40% reduction in all the other measures of violence against women (physical violence, psychological violence, sexual violence and sexual harassment). Our results are robust to the inclusion of standard controls and to several validation and falsification tests. In particular, we do not find an effect on violent crime against men, general mortality, the motor vehicle accident fatality rate, and the suicide rate for both males and females, separately.

Our paper mainly contributes to two strands of the literature: women in politics and violence against women. First, recent studies provide broad evidence that female political representation affects policies (Hessami and da Fonseca, 2020), improves education and health provision (Chattopadhyay and Duflo, 2004; Clots-Figueras, 2012; Bhalotra and Clots-Figueras, 2014; Bruce et al., 2022), improves public institutions (less corruption/rent-seeking) (Brollo and Troiano, 2016; Jha and Sarangi, 2018; Baskaran et al., 2018) and has no clear effect on public spending (Bagues and Campa, 2021; Ferreira and Gyourko, 2014; Baltrunaite et al., 2019), at least in more developed countries. Second, this paper is related to the expanding literature on violence against women. For instance, Iyengar (2009) finds that mandatory arrest in the case of domestic violence in-

creased femicide, while Chin and Cunningham (2019) find no conclusive evidence. Luca et al. (2015) suggest that policies that restrict access to alcohol may help reduce gender violence in India, while Aizer (2010) provides evidence that a decrease in the gender wage gap reduces violence against women. Iyer et al. (2012) find that an increase in female representation in local government induces a large and significant rise in documented crimes against women in India, reflecting improvements in reporting rather than a rise in actual crimes. Besides these results on the causes of violence against women, Sabia et al. (2013) and Siddique (2021) find that sexual violence against women has significant effects on the subsequent labor market outcomes of the victims.

Thus, we complement the related literature by providing the first clear evidence that there is a link between female political representation and reduced femicide and violence against women

The paper proceeds as follows. Section 2 provides institutional details. Section 3 and Section 4 describe our data and empirical strategy, respectively. Section 5 presents our results and discusses the possible mechanisms at play. Section 6 concludes.

2. Institutional background

2.1. Violence in Brazil

Like other countries in Latin America, Brazil has a high level of violence against women. This is a long-term and persistent phenomenon that has gained attention only in the recent years thanks to the efforts of women's activists and politicians, who have been able to push forward several specific legislative reforms to criminalize femicide and gender-based violence. For example, in 2006, Brazilian legislators passed Law no. 11.340 (known as the "Maria da Penha" Law on Domestic and Family Violence), which establishes criminal sanctions for perpetrators of domestic violence against women and domestic violence courts. However, it also requires Brazilian authorities to protect and assist the victims of violence through special police bodies and stations and shelters for women. In the following years, there were additional initiatives and further legislation was approved. For instance, in 2013 the "Mulher, Viver sem Violencia" wa promoted. It aimed to improve public policies in favor of female victims of violence. 2015 saw the enactment of the Feminicide Law, which changed the Brazilian Penal Code by including feminicide as a qualifier for the crime of homicide.

Despite these efforts to combat violence against women, there were no substantial changes to the overall level of violence.[3] For example, the female homicide rate (FHR) was 4.2 per hundred thousand in 2018, slightly decreasing from the previous 15 years in which the average homicide rate was about 4.3. Looking at the geographical distribution, we can see that the most violent states in 2018 are Roraima (FHR= 18.8), Ceará (FHR= 10.2) and Acre (FHR=8.0), while the least violent are São Paulo (FHR= 1.9), Santa Catarina (FHR= 2.6) and Piauí (FHR= 3.1). The heterogeneity in the level of violence across municipalities is quite significant, as demonstrated by the fact that, in 2018, around 75% of municipalities did not have any cases of female homicides in their territory, while in those municipalities with at least one case, the FHR ranges between almost 0 and more than 100, with an average of 13.4.

Our empirical analysis aims to highlight whether this cross-sectional heterogeneity could in part be explained by the gender of the local political leader.

2.2. Local politics

Brazil is a federal republic governed under a presidential system, with a federal government, 26 states and 5,570 municipalities. Each municipality has an autonomous local government, comprising a mayor (prefeito) and a legislative body (câmara municipal). Local governments are responsible for the provision of several local public goods (e.g., primary education, culture, health care, housing, transportation and municipal infrastructure). The mayor plays a central role in defining the expenditure programs, while the city council is responsible for enacting municipal laws and overseeing the mayor on the usage of public resources.

Mayors are elected in a one-round election in municipalities with less than 200,000 registered voters, while a run-off may take place in municipalities with more 200,000 voters, when no mayoral candidate achieves at least 50% of the votes in the first round. Mayors can be in office for up to two four-year terms. City councilors are elected based on an open list proportional representation system, in which parties' share of seats is proportional to the number of votes cast for their candidates. According to population size, the number of councilors varies from a minimum of 9 to a maximum of 55. All elected municipal officials take office from January 1st of the year following the elections.

[3]It is worth pointing out that we are not suggesting that these laws were not effective, as it might be the case that violence would have increased in absence of the reforms.

With respect to equal gender representation in politics, since 1997 the electoral law requires a minimum of 30% of candidates of each sex on electoral lists (e.g., party or coalition). Despite the electoral quota, the percentage of women in politics in Brazil is relatively low in both the national and the local governments. Currently, 75 of the 513 deputies are women (14.6%), as well as 11 out of 81 senators (13.6%). Appendix Table A.1 provides some statistics on the presence of women in local politics in the sample (three consecutive terms) we use for the analysis. Looking at the share of female mayoral candidates and female mayors we see that women's participation in local elections is relatively low (in 2004, 8% and 7% respectively), but increases over time (an increase of 4 p.p for both measures from 2004 to 2012). In contrast, the share of female councilors is steady at around 13%.

