

PHD IN APPLIED ECONOMICS AND MANAGEMENT

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Essays on violence against women

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Contents

1	Introduction	1
2	Systematic literature review on violence against women	4
2.1	Introduction	4
2.2	Methods	5
2.3	Results	7
2.3.1	Research by geography distribution	9
2.3.2	Research by type of violence considered	9
2.3.3	Research by data type	10
2.3.4	Research by the aim of study	10
2.4	Discussion	16
2.5	Conclusion	17
A.2	Appendix	18
3	The role of female political representation on violence against women in Brazil	19
3.1	Introduction	19
3.2	Institutional background	22
3.2.1	Violence in Brazil	22
3.2.2	Local politics	23
3.3	Data	24
3.3.1	Homicide and violence data	24
3.3.2	Local election data	25
3.3.3	Other data	25
3.4	Empirical strategy	25
3.5	Results	26
3.5.1	Violence against women	26
3.5.2	Additional results	31
3.5.3	Discussion on the mechanisms	33
3.6	Conclusion	35
A.3	Appendix	36
4	The effect of "coloring" the Italian regions on domestic violence	49

4.1	Introduction	49
4.2	Institutional background	50
4.3	Data	52
4.3.1	Helpline 1522 data	52
4.3.2	Region classification data	53
4.3.3	Google Trends data	53
4.3.4	Google Mobility Index data	54
4.4	Empirical Strategy	54
4.5	Results	56
4.5.1	Additional Results	61
4.5.2	Discussion on the mechanisms	63
4.6	Conclusion	66
A.4	Appendix	67
5	Conclusion	80

List of Figures

2.1	Flow diagram summarising literature review	8
2.2	Distribution of papers by country of analysis	9
2.3	Distribution of papers by type of violence considered	10
2.4	Distribution of papers by data source used	11
3.1	Female Mayor and Violence against Women	27
3.2	Female Mayor and Different Type of Violence against Women	29
A.3.1	Continuity of the Density of the Margin of Victory	40
A.3.2	Different Cut-offs	42
4.1	The distribution of victim calls	51
4.2	Event study results	57
4.3	The effect of the Red Zone on helpline calls	58
4.4	The effect of the Red Zone on helpline calls: Synth Runner Command	62
4.5	The effect of the Red Zone on helpline calls: Allsynth Command	64
A.4.1	Varying the Effect Window	69
A.4.2	The effect of the Orange Zone on Victim’s calls	70
A.4.3	The effect of the Orange Zone on User’s calls	71
A.4.4	The effect of the Red Zone on Google Trends	72
A.4.5	The effect of the Red Zone on Google Trends (Event study)	75
A.4.6	The effect of the Red Zone on Google Mobility Index	78
A.4.7	The effect of the Red Zone on Google Mobility Index (Event study)	79

List of Tables

2.1	Summary of integrative review databases, search terms, and inclusion criteria	6
2.2	Summary of selected papers	14
A.2.1	Distribution of papers by data type	18
3.1	Female Mayor and Violence Against Women	30
3.2	Female Mayor and Violence Against Women: Extensive Margin	31
3.3	Female Mayor and Violence: Placebo	32
3.4	Female Mayor and Policies for Women	34
A.3.1	Women in Local Elections	36

A.3.2	Summary Statistics	37
A.3.3	Data Description	38
A.3.4	Municipal and Mayoral Characteristics Balance at the Threshold	41
A.3.5	Female Mayor and Violence Against Women: Pre-treatment Effect	43
A.3.6	Female Mayor and Violence Against Women: Different Bandwidth	44
A.3.7	Female Mayor and Violence Against Women: Quadratic Polynomial RD Estimator	45
A.3.8	Female Mayor and Violence Against Women: Interaction Models	46
A.3.9	Mayor’s Level of Education and Violence Against Women	47
A.3.10	Female Mayor and Violence Against Women: Adding Pre-treatment Outcome Variable as Covariates	48
4.1	Event study results	59
4.2	The effect of the Red Zone on helpline calls	60
4.3	The estimates of synthetic control analysis by synth runner	63
A.4.1	Brief description of the rules in place for the Yellow, Orange, Red zones	67
A.4.2	Summary Statistics	68

1. Introduction

The United Nations defines violence against women 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." Today, violence against women is considered a crucial public health problem. According to statistics, in 2020 a woman or girl was killed every 11 minutes in their home. The Covid-19 lockdown had a heterogeneous effect on domestic abuse. Reports in different countries have shown a major increase in reported cases of domestic violence to helplines, women's refuges/shelters, and the police, linked to COVID-19. For instance, calls to helplines have increased five-fold in some countries, while others have observed a decrease in the number of domestic violence incidents reported, highlighting the problem of reporting during lockdowns and other social distancing measures^{1,1}.

This Ph.D. dissertation contains three main chapters devoted to the analysis of this crucial problem. The research contains an in-depth literature review and two noval separate analyses of domestic abuse in Brazil and Italy. Chapter 2, titled "*Systematic literature review on violence against women*", provides the literature review by analyzing papers from 9 databases, direct Google searches, and other relevant sources for the period 2017 to 2021. A total of 131 studies in English on the topic of domestic violence against women were included in the systematic review with the aim of summarizing the breadth of recent research and identifying the gaps in the literature. This review confirmed that in the past few years the number of publications addressing violence against women has tended to increase. The review findings highlight that the meaning of violence against women, its determinants, and the acceptance of violence are highly heterogeneous across the included studies. This chapter provides insight for researchers to make an informed decision on further research agenda on domestic violence. Thus, this analysis helped me shape a vision of the problem of violence against women and determine the further direction of research within the framework of the current Ph.D. dissertation. The next two chapters are dedicated to the empirical analysis of domestic abuse in the context of Brazil and Italy. For instance, Brazil has one of the highest

^{1,1}UN Women (2020). Intensification of efforts to eliminate all forms of violence against women: Report of the Secretary-General (2020), p. 4.

indices of femicide in the world. According to United Nations, approximately one-third of Brazilian girls and women had suffered violence in the last 12 months; furthermore, a survey of crime statistics in 2021 reveals that every 10 minutes a woman is raped in Brazil and every seven hours a femicide occurs. It is crucial that the Government of Brazil and local municipalities spare no effort to combat the tide of violence against its women and girls and end the rampant impunity that has existed for crimes committed against them. Thus, Chapter 3, titled "*The role of female political representation on violence against women in Brazil*"^{1.2} is dedicated to investigating the effect of women's political leadership in local government on homicide and violence against women in Brazil. Using a regression discontinuity design I compare Brazilian municipalities in which a female candidate barely won to those in which a female candidate barely lost mayoral elections (close election in 2004-2016). I conclude that having a female mayor reduces homicide rate of women by 20% and violence (physical, psychological, sexual) by 40%, over a 4-year term. These results are not due to pre-existing municipalities' characteristics or other observable characteristics of mayor. Collectively, these findings provide compelling evidence that women holding office are effective in addressing violence against women. Nevertheless, it is challenging to have a clear understanding of the actual mechanism of these findings. However, from existing literature and evidence, I suggest that female mayors have increased attention to policies that might favor women's welfare, and seek to create a more peaceful society where violence is considered a gross violation of human rights. Besides, I also refer to a role model hypothesis where having a female mayor might help change the norms that accept violence against women (Beaman et al., 2012; Chong and Ferrara, 2009). The contribution of this chapter is multiple. Firstly, I contribute to the two streams of the literature, namely women in politics and violence against women, by providing the first evidence that there is a link between female political representation and reduced femicide and violence against women. Secondly, I consider not only different forms of violence (physical, sexual, psychological) that are related to the under-reporting, but also cases of femicide, that are less suffer from this problem. Consequently, the results I present are robust.

The following Chapter 4, entitled "*The effect of "coloring" the Italian regions on domestic violence*"^{1.3} considers the problem of domestic abuse in Italy. Concretely, I

^{1.2}Coauthored with Paolo Buonanno and Sergio Galletta

^{1.3}Coauthored with Paolo Buonanno and Sergio Galletta

study the impact of the Decree-law on November 4, 2020 (Dpcm), classifying Italian regions into four areas - red, orange, yellow, and white - corresponding to Covid diffusion risk scenarios, on domestic violence. To understand the impact of the new restrictions and identify their causal effect on domestic violence cases, I exploit the variation of calls in the 1522 helpline across Italian regions using a difference-in-differences design with staggered treatment adoption and synthetic control methods. I demonstrate that the effect of the red zone is stronger during the initial shock period, in particular, in the first two weeks after Dpcm. These findings are consistent with three alternative mechanisms: social isolation, decreased bargaining power for women, and exposure reduction theory. The main contribution of this chapter is providing the first evidence of a link between the strict restrictions in the red zone and violence in Italy.

Finally, Chapter 5 provides concluding remarks. It summarises the results of the previous studies and briefly outlines future lines of research.

2. Systematic literature review on violence against women

2.1. Introduction

Nowadays, violence against women is still a widespread phenomenon with significant economic costs for countries. The European Institute for Gender Equality estimated this cost at 226 billion euros (2014).

The 2017 year was the year of transforming the culture of gender-based violence. The European Commission dedicated this year of focused actions to put an end to violence by 4 million euros available to EU countries in developing and implementing national practical and targeted information, awareness-raising, and education activities to combat violence against women and girls. Moreover, the EU in partnership with the United Nations launched a global, multi-year Spotlight Initiative with a 500 million euro contribution to eliminating all forms of violence against women and girls. The same year the #metoo hashtag went viral and woke up the world to the magnitude of the problem of sexual violence. Also from 2017 to 2019, the project of the World Bank Group "Women, Business, and the Law" recorded 62 reforms enhancing gender equality in 40 countries.

This research tries to understand how these transformations affected the scientific world publications' trends on violence against women. I present a review of the studies conducted over the five recent years that assess domestic violence (DV) experienced by women in the world and evaluate the specific focus of the articles and data sources used to measure it. Specifically, this review aims to systematically summarize the breadth of recent works on domestic or intimate partner violence (IPV) against women and highlight the gaps in the literature^{2.1}.

Published and unpublished studies written in English were searched for and considered for this systematic review to minimize publication bias. Studies were searched from 9 main databases (ScienceDirect, PubMed, JSTOR, MDPI, Google Scholar, and working papers from Econbiz, NBER, CEPR, IZA), direct Google search, and other relevant sources using electronic and manual techniques.

This review identified 2.471 primary studies which were reduced through different steps to 131 studies for final evaluation.

^{2.1}The two phrases domestic violence (DV) and intimate partner violence (IPV) were interchangeably used as outcome variables in this systematic review process

In general, domestic abuse can be defined as a pattern of behavior in any relationship that is used to gain or maintain power and control over an intimate partner. Abuse is physical (beatings, torture, murder), sexual (unwanted intercourses, harassment, rape), psychological/emotional (threats, humiliations, intimidation), economic (obsessive control of finances, money subtraction) actions or threats that influence another person^{2.2}.

Despite the existence of different forms of domestic violence, physical and sexual violence are the most apparent forms. It also substantiates the huge number of research focusing on these two forms (63% of the selected papers). The majority of studies have examined factors associated with intimate partner violence against women at individual, relational, community, or structural levels (policy, gender norms), have considered the effect of COVID-19 and the consequences of the lockdown on domestic violence against women, and the lifetime prevalence of violence. 75% of the research used survey data. Several reasons could explain why this kind of data is most frequently used. Firstly, because this is the most available source of data; furthermore, in order to overcome the misreporting problem, this kind of data provides more accurate estimates and a more reliable method. However, surveys may not measure the actual number of women who have been abused, but rather, the number of women who are willing to disclose abuse. As with all self-reported disclosure, it is possible that results are biased by either over-reporting or under-reporting.

Thus, the current review compliment the related literature on the domestic violence against women topic. This is the first study that summarises the papers by aim and object of study and focuses to understand the gap in existing literature in this way. It will provide insight to researchers to make an informed decision on further research agenda.

The rest of the chapter is organized as follows. Section 2.2 describes the method and selection criteria used. Sections 2.3 and 2.4 present results and their discusses. Section 2.5 concludes.

2.2. Methods

Parallel literature searches of 9 databases (ScienceDirect, PubMed, JSTOR, MDPI, Google Scholar, and working papers from Econbiz, NBER, CEPR, IZA) were undertaken for the period from 2017 to 2021. The specific search terms included "Domestic Violence

^{2.2}According to United Nations

against women", "Intimate Partner Violence" and "Violence against women"^{2,3}.

All studies were selected using eligibility criteria and screened through three steps for the systematic review. Initially, studies from all sources from 2017 to 2021 were collected and exported to Covidence software to automatically removing of duplicates. Only freely available online studies were included without geographic restriction to the location of the study but published in English. Further, the studies were screened and selected for subsequent evaluation based on their titles and abstracts, that is if studies clearly evaluated the domestic violence experience of women and were quantitative manner. I excluded studies concerning men or children/young adolescents violence, reviews, and qualitative and non-English studies. I also excluded studies considering very narrow topics like violence against specific groups of women (pregnant women, women with disabilities, women with certain complicated diseases, climate change and violence), where a large number of studies were found, that merit a separate review. Articles associated with offenders were also excluded, due to the fact this study is primarily focused on victims of violence, i.e. women. Table 2.1 represents the summary of all criteria. Lastly, studies whose abstract section briefly reported the experience of domestic violence against women were included in the next evaluation process with a focus on the full text.

Table 2.1: Summary of integrative review databases, search terms, and inclusion criteria

Search terms	"Domestic Violence against women", "Intimate Partner Violence" and "Violence against women"
Inclusion criteria	Free available papers written in English language; Articles published in last five years 2017-2021; Articles focusing on Domestic Violence against women only (above 15 age); Quantitative studies evaluating domestic violence experience of women
Exclusion criteria	Non-English written papers; Literature reviews and reports; Papers considering violence against men or children/young adolescents; Papers focusing on the analysis of the specific group of women: pregnant women, women with disabilities or diseases; Narrow topic papers: climate change and violence; Papers based on medical experiments
Databases	ScienceDirect, PubMed, JSTOR, MDPI, Google Scholar, and working papers from Econbiz, NBER, CEPR, IZA

The searches identified 2.471 primary studies, which were reduced to 456 after checking for duplicates between databases, excluding also literature review articles, and pa-

^{2,3}The term domestic violence is used throughout the chapter, to capture intimate partner violence, as well as violence against non-spouses in the same household

pers considering violence against children or men and non-relevant to the selected topic research. Further 325 studies were excluded because they were qualitative studies or reports, or authors considered only men surveys or the effect of climate on violence. A final total of 131 studies was selected for further analysis. The forest plots (Figure 2.1) were produced to give a graphical representation of the process of selecting.

I collected data for each study regarding the country of analysis, year of publication, the object of study, data source, characteristics of women (age), the time frame during which domestic violence was measured, and form of violence (physical, psychological/emotional, sexual, economic violence, online abuse, homicides, and kidnapping), sample size and empirical model used. The analysis of selected papers and obtained results are discussed below.

2.3. Results

The results show that most of the 131 articles analyzed were published in 2021, totaling 50 articles (38%). However, the number of publications from 2017 to 2019 remained constant, with an average of 16 manuscripts.

Collectively, the reviewed studies provide information on the domestic or intimate partner violence determinants (40% of selected papers), such as alcohol consumption, women's level of education, income, and so on (Burgos-Muñoz et al. (2021), Das and Roy (2020), Svec and Andic (2018)); 22% of studies evaluated the impact of violence on a specific factor (like abortion, marital disruptions) or considered the effect of implementing different policies to combat violence (Fan and Loria (2020), Seidu et al. (2021), Fernández-Kranz et al. (2020)); 14% of selected papers were focused on the effect of the COVID-19 pandemic on violent behavior (Hoehn-Velasco et al. (2021), Brink et al. (2021), Arenas-Arroyo et al. (2021a)); 12% of works identified the prevalence of violence (Ruiz-Pérez et al. (2017), Ditekemena et al. (2021), Valentine et al. (2019)), and 7% of works dedicated to understanding the acceptance of violence (Cools and Kotsadam (2017), Alabi and Ramsden (2021), Aboagye et al. (2021)).

Among the studies specifying the age limits, the vast majority evaluated domestic violence experienced by women aged 15-49 (34,4%), with 15,3% of studies considering also the women above age 50 and 50,3% of studies specified other age intervals. The majority of all review studies utilize the cross-country design. Logistic Regression analysis, Difference-in-Differences (DID), and Event Study are the main analytic techniques used by the authors.

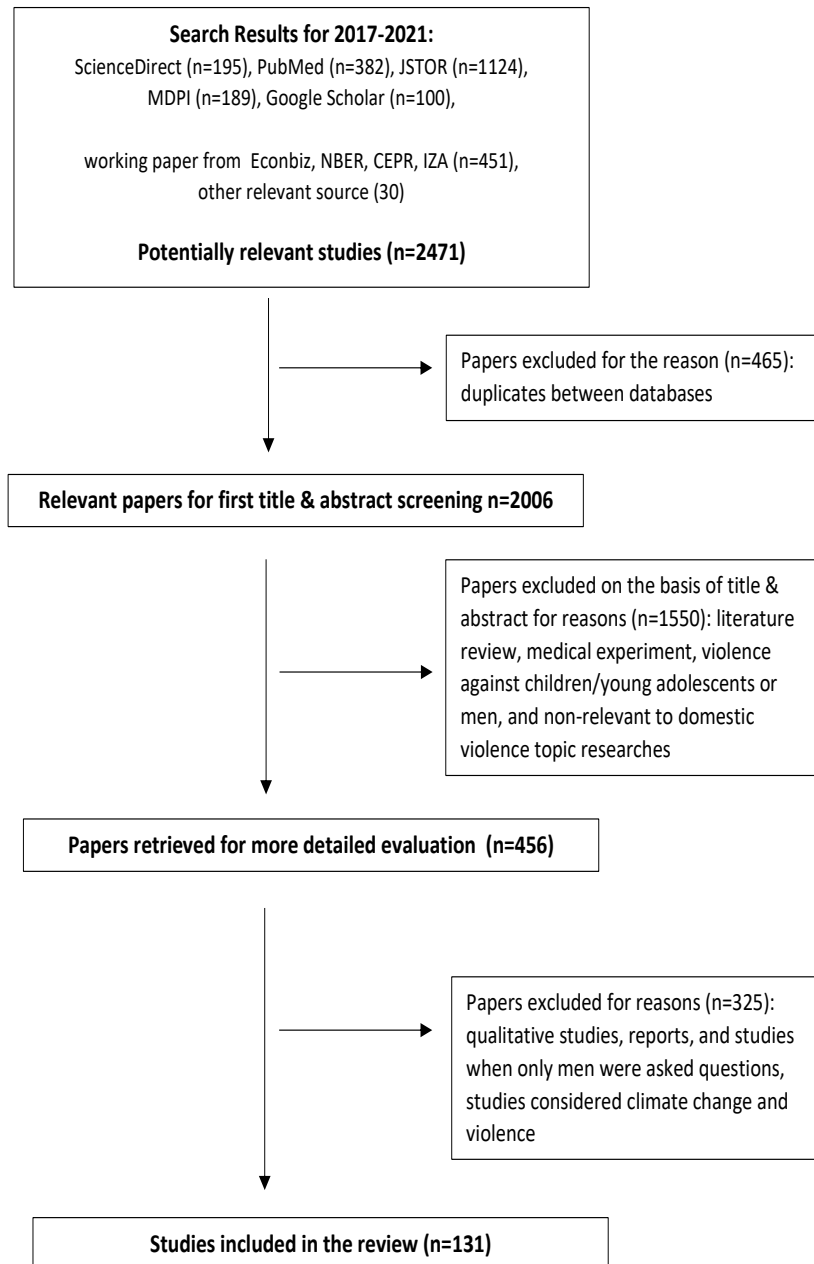


Figure 2.1: Flow diagram summarising literature review

2.3.1. Research by geography distribution

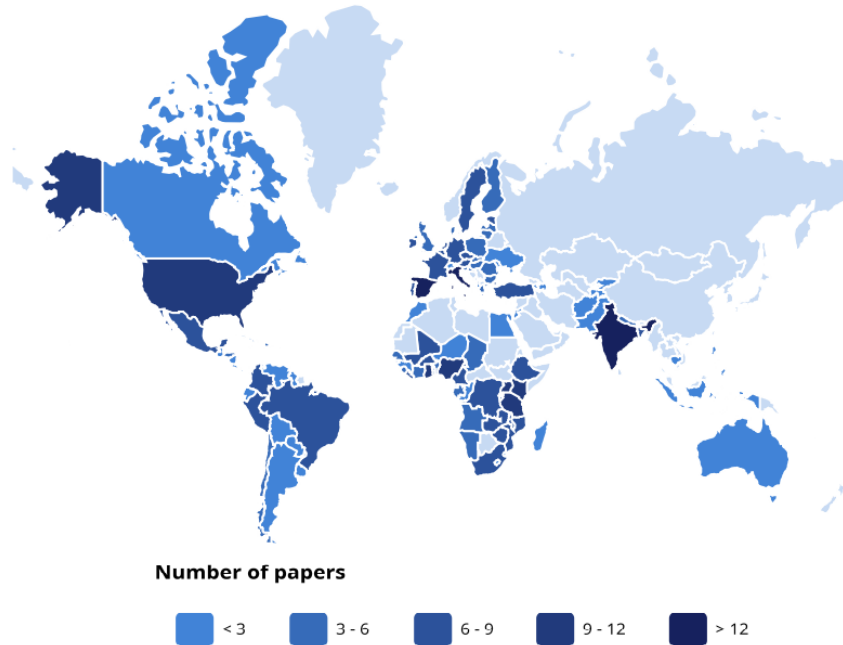


Figure 2.2: Distribution of papers by country of analysis

Figure 2.2 shows the distribution of papers by countries analyzed by the authors. The 22 works applied the analyses considering two or more countries together. The majority of the studies were conducted in Africa (35 papers) and Asia (35 papers), followed by Europe (31 papers). India, Italy, Spain, Uganda, USA, Ghana, Kenya, Nigeria, and Tanzania were selected by authors for domestic violence analysis more than other countries. The distribution of countries can be connected to the availability of data and the fact, that, for instance, African countries have the high prevalence rates of lifetime intimate partner violence (30-33%), Asia - 25-29% and Europe about 16-23%.^{2.4}

2.3.2. Research by type of violence considered

Regarding the typology of violence, 84% of works assessed two or more forms of domestic violence. According to World Health Organisation (WHO), physical and sexual assaults are the most apparent forms of domestic violence that confirms also by this

^{2.4}According to Violence Against Women Prevalence Estimates, 2018. World Health Organization 2021

review. Of all forms of domestic violence, physical violence and sexual violence authors were evaluated more frequently, followed by psychological/emotional abuse. 32% of studies evaluated the past 12 months of domestic violence.

