Supplementary Appendix: Representation Behind Closed Doors: The Effect of Electing Women Mayors on Domestic Violence

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Contents

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1 Appendix A: Security Plan

Municipality security plans were processed in two stages using Python. First, the *pypdf* package[1] was used to clean for stop words, tokenize, and export into a bag-of-words data frame. Some files could not be processed this way due to being scanned images, so the second stage utilized Python OCR. Python OCR is a technology that extracts text from images, such as scanned documents and photos, using Python.[2] This process was completed using the open-source OCR engine Tesseract. Security files that could not be processed in the first stage were treated as images and processed through OCR, resulting in another bag-of-words data frame.

Table A1 shows the keywords of interest for this analysis in Spanish (left-hand table) and English (right-hand table). The most common mentions are “mujeres" or “women", closely followed by the singular of this keyword and “intrafamilial". The “vif" keyword refers to intrafamilial violence, which is also common across the documents.

Table A1: Keyword Mentions in Security Plans

Keyword	Mentions
femicidios	5
femicidio	6
intrafamiliar	853
mujer	858
vif	668
genero	7
mujeres	895
violencia	125

Keyword	Mentions
femicides	5
femicide	6
intrafamilial	853
woman	858
vif	668
gender	7
women	895
violence	125

Table A2 lists the municipalities and years for security reports, totaling 115 security plans from Chilean municipalities spanning 2011 to 2024.

[1]For documentation on usage, see https://github.com/py-pdf/pypdf.

[2]For documentation on this process, see https://builtin.com/data-science/python-ocr.

Table A2: Security Plans for Municipality-Years

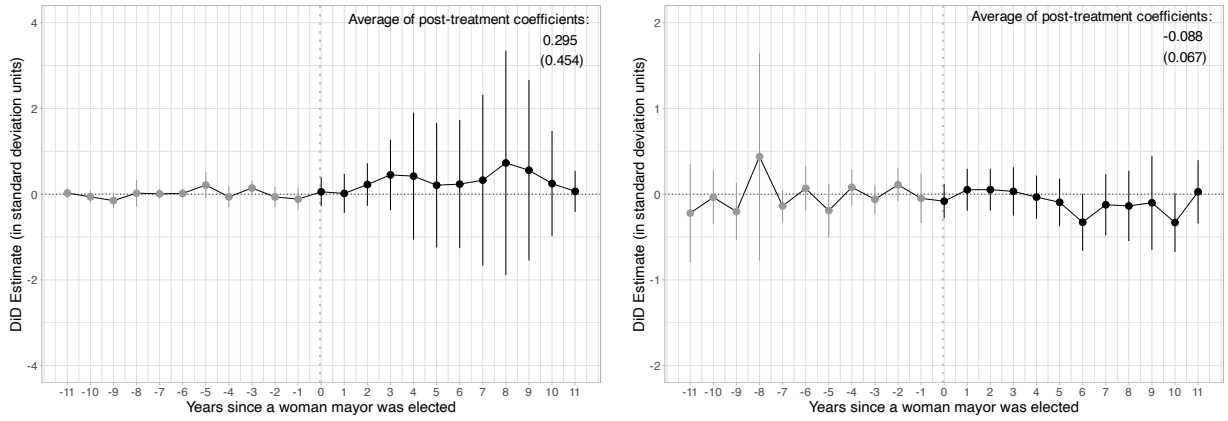
Municipality	Years
Alto Del Carmen	2018, 2019, 2020
Ancud	2022
Antofagasta	2022
Arica	2021, 2024
Buin	2019
Cabo De Hornos	2017
Cabrero	2023
Calbuco	2018
Castro	2020
Cerro Navia	2022
Chillan	2022
Cholchol	2019
Chonchi	2017, 2023
Colina	2021, 2022
Collipulli	2022
Conchali	2017, 2022
Coquimbo	2022
Coyhaique	2022
Curepto	2022
El Tabo	2022, 2025
Freirina	2017
Futaleufu	2022
Huechuraba	2022
Iquique	2020
La Cruz	2022
La Florida	2022
La Pintana	2020
La Reina	2017
Lautaro	2023
Limache	2023
Lo Padro	2019
Los Alamos	2018
Los Angeles	2017, 2021
Los Lagos	2023
Los Vilos	2017