3. Data

3.1. Homicide and violence data

Our analysis considers two main categories of crime against the person: i) homicide and ii) violence against the person. Data on homicide come from the Brazilian Ministry of Health's TABNET Platform and cover the period 2000-2016. The Mortality Information System (Sistema de Informação de Mortalidade - SIM) provides detailed data at the municipality-year level about the causes of individuals' deaths. We consider homicides, defined as the number of deaths provoked by external causes through aggression: the group X85–Y09 of the International Classification of Diseases (ICD 10). For additional analysis in the robustness section we also consider (from the same source) deaths due to traffic accidents, suicide and a general measure of mortality (excluding homicide). All measures are expressed as a rate for hundred thousand inhabitants. One of the main advantages of using murder as a proxy for violence is related to under-reporting. It is well-known that official crime statistics may suffer from under-reporting, but this is much less applicable for murders (MacDonald, 2002). Data on violence comes from the Violence and Accidents Surveillance System (Sistema de Vigilância de Violências e Acidentes - VIVA) which provides municipality-year level data about different types of violence for the period 2009-2016. Our analysis focuses on cases of physical violence, psychological violence, sexual violence and sexual harassment against women expressed as a rate per hundred thousand inhabitants. Relevantly, the law mandates health providers to report

suspected or confirmed cases of domestic violence, other violence and sexual violence. To a certain extent, this provision of the law reduces the relevance of under-reporting issues.

3.2. Local election data

We focus on data about municipal elections for three electoral terms (2005–2008, 2009–2012 and 2013–2016). Our data source is the Brazilian Electoral Court (Tribunal Superior Eleitoral). For each candidate in each municipal election, we know: vote share, sex, education (graduatd or not), age and party of affiliation. It is worth noting that, as we apply an RD design in the empirical analysis, only municipalities with mixed-gender races are considered, therefore the final sample will be composed of all municipalities-terms in which the two top candidates were of different sexes. Overall, we have 3,080 observations, of which 804 are from the term 2005-2008, 1023 from the term 2009-2012 and 1253 from the term 2012-2016.

3.3. Other data

We complement the previous data with a set of municipal characteristics from the Brazilian Institute of Geography and Statistics (IBGE) collected for the 2000 Brazilian decennial census. The data includes municipality-level covariates, such as population, the share of females in the population, average income per capita, the percentage of active individuals in the total population and of individuals employed in different economic sectors, income inequality with a GINI index, the percentage of the population living below the national poverty line and the percentage of illiterate individuals older than 15 years.

Summary statistics for all variables are reported in Appendix Table A.2, while their descriptions and sources are in Appendix Table A.3.

4. Empirical strategy

Identifying the causal effect of having a female mayor on violence against women is challenging. Simply comparing violent outcomes of municipalities governed by a female to those governed by a male mayor would not deliver a causal estimate, as the assignment

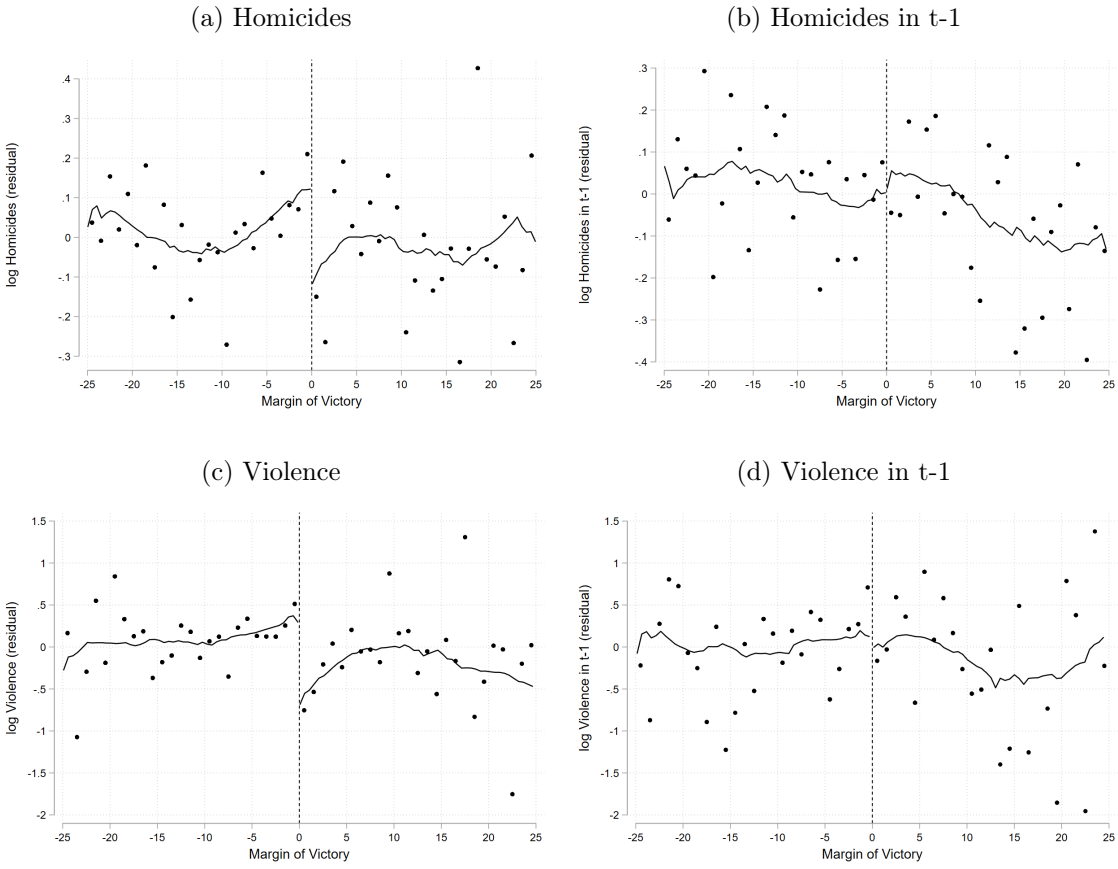
of mayoral sex is not random. Therefore, we apply an RD design to our sample of mixed-gender electoral races using the following empirical specification:

$$Y_{ist} = \alpha + \beta F_{ist} + f(MV_{ist}) + \mathbf{X}_{ist} + \epsilon_{ist} \tag{1}$$

where the dependent variable, Y_{ist}, denotes the sum of cases of violent events that took place in municipality i, belonging to state s, in term t. F_{ist} is a dummy variable indicating whether a woman wins the mayoral race in election t in municipality i, while the running variable MV_{ist} is the margin of victory in elections defined as the difference in the votes received by the two most voted-for candidates. $f()$ is a polynomial function calculated on the margin of victory. $\mathbf{X}_{ist}$ includes a set of municipal pre-determined covariates, contemporaneous mayoral characteristics and term and state fixed effects that we include in our preferred specification to improve precision in our estimates (Calonico et al., 2019). Finally, ϵ_{ist} is the error term. β is our coefficient of interest, and under specific assumptions (i.e., continuity of the density of the margin of victory and that the treatment does not affect other covariates), its estimate provides a causal effect. In the Appendix, we show the results from standard validity checks of RD design. Specifically, we show that the density of the running variable is continuous at the threshold (Appendix Figure A.1) and that pre-determined characteristics are balanced (Appendix Table A.4).[4]

For the actual implementation, we use a linear function with a rectangular kernel and employ a mean-squared error (MSE) optimal bandwidth (Calonico et al., 2014), while errors are clustered at the municipality level to account for serial correlation in the error component.