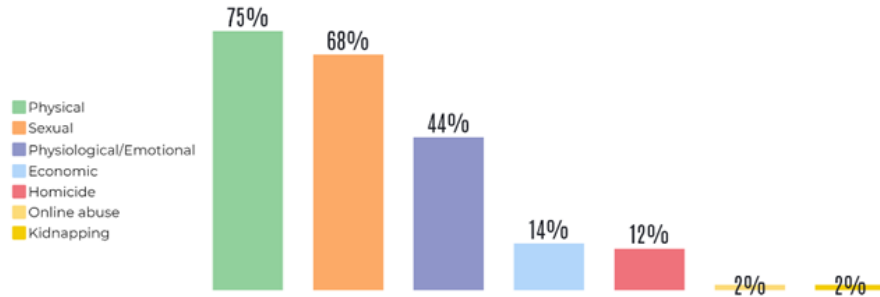


Figure 2.3: Distribution of papers by type of violence considered

2.3.3. Research by data type

Almost 69,5% of the studies rely on surveys or interviews as the main source of data. This could be explained by the availability of this kind of data, as well as by the fact that most researchers consider surveys as more reliable methods for assessing the domestic violence against women problem. 24% of all works used surveys provided by the Demographic and Health Surveys Program. The distribution of works by data type used is shown in Figure 2.4 and Table A.2.1 .

2.3.4. Research by the aim of study

The principal authors' findings grouped by the aim of the study are presented in this subsection and are displayed in Table 2.2.

According to the World Health Organisation (WHO), intimate partner violence is the result of factors occurring at the individual, family, or societal levels. They identify the following risk factors: lower level of education, a history of exposure to child maltreatment, harmful use of alcohol, low level of gender equality, community norms that privilege or ascribe higher status to men and lower status to women; low levels of women's access to paid employment, witnessing family violence and some others. Authors of selected papers for this review provide some evidence to prove the association of those factors with violent behavior (Burgos-Muñoz et al. (2021),Gautam and Jeong (2019), Clark et al. (2018), Benavides et al. (2019), Tunc et al. (2021), Ruiz-Pérez et al.

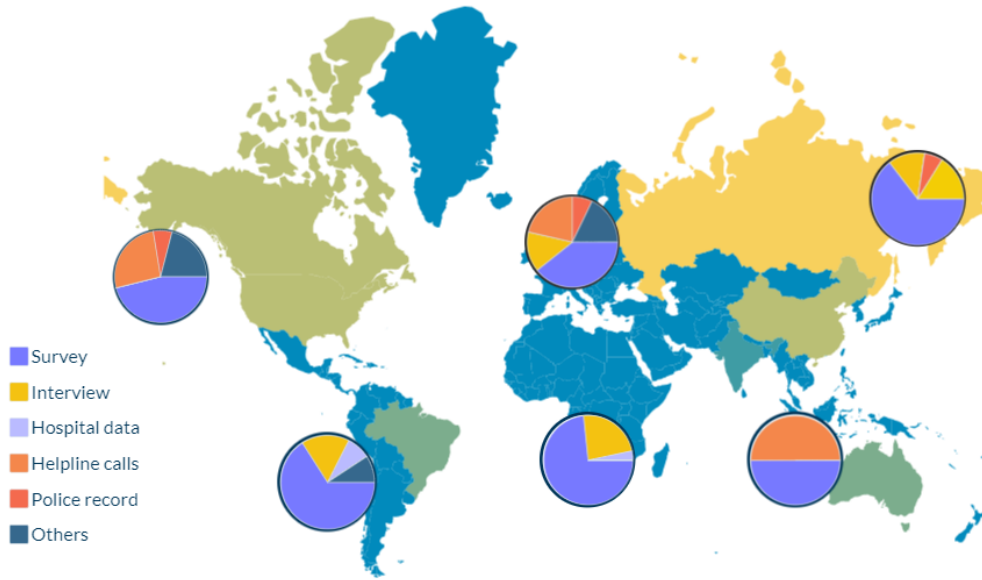


Figure 2.4: Distribution of papers by data source used

(2017), Sanz-Barbero et al. (2018), Rashad et al. (2017), Dang et al. (2017), Castro et al. (2017)), and also expand the list of them. For instance, Das and Roy (2020) and Nabagala et al. (2021) showed that women who belonged to the poorest economic background (prevalence of violence -47%) or lived in rural areas (prevalence of violence -35%) were at higher risk of experiencing violence from their husband. Kelly et al. (2021) indicate that living in a district with conflict fatalities increased the risk of IPV among women by roughly 60%. Andarge and Shiferaw (2018) found that the experience of IPV was higher among women from food-insecure households and lower when a husband has high decision-making power. Gao et al. (2021) also consider that inadequate living conditions were associated with 13% higher IPV.

Many others found some evidence concerning that opening special women’s stations or courts increases reporting of violence cases, while the implementation of new laws can reduce intimate partner violence. For instance, Garcia-Hombrados and Martínez-Matute (2021) thinks that the opening of a specialized IPV court decreases the time to disposition of IPV cases by 61% and increases the reporting of IPV in the judicial district by approximately 22%. Amaral et al. (2021) find that the opening of the women’s police stations is associated with an increase in police reports of crimes against women by 29%, a result driven by domestic violence. Fernández-Kranz et al. (2020) shows that Joint Custody Laws led to a large and significant decrease in intimate partner

violence in treated regions. Thus, implementing different women-supporting programs and expanding women's rights affects decreasing violence cases and improving reporting. [Gulesci et al. \(2021\)](#) shows that the youth empowerment program reduced the reported prevalence of violence, and the adoption of sanctuary policies considered in the [Amuedo-Dorantes and Arenas-Arroyo \(2019\)](#) paper is accompanied by a lower rate of domestic homicides involving a female Hispanic victim, and the investigation of the impact of violating the gender norm ([Zhang and Breunig \(2021\)](#)) according to which women should earn less than their male partners in Australia show that when women earn more than their male partners, they are 35% more likely to report domestic violence and 20% more likely to report emotional abuse.

One more stream of research was considering the effect of violence on women's mental health. Only 6 articles were included in the review. The authors considered the association between the severity of intimate partner violence and the risk of depressive symptomology and suicidal ideation. For instance, [Jonker et al. \(2019\)](#) pointed out that symptoms of depression severity were positively associated with migration background and the experience of physical abuse and post-traumatic stress disorder (PTSD) symptoms were positively associated with the experience of sexual abuse.

The vast majority of papers conducted in 2020 or 2021 were focused on the COVID-19 impact and especially the stay-at-home regimes on domestic violence. The slogan "Stay at home, save lives" was very paradoxical in the context of domestic violence against women. The results highlight the heterogeneous effects of the pandemic across domestic violence measures. Some authors showed an increase in domestic violence reports, the number of helpline calls during the period of the pandemic, and an increase in the cases of violence ([Brink et al.](#), [Agüero \(2021\)](#), [Leslie and Wilson \(2020\)](#), [Beigelman and Vall Castelló \(2020\)](#)). [Arenas-Arroyo et al. \(2021a\)](#) find a 23% increase in intimate partner violence during the lockdown in Spain. [Berniell and Facchini \(2021\)](#) show an increase in DV search intensity after lockdown (30%), with larger effects as more people stayed at home (measured with Google Mobility Data). However, [Hoehn-Velasco et al. \(2021\)](#) note that during the stay-at-home period, March through May in Mexico, overall crimes against women declined by 24%, then started to rise back to the original level after 4 months. Some research in the USA shows DV calls to the police and to the hotline increased during the initial shutdown, but DV crimes decreased, as did arrests for those crimes. The period following re-opening showed a continued decrease in DV crimes and arrests, as well as decreases in calls to the police and to the hotline([Miller](#)

et al. (2020)). Chalfin et al. (2021) found the double strength of the relationship between visits to alcohol outlets and domestic violence starting in March 2020 and demonstrated that it is not alcohol consumption per se but alcohol consumption at home that is a principal driver of domestic violence. However, Miller et al. (2021) find no evidence that domestic violence crimes increased during the lockdown.

According to results obtained in the considered articles, the acceptance of domestic violence is high. Khan and Islam (2018) documented that around 32% of the participants in Bangladesh reported that hitting or beating the wife by the husband was justified in certain situations. Alabi and Ramsden (2021) found that women are more likely to accept IPV than men in Africa.

Many works are also devoted to the consideration of the prevalence of violence. The authors' results vary greatly. The relevance of any type of violence varies from 11% (Ditekemena et al. (2021)) to 26% (Gautam and Jeong (2019), Ruiz-Pérez et al. (2017)).

A minor part of the papers was focused on the tools of predicting violence (among them, Köksal et al. (2021) suggest that online searches using selected keywords measuring different facets of IPV are a powerful tool to track potential threats of IPV before and during global level crises) and on the prevention program (Ogum Alangea et al. (2020), Dunkle et al. (2020)) to prevent IPV.

Table 2.2: Summary of selected papers

Aim of study	Number of researches	Main authors	Data used	Main findings
1. Determine factors associated with intimate partner violence against women	53	Steele et al. (2019), Heath et al. (2020), Abramsky et al. (2019), Burgos-Muñoz et al. (2021), Zegenhagen et al. (2019), Das and Roy (2020), Nabaggala et al. (2021), Svec and Andic (2018), Ruiz-Pérez et al. (2017), Sanz-Barbero et al. (2018), Yaya et al. (2019)	Mainly survey data or interviews (75,5% (40/53 papers) of authors used this data; 39% of studies based on DHS data).	IPV was more frequent among women with a low educational level, or with a partner with a low educational level; with children; with a partner with an alcohol habit; in women with a history of violence by the father against the mother or within families, where the husband takes the decisions alone; women with disabilities. Among risk factors, I can also note inadequate living conditions, living in a district with conflict, climate changes, food insecurity, financial dependence on partners, household income or women's income, polygamous households, living in rural areas, lack of civil marriage, employment status, and immigration background, lower socioeconomic status, pregnancy, frequency of attending church.
1.1. Determine the effect of one specific factor on IPV or DV (effect of creating a specific policy, program, law, or considering the consequence of IPV)	29	Goemans et al. (2021), Seidu et al. (2021), Willie et al. (2020), Perova and Reynolds (2017), González and Rodríguez-Planas (2020), Garcia-Hombrados and Martínez-Matute (2021), Durevall (2020), Fernández-Kranz et al. (2019), Haushofer et al. (2020), Dunkle et al. (2020), Amuedo-Dorantes and Arenas-Arroyo (2019) Amuedo-Dorantes and Deza (2019), Zhang and Breunig (2021)	72% of papers are based on survey or interview data, 38,5% of this is DHS data.	Experience of any type of violence is associated with women that were more likely to have an abortion, were more likely to experience marital disruptions or an increase in contraceptive use, used more community resources (like emergency medical services, battered women's counseling, and the emergency medical hotline). The authors take into consideration programs of increasing knowledge on VAW, youth empowerment programs, sanctuary policies, gender norms, and establishing women's special police stations and courts. They found that establishing a women's police station in a municipality is associated with a reduction in female homicide; the opening of a specialized IPV court decreases the time to disposition of IPV cases by 61% and increases the reporting of IPV in the judicial district by approximately 22%; it was also found that the custody laws led to a large and significant decrease in intimate partner violence and a significant reduction in female partner homicides in treated regions; an unconditional cash transfer to women reduces PV and SV. The intervention of different programs shows that this has benefits for women by reducing women's experiences of IPV, and depression, and decreasing the risk of the partner controlling behavior.
2. Determine the violence impact on women's mental health	6	Jonker et al. (2019), Gibbs et al. (2018), Esie et al. (2019), Khan et al. (2020), Lacey et al. (2021)	100% of survey data used	Experience of domestic violence increases the risk of major depressive episodes: the highest prevalence of suicidal ideation in all combinations was where physical or sexual IPV was combined with emotional or economic IPV.

Table 2.2: Summary of selected papers (cont.)

Aim of study	Number of research	Main authors	Data used	Main findings
3. Investigate Covid-19 impact on violence against women	19	Hoehn-Velasco et al. (2021), Raj et al. (2020), Brink et al. (2021) Arenas-Arroyo et al. (2021a), Porter et al. (2021), Berniell and Fachimi (2021), Agüero (2021), Leslie and Wilson (2020), Beigelman and Vall Castelló (2020), Ravindran and Shah (2020), Vives-Cases et al. (2021)	36% of papers consider survey data, 36% of helpline data and 14,3% of Google data.	The results of the impact of Covid-19 on DV against women vary a lot. Many authors conclude that during the stay-at-home period (usually March through May), overall crimes against women declined by 24%-30%. However, afterward, all crimes against women start to rise back to the original level. Another flow of research documents an increase in domestic violence of 9 - 23% during the lockdown. Other estimates show an increase in DV search intensity after the lockdown (30-35%), an increase in the incidence rate of the helpline calls (8-48%), and large increases in cybercrime complaints.
4. Investigate the acceptance of violence against women	9	Khan and Islam (2018), Cools and Kotsadam (2017), Islam et al. (2021), Alabi and Ramsden (2021), Hayes and Boyd (2017), Bucheli and Rossi (2017)	100% of survey data used	The acceptance of wife-beating is relatively high in society. Different studies reported that hitting or beating a wife by a husband was justified in certain situations (32%); one in five women (20,5%) approved at least one form of violence by their husband. It was found that women are more likely to accept IPV than men. Some findings show that approval of IPV increases with poverty, fertility rate, and equal gender outcomes. It decreases with internet access and, with a lesser degree of robustness, with the time elapsed since the enactment of women's suffrage.
5. Identify the prevalence of violence against women	16	Purcell et al. (2021), Napolitano et al. (2018), Soumah and Diop (2020), Domenech del Río and Sirvent Garcia del Valle (2017), Ditekemena et al. (2021), Gautam and Jeong (2019)	79% of research focuses on survey or interview data, 18% of this is DHS	Here I consider the prevalence of different types of violence: prevalence of any form of IPV was among 6,5% -25%, the lifetime prevalence of SV was among 7 - 24,9%; the in-home assault interpersonal violence was 37,1%, psychological / EV violence among 28%-97%, 6-40,3% experiencing physical violence, 18,9% economic violence.
6. Create tools to predict or track violence (big data)	3	Köksal et al. (2021), Hosain et al. (2021)	Interview and Google searching data	The findings suggest that online searches using selected keywords measuring different facets of IPV are a powerful tool to track potential threats of IPV before and during global level crises such as the current COVID-19 pandemic, with stronger predictive power post outbreaks. Other authors consider the Naive Bayes algorithms to predict violence.
7. Identifying policy differences between male and female police officers	1	Siwach (2018)	Crime record bureau data	Results suggest that increasing women in the ranks of inspectors play a significantly higher role in arrests for violent crimes, compared to increasing male inspectors.

Notes: 6 articles have two aims of the study, so they were put into different categories. PV- physical violence; SV- sexual violence; EV- emotional violence; VAW- violence against women

2.4. Discussion

In the past years, there has been incredible growth in domestic violence research. This review summarized the previous five years' published and unpublished papers in English available on 9 databases to see the literature mainstream on domestic violence against women and understand the gaps.

The review results highlight that the most common research aims during the last five years were determining the risk factors of violence, considering the effect of COVID-19 on violence against women, and identifying the prevalence of violence. All associated factors with domestic violence against women, the meaning of violence, and its acceptance are highly heterogeneous between included studies. For instance, the authors' conclusions highlight the heterogeneous effects of the pandemic across domestic violence measures, some results also fail to support claims that shutdowns increased domestic violence, and thus it caution before drawing inferences or basing policy solely on data from one source (usually from calls to the police).

Thus, while this review yielded many well-designed studies providing insight into domestic violence worldwide, it also revealed some gaps in the current understanding of the phenomena of domestic violence. Firstly, most studies are limited by location, considering only one city or region, which obviously implies a small sample size and lack of robust results. Second, the main share of papers is focused on analyses of women of age 15-49 (reasonably due to the limited survey data used) and considered only physical and sexual violence. Further, some papers insufficiently reasoned about the causation of factors and intuitional strategy lack. Moreover, the authors build their empirical analysis based on a single source of data, commonly survey data, and do not deepen their research by considering issues of prevention and combat violence.

All of these points highlight the need for further studies evaluating the domestic violence experiences of older women, not married or in-union women, and assessing the multiple forms or levels of abuse (economic violence, online abuse, homicide, or stalking). Moreover, despite IPV being less frequent in other environments along with the victim's home, there is a need for further studies that report violence in other spaces, such as workplaces, and public places to increase the understanding of the phenomenon of violence. It is recommended to use more data sources and address the question of understanding the tools to prevent and combat violence against women (for instance, bargaining power (e.g. provision of cash), individual and social norms, legislation, pro-

vision of protection and support services, and increase of reporting).

2.5. Conclusion

The current systematic review contributes to the growing body of evidence on domestic violence by providing an important summary of the studies during the five years. This review highlighted the major differences in methodology, the aim of the study, the data source used, and the types and forms of violence studied.

This review used relatively a comprehensive search of the major databases, including only quantitative studies, published and unpublished studies, and sub-group analysis by setting and violence types, however, it had some limitations. Firstly, the analysis relied on data directly provided in the publications. Second, a single author reviewed the papers for inclusion in the review, which may have introduced a selection bias. I tried to limit this bias through discussion of the papers in which eligibility was not with some researchers on this topic.