Municipality	Years
Mejillones	2023
Melipilla	2019
Molina	2022
Mulchen	2021, 2022
Nueva Imperial	2017, 2021
Nunoa	2016, 2017
Osorno	2016
Ovalle	2022
Padre Hurtado	2022
Padre Las Casas	2023
Paillaco	2022
Paredones	2018
Parral	2011
Pelluhue	2022
Penaflor	2022
Penalolen	2022
Pichilemu	2017, 2022
Pitrufquen	2021
Providencia	2021, 2023
Pucon	2019
Puente Alto	2022, 2023
Puerto Montt	2023
Puerto Varas	2022
Purranque	2016
Putaendo	2023
Quilicura	2022
Quinta De Tilcoco	2022
Quintero	2022
Quisco	2021
Rancagua	2016
Recoleta	2020
Renca	2017
Rengo	2022
Rinconada	2023
Saavedra	2017

Municipality	Years
San Antonio	2015, 2021
San Fabian	2023
San Fernando	2022
San Javier	2022
San Joaquin	2022
San Miguel	2021
San Pedro De Atacama	2021
San Vicente De Tagua Tagua	2022
Santiago	2019, 2023
Sierra Gorda	2019, 2023
Tagua Tagua	2022
Talca	2022
Talcahuano	2015
Temuco	2022
Teno	2022
Teodoro Schmidt	2022
Tocopilla	2023
Tucapel	2017
Valdivia	2022, 2023
Valparaiso	2017
Vichuquen	2022
Victoria	2023
Villa Alegre	2021, 2023
Villa Alemana	2022
Vina Del Mar	2022

2 Appendix B: Alternative Explanations

An alternative explanation for substantive representation is that women are simply better mayors, leading to a general increase in reports of other offenses that affect people's quality of life. Women mayors might improve reporting avenues overall, resulting in more complaints about various types of crimes. To test this alternative explanation, we focus on two common offenses in Chile that are typically reported by citizens: disturbing the peace and public intoxication. If women mayors are enhancing communication between citizens and the government, we would expect to see an increase in reports of these offenses.



(a) Public Intoxication

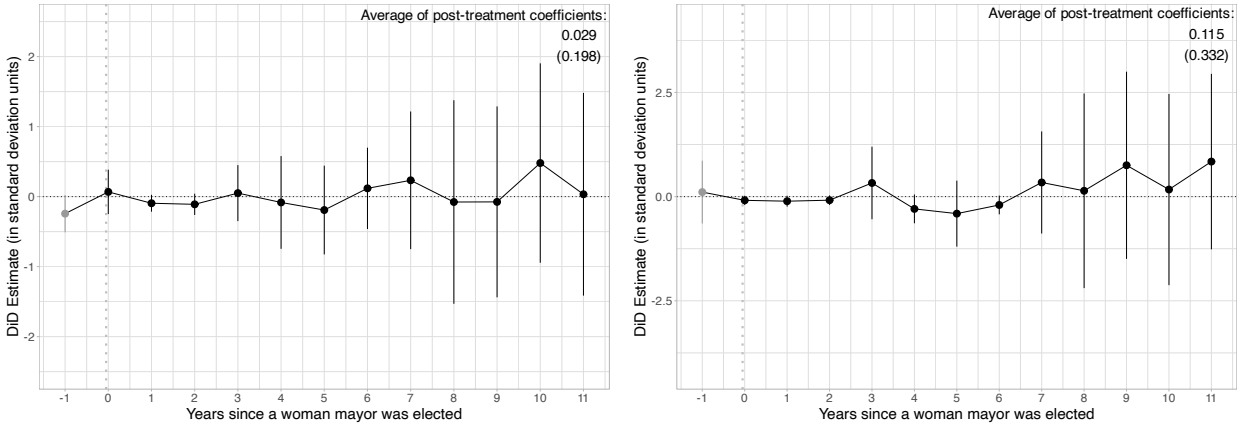
(b) Disturbance of the peace

Figure A1: Average effect of having a woman mayor on reports of alternative offenses. A length of exposure of -1 refers to the period before the first exposure, 0 to the first exposure, and 1 to the second exposure. The overall treatment effect is reported with coefficients, standard errors in parentheses, and (*) denoting p-values lower than 0.1. N = 4,729 (municipality-year observations).