Figure 1: Female Mayor and Violence against Women



Notes: In each panel the dependent variable is the residual from a regression of the reported type of event on a set of municipal and individual covariates as well as year and state fixed effects. Plotted points are conditional means with a bandwidth of 1. The solid line is the predicted values of a local linear smoother with a rectangular kernel and a bandwidth of 7.

5. Results

5.1. Violence against women

Our results are graphically presented in Figures 1 and 2 and show the relationship between the margin of victory and the per capita number of violent outcomes (in log) once we partial out covariates and fixed effects.[5] In Figure 1 we report the results when focusing on female homicides and violent acts against women (i.e., aggregating all types of violence), using alternatively the contemporaneous and prior term outcomes. Interestingly, we can identify discontinuity at the threshold for the contemporaneous outcome, while no clear discontinuity is displayed for the outcome in the previous term. Overall, the graphical evidence hints at the presence of an effect of having a female mayor on violent acts against women, which is not confounded by pre-existing differences. In Figure 2 we furterh detail on the type of violent acts by reporting results separately for physical violence (panel a), psychological violence (panel b), sexual violence (panel c) and sexual harassment (panel d). Consistent with the initial findings there is discontinuity at the threshold for the three types of violent acts taken separately and in addition also to sexual harassment.

In Table 1 we report the formal estimates as defined in the empirical strategy section.[6] In the first panel we show the RD estimates when we do not include controls, while in the second panel we include as covariates municipal level pre-determined characteristics, mayoral characteristics and term and state fixed effects. The effects highlighted in the graphical reporting are confirmed in the estimates.[7] Homicide rates (column 1) are between 22% (i.e., $100 \times [exp(-0.250) - 1]$) and 17% (i.e., $100 \times [exp(-0.186) - 1]$) lower

[4]Like other contexts we find that female candidates improve the overall quality of the pool of candidates (Baltrunaite et al., 2014). In particular, we show that female mayors are more educated than male mayors. We provide evidence that our results are not affected by this discontinuity. First, we show that interacting them with the treatment status does not change the results, and if anything they are more precise (Appendix Table A.8). Second, using an RD design, we show that the mayor's education does not matter for violence against women (Appendix Table A.10).

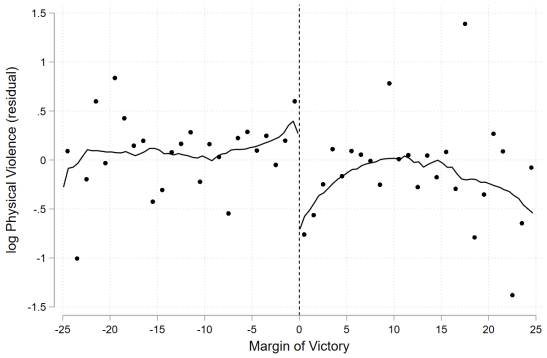
[5]In both figures, the plotted points are conditional means from the residuals, with a size of 1, and the solid line is the predicted values of a local linear smoother with a rectangular kernel and a bandwidth of 7.

[6]In the online Appendix Tables A.9 and A.6, we report our estimates by vary the size of the bandwidth and order of polynomial function, respectively. Next, in online Appendix Figure A.2, we report coefficients' estimates and confidence intervals of a series of placebo checks in which we arbitrarily change the cut-off value. Overall, we find our results to be robust to this set of sensitivity checks.

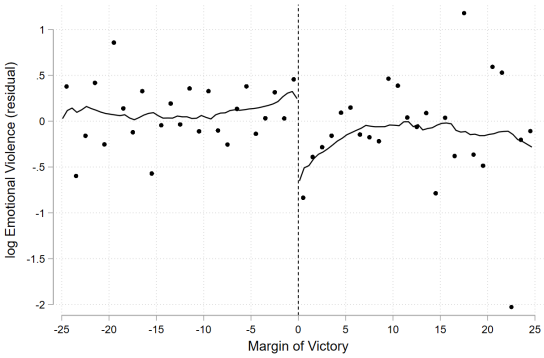
[7]To provide the correct percentage effect of the estimated treatment we apply the transformation $100 \times [exp(\text{estimated effect}) - 1]$.

Figure 2: Female Mayor and Different Type of Violence against Women

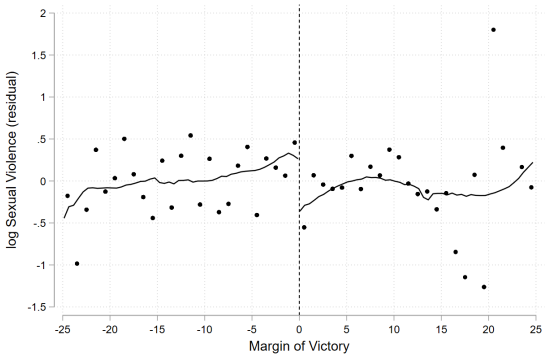
(a) Physical Violence



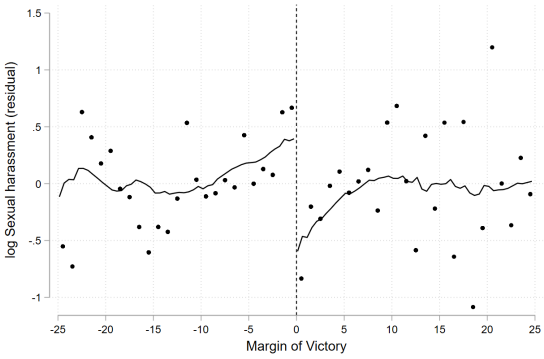
(b) Psychological Violence



(c) Sexual Violence



(d) Sexual Harassment



Notes: In each panel the dependent variable is the residual from a regression of the reported type of event on a set of municipal and individual covariates as well as year and state fixed effects. Plotted points are conditional means with a bandwidth of 1. The solid line is the predicted values of a local linear smoother with a rectangular kernel and a bandwidth of 7.