I only included the studies whose main intent was to examine domestic or intimate partner violence against women and not the studies that included domestic violence as a covariant, to be sure that those studies had the scope and resources to fully evaluate the problem. Lastly, the main goal of this study was not to critically evaluate each paper but to comprehensively review the information provided by different authors in the recent literature.

It is expected that the findings of this study contribute to raising awareness about the recent research and help to understand the future scientific stream.

A.2. Appendix

Table A.2.1 : Distribution of papers by data type

Type of data	North America	South America	Europe	Asia	Oceania
Survey	38.89%	53.33%	39.29%	64.52%	50%
Interview	-	13.33%	14.29%	12.90%	-
Hospital data	-	6.67%	-	-	-
Helpline calls	22.22%	-	21.41%	-	50%
Police record	5.56%	-	7.14%	6.45%	-
Others	17.72%	7.50%	17.86%	16.13%	-

3. The role of female political representation on violence against women in Brazil

3.1. Introduction

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.^{3.1} Moreover, more than 50% of homicides with female victims are perpetrated by intimate partners or other family members.^{3.2} 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). Creating a society where domestic violence is truly unacceptable is a very long process. It depends heavily on transforming gender norms and social structures. Comprehensive strategies focused on promoting gender equality to prevent violence against women are needed.

Currently, 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 research, I provide evidence of the effect of female political representation on violence. In particular, I 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.

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,

^{3.1}According to the UN 736 million women (roughly 30%) have been subjected to physical and/or sexual violence at least once in their life

^{3.2}In 2017, according to the United Nations Office on Drugs and Crime (UNODC), 87,000 women were intentionally killed.

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 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 for 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. For instance, I can highlight that one of whose pre-election goals of many female candidates in Brazil was to tackle the problem of violence. Márcia Rosa de Mendonça Silva (mayor of Cubatão (SP) in 2009-2016) set the main priority tasks for her term of office the following: combating corruption, patrimonialism, enticing the truth and violence against women in its most varied forms. She said:

“I know my responsibility to fulfill these many dreams. And among them, the dream of many women, like me, of living in a fairer, more egalitarian, more human world, in which the condition of gender is not the window whitened by the cruelty of those who do not know how to build serious, committed debate in politics and not spiteful - and most especially out of respect for women!”

“... the people of my city trust me with the mission of continuing to transform Cubatão. Not just transforming cement, bricks, and sand in schools, health facilities, squares, parks, and avenues. But also changing people’s self-esteem concerning their city and establishing respect for women ...”

Glacy Delis Da Conceicao Osorio (who was elected in 2008, Capivari do Sul(RS)) and other mayors set new laws in the framework of the National Program for Public Security providing for monitoring and processing of images, data, and information produced for permanent surveillance of public space by video cameras to preventing crime and violence.

Antonia Diana Mota De Oliveira was the first woman to occupy the position of mayor of the municipality of Capitão Poço (PA), from 2009 to 2016, with exemplary,

efficient management and was nationally awarded as "Brazilian Municipal Administrator Woman". She has been recognized for her dedicated work on behalf of the population of Pará, especially in projects aimed at combating social inequality, improving health, education, agriculture, and public safety in Pará, in addition, to being an active voice for female empowerment.

However, 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, I 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).

The results of the research suggest 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). These results are robust to the inclusion of standard controls and to several validation and falsification tests. In particular, I 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. It is worth stressing, that using the number of murders as one of the proxies for violence helps in addressing issues of under-reporting which might be present for less extreme acts of violence.^{3.3}

The research 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; Fer-

^{3.3}Iyer et al. (2012) show that higher female representation increases the reporting of crimes against women, not an actual crime, in which case our estimates are potentially downward bias.

reira and Gyourko, 2014; Baltrunaite et al., 2019), at least in more developed countries. Second, this research is related to the expanding literature on violence against women. For instance, Iyengar (2009) finds that mandatory arrest in the case of domestic violence increased 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, this research complements the related literature by providing the first evidence that there is a link between female political representation and reduced femicide and violence against women.

The rest of the chapter is organized as follows. Section 3.2 provides institutional details. Section 3.3 and Section 3.4 describe the data and empirical strategy, respectively. Section 3.5 presents the results and discusses the possible mechanisms at play. Section 3.6 concludes.

3.2. Institutional background

3.2.1. 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 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” was 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 femicide 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.^{3,4} 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 can be seen 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.

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

3.2.2. 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 than 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

^{3,4}It is worth pointing out that this is not suggesting that these laws were not effective, as it might be the case that violence would have increased in absence of the reforms.

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.

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 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.3.1](#) provides some statistics on the presence of women in local politics in the sample (three consecutive terms) I use for the analysis. Looking at the share of female mayoral candidates and female mayors is noted 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%.

3.3. Data

3.3.1. Homicide and violence data

This 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. I 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, I 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 a 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. The current 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.

3.3.2. Local election data

I focus on data about municipal elections for three electoral terms (2005–2008, 2009–2012 and 2013–2016). The data source is the Brazilian Electoral Court (Tribunal Superior Eleitoral). For each candidate in each municipal election is known: vote share, sex, education (graduated or not), age and party of affiliation. It is worth noting that, as I 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, I 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.

3.3.3. Other data

I 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.4.2](#) , while their descriptions and sources are in Appendix Table [A.3.3](#) .

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, I apply an RD design to the sample of mixed-

gender electoral races using the following empirical specification:

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

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 I include in the preferred specification to improve precision in the estimates (Calonico et al., 2019). Finally, ϵ_{ist} is the error term. β is the 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, I show the results from standard validity checks of the RD design. Specifically, I show that the density of the running variable is continuous at the threshold (Appendix Figure A.3.1) and that pre-determined characteristics are balanced (Appendix Table A.3.4).^{3.5}

For the actual implementation, I 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.

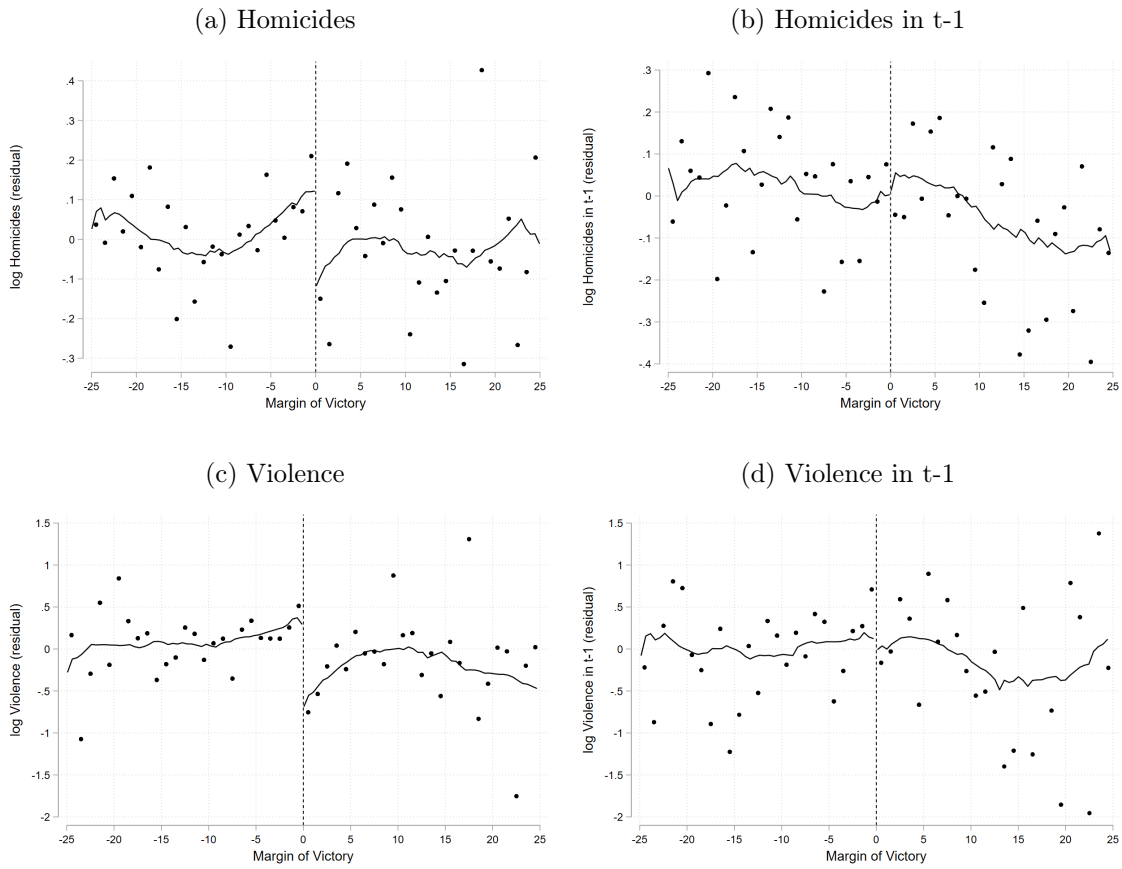
3.5. Results

3.5.1. Violence against women

The main research results are graphically presented in Figures 3.1 and 3.2 and show the relationship between the margin of victory and the per capita number of violent

^{3.5}Like other contexts I find that female candidates improve the overall quality of the pool of candidates (Baltrunaite et al., 2014). In particular, I show that female mayors are more educated than male mayors. However, I provide evidence that the research results are not affected by this discontinuity. First, I show that interacting them with the treatment status does not change the results, and if anything they are more precise (Appendix Table A.3.8). Second, using an RD design, I show that the mayor’s education does not matter for violence against women (Appendix Table A.3.9).

Figure 3.1: 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.

outcomes (in log) once I partial out covariates and fixed effects.^{3.6} In Figure 3.1 I 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, there is a 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. Panel A of Appendix Table A.3.5 provides formal estimates of pre-treatment effects. In Figure 3.2 I further detail 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 a discontinuity at the threshold for the three types of violent acts taken separately and in addition also to sexual harassment.

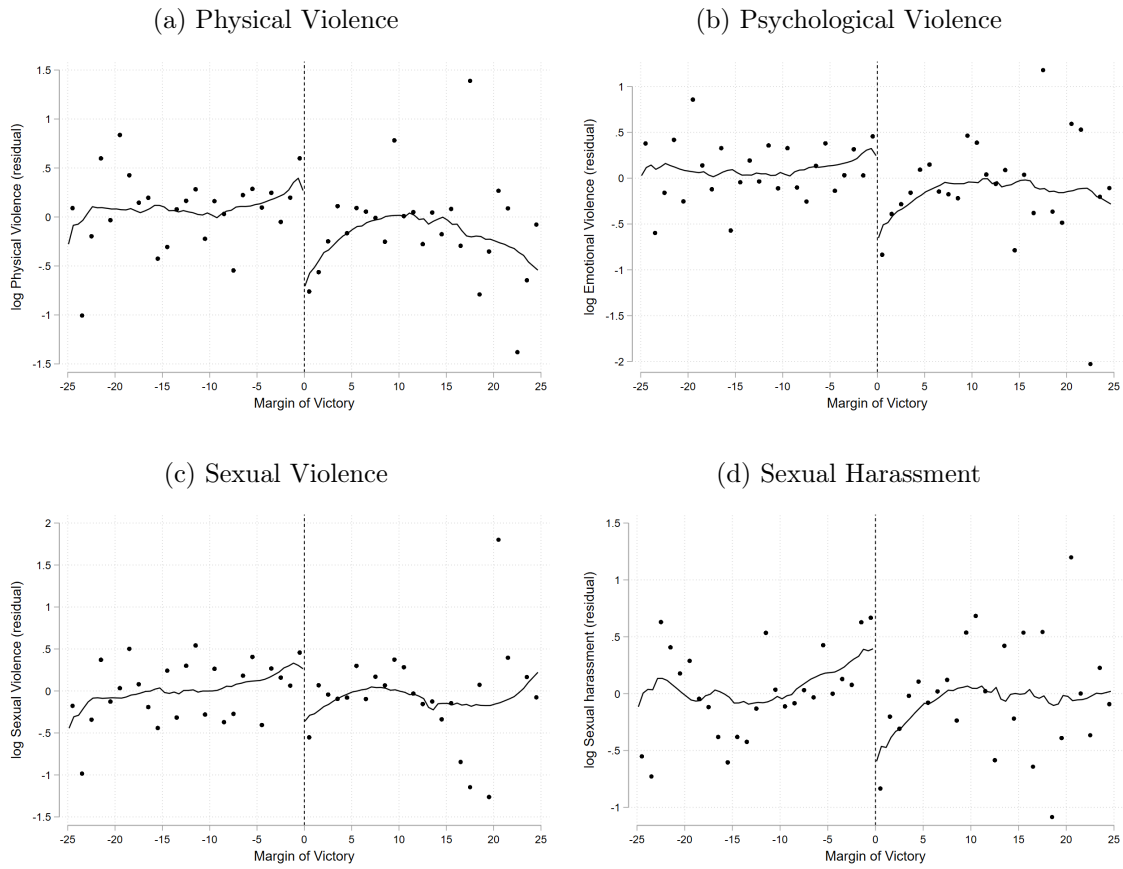
In Table 3.1 I report the formal estimates as defined in the empirical strategy section.^{3.7} In the first panel I show the RD estimates when I do not include controls, while in the second panel I include as covariates municipal level pre-determined characteristics, mayoral characteristics and term and state fixed effects. The effects highlighted in the graphical reporting are confirmed in the estimates.^{3.8} 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 in the presence of a female mayor with a level of statistical 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) I 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

^{3.6}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.

^{3.7}In the Appendix Tables A.3.6 and A.3.7, I report the estimates by varying the size of the bandwidth and order of polynomial function, respectively. Next, in Appendix Figure A.3.2, I report coefficients' estimates and confidence intervals of a series of placebo checks in which I arbitrarily change the cut-off value. Overall, I find all results to be robust to this set of sensitivity checks.

^{3.8}To provide the correct percentage effect of the estimated treatment I apply the transformation $100 \times [\exp(\text{estimated effect}) - 1]$.

Figure 3.2: Female Mayor and Different Type of 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.

Table 3.1: Female Mayor and Violence Against Women

	(1)	(2)	(3)	(4)	(5)
	ln(Homicides)	ln(Physical Violence)	ln(Psychological Violence)	ln(Sexual Violence)	ln(Sexual Harassment)
Panel A: without covariates					
Female Mayor	-0.250** (0.117)	-0.617*** (0.237)	-0.491** (0.226)	-0.389* (0.212)	-0.790*** (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* (0.103)	-0.572*** (0.200)	-0.524*** (0.202)	-0.414** (0.174)	-0.509** (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 *** $p < 0.01$.

level of statistical significance.

I also consider the presence of women in the municipal council. In Panel B of Appendix Table A.3.8 I show the results while interacting the treatment by the share of female city councilors, finding the coefficient marginally affected. This result would suggest that the effect is not mediated by the general representation of women in the city council.

As the outcome variable is in the logarithmic term, municipalities that have no violence in a given term are excluded from the analysis.^{3.9} This implies that the results reported so far are about the intensive margin. Next, I do evaluate the extensive margin effect of the female mayor on violence. Specifically, I use as outcome variable an indicator of whether in a given term-municipality it was reported at least one case of homicide/violence. The results reported in Table 3.2 show that there is not a significant effect on the extensive margin of violence. This could be justified by the fact that vio-

^{3.9}This is also the reason why the mean of the dependent variable reported in the results table is different from the one in the summary statics.

Table 3.2: Female Mayor and Violence Against Women: Extensive Margin

	(1)	(2)	(3)	(4)	(5)
	Homicides	Physical Violence	Psychological Violence	Sexual Violence	Sexual Harassment
Female Mayor	0.043 (0.052)	0.012 (0.034)	-0.042 (0.040)	-0.052 (0.041)	0.002 (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 *** $p < 0.01$.

lence against women is concentrated in specific areas and that having a female mayor is not enough to affect the such pre-existing conditions.

3.5.2. Additional results

In this section, I provide evidence about the relationship between having a female mayor and other outcomes. First, I 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 3.3, I report the estimates from the main specification, this time using as dependent variables relating to violence against men. Columns 1 and 2 show that there is no effect on the homicide rate and (total) violence, respectively.^{3.10} 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 the 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 the economic condition and violence (Aizer, 2010).

Next, I report a set of additional results addressing other possible concerns related to the main evidence being just the consequence of some structural reforms occurring

^{3.10}I 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.

Table 3.3: Female Mayor and Violence: Placebo

	(1)	(2)	(3)	(4)	(5)
	ln(Homicides)	ln(All type of Violence)	ln(Other Deaths)	ln(Traffic Accidents)	ln(Suicide)
Panel A: Male victims					
Female Mayor	0.063 (0.081)	-0.298 (0.308)	-0.015 (0.043)	0.013 (0.053)	-0.077 (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 victims					
Female Mayor	-0.186* (0.103)	-0.558*** (0.184)	-0.006 (0.060)	0.074 (0.076)	-0.004 (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 *** $p < 0.01$.

during a female mayor's tenure affecting mortality in general. Again in Table 3.3, I 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.

As another robustness exercise, I also try to add the pre-treatment outcomes as covariates. The results are presented in Appendix Table A.3.10 and show that they are still significant for all types of violence.

3.5.3. Discussion on the mechanisms

This research 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, I discuss a set of potential channels that could explain the 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 reasonable in the context, as women can be expected to be more sympathetic than men toward the specific type of crime studied in this research. 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, I 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 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. This seems plausible, as existing research focusing on Brazil has already shown that female mayors are less corrupted, do better on health outcomes, hire more female managers and favor gender equality policies. (Brollo and Troiano, 2016; Bruce et al., 2022; de Lucena, 2021). In Table 3.4 I also test whether female mayors are more likely to introduce women's shelters and women's police stations, and did not find a significant effect. Thus, female and male mayors' policies are not different in this context. I also report results in line with de Lucena (2021), showing that female mayors are more likely

Table 3.4: Female Mayor and Policies for Women

	Panel A: With Covariates			
	(1)	(2)	(3)	(4)
	Women Shelter	Women's police stations	Municipal body for women's policy	Council for women's right
Female Mayor	0.002 (0.009)	-0.015 (0.022)	0.072* (0.308)	0.115*** (0.041)
bandwidth	8.63	6.15	12.57	12.2
n. obs.	[663,611]	[480,447]	[914,803]	[672,616]
outcome mean	0.012	0.054	0.239	0.166

Notes: The dependent variable is defined as a dummy variable identifying the presence of policy supporting women in an electoral term. The column-heads identify the type policy. 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). The coefficients are constructed using local linear estimators with rectangular kernel. Robust standard errors clustered at the municipality level in parenthesis * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

to introduce gender equality policies such local women's rights council and woman's rights board.

Next, besides policy changes one might expect the 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). I cannot directly test for this channel as I do not have avail survey data that could be used to infer changes in attitude or beliefs. Yet, one can expect that this kind of changes when they occur are likely to persist also in the years following the exposure to a female mayor. I, therefore, test what are the effect of having a female mayor on violence in the term right after she was in power. These estimates are reported in Panel B of Appendix Table A.3.5 . Overall, I find that the negative effect is still present, but statistically significant only for homicide rates and sexual harassment, suggesting some persistence of the effect, that goes beyond the tenure of the female mayor.

3.6. Conclusion

Violence is one of the crucial problems in Latin American countries with harmful effects on society. The problem of violence and its costs is especially acute in Brazil, which stands out as increasing female homicides over the last several decades.

This research highlights the effect of female political leadership on femicide and violence against women. Using Brazilian municipality-level data for the period 2005-2016 and exploiting an RD design in close elections, I provide evidence that the election of a female mayor causes a large and significant reduction in femicide and violence against women. In particular, having a female mayor reduces the homicide rate of women by 20% and violence (physical, psychological, sexual) by 40%, over a 4-year term. These 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. Current 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).