We do not find evidence that women mayors have either an overall or dynamic effect on offenses typically reported by citizens, such as public intoxication and disturbance of the peace. This finding strengthens the interpretation of substantive representation, suggesting that women mayors specifically facilitate the reporting of violence that disproportionately affects women.

Additionally, we investigate whether women mayors enhance the security performance of mu-

nicipalities, which could have two implications. First, improved security might explain changes in reporting. Second, and more importantly, it could influence our primary outcome: cases found by the police. In other words, if women mayors improve security measures, our benchmark may no longer serve as a true baseline or reference for reports but instead become an outcome or consequence of electing women mayors. To explore this possibility, we examine the impact of electing a woman mayor on two security-related outcomes: the number of security cameras and the number of security booths.



(a) Number of security cameras (logged)

(b) Number of security booths (logged)

Figure A2: Average effect of having a woman mayor on reports of alternative offenses. A length of exposure of -1 refers to the period before the first exposure, 0 to the first exposure, and 1 to the second exposure. The overall treatment effect is reported with coefficients, standard errors in parentheses, and (*) denoting p-values lower than 0.1. N = 4,729 (municipality-year observations).

We do not find evidence that electing women mayors affects the number of security cameras or security booths. We interpret this as a lack of support for the explanation that our main findings are driven by improved security performance. Additionally, this provides extra support for our benchmark outcome—cases found by the police—since women mayors do not appear to improve security performance.

3 Appendix C: Length of Effects

Figure A3 shows that electing a woman mayor increases reports of domestic violence around five years after her election, but this impact completely disappears ten years later. Why do these effects diminish over time? There are two plausible explanations for this: (i) municipalities controlled by men catch up with those controlled by women following a highly salient national discussion about domestic violence in 2010, which culminated in Congress passing a law on femicides (Vásquez Mejías, 2015); or (ii) policies that facilitate reporting fail to address the structural dynamics of violence against women and therefore may not have long-term consequences for reports of violence (Franceschet, 2010).

To determine which of these explanations is supported by the data, we disaggregate the dynamic difference-in-differences effects by the year of first exposure. Four groups are analyzed: never-treated, first exposed in 2009, first exposed in 2013, and first exposed in 2017 (with data spanning from 2005 to 2020). This allows us to compute the effects for three different groups: those first exposed in 2009, 2013, and 2017.

