Women politicians reduce violence against women: Evidence from Mexico

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Abstract

Do women politicians address violence against women more than men politicians? This study looks at contemporary Mexico and estimates the effects that women politicians in local executive office have on violence against women using a regression discontinuity design leveraging close elections. We find that women mayors reduce some of the most egregious violent crimes committed against women compared to men mayors. On average, municipalities governed by a women had 70% fewer homicides of women over the three-year mayoral term. As evidence of possible mechanisms, we show that women-led municipalities also had a higher proportion of women leading municipal institutions and working as support staff for the municipal council and were more likely to provide specialized services for crime victims.

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Are women politicians better at addressing violence against women (VAW)[1] than men politicians? VAW is a pervasive global problem, with one in three women experiencing physical or sexual violence at least once in their lifetime (World Health Organization 2021). With the share of women in politics steadily increasing around the world and VAW gaining political salience, it is critical to understand whether women politicians are more effective at reducing VAW.

At the legislative level, scholars have found no association between the number of women in legislatures and either the comprehensiveness of VAW policies and their implementation (Beer 2017) or progressive policies to combat VAW (Htun and Weldon 2012). At the sub-national level, however, some have found that women's representation in local government can decrease deeply engendered attitudes and beliefs and shift their attitudes and behavior towards women and VAW (Beaman et al. 2009; Iyer et al. 2012; Kuipers 2020). Perhaps most relevant, a study looking at India found that women's descriptive representation in local governments and as heads of local governments had no effect on the prevalence of VAW crimes but did increase the number of reported crimes against women, as well as arrests for these crimes (Iyer et al. 2012). Related studies analyzing women executives and gendered policies have found that women leaders invest more in infrastructure that directly benefits women (Chattopadhyay and Duflo 2004), raise the educational attainment of girls (Beaman et al. 2012), increase spending on women's issues (Funk and Philips 2019), and change the gendered composition of bureaucracies (Alberti et al. 2022; Erlandsen et al. 2022). Thus, while the effect of women's local political representation through executive positions on actual instances of VAW remains relatively unexplored, there is good reason to believe women executives may impact these outcomes.[2]

This short article provides an initial empirical evaluation of this issue through an analysis

[1] VAW is defined as "any act of gender-based violence that results in, or is likely to result in, physical, sexual, or mental harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or in private life" (United Nations 1993).

[2] Recently, two simultaneous efforts by Bochenkova et al. (2023) and Delaporte and Pino (2022) find that women mayors reduce VAW in Brazil, however, neither explore the mechanisms.

of women mayors and VAW in contemporary Mexico. The article uses a pre-registered regression discontinuity design (RDD) and leverages the as-if-random "treatment" of a women mayor narrowly winning a close election against men candidates to assess whether women-led municipalities have systematically different VAW outcomes than those led by men.[3] Drawing on data from the 2018 local elections in Mexico for 1,324 municipalities and VAW outcomes during the three years of the mayoral term that followed (2019-21), we find that municipalities with women mayors have 4.4 fewer homicides of women and 2.6 fewer homicides of young women over the course of the three-year term. We also probe possible mechanisms and find that municipalities with women mayors have a higher proportion of women-led municipal institutions and women support staff for the municipal council, and were more likely to provide specialized services and care for crime victims through public security institutions.

1 Background and Data

We focus on Mexico, where women's political representation is high and VAW is prevalent and politically salient. Between 2015 and 2018, the proportion of women mayors nearly doubled, from 14 to 26% (ONU Mujeres 2018). Yet, recent reports show that over 70% of Mexican women suffer from violence at least once in their lives (INEGI 2021), and an average of ten women are murdered every day (OECD 2017). VAW has become a key political and electoral topic (Arista 2022) and since the early 2000s, Mexican national and subnational governments have created numerous institutions specifically to address women's issues and prevent gender-based violence.[4]

Mexico has 2,454 municipalities governed by an elected mayor (*presidente municipal*) who oversees the municipal council (*ayuntamiento*). Mayors are elected by plurality voting and serve for three years. Municipal elections occur in June and mayors take office near the end of election year. We focus on the effect of mayors on VAW because they tend to

[3]The Pre-Analysis Plan is registered at the OSF Registry and included in the Appendix.
[4]For example, see here, here, and here.

have closer links to citizens, are better able to respond to local issues, and because Mexico's federal system bestows considerable *de jure* and *de facto* powers to local policymakers (Selee 2011), including over municipal institutions, public programs, and law enforcement, which can affect the prevalence of VAW.