A.3. Appendix

Table A.3.1 : 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.3.2 : Summary Statistics

	Obs	Mean	Std.Dev.	Min	Max
Panel A. Violence Data, 100k pop.					
Female					
Homicide	3080	15.439	21.56	0	300.023
Other Deaths	3080	79.857	56.897	0	645.995
Physical Violence	3080	168.472	446.311	0	7216.495
Psychological Violence	3080	87.612	342.116	0	13058.42
Sexual Violence	3080	13.726	40.378	0	794.802
Sexual Harassment	1344	18.124	43.263	0	467.071
All Types of Violence	3080	269.809	756.304	0	20274.91
Traffic Accidents	3080	35.524	39.423	0	518.518
Suicides	3080	10.055	18.285	0	179.856
Male					
Homicide	3080	139.266	135.403	0	1007.588
Other Deaths	3080	322.158	131.398	0	1012.461
Physical Violence	3080	41.098	184.407	0	3494.898
Psychological Violence	3080	18.728	71.283	0	1278.898
Sexual Violence	3080	.187	2.605	0	88.255
Sexual Harassment	1344	13.141	9.702	4.319	35.723
All Types of Violence	3080	60.012	232.461	0	4022.109
Traffic Accidents	3080	178.069	101.595	0	718.276
Suicides	3080	41.653	43.08	0	588.235
Panel B. Municipality Level Characteristics					
Margin of Victory Female	3080	-3.823	22.777	-100	100
Population (2000)	3080	23637.57	66662.29	873	2141402
Population (2010)	3080	26513.58	75190.2	815	2452185
Female Population (2000)	3080	11895.65	34935.04	414	1139166
Female Population (2010)	3080	13417.54	39506.85	385	1304267
Male Population (2010)	3080	13096.03	35702.54	430	1147918
Income (2000)	3080	543.156	310.003	55.567	3062.481
Agriculture (2000)	3080	16.427	8.937	.041	66.199
Industry (2000)	3080	3.724	3.736	0	35.39
Commerce (2000)	3080	7.162	3.593	.264	27.764
Employed Population (2000)	3080	36.904	7.711	11.862	74.464
Poverty (2000)	3080	10.426	7.972	.388	45.661
Gini Coefficient (2000)	3080	.557	.068	.297	.88
Illiterates (2000)	3080	24.404	12.8	1.595	60.661
Female Heads of Household (2000)	3080	5.239	1.706	1.08	14.244
Female Mayor Before	3080	.275	.446	0	1
Female city councilors	3080	.144	.117	0	.556
Women Shelter	3080	.02	.14	0	1
Women's police station	3080	.079	.27	0	1
Municipal body for women's policy	3080	.24	.427	0	1
Council for women's right	3080	.182	.386	0	1
Panel C. Individual Level Characteristics					
Age	3080	48.265	9.392	23	82
Graduate	3080	.511	.5	0	1
Party PT	3080	.094	.292	0	1
Party PSDB	3080	.138	.345	0	1
Party DEM	3080	.049	.215	0	1
Party PMDB	3080	.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.3.3 : Data Description

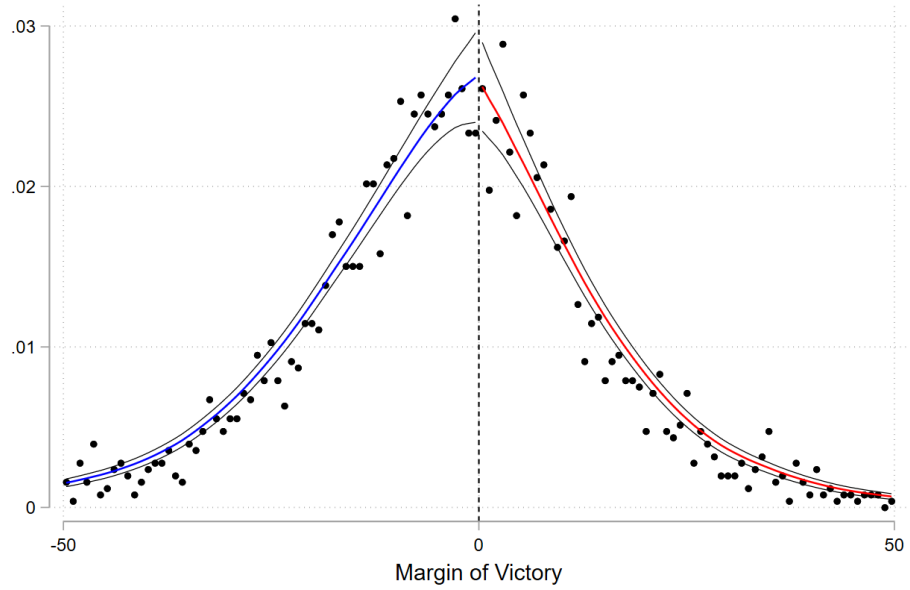
Variable	Description	Source
<i>Dependent variables</i>		
Female (Male) Homicide	Cases of homicides by gender of the victim per 100k inhabitants (ICD10, categories X85-Y09)	SIM ^{3,1}
Female (Male) Other Homicides	Cases of unintentional homicides by gender of the victim per 100k inhabitants (ICD10, All 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 ^{3,2}
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.3.3: Data Description (cont.)

Variable	Description	Source
<i>Municipal characteristics</i>		
Population (2000,2010)	Number of inhabitants in the municipality (Census 2000 and 2010)	IBGE ^{3,4}
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 ^{3,3}
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 ^{3,5}
Female city councilors	Share of females in city council	TSE ^{3,5}
Women Shelter	Presence of a women shelter in the municipality	IBGE
Women's police station	Presence of a women's police station in the municipality	IBGE
Municipal body for women's policy	Presence of a municipal body responsible for executing programs and actions for women in the municipality	IBGE
Council for women's right	Presence of a council for women's right in the municipality	IBGE
<i>Mayoral characteristics</i>		
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 Estatística (IBGE); 5. Tribunal Superior Eleitoral (TSE)

Figure A.3.1: Continuity of the Density of the Margin of Victory



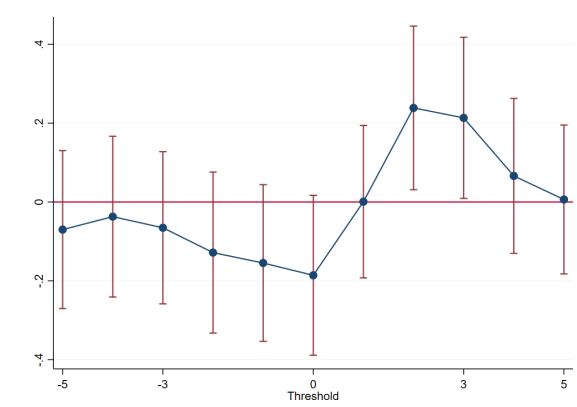
Notes: McCrary's test on the density of the running variable at the threshold - Estimated discontinuity: -0.014 s.e.(0.079).

Table A.3.4 : Municipal and Mayoral Characteristics Balance at the Threshold

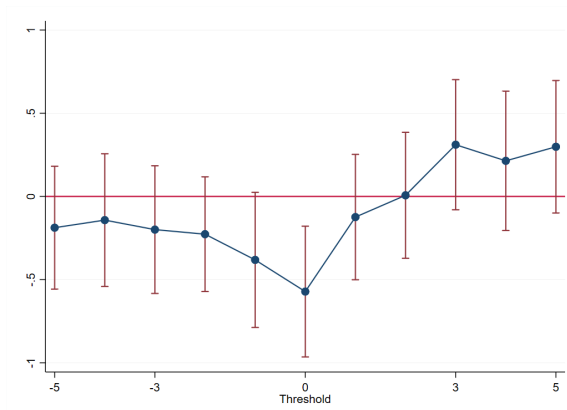
Variable	RD Estimator	std. error	N. Obs.	Bandwidth
<i>Municipality level</i>				
Population (2000)	679.472	4373.348	[248 , 246]	8.48
Female population (2000)	-1.655	1.452	[490, 403]	18.34
Share of pop. in agriculture (2000)	-1.806	1.461	[399 , 345]	14.39
Share of pop. in industry (2000)	0.080	0.708	[344 , 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
Female city councilors	0.006	0.013	[1027 , 869]	14.68
<i>Individual level</i>				
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

Figure A.3.2: Different Cut-offs

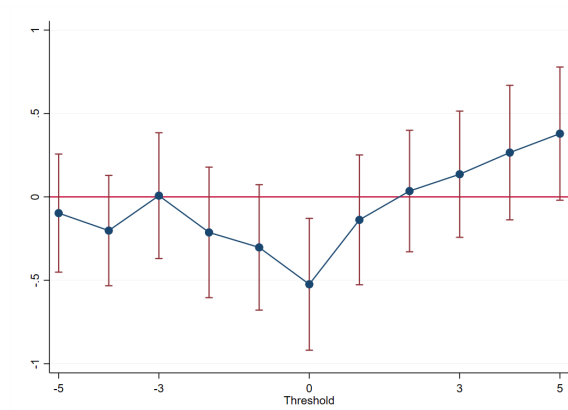
(a) Homicides



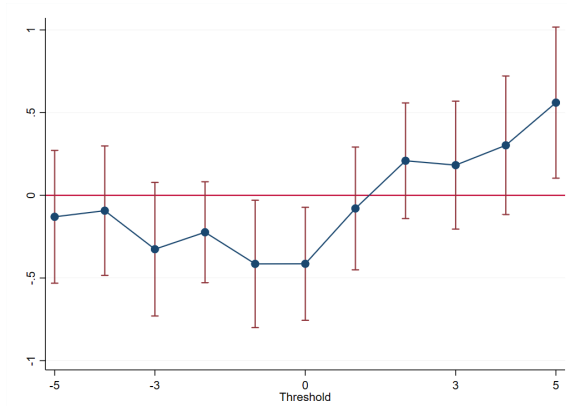
(b) Physical Violence



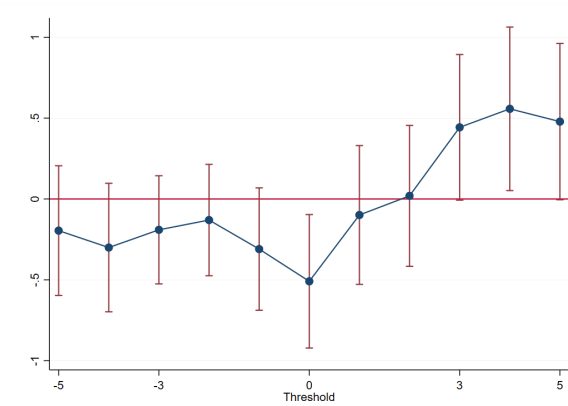
(c) Psychological Violence



(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.3.5 : Female Mayor and Violence Against Women: Pre-treatment Effect

	(1)	(2)	(3)	(4)	(5)
	ln(Homicides)	ln(Physical Violence)	ln(Psychological Violence)	ln(Sexual Violence)	ln(Sexual Harassment)
Panel A: Pre - treatment					
Female Mayor	-0.006 (0.076)	0.098 (0.196)	0.084 (0.201)	0.145 (0.174)	0.137 (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]
Panel B: Post - treatment					
Female Mayor	-0.174* (0.103)	-0.052 (0.159)	0.004 (0.201)	-0.267 (0.174)	-0.322* (0.163)
bandwidth	9.90	12.57	13.59	8.25	10.72
n. obs.	[384,386]	[500,451]	[491, 438]	[212,220]	[224,207]

Notes: In panel A, the dependent variable is defined as the sum of violent events in a pre-electoral term in per-capita terms, while panel B the dependent variable is defined as the sum of violent events in the term after a women won election, 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.3.6 : Female Mayor and Violence Against Women: Different Bandwidth

	(1)	(2)	(3)	(4)	(5)
	ln(Homicides)	ln(Physical Violence)	ln(Psychological Violence)	ln(Sexual Violence)	ln(Sexual Harassment)
	Double				
Female Mayor	-0.045 (0.079)	-0.350*** (0.154)	-0.293** (0.156)	-0.061 (0.144)	-0.538*** (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* (0.157)	-0.682*** (0.255)	-0.455** (0.251)	-0.35 (0.255)	-0.636*** (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.3.7 : Female Mayor and Violence Against Women: Quadratic Polynomial RD Estimator

	(1)	(2)	(3)	(4)	(5)
	ln(Homicides)	ln(Physical Violence)	ln(Psychological Violence)	ln(Sexual Violence)	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.3.8 : Female Mayor and Violence Against Women: Interaction Models

	(1)	(2)	(3)	(4)	(5)
	ln(Homicides)	ln(Physical Violence)	ln(Psychological Violence)	ln(Sexual Violence)	ln(Sexual Harassment)
Level of Education					
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]
Share of Female Councilors					
Female Mayor	-0.202**	-0.587***	-0.531***	-0.498***	-0.395*
	(0.101)	(0.202)	(0.201)	(0.190)	(0.215)
bandwidth	10.37	8.71	10.37	8.23	8.87
n. obs.	[405,397]	[274,274]	[279,266]	[151,144]	[116,117]

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.3.9 : Mayor's Level of Education and Violence Against Women

	(1)	(2)	(3)	(4)	(5)
	ln(Homicides)	ln(Physical Violence)	ln(Psychological Violence)	ln(Sexual Violence)	ln(Sexual Harassment)
Graduate Mayor	-0.108 (0.068)	-0.000 (0.203)	0.176 (0.229)	-0.040 (0.206)	-0.154 (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: 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 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.3.10 : Female Mayor and Violence Against Women: Adding Pre-treatment Outcome Variable as Covariates

	(1)	(2)	(3)	(4)	(5)
	ln(Homicides)	ln(Physical Violence)	ln(Psychological Violence)	ln(Sexual Violence)	ln(Sexual Harassment)
Female Mayor	-0.186* (0.101)	-0.453*** (0.179)	-0.471*** (0.186)	-0.409** (0.186)	-0.375* (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 *** $p < 0.01$.

4. The effect of "coloring" the Italian regions on domestic violence

4.1. Introduction

On November 4, 2020, Italian Prime Minister Giuseppe Conte signed a Decree (Dpcm) that establishes new stringent measures to counter the spread of the second wave of coronavirus. The new Dpcm came into force on November 6, 2020, and identified four main areas, corresponding to risk scenarios. All Italian regions and autonomous provinces have been classified according to colored levels: the most restrictive measures are concentrated in the area including Regions at maximum risk (Red area), in the area including Regions at high risk (Orange area), the third area includes Regions at moderate-risk (Yellow area) and the last area includes Regions with low risk (White area).^{4.1}

In this chapter, I provide evidence of the effect of these new measures on domestic violence. In particular, I analyze whether the red zone restrictions affect domestic violence by exploring the variation of valid calls to the 1522 helpline. For this analysis, I use an estimator developed by [Borusyak et al. \(2021\)](#) for difference-in-differences settings with staggered adoption of treatment and heterogeneous treatment effects, and a synthetic control method for multiple treatments.

Theoretically, one can expect strict movement restrictions to influence domestic violence against women via a number of mechanisms. First, any movement, even within its own municipality, except for reasons of work, needs and health is forbidden again which restricts any victim's contact outside of the home. Isolation increases "family privacy" and thus domestic violence becomes more often when friends and relatives outside of the family are incapable of serving as agents of social control (the effect of social control theory [Finkelhor et al. \(1983\)](#), and [Gelles and Straus \(1979\)](#)). Second, the exposure reduction theory examines that the more often a prospective criminal is exposed to opportunities for crime, the more often crime will occur ([Henke and Hsu \(2022\)](#)). In the case of the stay-at-home regime whereby abusers and victims are at home with each

^{4.1}The inclusion or the withdrawal of a region within one of the four areas takes place by Order of the Minister of Health, after consultation with the Presidents of the Regions concern, and depends on the risk coefficient reached by said Region, certified by the Official Report of the Higher Institute of Health, on the basis of specific parameters, and on the trend of the epidemic curve.

other all day, it increases the likelihood of violence. Finally, I also build on the literature on the economic consequences of emotional cues. [Card and Dahl \(2011\)](#) demonstrate that the abuser’s taste for violence varies over time, for instance, emotional cues such as professional football losses can increase an abuser’s frustration, and thus increase his utility of committing acts of domestic violence (household bargaining theory). The rigors of restrictions, stress, negative emotional shocks, and financial problems could be considered emotional cues in case of isolation which temporarily increases preferences for violence.

Recent literature has also documented that different measures of domestic violence, including police reports, and calls to domestic violence hotlines or anti-violence centers, increased dramatically near the beginning of the COVID-19 pandemic ([Leslie and Wilson \(2020\)](#), [Agüero \(2021\)](#); [Perez-Vincent et al. \(2020\)](#), [Colagrossi et al. \(2020\)](#), [Anderberg et al. \(2020\)](#), [Köksal et al. \(2021\)](#), [Arenas-Arroyo et al. \(2021b\)](#)).

I complement the related literature aimed to understand the impact of stay-at-home regimes on domestic violence by providing, to my knowledge, the first evidence of a link between the strict restrictions in the red zone and domestic abuse. This research also advances the literature on the effects of COVID-19 on domestic violence by extending the analysis to the later months of the pandemic. Additionally, this analysis contributes to expanding the literature concerning the problem of domestic violence in Italy.

I find that the effect of the red zone is stronger during the initial shock period. The number of helpline calls (both telephone and chat) from victims increased on average by 28%, and from users increased by 25%. I do not detect the effect of the orange zone on domestic abuse in Italy.

The remainder of the chapter is structured as follows. Section [4.2](#) provides institutional details. Section [4.3](#) and Section [4.4](#) describe the data and empirical strategy, respectively. Section [4.5](#) presents the results and discusses the possible mechanisms at play. Section [4.6](#) concludes.

4.2. Institutional background

The coronavirus pandemic has sparked an international debate on the impact of the stay-at-home regime on domestic violence. One of the consequences of the lockdown in many countries has been the dramatic increase in helpline calls to anti-violence centers.

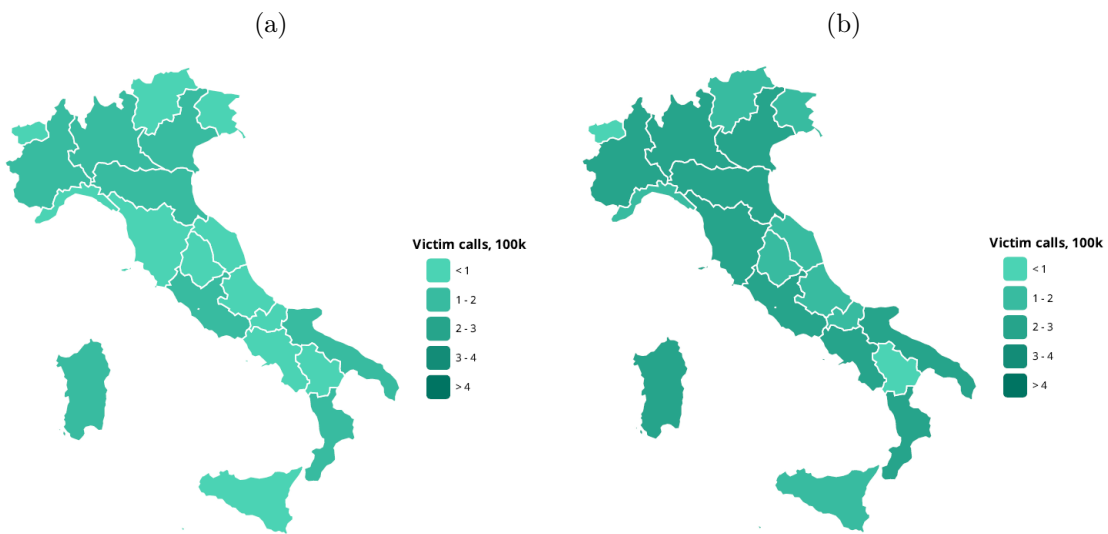
On November 4, 2020, the Italian Minister of Health, Roberto Speranza, issued a new Ordinance classifying Italian regions into four areas - red, orange, yellow, and white

- corresponding to three risk scenarios. The Dpcm provided more serious restrictive measures (Table A.4.1 presents a brief description of the rules), especially in the red zones that led to massive strikes against the lifting of new restrictions (in Reggio Calabria, Naples, Bergamo, Milan, Viterbo, and other Italian cities).