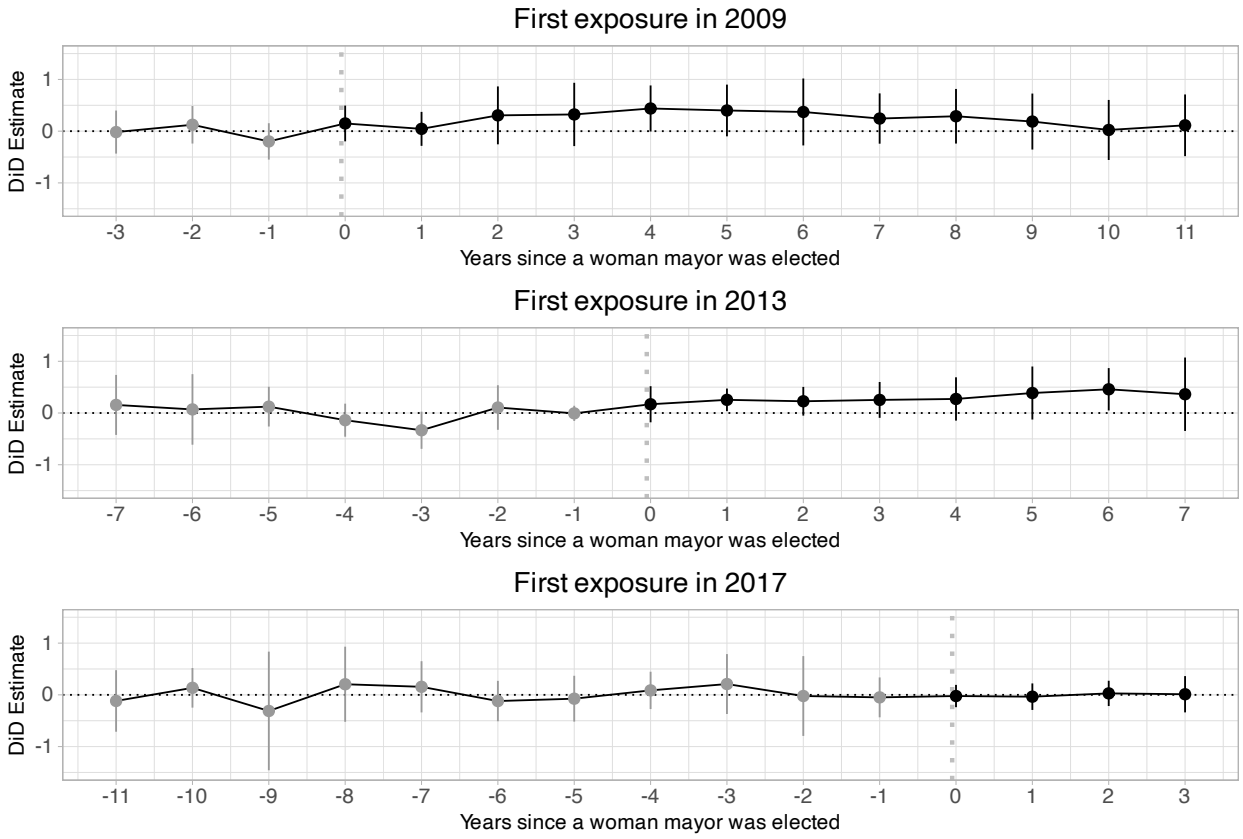


Figure A3: Average effect of having a woman mayor on violence against women by length of exposure and by group (first exposure in 2009, 2013, and 2017). A length of exposure of -1 refers to the period before the first exposure, 0 to the first exposure, and 1 to the second exposure. N = 4,353, 4,321, and 4,251 (municipality-year observations).

Figure A3 provides consistent results across the three subgroups. For units exposed in 2009, we observe an increase in reports but then they completely disappear ten years after first exposure. For units exposed in 2013, we also observe an increase but since our data do not extend beyond 2020, we cannot compute effects beyond seven years after exposure for this group. Finally, for units exposed in 2017, we do not observe an effect within the first three years, unlike the previous groups.

Given that patterns are similar for groups first exposed in 2009, 2013, and 2017, suggesting that the length of exposure to a woman mayor, rather than the year itself, explains the effects. This undermines the idea that men-controlled municipalities are catching up following the 2010

law categorizing femicides. Finally, we note that the effects are not immediate (as seen in the first, second, and third plots) and vanish after a few years (first plot). This pattern aligns with the second explanation, suggesting that the reforms lose power over time rather than being driven by contextual factors, such as men-controlled municipalities catching up with women-controlled municipalities. We encourage further research to have a better understanding of the long-term effects of electing women.

4 Appendix D: Regression Discontinuity Design

As an alternative empirical strategy, we employ a regression discontinuity design (RDD) in close electoral races, comparing municipalities where a woman narrowly wins over a man to those where a man narrowly wins over a woman. In this RDD setup, the unit of analysis is the municipality-year. Each municipality has a score based on the margin in the previous local election, and treatment is assigned if the score exceeds a particular cutoff. The treatment is defined as having a woman mayor (with a man as the runner-up), while the control is defined as having a man mayor (with a woman as the runner-up). The score represents the vote share difference between women and men candidates (the margin of victory). The cutoff is set at zero; thus, when the score is positive, the winning candidate is a woman, and when the score is negative, the winning candidate is a man.

It is important to note that RDD estimates the effect of electing women at the cutoff, meaning the results are local in nature and apply to closely contested races.

We use the same time frame as the difference-in-differences design used in the manuscript (from 2005 to 2020). To estimate the effects of electing a woman, we use local linear regressions, relying on an MSE-optimal bandwidth and a triangular kernel. The following estimation equation is used for this analysis:

$$Y_{it} = \alpha + \beta_1 T_{it} + \beta_2 M_{it} + \beta_3 T_{it} * M_{it} + \sigma_X + \varepsilon_{it} \tag{1}$$

Y is domestic violence in municipality i and year t. T depicts the treatment (units above the cutoff). M describes the margin of victory. The interaction between T and M allows the regression function to differ on both sides of the cutoff point; σ_X corresponds to a pre-treatment measure of local human development and a year indicator.

Table A3 shows the results using equation 1, which allows us to observe the effect of electing a woman mayor (at the cutoff) on domestic violence. Only coefficient β_1 from equation 1 is reported.