To determine the effect of women mayors on VAW in Mexico, we create a dataset covering 1,324 local elections in 2018 across 22 states[5] and VAW data during the three years of the mayoral administration (2019–2021). Using data from each state's electoral agency, we hand-code the sex of the first and second place candidates[6], and calculate the difference in the share of votes received by the top two candidates. Of the 1,324 municipalities analyzed, 559 (42%) held elections where a woman and a man were the top two vote-receiving candidates.

We analyze the effect of women mayors on various forms of VAW for the 2018 mayoral administration. We explore these outcomes disaggregated by term year to analyze temporal effects, and pooled (total instances) to examine overall effects. Using official death certificate data from Mexico's Statistical Agency (*INEGI*), we find the total number of women in each municipality that died by homicide in each year. We also create a measure of homicides of young women between the ages of 15 and 44, because women in this age group are particularly vulnerable to VAW in Mexico (SEGOB et al. 2017) and Latin America (Economic Commission for Latin America and the Caribbean 2021). To measure other forms of VAW, we use official data from the National Security Agency (*SESNSP*) on instances of reported rape, domestic violence, sex abuse, and sexual harassment from 2019 to 2021. One limitation is that these reported crimes are not disaggregated by the gender of the victim. However, since 90% of sexual violence victims are women both in Mexico(Universal 2019) and worldwide (UN Women 2022), we believe that these data are a valid measure of our proposed concept. Moreover, if any reporting bias is present, measures drawn from crime report data should *understate* the prevalence of VAW, leading our estimate of the treatment effect to be

[5]25 states held local elections in 2018. We exclude Oaxaca, as is standard in the literature, because hundreds of its municipalities follow indigenous self-governance, and Tabasco and Yucatán due to lack of data on candidate gender.

[6]Details on how sex was coded are in the Appendix.

more conservative (Jaitman and Anauati 2019).

2 Research Design

To estimate the effect women politicians have on VAW, we leverage an RDD of close elections. Our research design exploits close mayoral races in 2018 where either: (1) a woman candidate narrowly defeats a man candidate, or (2) a man candidate narrowly defeats a woman candidate, ($n = 559$). The close election RDD allows us to leverage the election of a women as an as-if-random "treatment" to estimate the causal effect of having a woman mayor on VAW. If the continuity assumption is met, municipalities where a woman narrowly defeated a man should serve as a good counterfactual for municipalities where a man narrowly defeated a woman (De la Cuesta and Imai 2016).

Formally, we estimate the following specification:

$$Y_i = \alpha + \tau W_i + \beta f(X_i) + \epsilon_i \tag{1}$$

where Y_i denotes the number of instances of a particular VAW outcome in municipality i; W_i is a binary variable that takes the value of 1 if a woman was elected mayor in municipality i and 0 otherwise; the running variable X_i is the margin of victory which takes positive values when a woman candidate wins and negative values when a man candidate wins; and $f(X_i)$ is a polynomial that denotes the functional form used to estimate the model. The coefficient of interest is τ, which estimates the causal effect of having a woman mayor on outcome Y_i.

Following the literature, we estimate first and second-order polynomials (Calonico et al. 2014; Gelman and Imbens 2019) using optimal bandwidths that minimize the mean-squared error (Calonico et al. 2014) and robust standard errors. We report and interpret conventional RDD estimates in the main text and include the robust bias-corrected RDD estimates in the Appendix. Results across the two estimation methods are consistent, but conventional estimates are more conservative. We rely on the `rdrobust` package in `R` to estimate the RDD

(Calonico et al. 2015).