The red zone involves strict restrictions on movement in and out of the region or province and also within the territory itself. Thus, women’s mobility and contact with their family, friends, and colleagues have been restricted, which could provide support and protection from violence.

In November 2020 there was a growing trend of victim calls in almost all Italian regions with respect to November 2013 - 2019. For instance, on average fixed 59 calls (telephone and chat) from victims in November 2020, which is 1,5 and 2 times more than in November 2018 and 2019 corresponding. Figure 4.1 provides a graphical illustration of this trend.

Figure 4.1: The distribution of victim calls



Notes: The graph shows the number of calls per 100.000 inhabitants from victims in November 2019 (a) and November 2020 (b) for each of the 20 regions considered.

Is the growth of domestic violence cases connected with red zone restrictive measures? Theoretically, I expect an effect of restriction on help-seeking victims’ behavior, i.e. I say that putting a region into a red zone is accompanied by an increase in cases of domestic violence, which leads to an increase in calls to the helpline 1522 (as a more available, anonymous, and quick way to report violence). I explain this effect through several mechanisms.

In the case of a pandemic, the most direct channel for violence is that victims and abusers spend more time with each other, which is related to the exposure reduction theory examines the opportunity for and temptation of crime. In the case of domestic violence, a potential victim who is away when the abuser is at home is less likely to be abused than one who is at home with the abuser (Chin (2012); Henke and Hsu (2022)).

Moreover, in the strict isolation condition (for instance, in the red zone), the family bargaining model may come into force, where a perpetrator enjoys the use of “expressive” violence against his partner as a way to relieve frustration. Card and Dahl (2011) demonstrated that emotional cues such as professional football losses can increase an abuser’s frustration, and thus increase his utility of committing acts of domestic violence. Beland and Brent (2018) also confirmed the effect of emotional cues associated with high traffic (increase psychological stress) on domestic violence in Los Angeles. They found that extreme traffic (above the 95th percentile) significantly increases the incidence of domestic violence by approximately 9%. Related, the Covid-19 restrictions can lead to negative emotional shocks and increase the likelihood of domestic violence.

An alternative related mechanism is the theory of social control which predicts that societal controls through formal police interventions or informal societal disapproval of friends and relatives can increase the costs of domestic violence for men (Finkelhor et al. (1983), Gelles and Straus (1979)). In other words, the red zone rules restrict victims’ contact outside of the home and thus decrease societal protection of women from domestic violence.

The following chapters are devoted to testing the hypothesis of whether the strict measures to address the second wave of COVID-19 indicated in the decree-law from November 4, 2020, affect domestic abuse.

4.3. Data

4.3.1. Helpline 1522 data

I present evidence, based on the Italian National Institute of Statistics (ISTAT) data with information on valid calls (telephone and chat) to the helpline 1522 (anti-violence and stalking number)^{4.2} for the period from 2013 to 2021.

^{4.2}1522 was launched in 2006 by the Department for Equal Opportunities to develop a broad system of action for the emergence and contrast of the phenomenon of intra and extra-family violence to the detriment of women. The public number 1522 is active 24 hours a day to help and support victims of violence and stalking.

I consider two different macro-categories of data: (1) the weekly number of valid calls from victims at the regional level; (2) the weekly number of valid calls from users at the regional level. Victims are those who have suffered some form of violence and/or stalking, and whose socio-economic and personal details are available that are much less investigated in users^{4.3}.

I should also note, that the data can suffer from bias, considering the fact that the system, also for reasons of privacy, does not control if the same person calls the toll-free number several times, both for themselves and for others. In the same way, since it is impossible to check the information collected during the call or the message sent, it is possible that the call is registered in the name of a possible interlocutor (other than the victim) but that it is, in fact, the same victim who does not want to report information related to himself. In this case, the database, acquiring all the information of a social and personal nature, is marked as a victim^{4.4}. However, since this helpline is anonymous, I suppose that the data less suffer from under-reporting than police records or survey data.

4.3.2. Region classification data

According to the Ordinance by the Ministry of Health on November 4, 2020 (GU Serie Generale n.276 del 05-11-2020) all Italian regions and autonomous provinces were classified into four areas - red, orange, yellow, and white - corresponding to three risk scenarios, for which specific restrictive measures were foreseen. I collect the data of color of each Italian region at a specific week from DPCMs published in the Gazzetta Ufficiale with the official number of each Decree from November 2020 to December 2021 (the first GU Serie Generale n.276 del 05-11-2020 that come into force on November 6; the last GU Serie Generale n.305 del 24-12-2021). Thus, the weekly call data corresponds to the weekly color for each region from the 45th week of 2020.

4.3.3. Google Trends data

Google Trends is another source that allows one to request trend data for the fourteen main search queries connected with violence topics in English and Italian languages: 1. 1522 (the helpline number for anti-violence and stalking in Italy); 2. Centro Antiviolenza;

^{4.3}Methodological note ISTAT

^{4.4}Methodological note ISTAT

3. Domestic violence; 4. Violenza domestica ; 5. Helpline; 6. Mascherina 1522 (the code phrase developed to report cases of domestic or sexual violence); 7. Sexual abuse; 8. Stalking; 9. Violenza sulle donne; 10. Violenza di genere; 11. Numero antiviolenza; 12. Maltrattamenti in famiglia; 13. Denuncia violenza; 14. Giornata contro la violenza sulle donne. Google Trends provides a normalized value to display the search activity for a given term at a specific period (index between 0 and 100, where 100 is the maximum search interest for the term). This tells how popular that topic was in a particular location during a specific period. The data was obtained on the weekly basis for each query and region from 2013 - 2021 on selected topics through the R package gtrendsR.

4.3.4. Google Mobility Index data

I complement the previous data using a region-level mobility index to see the movement trends before and after Decree-law. There are six categories of places of visit that were recorded by Google, namely (1) Workplaces, (2) Residential, (3) Transit Stations, (4) Retail and Recreation, (5) Grocery and Pharmacy, and (6) Parks^{4.5}. The data shows how visitors to (or time spent at home for the ‘Residential’ category) categorized places change compared to baseline day (the median value from the five-week period 3 Jan – 6 Feb 2020). Each index is smoothed to the 7-day average to correspond to weekly data. I select the datasets from the 8th week of 2020 (the first available data) to the 52nd week of 2021 for this analysis.

In this dataset, the Trentino-South Tyrol region was separately considered as the autonomous provinces of Trento and Bolzano.

Summary statistics for all variables are reported in Appendix Table [A.4.2](#) .

4.4. Empirical Strategy

I begin the analysis by implementing an event study design considering up to 3 weeks before and 4 weeks after the treatment ^{4.6}. The event study model is as follows:

^{4.5}The category "Retail and recreation" includes places like restaurants, cafes, shopping centers, theme parks, museums, libraries, and movie theaters. The "Grocery and pharmacy stores" category includes grocery markets, food warehouses, farmers’ markets, specialty food shops, drug stores, and pharmacies. The Public transport station includes public transport hubs such as subway, bus, and train stations. "Park" is considered as the number of visitors in local parks, national parks, public beaches, marinas, dog parks, plazas, and public gardens.

^{4.6}I refer to this period as preferred after experimenting with different effect windows length and came to the conclusion that new restrictions mostly have influenced people’s behavior in the first month (Figure [A.4.1](#))

$$Calls_{it} = \sum_{j=-3}^4 \beta_j d_{i,t-j} + \mu_i + \theta_t + \epsilon_{it} \quad (1)$$

where $Calls_{it}$ is the natural logarithm of confirmed calls (from victims or users) in region i and period t (year-week) per 100,000 inhabitants. d_{it} is equal to 1 if region i in period t (year-week) was in the red zone. Parameter μ_i captures region fixed effects and θ_t denotes period fixed effects. ϵ_{it} is the residual.

I subsequently apply the event study designs with binned endpoints proposed by [Schmidheiny and Siegloch \(2020\)](#) who generalize the event-study approach to multiple events. According to this approach, I define the last lag (lead) as open intervals capturing all known events. I bin endpoints and normalize the pre-event coefficient $\beta_{-1} = 0$.

Second, in this analysis, I rely on a difference-in-differences design with staggered adoption of treatment (the imputation-based approach of [Borusyak et al. \(2021\)](#)). The causal model for the outcome of interest reported in the region i on the week of year t is

$$Y_{it} = \alpha_i + \beta_t + \tau_{it} D_{it} + \epsilon_{it} \quad (2)$$

In the baseline specification, I define the outcome variable Y_{it} as the number (in log) of confirmed calls (victim or user) per 100,000 inhabitants. α_i and β_t capture the region and week of year fixed effects and D_{it} is the binary variable equal to 1 if the region i is ‘treated’ (i.e., was in the red zone ^{4.7}) in period t . Further, τ_{it} sit captures the ‘treatment effect’—that is, the impact of the red zone on the victim or user calls—while ϵ_{it} is the residual. The standard errors are clustered at the regional level. I also focus on the effects of treatment up to four weeks after November 6, 2020. ^{4.8}

For both models, I separately consider four outcomes: (1) calls from the victim; (2) calls from the user; (3) Google Trends Hits for selected keywords, and (4) Google Mobility Index.

^{4.7}In the orange zone for placebo check

^{4.8}I implement the analysis using the did imputation Stata command provided by [Borusyak et al. \(2021\)](#)

4.5. Results

In Panels A and B of Figure 4.2, I replicate the event study results estimating equation (1). Panel A presents the original specification results presented in Table 4.1 (columns (1) and (3)). Panel B extends the original specifications by binning endpoints of the effect window and by normalizing the effect at the pre-event period to zero (according to Schmidheiny and Siegloch (2019)). The β -coefficients were estimated by creating binned treatment indicators at the endpoints $j = -3$ and $j = 4$. This method is equivalent to a distributed-lag model and leads to identical parameter estimates and standard errors as presented in Table 4.1 (columns (2) and (4)).

The coefficients are not statistically significant for both models (with and without binning endpoints), however, it can be noted the growth of calls after the Dpcm between lag -1 and lag 2 for victims and lag 1 and lag 3 for users. Moreover, I reestimate the generalized event study design gradually increasing j to almost three months (12 weeks). Results are presented in Figure A.4.1, suggesting treatment effects are higher in the first month (up to 4 lags).

In the following, the difference-in-differences design with staggered adoption of treatment (the imputation-based approach of Borusyak et al. (2021)) was used to address my research question (Equation 2). This approach allows estimating the effects of treatment with staggered rollout considering that in which each region i that gets treated as of period E_i (first-time treatment) stays treated forever and some regions never are treated (in our case Liguria and Umbria were not entered in the red zone).

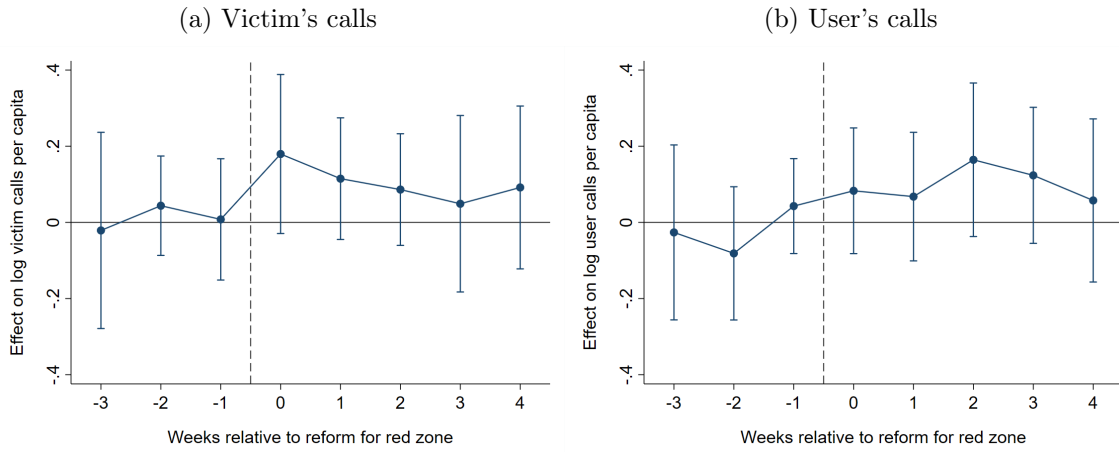
In Figure 4.3, I plot the pre-trend estimates obtained from regression (the red squares) and ‘treatment’ effects for four weeks following the entrance in the red zone (the blue dots), together with 95% confidence intervals. I apply this analysis separately for victims’ and users’ calls.

Figure 4.3 validates the empirical design: the pre-trend coefficients are small and statistically insignificant. Thus, there is no significant effect prior to the treatment in indicating that the parallel trends assumption is satisfied prior to the treatment. I show the increase in victim calls after the red zone treatment is concentrated in the first two weeks, while in the following weeks the point estimates are insignificant. I report the corresponding treatment effects in the first column of Table 4.2^{4.9}. The number of

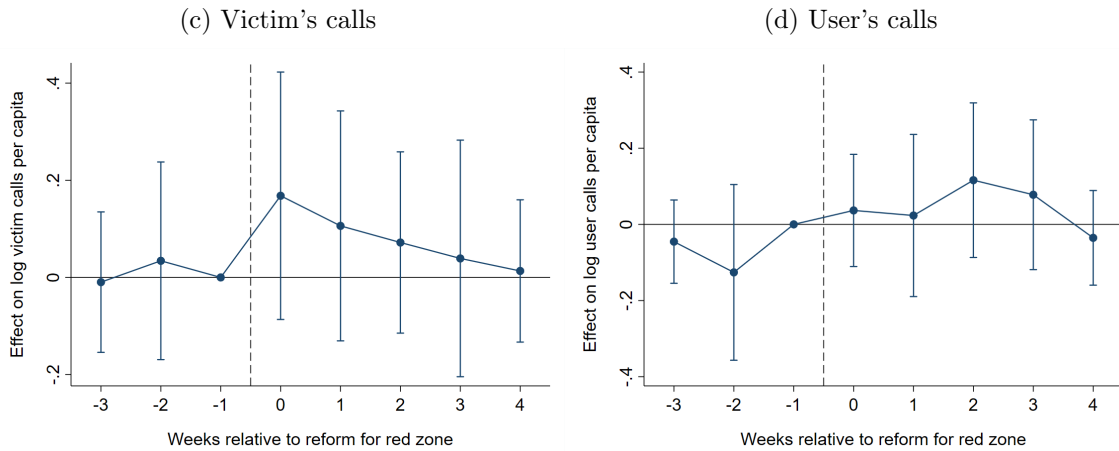
^{4.9}To provide the correct percentage effect of the estimated treatment I apply the transformation $100 \times [\exp(\text{estimated effect}) - 1]$.

Figure 4.2: Event study results

Panel A: No binning and no normalization at -1



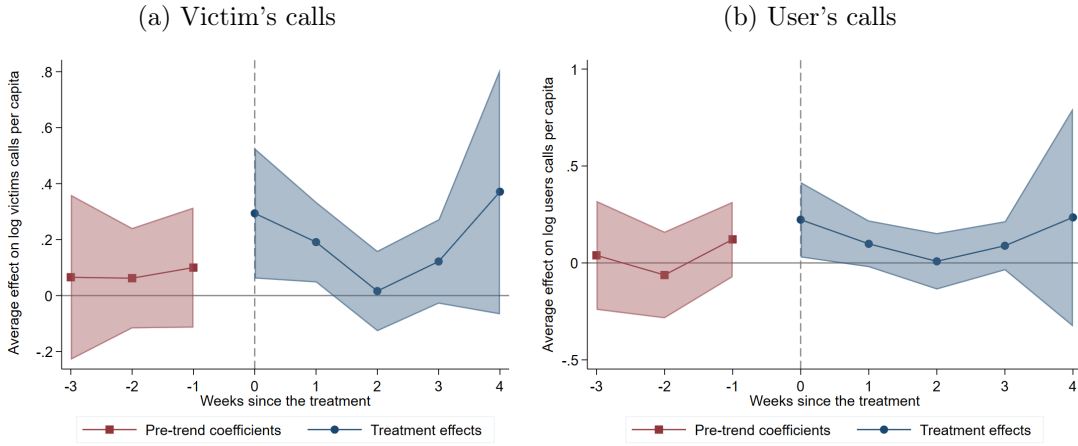
Panel B: Binning and normalization at -1



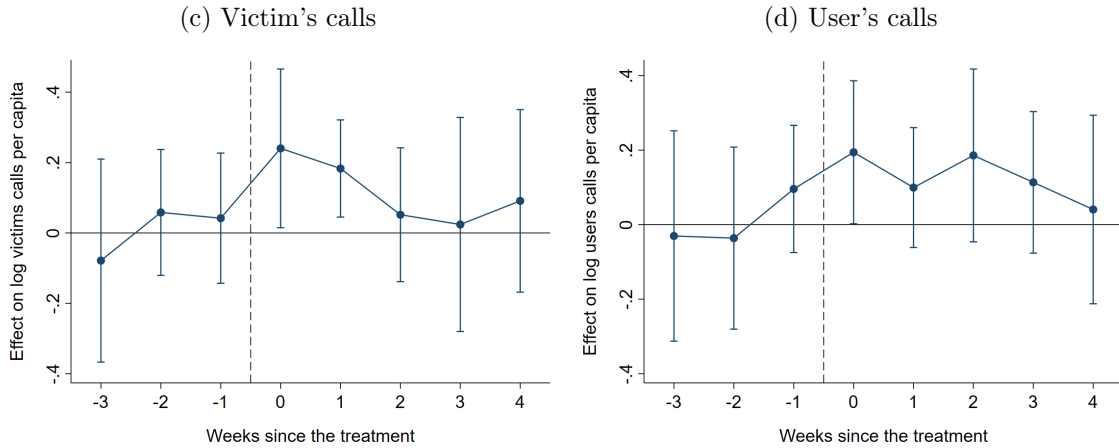
Notes: The figure replicates and extends the event study estimates. The graphs show point estimates and 95%-confidence intervals based on standard errors clustered by regions. The outcome variable is defined as the log number of calls per 100,000 inhabitants. Graphs in Panel A replicate the estimates reported in the specification (1) and (3), Panel B - (2) and (4) of Table 4.1. Panel B extends the original specifications by binning endpoints of the effect window (-3, 4) and by normalizing the effect at the pre-event period to zero. All models are estimated in levels with regions and time fixed effects.

Figure 4.3: The effect of the Red Zone on helpline calls

Panel A: The imputation-based approach



Panel B: Event study model in the general case without binning of endpoints



Notes: The graphs show the estimates obtained using did imputation command written by [Borusyak et al. \(2021\)](#)(Panel A), event study results (Panel B), and 95%-confidence intervals based on standard errors clustered by regions. Each region i that gets treated as of period E_i stays treated forever. Here I consider only the timing of the first treatment for each region i . Week zero is week 45 of 2020 when the treatment started. The outcome variable is defined as the log number of calls per 100,000 inhabitants.