Table 1: Female Mayor and Violence Against Women

	(1) ln(Homicides)	(2) ln(Physical Violence)	(3) ln(Psychological Violence)	(4) ln(Sexual Violence)	(5) ln(Sexual Harassment)
	Panel A: without covariates				
Female Mayor	-0.250**	-0.617***	-0.491**	-0.389*	-0.790***
	(0.117)	(0.237)	(0.226)	(0.212)	(0.259)
bandwidth	10.08	11.8	14.36	13.44	12.03
n. obs.	[388,390]	[369,350]	[375,334]	[252,214]	[166,146]
outcome mean (100k pop.)	29.3	357.4	231.1	52.3	41.2
	Panel B: with covariates				
Female Mayor	-0.186*	-0.572***	-0.524***	-0.414**	-0.509**
	(0.103)	(0.200)	(0.202)	(0.174)	(0.211)
bandwidth	9.99	8.95	10.76	10.38	8.33
n. obs.	[385,390]	[279,282]	[295,275]	[197,177]	[111,110]
outcome mean	29.4	346.5	212.4	53.0	38.7

Notes: The dependent variable is defined as the sum of violent events in an electoral term in per-capita terms. The column headings identify the types of violent events. Covariates include municipality level and mayoral level characteristics, as well as electoral term and state fixed effects. Municipality features include population size, occupational composition, income level, income inequality and previous experience with a female mayor. Mayoral features are age, level of education and party of affiliation (PT, PSDB, DEM, PMDB). The estimates in Column 1 are based on data from three electoral terms (2004-2016), while the estimates in Columns 2 to 5 the estimates use data from two electoral terms (2008-2016). The coefficients are constructed using local linear estimators with a rectangular kernel. Robust standard errors are clustered at the municipality level in parentheses * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

in the presence of a female mayor with a level of statistically significance that ranges between 10% and 5%. As the homicide rate in a term is on average 29 per hundred thousand female inhabitants, the estimated effect would imply a reduction of around 5 cases per hundred thousand women. For all types of violence (from column 2 to column 4) and sexual harassment (column 5) we again find significant reductions, which are larger than the one estimated for homicide rates. Physical violence is reduced by between 43% and 46%, psychological violence by between 38% and 40%, sexual violence by around 33% and sexual harassment by between 39% and 54%. All coefficients reach the conventional level of statistical significance.

5.2. Additional results

In this section, we provide evidence about the relationship between having a female mayor and other outcomes. First, we test whether the effect of having a female mayor on violent acts is also present when looking at male victims. Therefore, in panel A of Table 2, we report the estimates from our main specification, this time using as dependent variables relating to violence against men. Columns 1 and 2 show that there

Table 2: Female Mayor and Violence: Placebo

	(1) ln(Homicides)	(2) ln(All type of Violence)	(3) ln(Other Deaths)	(4) ln(Traffic Accidents)	(5) ln(Suicide)
	Panel A: Male victim				
Female Mayor	0.063	-0.298	-0.015	0.013	-0.077
	(0.081)	(0.308)	(0.043)	(0.053)	(0.073)
bandwidth	10.70	11.52	13.54	14.08	12.79
n. obs.	[726,631]	[198,162]	[967,824]	[983,827]	[722,638]
outcome mean (100k pop.)	153.7	240.1	325.4	184.9	54.5
	Panel B: Female victim				
Female Mayor	-0.186*	-0.558***	-0.006	0.074	-0.004
	(0.103)	(0.184)	(0.060)	(0.076)	(0.100)
bandwidth	9.99	11.17	10.68	11.39	12.11
n. obs.	[385,390]	[372,341]	[719,645]	[641,559]	[369,337]
outcome mean	29.4	544.1	88.3	48.0	23.5

Notes: The dependent variable is defined as the sum of violent events in an electoral term in per-capita terms. The column-heads identify the type of violent events. Covariates include municipality level and mayoral level characteristics as well as electoral term and state fixed effects. Municipality features include population size, occupational composition, income level, income inequality and previous experience with a female mayor. Mayoral features are age, level of education and party of affiliation (PT, PSDB, DEM, PMDB). Estimates in Column 1 are based on data from three electoral terms (2004-2016), while in Columns 2 to 5 the estimates use data for two electoral terms (2008-2016). The coefficients are constructed using local quadratic estimators with rectangular kernel. Robust standard errors clustered at the municipality level in parenthesis * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

is no effect on the homicide rate and (total) violence, respectively.[8] This result seems to reinforce the idea that having a female mayor does not have a general effect on violent crimes, but, rather the effect is limited to violence against women. It also rules out the possibility that our main result could be driven by some change associated with the arrival of a female mayor coming to power that would alter the overall level of violence. For example, this would be the case if one expects a female mayor to apply stronger policies for combating inequality or to be effective in improving economic growth, given the link between economic condition and violence (Aizer, 2010).

Next, we report a set of additional results addressing other possible concerns related to the main evidence being just the consequence of some structural reforms occurring during a female mayor's tenure affecting mortality in general. Again in Table 2, we show the effect of having a female mayor on general mortality (column 3), the motor vehicle accident fatality rate (column 4) and the suicide rate (column 5) for both males (panel A) and females (panel B) separately. Overall, the coefficients are very close to zero and none of them are statistically significant, suggesting the specific deterrence effect towards crime against women.

5.3. Discussion on the mechanisms

Our results point to a clear "reduced form" effect of having a female mayor on violence against women. However, the actual mechanisms that make this possible are not easy to clearly identify with the available data. Therefore, in this section, we discuss a set of potential channels that could explain our evidence and that are in line with previous findings. First, women might propose or enact policies with different objectives from those preferred by men simply because gender affects the kind of life experiences one has (Hessami and da Fonseca, 2020). This seems plausible in our context, as women can be expected to be more sympathetic than men toward the specific type of crime studied in this paper. Yet this is unlikely to happen directly via law and order, as in the Brazilian setting police activity and law enforcement are tasks assigned to the upper levels of government. Nevertheless, we cannot exclude some indirect influences that make the police more responsive to crimes against women, for instance by making the issue more salient. In addition, it is worth noting that violence against women could be indirectly

[8] We do not report the results separately for each type of violence because of the limited number of events, which drastically reduces the number of observations and therefore the reliability of the estimates.

affected by other policies that female mayors are more likely to pursue. For instance, female mayors might be more willing to help women access economic and social resources and to support the introduction of institutions to protect women under threat.