2.1 Identification and Threats to Inference

We run a series of tests to evaluate the robustness of the main results and include the details in the Appendix. First, the key assumption of the RDD is that potential outcomes are continuously distributed at the treatment cutoff; that is, the only change at the cutoff is the treatment status (De la Cuesta and Imai 2016). This assumption could be violated if candidates can influence their assignment-to-treatment (the margin of victory) and sort nonrandomly around the threshold. We conduct the McCrary test (McCrary 2008) and a nonparametric test (Cattaneo et al. 2020) and find no evidence of sorting. Discontinuities in confounding variables at the threshold could also violate the identification assumption. Using municipality-level gendered sociodemographic data from the 2010 Census – e.g., number of women, economically active women, and women-run households; average education of women – we conduct balance tests by estimating the RDD with these variables as outcomes. We find no discontinuity at the threshold, suggesting that the findings are not driven by underlying gendered differences across municipalities.

Additionally, we conduct two placebo tests by using *past* VAW outcomes: homicides of women and young women in 2010, to align with the sociodemographic Census data, and in 2017, to capture VAW outcomes before the election (see Figure 1, Plots A and B). Null results in both tests provide compelling evidence that women politicians did not self-select into *and* win close elections in municipalities with low VAW levels. There is also no evidence of a spurious correlation due to some confounding municipal characteristic driving both low VAW levels and the electoral success of women politicians in close elections.

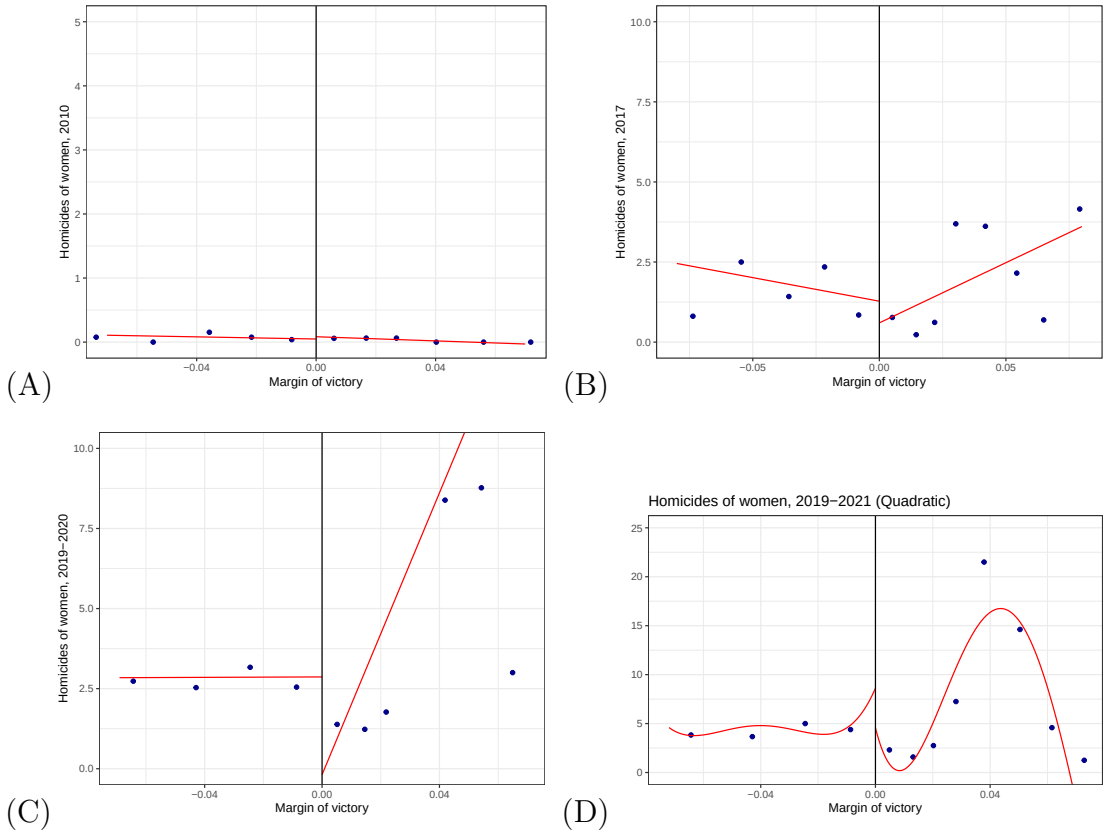

Figure 1: Linear RDD plots for (A) homicides of women in 2010 (placebo), (B) homicides of women in 2017 (placebo), (C) homicides of women from 2019-2021, and quadratic RDD plot for (D) homicides of women from 2019-2021. Running variable is winning margin. Bandwidths are optimized to minimize the mean-squared error. Data is binned using spacing estimators. The `rdrobust` package in `R` is used to estimate the RDD.