Table 4.1: Event study results

	Victim's calls		User's calls	
	(1) Event Study Estimator	(2) Distributed-lag Estimator	(3) Event Study Estimator	(4) Distributed-lag Estimator
t= -3	-0.0218 (.123)	-0.00971 (.074)	-0.0261 (.110)	-0.0453 (.056)
t= -2	0.0428 (.063)	0.0342 (.104)	-0.0813 (.084)	-0.126 (.118)
t= -1	0.00791 (.076)	0 (omitted)	0.0433 (.060)	0 (omitted)
t= 0	0.179* (.100)	0.168 (.130)	0.0832 (.079)	0.0366 (.075)
t= 1	0.115 (.076)	0.106 (.121)	0.0682 (.081)	0.0233 (.109)
t= 2	0.0850 (.070)	0.0719 (.095)	0.165* (.097)	0.116 (.104)
t= 3	0.0496 (.111)	0.0391 (.124)	0.124 (.086)	0.0779 (.100)
t=4	0.0915 (.102)	0.0133 (.075)	0.0578 (.103)	-0.0353 (.063)
N	8527	8416	9155	9042

Notes: This table complements the coefficient plots of Figure 4.2. Event study coefficients correspond to Panel A, and Distributed-lag coefficients to Panel B. The outcome variable is defined as the log number of calls (victim or user) per 100,000 inhabitants. t is the number of week relative to treatment. All models are estimated in levels with region and time fixed effects. Robust standard errors are clustered at the regional level in parentheses. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

Table 4.2: The effect of the Red Zone on helpline calls

	Victim's calls		User's calls	
	(1) Imputation Estimator	(2) Event Study Estimator	(3) Imputation Estimator	(4) Event Study Estimator
t= -3	0.0653 (.151)	-0.0785 (.138)	0.0391 (.143)	-0.0304 (.135)
t= -2	0.0621 (.092)	0.0583 (.086)	-0.0622 (.114)	-0.0362 (.117)
t= -1	0.100 (.109)	0.0419 (.089)	0.121 (.099)	0.0958 (.082)
t= 0	0.294** (.119)	0.240** (.108)	0.223** (.099)	0.194** (.092)
t= 1	0.191*** (.074)	0.183*** (.066)	0.0986* (.062)	0.0995 (.077)
t= 2	0.0162 (.073)	0.0518 (.091)	0.00839 (.074)	0.186 (.111)
t= 3	0.122 (.077)	0.0241 (.146)	0.0886 (.065)	0.114 (.091)
t=4	0.371* (.224)	0.0912 (.124)	0.235 (.288)	0.0407 (.121)
N	7798	8527	8391	9155

Notes: This table complements the coefficient plots of Figure 4.3. Imputation coefficients correspond to Panel A, while event study coefficients correspond to Panel B. The outcome variable is defined as the log number of calls (victim or user) per 100,000 inhabitants. Each region i that gets treated as of period E_i stays treated forever. t is the number of week relative to treatment. Here I consider only the timing of the first treatment for each region i . Week zero is week 45 of 2020 when the treatment started. All models are estimated in levels with region and time fixed effects. Robust standard errors are clustered at the regional level in parentheses. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

helpline calls from victims increased on average by 28%, during the zero (34%) and first weeks (21%) after the new decree-law came into force on November 6, 2020. The number of calls from users increased by 25% during the zero week.

The event study coefficients presented in Table 4.2 are smaller than the imputation results, however, they are still significant at the same time period. The average increase of victim's calls was 24% (27% in $t=0$ and 20% in $t=1$), while the number of calls from users was 21% for zero week.

For analysis of the robustness, I also consider the effect of the orange zone on violence. Italy's orange zones were not mean full lockdown, but the rules remained strict. It was forbidden to move between municipalities but not within. However, it was allowed to visit family and friends who live in the same town once a day, between the hours of 5

am to 10 pm, but no more than two adults, plus children under 14, could go at once. I suppose that this effect may affect more reporting of violence rather than the increase in cases. I consider the weeks when a region was moved from yellow to orange zone or was in orange before. In Figures A.4.2 and A.4.3, I report the results separately for victims' and users' calls. Interestingly, I do not obtain significant results for calls from users but I note some increase in victim calls in the fourth week. I partially try to explain this by excluding Lombardy, Tuscany, Abruzzo, Molise, and the Autonomous Province of Trento regions which were moved to the red zone right after the orange (on average 1-2 weeks after), and note that this result explained by the effect of the presence of red zones (Figure A.4.2 (b) and (d)). Thus, I do not observe the effect of the orange zone on violent cases and confirm my hypothesis of the strict effect of the red zone on domestic abuse.

Further, I apply the same strategy for the other two outcome variables - Google Trends and Google Mobility Index (Figures A.4.4 - A.4.7). The graphs of Google Trends show that there are no meaningful results of red zone treatment for almost all selected keyword queries (Figures A.4.4 and A.4.5). However, the result is statistically significant for the average of following hits : 1522, violenza domestica, violenza sulle donne, maltrattamenti in famiglia and denuncia violenza (Figure A.4.4 (a)). I note an increase in searches in the first, third and fourth weeks after the red zone treatment. As expected, the red zone restriction affected the number of visitors in public places and the time spent at home (Google Mobility Trends). The effect was mostly concentrated in the first two weeks after the red zone treatment (Figures A.4.6 and A.4.7).

4.5.1. Additional Results

Considering the different time red zone treatment periods implemented for Italian regions, I expand the current research by applying the synthetic control method for multiple treated units. In this subsection, I provide graphical evidence for the effect of red zones on 1522 helpline calls using Synth Runner and Allsynth Stata Command.

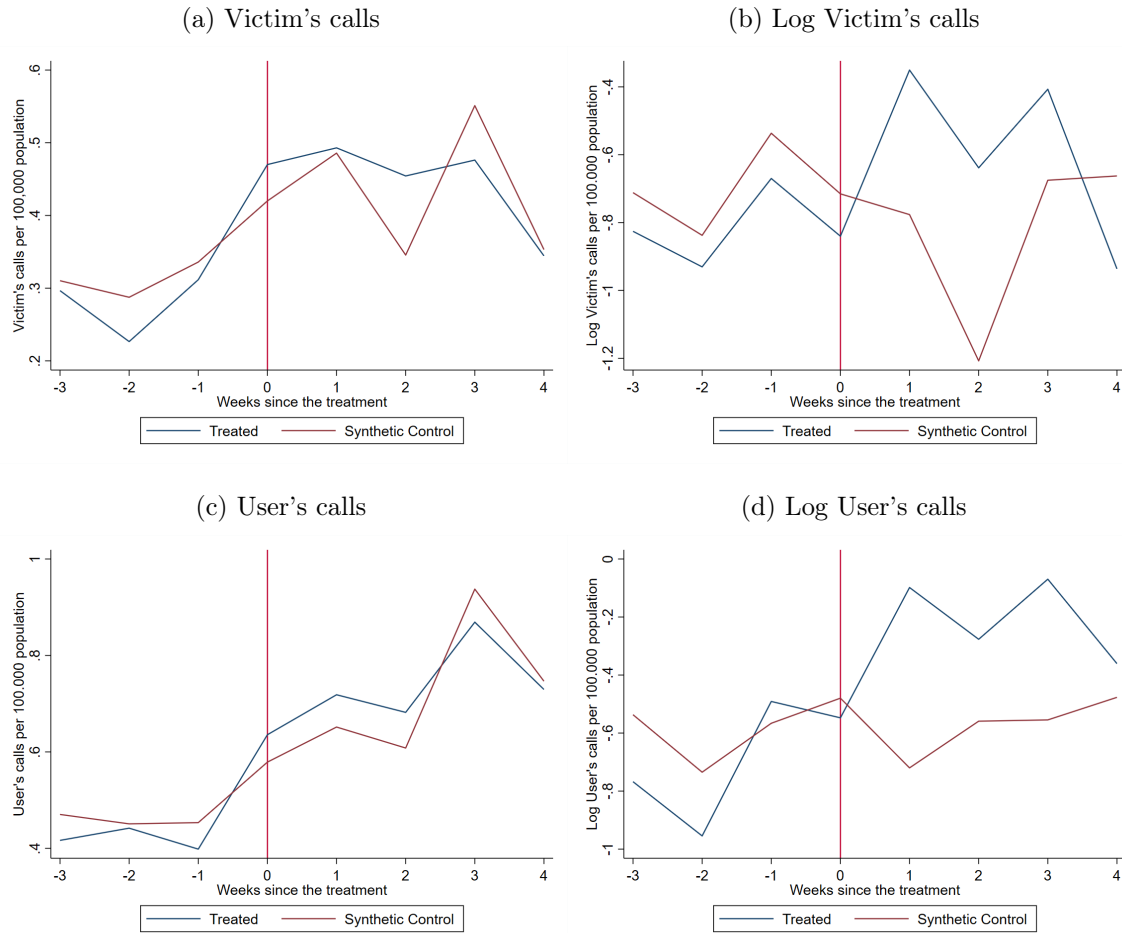
Synth Runner Command

I first apply the *Synth Runner* Stata package (Galiani and Quistorff (2017)) to automate the process of running multiple synthetic control estimations.

I again consider four weeks before and four weeks after treatment for this kind of analysis. Thus, Piedmont, Aosta Valley, Calabria, Campania, Tuscany, Abruzzo, Lombardy, and the Autonomous Province of Bolzano are considered treated regions, other

regions are considered synthetic controls.

Figure 4.4: The effect of the Red Zone on helpline calls: Synth Runner Command



Notes: I use the synth runner command to consider multiple treatments at different times. Treatment regions are regions that were treated for four weeks after applying Decree (Piedmont, Aosta Valley, Calabria, Campania, Tuscany, Abruzzo, Lombardy, and the Autonomous Province of Bolzano). The outcome variable is defined per 100,000 inhabitants. The dataset includes variables from 2017 to 2021.

Table 4.3 and Figure 4.4 show the results of this comprehensive synthetic control analysis by *synth runner* examining the effect of the red zone on both victims' and users' calls to the 1522 Italian helpline. During the pre-decree periods, the treated regions receive fewer calls than the synthetic control group. In the post-treatment period, I note a sharp growing trend of calls to the 1522 helpline among "red-zone" regions (treatment group), which confirms the previous results. The comprehensive synthetic control analysis suggests that the differences in calls between treatment regions and control regions are statistically meaningful for victims for two weeks after treatment (Table 4.3). The treatment group received 53% more calls from victims in the first week

after Decree (t=1) and 77% more calls in the second week (t=2) than regions that were not put into the red zone (control group). Concerning the calls from users, I note the significant results for the first week and the third week (86% (t=1) and 62% (t=3) more calls among the treatment group than the control group). I suppose that more calls from users in the third week correspond to the celebration of International day for the elimination of violence against women (November 25).

Table 4.3: The estimates of synthetic control analysis by synth runner

	(1)	(2)	(3)	(4)
	Victim Calls	Ln(Victim Calls)	User Calls	Ln(User Calls)
t= 1	0.00724	0.426**	0.0669	0.622***
t= 2	0.109*	0.569***	0.0739	0.282
t= 3	-0.0749	0.268	-0.0685	0.485*
t= 4	-0.00862	-0.274	-0.0171	0.116

Notes: The outcome variable is defined per 100,000 inhabitants. The dataset includes variables from 2017 to 2021. * p < 0.1, ** p < 0.05 and *** p < 0.01.

Allsynth Command

To complete the synthetic control method for multiple treatment units and staggered timing I use the new Stata command *Allsynth* (Wiltshire et al. (2021)). Particularly I applied the *Stacked Allsynth* option to calculate the “stacked” average treatment effects of the red zone on both victims’ and users’ helpline calls.

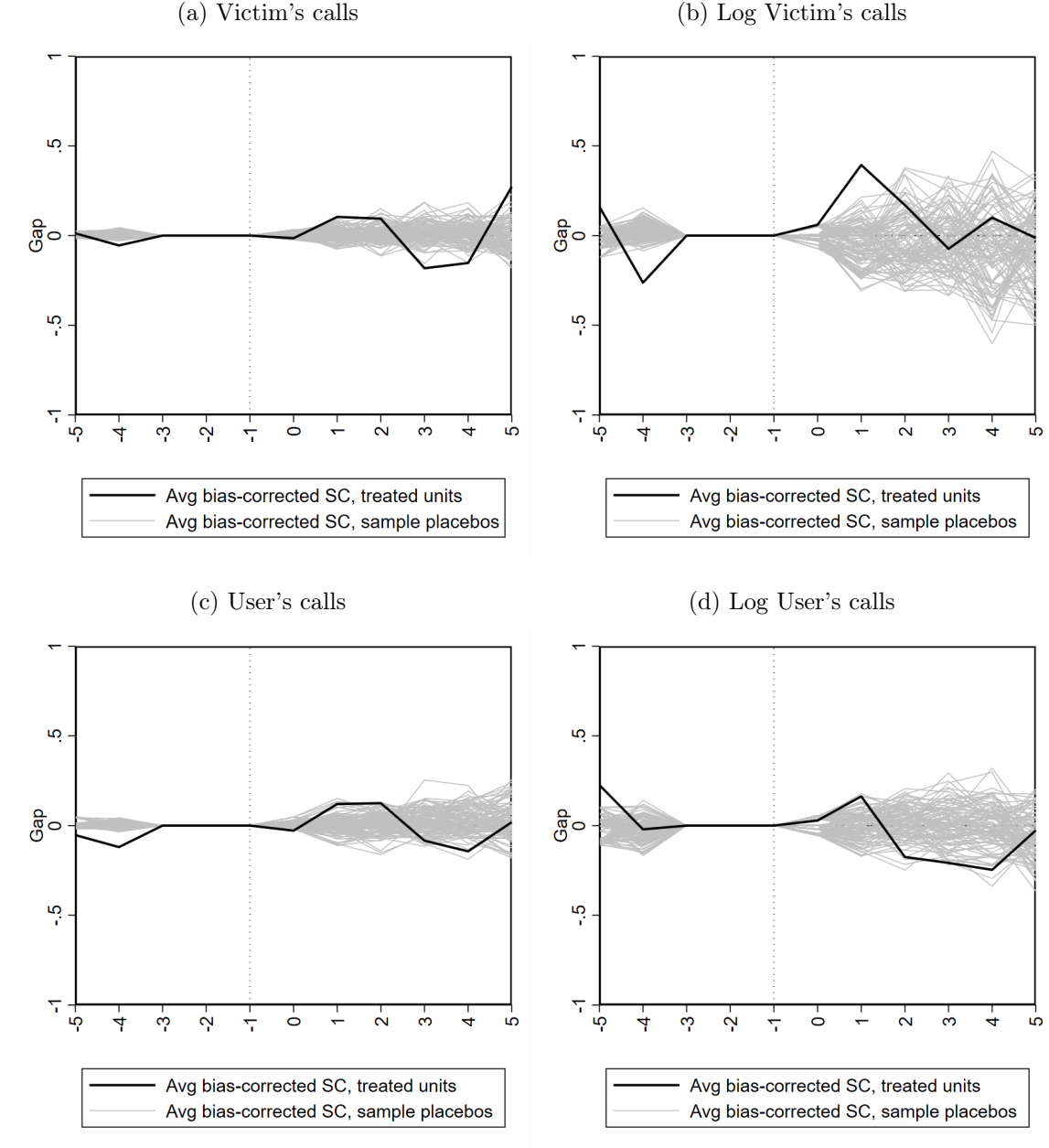
The "Treated" regions identify with a 1 for all the regions which got their first treatment over this period (during 4 weeks after Dpcm) and identify with a 0 for all of the "Donor pool" regions (sample placebos) in the sample where the treatment was implied after 4 weeks or was not implied at all (Umbria and Liguria).

Figure 4.5 shows the results of estimating treatment effects with a bias-corrected synthetic control estimator. I note the large significant treatment effect (“gap”) between the treated unit outcome and the synthetic control outcome in log victim’s calls in the first two weeks after applying new restrictions (Figure 4.5 (b)).

4.5.2. Discussion on the mechanisms

The research results point to an effect of red zone restrictions on violence against women for the first weeks after Dpcm. However, the actual mechanism of this is difficult to explore with available data. But in this subsection, I try to explain some evidence.

Figure 4.5: The effect of the Red Zone on helpline calls: Allsynth Command



Notes: This plots the bias-corrected average treatment effects of the red zone on the victim and user calls. The outcome variable is defined per 100,000 inhabitants. The Treated variable identifies with a 1 all the regions which got their first treatment (red zone) over the period during 4 weeks after Dpcm and identifies with a 0 all of the donor pool regions in the sample where the treatment was implied after 4 weeks or was not implied at all. The dataset includes variables from 2017 to 2021.

The findings are consistent with three alternative mechanisms: social isolation, decreased bargaining power for women, and exposure reduction theory.

A possible reason for the effect of the increasing domestic violence is that the staying-at-home effect is strongest during an initial shock period. The “shock” of the new restrictions may be more strict than the prolonged effects of isolation in terms of its effect on domestic violence. For instance, [Brühlhart et al. \(2021\)](#) after analyzing 8 million helpline calls from 19 countries found that their volumes significantly increased (by 35%) after the onset of the pandemic, but decreased again after six weeks. [Leslie and Wilson \(2020\)](#) said that the biggest increase of domestic violence calls for service in 14 large US cities came during the first five weeks after widespread social distancing began when domestic violence calls were up 9.7%. They also note that this increase in reported domestic violence began when data on cellphone GPS tracking and seated restaurant customers showed people started spending more time at home.

This evidence on the staying-at-home regime and domestic violence is also consistent with the exposure reduction theory and the theory of social control. The effect is strongest when people were more time at home, as displayed in Figures [A.4.6](#) and [A.4.7](#) (f), namely during the first two weeks after Dpcm took into force. (I should also note the fact that the average stay period in the red zone for a region was two weeks).

On the other hand, the discontent on part of the population of the new restrictions was expressed in protests in different regions of Italy after a region was classified as a red zone, which can be considered as an emotional cue, increasing the abuser’s frustration and thus increasing his utility of committing acts of domestic violence.

4.6. Conclusion

In this chapter, I provide new evidence about the Covid-19 impact on domestic violence in Italy and advance the literature by expanding the analysis to later months of the pandemic. Since October, Italy has been experiencing a second severe wave of Covid-19 that is characterized by a large heterogeneity of intensity of contagion across regions and across provinces that effort the government to establishment of “colored zones”.

I focus on this new policy of government restrictions implemented on November 4, 2020, in Italy to address the second wave of Covid-19. I build the hypothesis of the existing effect of the red zone restrictions on domestic violence by exploring the variation of calls in the 1522 helpline across Italian regions. To examine the overall effect of the new Dpcm over time, I employ a generalized event study and difference-in-differences design with staggered adoption, as well as, a synthetic control method.

I find the expected effect of the red zone on helpline calls after Dpcm. This effect is more substantial during the initial shock period. The number of helpline calls (both via telephone and chat) from victims increased on average by 28%, and from users increased by 25%. These findings are consistent with three alternative mechanisms: social isolation, decreased bargaining power for women, and exposure reduction theory. I do not find a significant effect of the red zone on Google Trends queries on almost all of the fourteen research hits, as well as the effect of the orange zone on domestic abuse.

A.4. Appendix

Table A.4.1 : Brief description of the rules in place for the Yellow, Orange, Red zones

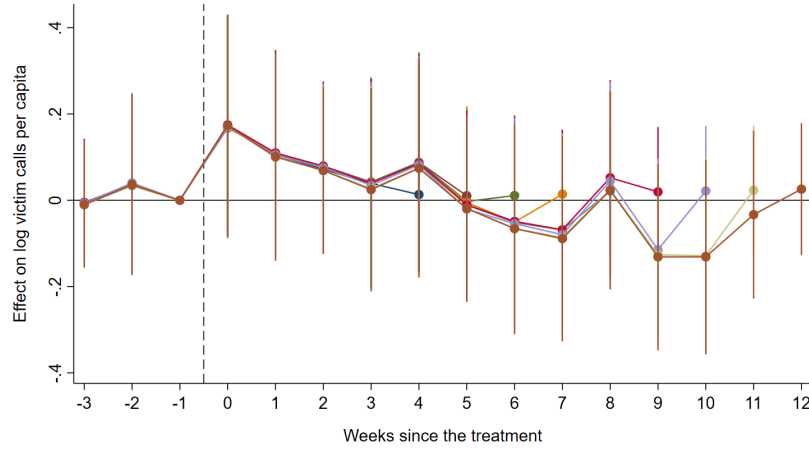
<p>Yellow zone</p>	<ul style="list-style-type: none"> • Requirement to wear masks outdoors; • Social distancing of 1 meter; • National curfew from 10pm to 5am; • Half-capacity public transport; • Museums, exhibitions and bingo halls, pools, gyms, theaters, and cinemas closed; • Bars, pubs, and restaurants are open until 6 pm; consumption at the table is allowed for a maximum of four people per table; takeaway allowed until 10pm; home deliveries without restrictions; • Public competitions suspended (including school), except for healthcare ones; • Shopping centers and markets closed on weekends and public holidays; • All high schools and universities must adopt distance learning solutions (universities closed, except for laboratories); in-person teaching for preschools, elementary schools, and middle schools.
<p>Orange Zone <i>All the restrictions of Yellow, plus:</i></p>	<ul style="list-style-type: none"> • Any movement in and out of the region and municipality is prohibited (except for proven needs); • Bars and restaurants closed; takeaway allowed until 10pm; home deliveries without restrictions.
<p>Red Zone <i>All the restrictions of Orange, plus:</i></p>	<ul style="list-style-type: none"> • Any movement in and out of the Region and also within the territory itself is prohibited (except for reasons of work, needs and health); • All retail stores closed, except for food stores, grocery stores, pharmacies, tobacconists and newsstands; • Walking or physical activity is allowed near the house at least a 1-meter distance from other people; • School in presence is allowed only for kindergarten, elementary school, and 6th grade (prima media); • Smart working in the public and private sectors: staff presence only for activities that cannot be postponed and connected to emergency management; • Suspended all sports competitions, and closed sports centers.