Next, besides policy changes one might expect our results to be explained by a role model hypothesis where having a female mayor would help change the norms that accept violence against women (Beaman et al., 2012; Chong and Ferrara, 2009). For instance, one can expect the exposure of women to successful female politicians to empower women, making them more likely to stand against acts of violence (Jensen and Oster, 2009). Similarly, there might be changes in how men perceive the role of women in society, therefore, changing the interactions between the two sexes (Beaman et al., 2009).

6. Conclusion

This paper highlights the effect of female political leadership on femicide and violence against women. By using Brazilian municipality-level data for the period 2005-2016 and exploiting an RD design in close elections, we provide evidence that the election of a female mayor causes a large and significant reduction in femicide and violence against women. Our findings are robust to placebo regressions and to standard validation and falsification tests in the RD design. This effect is not confounded by the initial presence of violence and is not part of a more general reduction in violence. Our evidence adds to the growing body of research emphasizing the effect of increasing female representation in public offices on society. More research is needed to empirically test through which channels women in politics are affecting violence (e.g., a role model effect or policy changes).

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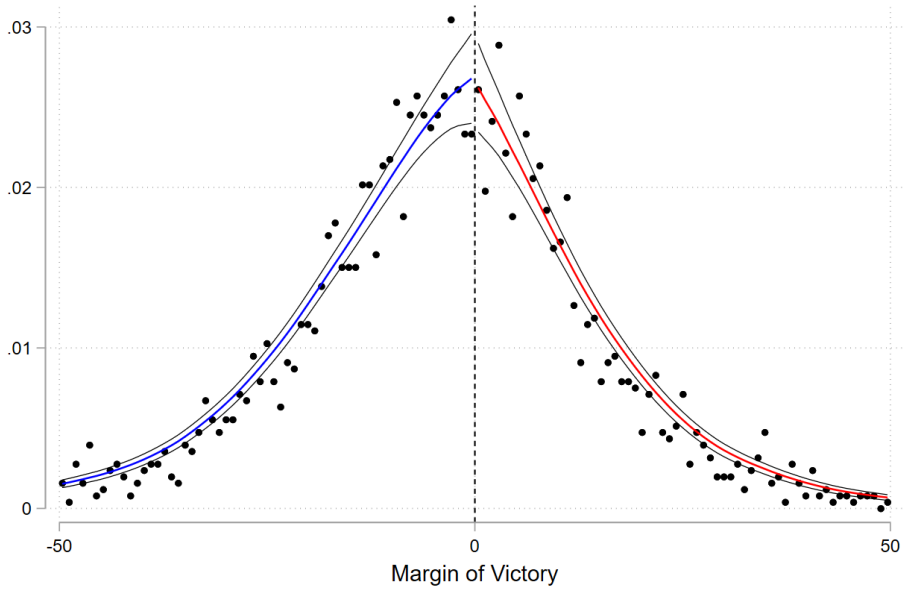
A. Appendix

List of Figures

List of Tables

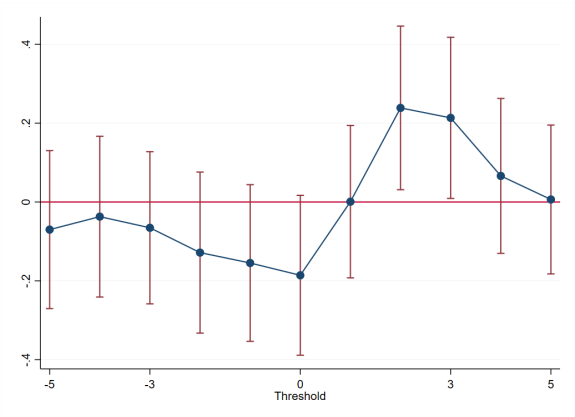
Figure A.1: Continuity of the Density of the Margin of Victory



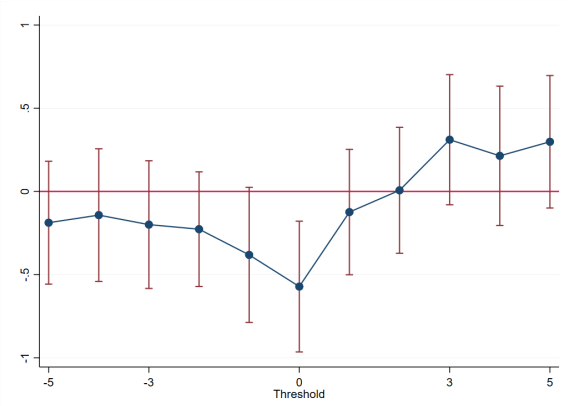
Notes: McCrary's test on the density of the running variable at the threshold - Estimated discontinuity: -0.014 s.e.(0.079).

Figure A.2: Different Cut-offs

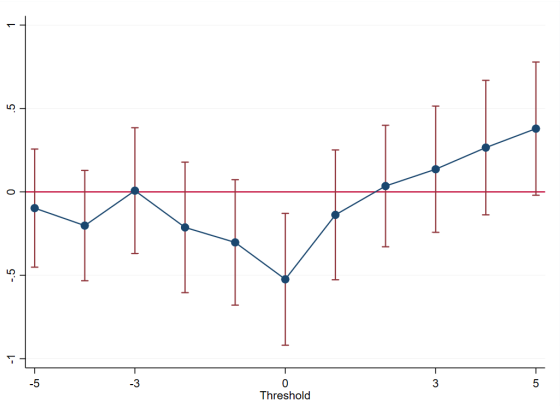
(a) Homicides



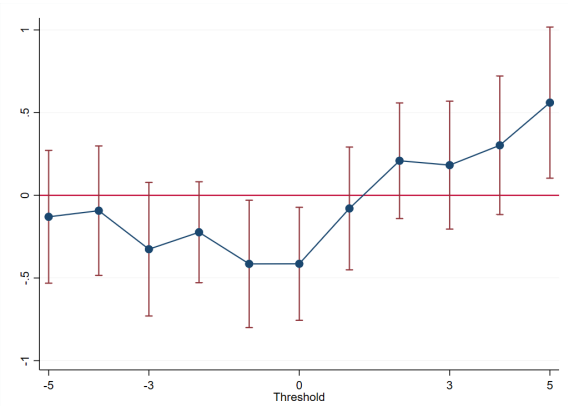
(b) Physical Violence



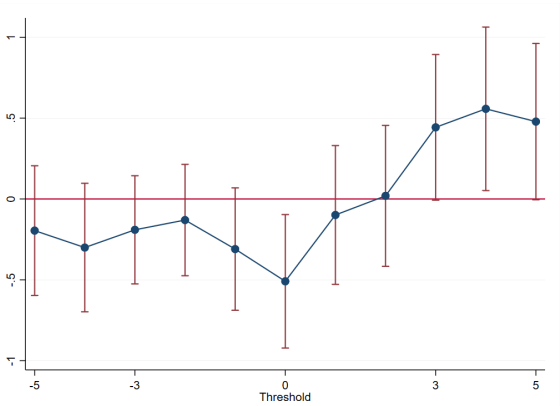
(c) Psychological Violence



(d) Sexual Violence



(e) Sexual Harassment



Notes: This figure displays the effect of female mayors on the number of homicides and violence cases for different (and placebo) cutoffs. The largest negative and significant coefficients are at the 0 threshold.