3 Results

Table 1 shows the main RDD estimates for the different VAW outcomes during a mayor's first (2019), second (2020), and third (2021) year in office, as well as pooled results for the total three-year administration. We present the results for RDDs estimated using both linear and second-order polynomial specifications.

We find strong evidence that women politicians reduce the most severe forms of VAW, including homicides of women and young women, and instances of rape. We find suggestive evidence that they reduce other forms of VAW like domestic violence, sex abuse, and sexual harassment. Specifically, the more conservative linear RDD point estimates find that during

Table 1: Regression discontinuity results: Effect of women politicians on VAW

	Linear RDD				Quadratic RDD			
	2019	2020	2021	Pooled	2019	2020	2021	Pooled
Homicides of women	−1.029	−1.680**	−1.069	−4.439**	−3.082**	−3.277**	−3.395**	−9.453***
	(0.769)	(0.666)	(0.840)	(2.075)	(1.419)	(1.357)	(1.441)	(3.644)
n	210	205	255	209	228	220	252	225
Bandwidth	0.073	0.070	0.093	0.072	0.081	0.077	0.092	0.079
Homicides of young women	−0.503	−1.632**	−0.261	−2.597*	−2.068**	−2.417**	−1.940*	−6.223**
	(0.584)	(0.676)	(0.609)	(1.497)	(1.051)	(1.109)	(1.068)	(2.734)
n	227	179	285	216	241	223	248	225
Bandwidth	0.081	0.061	0.108	0.075	0.086	0.078	0.090	0.080
Rape	−2.894	−4.622	−6.842*	−14.968	−6.325	−6.223*	−9.676**	−22.353*
	(2.657)	(2.960)	(3.638)	(9.279)	(3.927)	(3.590)	(4.408)	(11.669)
n	249	194	195	206	257	264	264	261
Bandwidth	0.090	0.067	0.067	0.070	0.095	0.100	0.099	0.097
Domestic violence (in tens)	−6.991	−5.486	−7.182	−22.026	−10.939	−14.746*	−16.141**	−41.816*
	(5.486)	(5.350)	(5.771)	(16.390)	(6.825)	(7.578)	(8.097)	(22.285)
n	219	265	255	244	274	275	268	273
Bandwidth	0.076	0.100	0.092	0.087	0.104	0.105	0.101	0.103
Sex abuse	−4.051	−2.824	−8.264	−12.191	−14.431*	−15.286*	−19.832**	−49.477*
	(5.175)	(5.552)	(6.969)	(17.487)	(8.771)	(7.918)	(9.670)	(25.976)
n	264	274	240	263	259	266	258	260
Bandwidth	0.099	0.104	0.085	0.098	0.097	0.101	0.096	0.097
Sexual harassment	−1.939	−0.830	−2.536	−5.174	−3.263*	−3.577	−5.964**	−12.942*
	(1.420)	(2.091)	(2.557)	(6.026)	(1.951)	(2.319)	(3.030)	(7.079)
n	222	295	265	262	284	311	295	293
Bandwidth	0.077	0.113	0.100	0.098	0.108	0.122	0.113	0.112

Conventional RDD estimates with robust standard errors and optimal bandwidth that minimizes mean-squared errors.
Robust standard errors shown in parentheses.
* p < 0.1, ** p < 0.05, *** p < 0.01

their three-year terms, women mayors reduce homicides of women by 0.505 standard deviations (SDs) (SD = 8.783 among observations within the MSE optimal bandwidth, to the left of the cutoff), and homicides of young women by 0.409 SDs (SD = 6.349 among observations within the MSE optimal bandwidth, to the left of the cutoff). These effects are substantively large, and suggest that women-led municipalities have 4.4 fewer homicides of women (a 70% decline) and 2.6 fewer homicides of young women (59% decline) over a three-year period.