Table A.4.2 : Summary Statistics

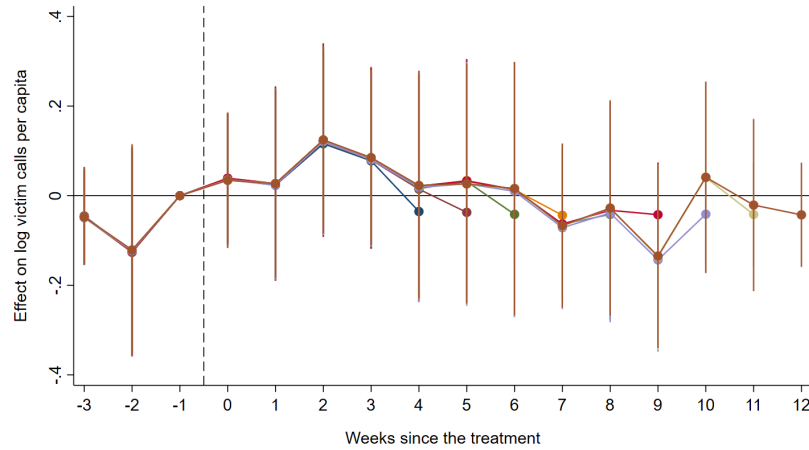
	Obs	Mean	Std.Dev.	Min	Max
<i>Panel A. Helpline Data, 100k pop.</i>					
Victim calls	10017	.28	.222	0	3.183
User calls	10017	.592	.397	0	4.279
ln(Victim calls)	8527	-1.284	.607	-4.606	1.158
ln(User calls)	9155	-.588	.572	-3.894	1.454
Dummy red	10017	.009	.096	0	1
<i>Panel B. Google Trends Data</i>					
Hits_1522	10017	9.777	25.394	0	100
Hits_centro antiviolenza	10017	13.881	27.74	0	100
Hits_domestic violence	10017	6.216	22.434	0	100
Hits_helpline	10017	9.264	25.792	0	100
Hits_mascherina 1522	10017	1.889	12.178	0	100
Hits_sexual abuse	10017	5.16	20.892	0	100
Hits_stalking	10017	27.78	28.878	0	100
Hits_violenza domestica	10017	12.927	27.506	0	100
Hits_violenza sulle donne	10017	24.342	28.571	0	100
Hits_violenza di genere	10017	8.671	24.125	0	100
Hits_numero antiviolenza	10017	1.876	13.384	0	100
Hits_maltrattamenti in famiglia	10017	7.408	23.443	0	100
Hits_denuncia violenza	10017	3.485	17.684	0	100
Hits_giornata contro la violenza sulle donne	10017	8.402	24.136	0	100
Hits_average google	10017	13.517	11.742	0	70
<i>Panel C. Google Mobility Index Data</i>					
Retail and recreation	2057	-21.632	28.584	-93	104.857
Grocery and pharmacy	2052	-.479	22.544	-63	103.571
Parks	2048	33.507	85.12	-89.286	614.286
Transit stations	2049	-21.227	31.301	-86.143	187.857
Workplaces	2058	-24.534	14.56	-73.143	1.429
Residential	2058	7.171	8.348	-5.714	34.143

Figure A.4.1: Varying the Effect Window

(a) Victim's calls



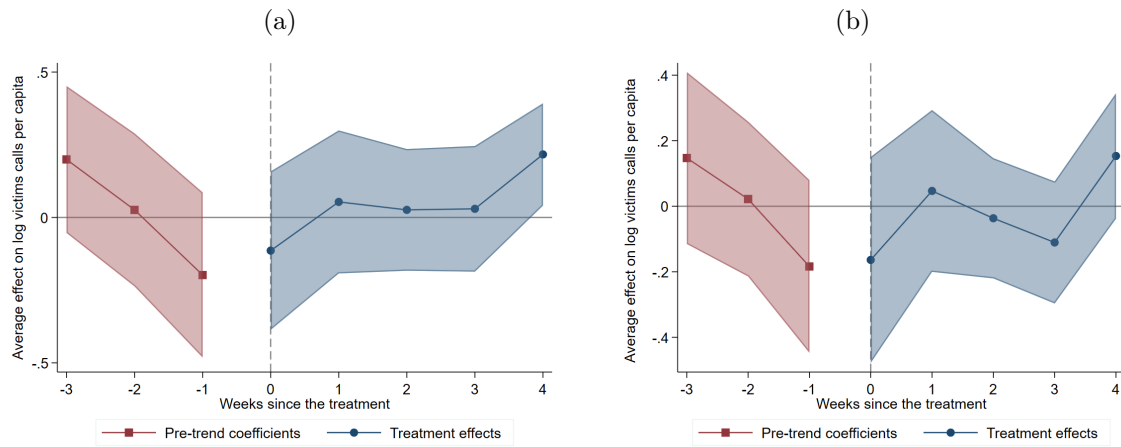
(b) User's calls



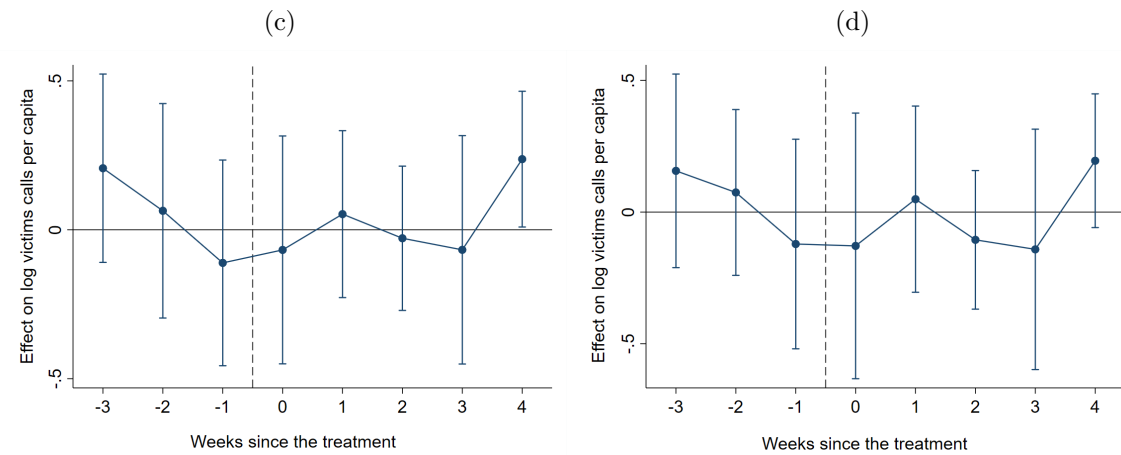
Notes: The figure plots the results when applying the generalized event study with a varying number of lags and 95% confidence interval. The outcome variable is defined as the log number of calls per 100,000 inhabitants. The blue line estimates the standard effect window with four lags in the estimation sample of the specification with the longest effect window of 12 lags.

Figure A.4.2: The effect of the Orange Zone on Victim's calls

Panel A: The imputation-based approach



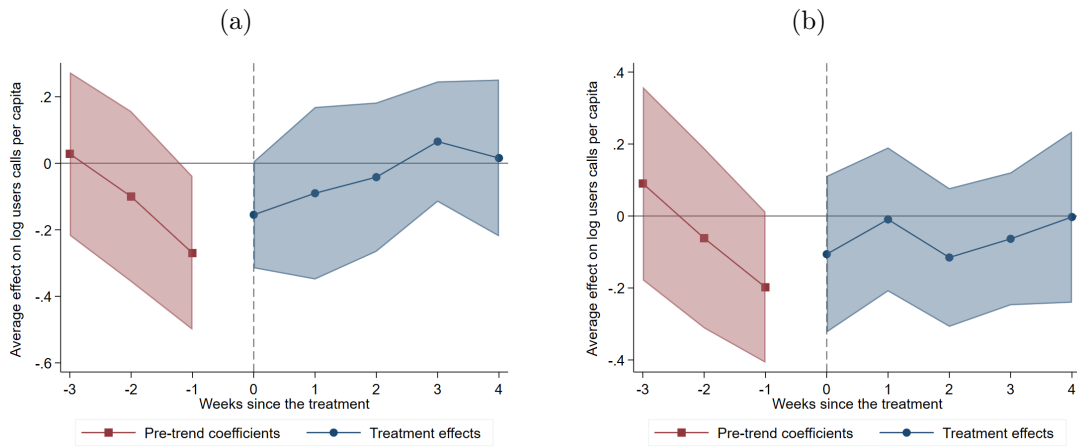
Panel B: Event study model in the general case without binning of endpoints



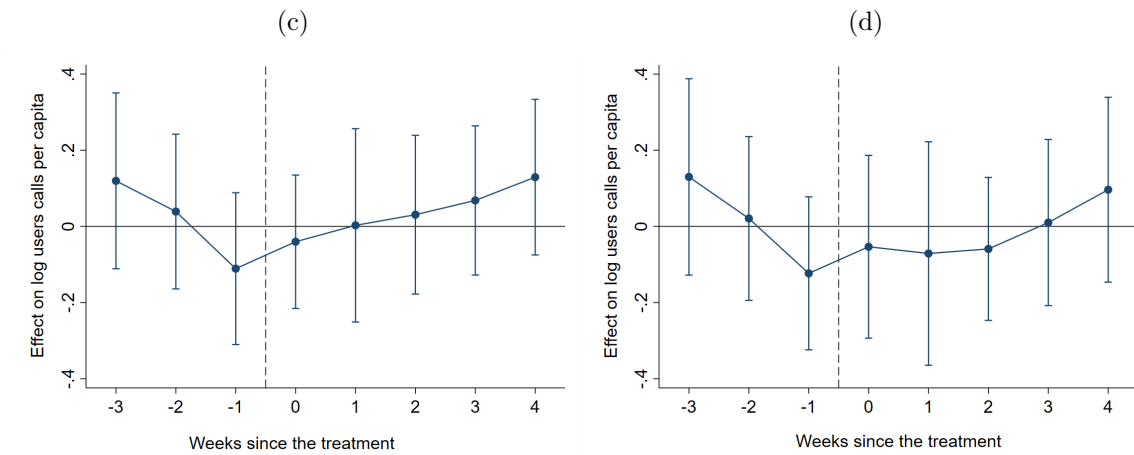
Notes: The graphs show the estimates obtained using did imputation command written by [Borusyak et al. \(2021\)](#) (Panel A), event study results (Panel B), and 95%-confidence intervals based on standard errors clustered by regions. Graphs (a) and (c) represent the full sample, (b) and (d) restricted one which excludes Lombardy, Tuscany, Abruzzo, Molise, and the Autonomous Province of Trento. Each region i that gets treated as of period E_i stays treated forever. Here I consider only the timing of the first treatment for each region i . Week zero is week 45 of 2020 when the treatment started. The outcome variable is defined as the log number of calls per 100,000 inhabitants.

Figure A.4.3: The effect of the Orange Zone on User's calls

Panel A: The imputation-based approach

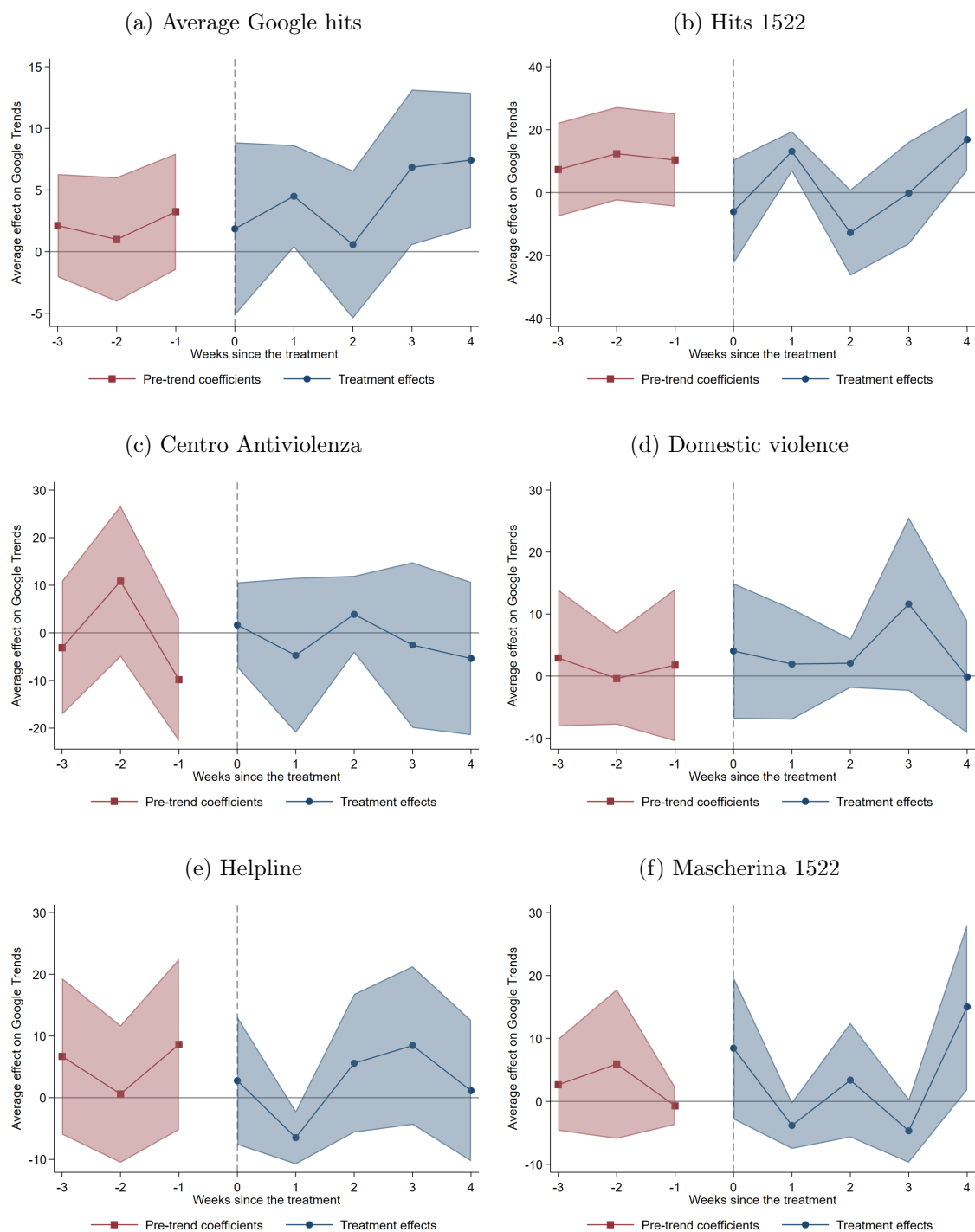


Panel B: Event study model in the general case without binning of endpoints



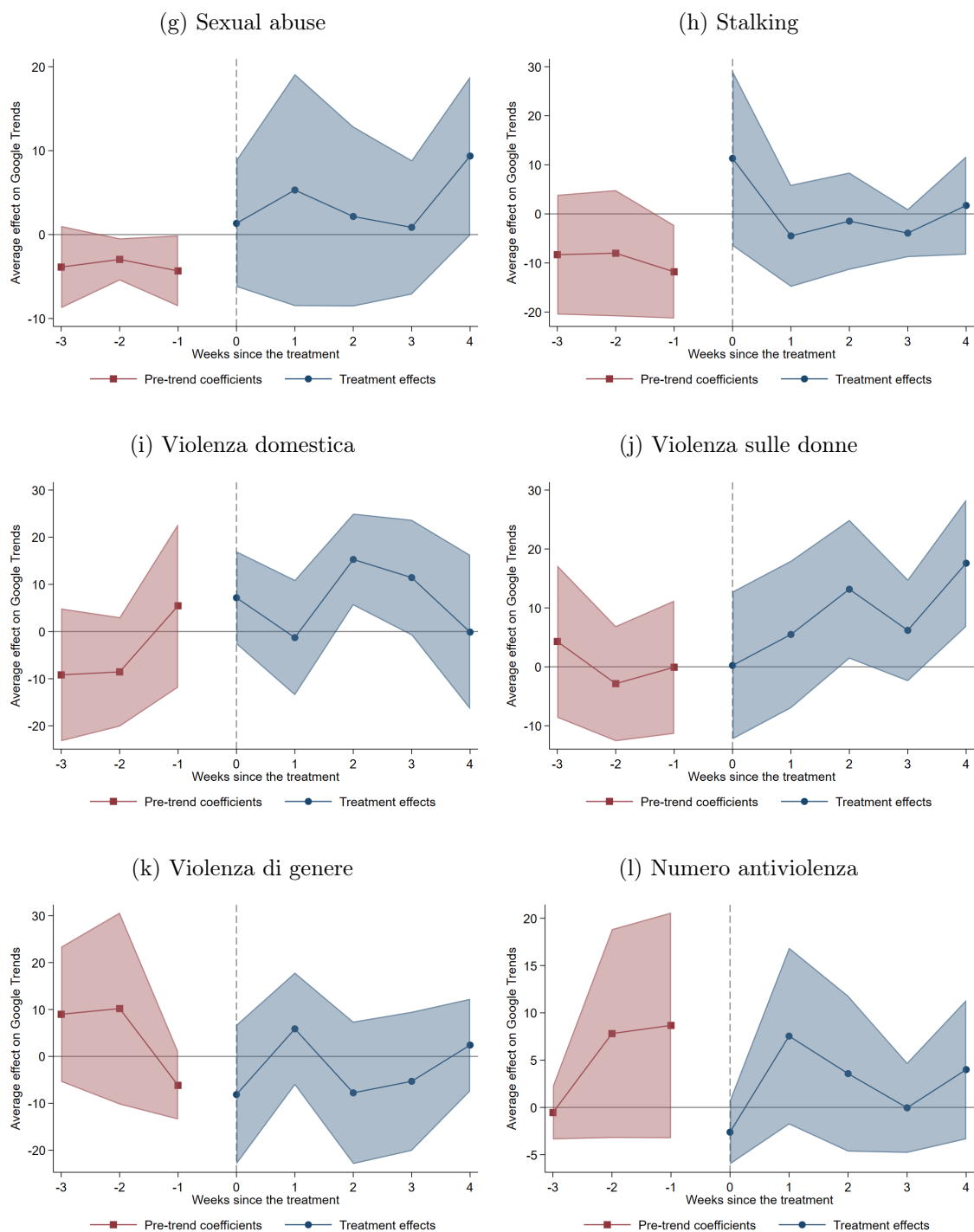
Notes: The graphs show the estimates obtained using did imputation command written by [Borusyak et al. \(2021\)](#) (Panel A), event study results (Panel B), and 95%-confidence intervals based on standard errors clustered by regions. Graphs (a) and (c) represent the full sample, (b) and (d) restricted one which excludes Lombardy, Tuscany, Abruzzo, Molise, and the Autonomous Province of Trento. Each region i that gets treated as of period E_i stays treated forever. Here I consider only the timing of the first treatment for each region i . Week zero is week 45 of 2020 when the treatment started. The outcome variable is defined as the log number of calls per 100,000 inhabitants.