Table A.1: Women in Local Elections

Term	Female Mayoral Candidates	Female Mayors	Female Councilors
2005-2008	8.6%	7.4%	12.6%
2009-2012	10.9%	9.1%	12.6%
2013-2016	13.5%	11.8%	13.6%

Notes: This table reports the share of women among the top two candidates in mayoral elections, the share of female mayors and the share of females in the city council, for the three electoral terms used in the analysis.

Table A.2: Summary Statistics

	Obs	Mean	Std.Dev.	Min	Max
Panel A. Violence Data					
Female					
Homicide	3,080	.0001544	.0002156	0	.0030002
Other Deaths	3,080	.0007986	.000569	0	.0064599
Physical Violence	3,080	.0016847	.0044631	0	.0721649
Psychological Violence	3,080	.0008761	.0034212	0	.1305842
Sexual Violence	3,080	.0001373	.0004038	0	.007948
Sexual Harassment	1,344	.0001812	.0004326	0	.0046707
All Types of Violence	3,080	.0026981	.007563	0	.2027491
Traffic Accidents	3,080	.0003552	.0003942	0	.0051852
Suicides	3,080	.0001006	.0001828	0	.0017986
Male					
Homicide	3,080	.0013927	.001354	0	.0100759
Other Deaths	3,080	.0032216	.001314	0	.0101246
Physical Violence	3,080	.000411	.0018441	0	.034949
Psychological Violence	3,080	.0001873	.0007128	0	.012789
Sexual Violence	3,080	1.87e-06	.000026	0	.0008826
Sexual Harassment	3,080	.0001314	.000097	0	.0003572
All Types of Violence	3,080	.0006001	.0023246	0	.0402211
Traffic Accidents	3,080	.0017807	.001016	0	.0071828
Suicides	3,080	.0004165	.0004308	0	.0058824
Panel B. Municipality Level Characteristics					
Margin of Victory Female	3,080	-3.823204	22.77738	-100	100
Population (2000)	3,080	23637.57	66662.29	873	2141402
Female Population (2000)	3,080	11895.65	34935.04	414	1139166
Income (2000)	3,080	543.156	310.003	55.567	3062.481
Agriculture (2000)	3,080	16.427	8.937	.041	66.199
Industry (2000)	3,080	3.724	3.736	0	35.390
Commerce (2000)	3,080	7.161	3.593	.264	27.764
Employed Population (2000)	3,080	36.904	7.711	11.862	74.464
Poverty (2000)	3,080	10.426	7.972	.388	45.661
Gini Coefficient (2000)	3,080	.557	.068	.297	.880
Illiterates (2000)	3,080	24.404	12.799	1.595	60.661
Female Heads of Household (2000)	3,080	5.239	1.706	1.08	14.244
Female Mayor Before	3,080	.275	.446	0	1
Panel C. Individual Level Characteristics					
Age	3,080	48.265	9.392	23	82
Graduate	3,080	.511	.499	0	1
Party PT	3,080	.094	.292	0	1
Party PSDB	3,080	.138	.345	0	1
Party DEM	3,080	.049	.215	0	1
Party PMDB	3,080	.195	.396	0	1

Notes: The variable "All type of Violence" includes physical, sexual and psychological. The variable "Other Deaths" includes all cases of Deaths except those caused by aggression (ICD10, all categories except X85-Y09)

Table A.3: Data Description

Variable	Description	Source
Dependent variables		
Female (Male) Homicide	Cases of homicides by gender of the victim per 100k inhabitants (ICD10, categories X85-Y09)	SIM[1]
Female (Male) Other Homicides	Cases of unintentional homicides by gender of the victim per 100k inhabithants (ICD10, All categories except X85-Y09)	SIM
Physical Violence	Cases of psychological violence against women per 100k inhabitants (violent acts in which physical force is used intentionally, not accidentally, with the aim of injuring, harming, causing pain and suffering, or destroying the person, leaving, or not, evident marks on their body)	SINAN[2]
Psychological Violence	Cases of physical violence against women per 100k inhabitants (every form of rejection, depreciation, discrimination, disrespect, exaggerated demand, humiliating punishments and use of the person to meet the psychic needs of others. It is any action that jeopardizes or damages a person's self-esteem, identity or development)	SINAN
Sexual Violence	Cases of sexual violence against women per 100k inhabitants (any action in which a person, taking advantage of his position of power and using physical force, coercion, intimidation or psychological influence, with or without the use of weapons or drugs, forces another person to witness or participate in any way in sexual interactions, or to use, in any way, their sexuality, for-profit, revenge or any other intention)	SINAN
Sexual Harassment	Cases of sexual harassment against women per 100k inhabitants (untimely insistence, regardless of sex or sexual orientation, with questions, proposals, claims, or other forms of the forced approach of a sexual nature)	SINAN
Female (Male) Traffic Accidents	Cases of traffic accidents by gender of the victim per 100k inhabitants	SIM
Female (Male) Suicides	Cases of suicides by gender of the victim per 100k inhabitants	SIM

Table A.3: Data Description (cont.)