For other VAW-related crimes, all linear and quadratic RDD point estimates are negative. Results from both RDD specifications indicate that women politicians significantly reduce rape after their second year in office ($p < 0.1$ in linear models; $p < 0.05$ in quadratic models) and that they have a more discernible impact on non-homicide VAW outcomes the longer they are in office. The estimates from the quadratic RDD indicate that women mayors

systematically reduce instances of domestic violence, sex abuse, and sexual harassment by their third year in office ($p < 0.05$), and overall during their term ($p < 0.1$). Since data on non-homicide VAW come from *reported* crimes, these results could reflect a reduction in VAW reporting, rather than VAW prevalence. We believe our findings are unlikely to be caused by a negative reporting effect for three reasons: (1) our results using death certificate data show that women mayors reduce actual homicides of women; (2) we show women mayors do not reduce reporting of non-VAW crimes (see below); and (3) previous research shows that women politicians *increase* VAW reporting (Iyer et al. 2012).

3.1 Probing Mechanisms

Mayors may be able to influence VAW through several channels (see INMUJERES 2005, 2022). We probe possible mechanisms through quantitative and qualitative evidence. First, using official administrative data on municipal governments in 2020 (the only year for which these data are available) to estimate the RDD, Table 2 shows that municipalities governed by women mayors had a higher proportion of women leading municipal institutions and working as support staff for the municipal councils, which is consistent with research showing that women politicians increase women's representation in bureaucracies (Alberti et al. 2022; Erlandsen et al. 2022). We further find that local public security institutions are more likely to provide specialized services and care for victims. Additional results, although not statistically significant, suggest that women-led municipalities also allocated a larger percent of their budget to institutions addressing women's issues and established channels for citizen participation. Second, we qualitatively investigate a subset of women politicians in our sample that won by an extremely narrow margin ($0 \leq X_i \leq 0.2\%$, $n = 33$) to examine whether they advanced women's issues and how they approached VAW. Results (shown in Appendix) provide evidence that many women mayors spearheaded diverse initiatives to raise awareness of and combat VAW, often utilizing municipal institutions to execute programs, workshops, events, and services aimed at reducing VAW.

Table 2: Women politicians and administrative outcomes. RDD estimates, linear (top) and quadratic (bottom).

	Women support staff (% of total)	Women institution leaders (% of total)	Budget for women institutions (% of total)	Formal channel for citizen participation	Police provided specialized victim care
Woman mayor	14.793*	7.393***	0.427	0.132	0.344***
	(7.986)	(2.575)	(0.270)	(0.116)	(0.125)
p	1	1	1	1	1
n	322	293	313	310	239
Bandwidth	0.127	0.111	0.125	0.121	0.091
Woman mayor	15.325	6.162*	0.462	0.159	0.395***
	(10.024)	(3.330)	(0.318)	(0.157)	(0.143)
p	2	2	2	2	2
n	404	345	379	358	347
Bandwidth	0.180	0.142	0.170	0.150	0.159

Conventional RDD estimates with robust standard errors and optimal bandwidth that minimizes mean-squared errors.
* p < 0.1, ** p < 0.05, *** p < 0.01

3.2 Additional Tests

We also explore the possibility that women politicians may address violence and crime more broadly by estimating the RDD using the following outcomes: homicides of men and young men, as well as four of the most prevalent crimes in Mexico (extortion, home burglary and vehicle theft, kidnapping, and drug dealing). We find that municipalities led by women mayors also have fewer homicides of men and young men. However, unlike the results for VAW, the coefficients for homicides of (young) men decrease and lose their statistical significance at the 5% level by the second year of the term. We also find that women politicians have no effect on the prevalence of reported non-VAW crimes for any year. Although women's leadership may lead to a short-term decline in overall homicides, it has no effect on other non-VAW crimes. These results suggest that our main findings capture the distinct impact of women mayors on VAW. See the Appendix for a detailed discussion of additional tests.

4 Concluding Remarks

We find that Mexican municipalities led by women mayors had fewer homicides of women and fewer reported instances of VAW, relative to municipalities led by men, and provide suggestive evidence that they also had higher proportions of women-staff in local govern-

ments and actively spearheaded anti-VAW initiatives. However, these results are limited to contemporary Mexico and further research should be conducted in other contexts. Nevertheless, the findings highlight the importance of women's representation in local politics in advancing women's safety.

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