The conclusions align with those from the difference-in-differences analysis. On the one hand, we observe a significant increase in reports made by citizens. On the other hand, we do not find

Table A3: RDD results

	Domestic Violence	
	Reported by citizens	Found by the police
	(1)	(2)
Woman mayor	0.336*	−0.382
	(0.105)	(0.221)
Observations	1,396	1,396
Note:		*p<0.05

evidence of a significant impact in cases found by the police. Importantly, the RDD estimates only the impact of electing a woman mayor at the cutoff, only for competitive elections, and does not provide insights into how these effects evolve over time or whether they vary during her first, second, or third year in office.

5 Appendix F: Main Results in Table Formant

In this section, we present the main results from Figure 3a and 3b in table format.

Event time	Estimate	Std. Error	[95% Simult. Conf. Band]
-11	-0.1179	0.2656	-0.8257, 0.5899
-10	0.1357	0.1776	-0.3375, 0.6088
-9	-0.3115	0.5119	-1.6754, 1.0523
-8	0.2051	. 0.3320	-0.6797, 1.0898
-7	0.1560	0.1629	-0.2781, 0.5901
-6	-0.0197	0.1685	-0.4686, 0.4292
-5	0.0302	0.1317	-0.3207, 0.3812
-4	-0.0328	0.1012	-0.3026, 0.2370
-3	-0.0572	0.1169	-0.3687, 0.2544
-2	0.0727	0.1276	-0.2675, 0.4128
-1	-0.0859	0.0774	-0.2921, 0.1203
0	0.1031	0.0709	-0.0858, 0.2921
1	0.0926	0.0659	-0.0831, 0.2683
2	0.1930	0.0992	-0.0715, 0.4574
3	0.2031	0.1019	-0.0683, 0.4746
4	0.3550	0.1137	0.0521, 0.6578
5	0.3932	0.1451	0.0066, 0.7798
6	0.4149	0.1476	0.0217, 0.8081
7	0.3034	0.1781	-0.1711, 0.7779
8	0.2882	0.2169	-0.2897, 0.8662
9	0.1859	0.2233	-0.4091, 0.7808
10	0.0233	0.2359	-0.6054, 0.6520
11	0.1132	0.2391	-0.5240, 0.7503

Table A4: Figure 3a

Event time	Estimate	Std. Error	[95% Simult. Conf. Band]
-11	-0.2519	0.1061	-0.5431, 0.0394
-10	0.0891	0.1800	-0.4050, 0.5832
-9	-0.2014	0.2368	-0.8513, 0.4485
-8	-0.2477	0.2908	-1.0459, 0.5504
-7	-0.0289	0.0804	-0.2495, 0.1917
-6	0.0198	0.0820	-0.2052, 0.2448
-5	0.0373	0.0825	-0.1891, 0.2637
-4	-0.0530	0.1308	-0.4120, 0.3061
-3	-0.0744	0.0745	-0.2789, 0.1300
-2	0.0449	0.0867	-0.1931, 0.2829
-1	-0.0764	0.1034	-0.3603, 0.2075
0	-0.1263	0.0787	-0.3423, .0896
1	0.0359	0.0654	-0.1436, 0.2153
2	0.0946	0.1120	-0.2129, 0.4020
3	-0.0176	0.0914	-0.2683, 0.2332
4	0.1165	0.1043	-0.1697, 0.4027
5	0.1327	0.0874	-0.1071, 0.3726
6	0.0943	0.1301	-0.2627, 0.4514
7	0.1150	0.1066	-0.1774, 0.4075
8	0.2009	0.2011	-0.3510, 0.7528
9	0.0844	0.2477	-0.5954, 0.7642
10	-0.0018	0.1496	-0.4125, 0.4088
11	0.2020	0.2565	-0.5018, 0.9059

Table A5: Figure 3b

References

Franceschet, Susan. 2010. "Explaining Domestic Violence Policy Outcomes in Chile and Argentina." *Latin American Politics and Society* 52(3):1–29. Publisher: [University of Miami, Wiley, Center for Latin American Studies at the University of Miami].
URL: *https://www.jstor.org/stable/40925584*

Vásquez Mejías, Ainhoa Montserrat. 2015. "Feminicidio en Chile, más que un problema de clasificación.".