Variable	Description	Source
Municipal characteristics		
Population (2000,2010)	Number of inhabitants in the municipality (Census 2000 and 2010)	IBGE[4]
Female population (2000,2010)	Number of females in the municipality (Census 2000 and 2010)	IBGE
Income (2000)	Average income of the working population of the municipality	IBGE
Agriculture (2000)	Percentage of citizens employed in the agricultural sector	IBGE
Industry (2000)	Percentage of citizens employed in the industrial sector	IBGE
Commerce (2000)	Percentage of citizens employed in the commercial sector	IBGE
Employed population (2000)	Percentage of employed persons in relation to population	IBGE
Poverty (2000)	Percentage of poor people in relation to population (monthly household income below R$ 140.00)	IBGE
Gini Coefficient (2000)	Gini Coefficient	IBGE
Illiterates (2000)	Percentage of people aged 15 and over who cannot read or write a simple note	Ipeadata[3]
Female heads of household (2000)	Percentage of female heads of households, without a spouse and with children under 15 years of age at home	Ipeadata
Female before	Mayor in the previous term was female	TSE[5]
Mayoral characteristics		
Age	Age of mayor in election term	TSE
Graduated	Mayor has a degree (Superior Completo)	TSE
Married	Mayor is married	TSE
Party PT	Mayor belongs to Partido dos Trabalhadores	TSE
Party PSDB	Mayor belongs to Partido da Social Democracia Brasileira	TSE
Party DEM	Mayor belongs to Democratas	TSE
Party PMDB	Mayor belongs to Movimento Democrático Brasileiro	TSE

Notes: 1. The Mortality Information System (SIM); 2. The Information System for Notification of Diseases (SINAN); 3. The Institute of Applied Economic Research (IPEA); 4. Instituto Brasileiro de Geografia e Estatistica(IBGE); 5. Tribunal Superior Eleitoral (TSE)

Table A.4: Municipal and Mayoral Characteristics Balance at the Threshold

Variable	RD Estimator	std. error	N. Obs.	Bandwidth
Municipality level				
Population (2000)	679.472	4373.348	[248 , 246]	8.48
Female population (2000)	-1.655	1.452	[490, 403]	18.34
Share of pop. in agriculture (2000)	-1.806	1.461	[399 , 345]	14.39
Share of pop. in industry (2000)	0.080	0.708	[344 , 316]	11.91
Share of pop. in commerce (2000)	0.062	0.618	[319 , 300]	10.86
Share of pop. employed (2000)	-0.082	1.538	[371 , 335]	13.31
Gini Coefficient - Income (2000)	-0.013	0.013	[320 , 300]	10.95
Share poor pop. (2000)	-1.288	1.529	[337 , 310]	11.42
Income (2000)	-52.511	57.005	[314 , 296]	10.75
Share of pop. illiterates (2000)	-0.029	2.416	[298 , 288]	10.26
Share of households with female head (2000)	0.442	0.310	[339 , 316]	11.73
Female mayor in previous terms	0.017	0.049	[884 , 783]	12.08
Individual level				
Party PT	-0.028	0.035	[925 , 811]	12.79
Party PSDB	-0.004	0.035	[931 , 814]	12.90
Party DEM	-0.014	0.024	[905 , 798]	12.44
Party PMDB	-0.054	0.043	[832 , 731]	11.08
Age	0.499	0.994	[993 , 842]	13.85
Graduated	0.190***	0.050	[1047 , 881]	15.05

Table A.5: Female Mayor and Violence Against Women: Pre-treatment Effect

	(1) ln(Homicides)	(2) ln(Physical Violence)	(3) ln(Psychological Violence)	(4) ln(Sexual Violence)	(5) ln(Sexual Harassment)
	Pre - treatment				
Female Mayor	-0.006	0.098	0.084	0.145	0.137
	(0.076)	(0.196)	(0.201)	(0.174)	(0.228)
bandwidth	10.96	8.96	9.12	10.56	8.25
n. obs.	[530,519]	[291,311]	[251, 266]	[209,203]	[109,128]

Notes: The dependent variable is defined as the sum of violent events in a pre-electoral term in per-capita terms. The column headings identify the types of violent events. Covariates include municipality level and mayoral level characteristics, as well as electoral term and state fixed effects. Municipality features include population size, occupational composition, income level, income inequality and previous experience with a female mayor. Mayoral features are age, level of education and party of affiliation (PT, PSDB, DEM, PMDB). The estimates in Column 1 are based on data from three electoral terms (2004-2016), while the estimates in Columns 2 to 5 use data from two electoral terms (2008-2016). The coefficients are constructed using local linear estimators with a rectangular kernel. Robust standard errors are clustered at the municipality level in parentheses. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

Table A.6: Female Mayor and Violence Against Women: Quadratic Polynomial RD Estimator

	(1) ln(Homicides)	(2) ln(Physical Violence)	(3) ln(Psychological Violence)	(4) ln(Sexual Violence)	(5) ln(Sexual Harassment)
	Panel A: without covariates				
Female Mayor	-0.215*	-0.940***	-0.959***	-0.776***	-0.824***
	(0.125)	(0.307)	(0.292)	(0.285)	(0.274)
bandwidth	19.94	15.33	17.11	14.32	26.74
n. obs.	[677,564]	[452,403]	[429,364]	[264,219]	[283,202]
outcome mean (100k pop.)	28.5	367.0	231.3	51.9	41.4
	Panel B: with covariates				
Female Mayor	-0.270**	-0.703***	-0.676***	-0.515**	-0.573**
	(0.132)	(0.256)	(0.235)	(0.243)	(0.249)
bandwidth	14.60	13.20	16.74	13.74	18.19
n. obs.	[548,491]	[406,373]	[422,363]	[261,216]	[225,178]
outcome mean	28.8	362.6	230.2	52.1	41.3

Notes: The dependent variable is defined as the sum of violent events in an electoral term in per-capita terms. The column headings identify the types of violent events. Covariates include municipality level and mayoral level characteristics, as well as electoral term and state fixed effects. Municipality features include population size, occupational composition, income level, income inequality and previous experience with a female mayor. Mayoral features are age, level of education and party of affiliation (PT, PSDB, DEM, PMDB). The estimates in Column 1 are based on data from three electoral terms (2004-2016), while the estimates in Columns 2 to 5 use data from two electoral terms (2008-2016). The coefficients are constructed using local quadratic estimators with a rectangular kernel. Robust standard errors are clustered at the municipality level in parentheses. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

Table A.7: Female Mayor and Violence Against Women: Extensive Margin

	(1) Homicides	(2) Physical Violence	(3) Psychological Violence	(4) Sexual Violence	(5) Sexual Harassment
Female Mayor	0.043	0.012	-0.042	-0.052	0.002
	(0.052)	(0.034)	(0.040)	(0.041)	(0.045)
bandwidth	11.43	17.69	13.89	14.53	10.98
n. obs.	[855,754]	[1181,949]	[996,843]	[1020,863]	[822,724]
outcome mean (100k pop.)	0.546	0.782	0.750	0.752	0.768

Notes: The dependent variable is defined as the dummy of violent events in an electoral term in per-capita terms. The column headings identify the types of violent events. Covariates include municipality level and mayoral level characteristics, as well as electoral term and state fixed effects. Municipality features include population size, occupational composition, income level, income inequality and previous experience with a female mayor. Mayoral features are age, level of education and party of affiliation (PT, PSDB, DEM, PMDB). The estimates in Column 1 are based on data from three electoral terms (2004-2016), while the estimates in Columns 2 to 5 use data from two electoral terms (2008-2016). The coefficients are constructed using local linear estimators with rectangular kernel. Robust standard errors are clustered at the municipality level in parentheses. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

Table A.8: Female Mayor and Violence Against Women: Interaction with Level of Education

	(1) ln(Homicides)	(2) ln(Physical Violence)	(3) ln(Psychological Violence)	(4) ln(Sexual Violence)	(5) ln(Sexual Harassment)
Female Mayor	-0.183*	-0.410**	-0.342*	-0.423**	-0.405**
	(0.103)	(0.200)	(0.202)	(0.174)	(0.210)
bandwidth	9.99	8.95	10.76	10.38	8.33
n. obs.	[385,390]	[279,282]	[295,275]	[197,177]	[111,110]

Notes: The dependent variable is defined as the sum of violent events in an electoral term in per-capita terms. The column headings identify the types of violent events. The level of education is defined as 1 if the mayor has a degree (Superior Completo). Covariates include municipality level and mayoral level characteristics, as well as electoral term and state fixed effects. Municipality features include population size, occupational composition, income level, income inequality and previous experience with a female mayor. Mayoral features are age, level of education and party of affiliation (PT, PSDB, DEM, PMDB). The estimates in Column 1 are based on data from three electoral terms (2004-2016), while the estimates in Columns 2 to 5 use data from two electoral terms (2008-2016). The coefficients are constructed using local linear estimators with a rectangular kernel. Robust standard errors are clustered at the municipality level in parentheses. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

Table A.9: Female Mayor and Violence Against Women: Different Bandwidth

	(1) ln(Homicides)	(2) ln(Physical Violence)	(3) ln(Psychological Violence)	(4) ln(Sexual Violence)	(5) ln(Sexual Harassment)
			Double		
Female Mayor	-0.045	-0.350***	-0.293**	-0.061	-0.538***
	(0.079)	(0.154)	(0.156)	(0.144)	(0.175)
bandwidth	19.99	17.91	21.52	20.76	16.66
n. obs.	[678,564]	[522,436]	[496,400]	[342,255]	[213,172]
			Half		
Female Mayor	-0.243*	-0.682***	-0.455**	-0.35	-0.636***
	(0.157)	(0.255)	(0.251)	(0.255)	(0.236)
bandwidth	5.00	4.48	5.38	5.19	4.16
n. obs.	[196,197]	[146,149]	[141,150]	[85,88]	[58,56]

Notes: The dependent variable is defined as the sum of violent events in an electoral term in per-capita terms. The column headings identify the types of violent events. Covariates include municipality level and mayoral level characteristics, as well as electoral term and state fixed effects. Municipality features include population size, occupational composition, income level, income inequality and previous experience with a female mayor. Mayoral features are age, level of education and party of affiliation (PT, PSDB, DEM, PMDB). The estimates in Column 1 are based on data from three electoral terms (2004-2016), while the estimates in Columns 2 to 5 use data from two electoral terms (2008-2016). The coefficients are constructed using local linear estimators with rectangular kernel. The two optimal bandwidth choices were used: double and half. Robust standard errors are clustered at the municipality level in parentheses. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

Table A.10: Mayor's Level of Education and Violence Against Women

	(1) ln(Homicides)	(2) ln(Physical Violence)	(3) ln(Psychological Violence)	(4) ln(Sexual Violence)	(5) ln(Sexual Harassment)
Graduate Mayor	-0.108	-0.000	0.176	-0.040	-0.154
	(0.068)	(0.203)	(0.229)	(0.206)	(0.283)
bandwidth	0.11	0.10	0.10	0.08	0.06
n. obs.	[556,922]	[241,710]	[199,612]	[93,342]	[45,185]
outcome mean (100k pop.)	30.1	86.1	41.2	21.3	-14.3

Notes: TThe dependent variable is defined as the sum of violent events in an electoral term in per-capita terms. The column ¬headings identify the types of violent events. Covariates include municipality level and mayoral level characteristics, as well as electoral term and state fixed effects. Municipality features include population size, occupational composition, income level, income inequality and previous experience with a female mayor. Mayoral features are age and party of affiliation (PT, PSDB, DEM, PMDB). The estimates in Column 1 are based on data from three electoral terms (2004-2016), while the estimates in Columns 2 to 5 use data from two electoral terms (2008-2016). The coefficients are constructed using local linear estimators with rectangular kernel. Robust standard errors are clustered at the municipality level in parentheses. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

Table A.11: Female Mayor and Violence Against Women: Adding Pre-treatment Outcome Variable as Covariates

	(1) ln(Homicides)	(2) ln(Physical Violence)	(3) ln(Psychological Violence)	(4) ln(Sexual Violence)	(5) ln(Sexual Harassment)
Female Mayor	-0.186*	-0.453***	-0.471***	-0.409**	-0.375*
	(0.101)	(0.179)	(0.186)	(0.186)	(0.197)
bandwidth	10.28	10.49	11.44	9.14	8.54
n. obs.	[401,396]	[330,314]	[315,294]	[168,158]	[115,114]

Notes: The dependent variable is defined as the sum of violent events in an electoral term in per-capita terms. The column headings identify the types of violent events. Covariates include municipality level and mayoral level characteristics, as well as electoral term and state fixed effects and pre-treatment effect. Municipality features include population size, occupational composition, income level, income inequality and previous experience with a female mayor. Mayoral features are age, level of education and party of affiliation (PT, PSDB, DEM, PMDB). The estimates in Column 1 are based on data from three electoral terms (2004-2016), while the estimates in Columns 2 to 5 use data from two electoral terms (2008-2016). The coefficients are constructed using local linear estimators with rectangular kernel. Robust standard errors are clustered at the municipality level in parentheses. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.