Figure A.4.4: The effect of the Red Zone on Google Trends



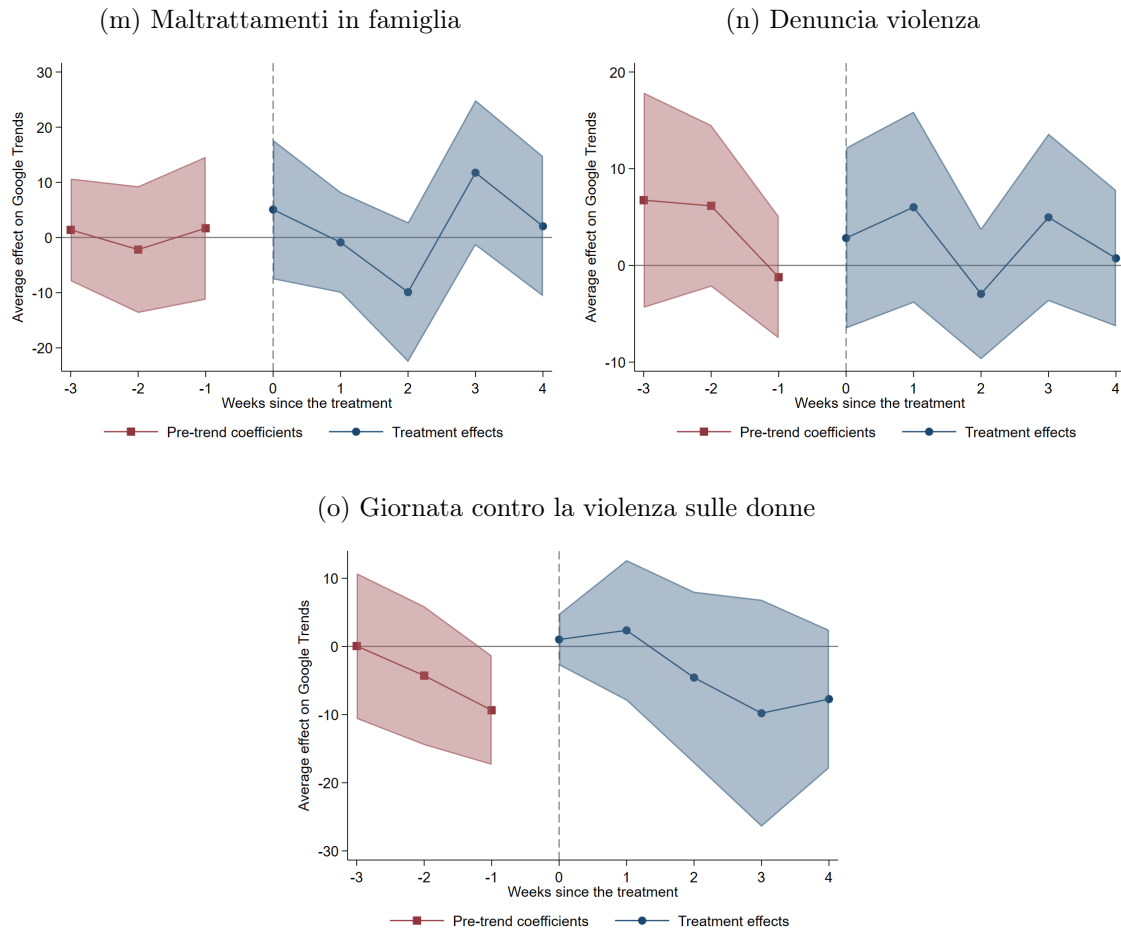
Notes: The figure plots the results when applying the did imputation command written by [Borusyak et al. \(2021\)](#) for each keyword from Google Trends separately and 95%-confidence intervals. Here I consider only the timing of the first treatment for each region i . Average Google Hit is calculated by including the following queries: 1522, violenza domestica, violenza sulle donne, maltrattamenti in famiglia and denuncia violenza.

Figure A.4.4: The effect of the Red Zone on Google Trends (cont.)



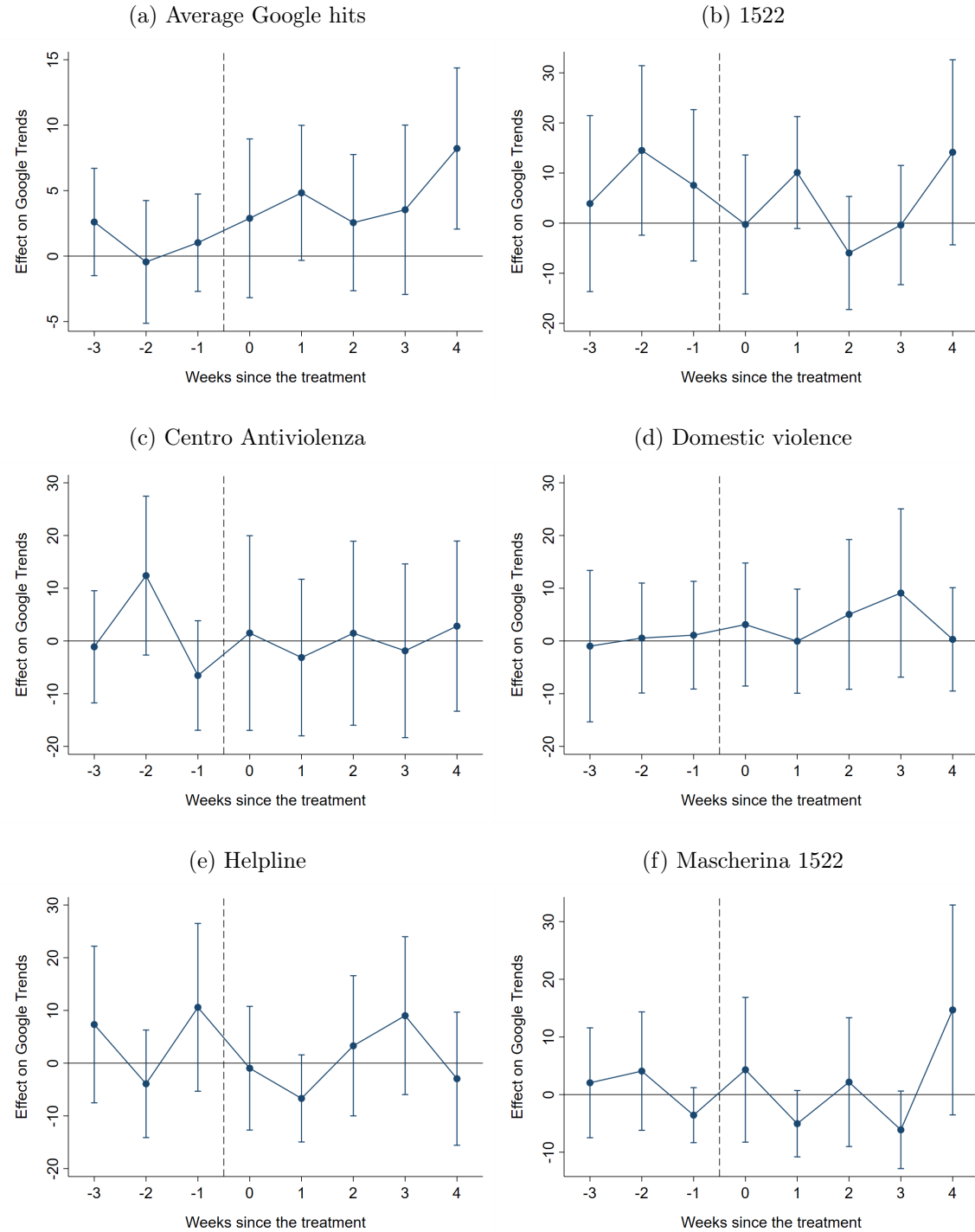
Notes: The figure plots the results when applying the did imputation command written by [Borusyak et al. \(2021\)](#) for each keyword from Google Trends separately and 95%-confidence intervals. Here I consider only the timing of the first treatment for each region i . Average Google Hit is calculated by including the following queries: 1522, violenza domestica, violenza sulle donne, maltrattamenti in famiglia and denuncia violenza.

Figure A.4.4 The effect of the Red Zone on Google Trends (cont.)



Notes: The figure plots the results when applying the did imputation command written by [Borusyak et al. \(2021\)](#) for each keyword from Google Trends separately and 95%-confidence intervals. Here I consider only the timing of the first treatment for each region i . Average Google Hit is calculated by including the following queries: 1522, violenza domestica, violenza sulle donne, maltrattamenti in famiglia and denuncia violenza.

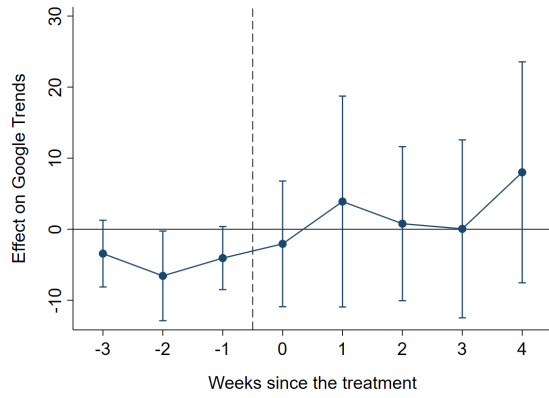
Figure A.4.5: The effect of the Red Zone on Google Trends (Event study)



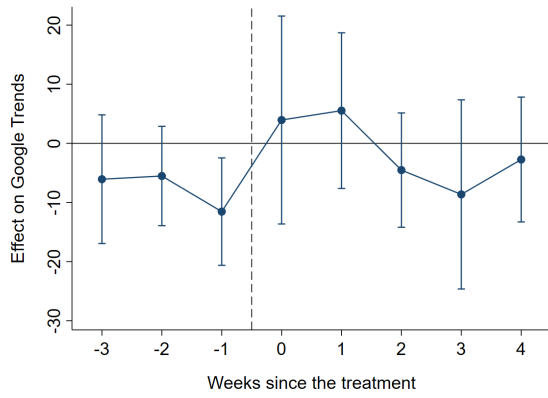
Notes: The figure plots the event study results for each keyword from Google Trends separately and 95%-confidence intervals. Here I consider only the timing of the first treatment for each region i . Average Google Hit is calculated by including the following queries: 1522, violenza domestica, violenza sulle donne, maltrattamenti in famiglia and denuncia violenza.

Figure A.4.5. The effect of the Red Zone on Google Trends (cont.)

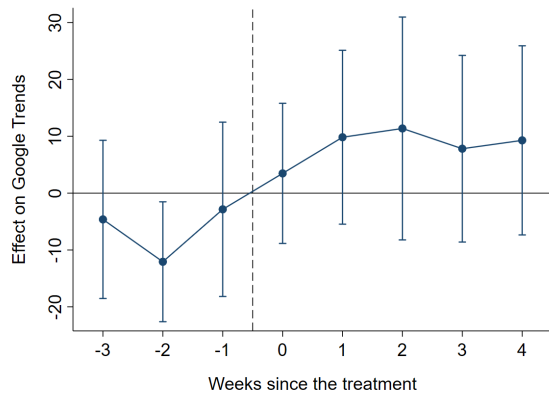
(g) Sexual abuse



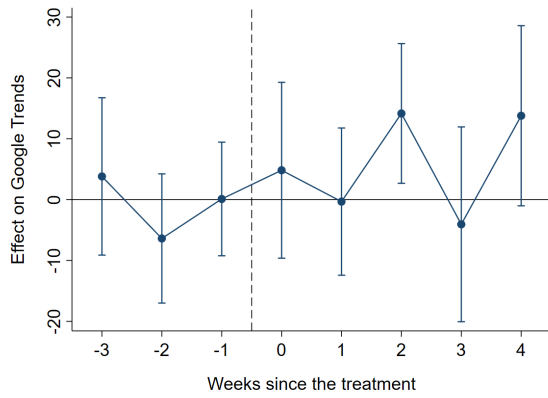
(h) Stalking



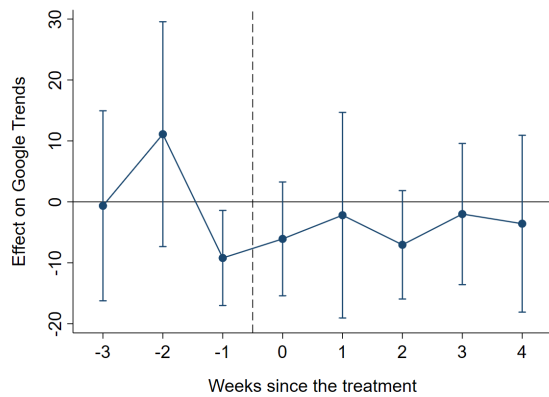
(i) Violenza domestica



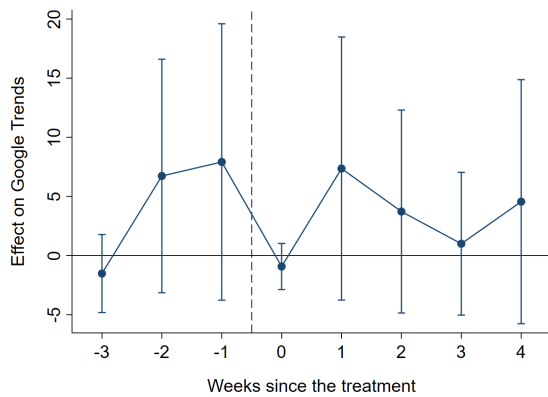
(j) Violenza sulle donne



(k) Violenza di genere



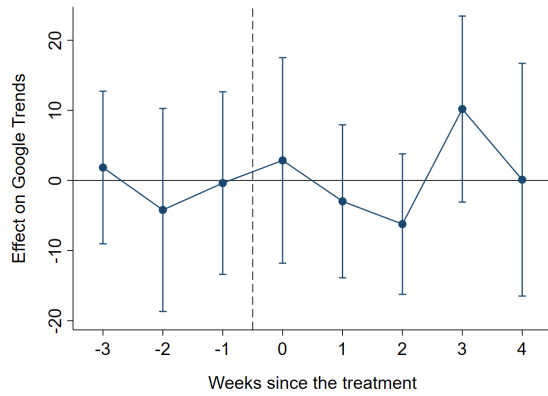
(l) Numero antiviolenza



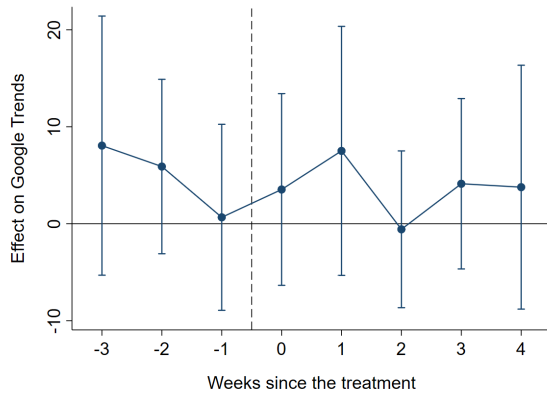
Notes: The figure plots the event study results for each keyword from Google Trends separately and 95%-confidence intervals. Here I consider only the timing of the first treatment for each region i . Average Google Hit is calculated by including the following queries: 1522, violenza domestica, violenza sulle donne, maltrattamenti in famiglia and denuncia violenza.

Figure A.4.5. The effect of the Red Zone on Google Trends (cont.)

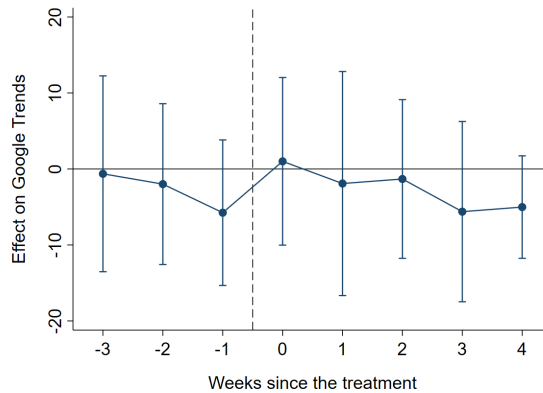
(m) Maltrattamenti in famiglia



(n) Denuncia violenza

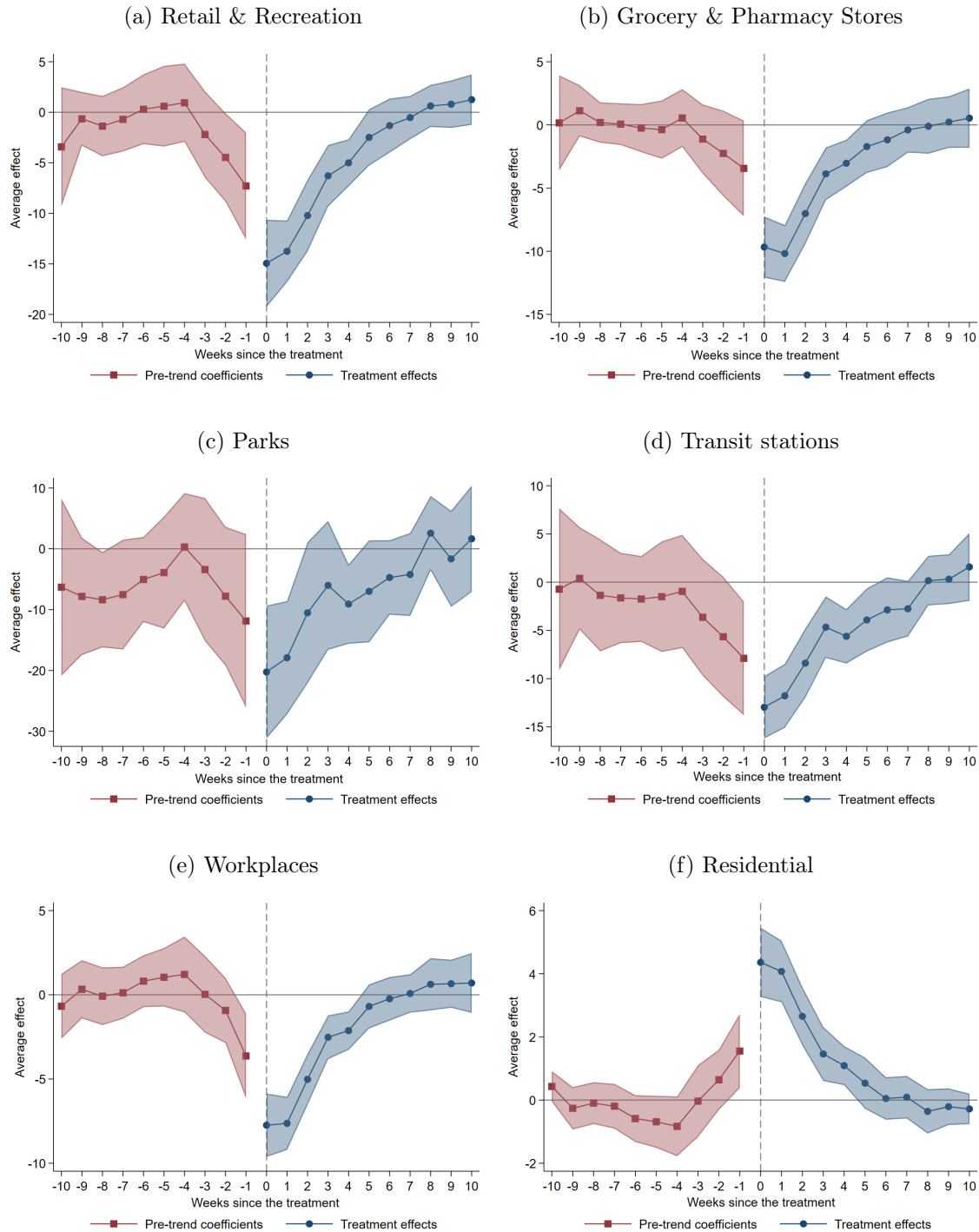


(o) Giornata contro la violenza sulle donne



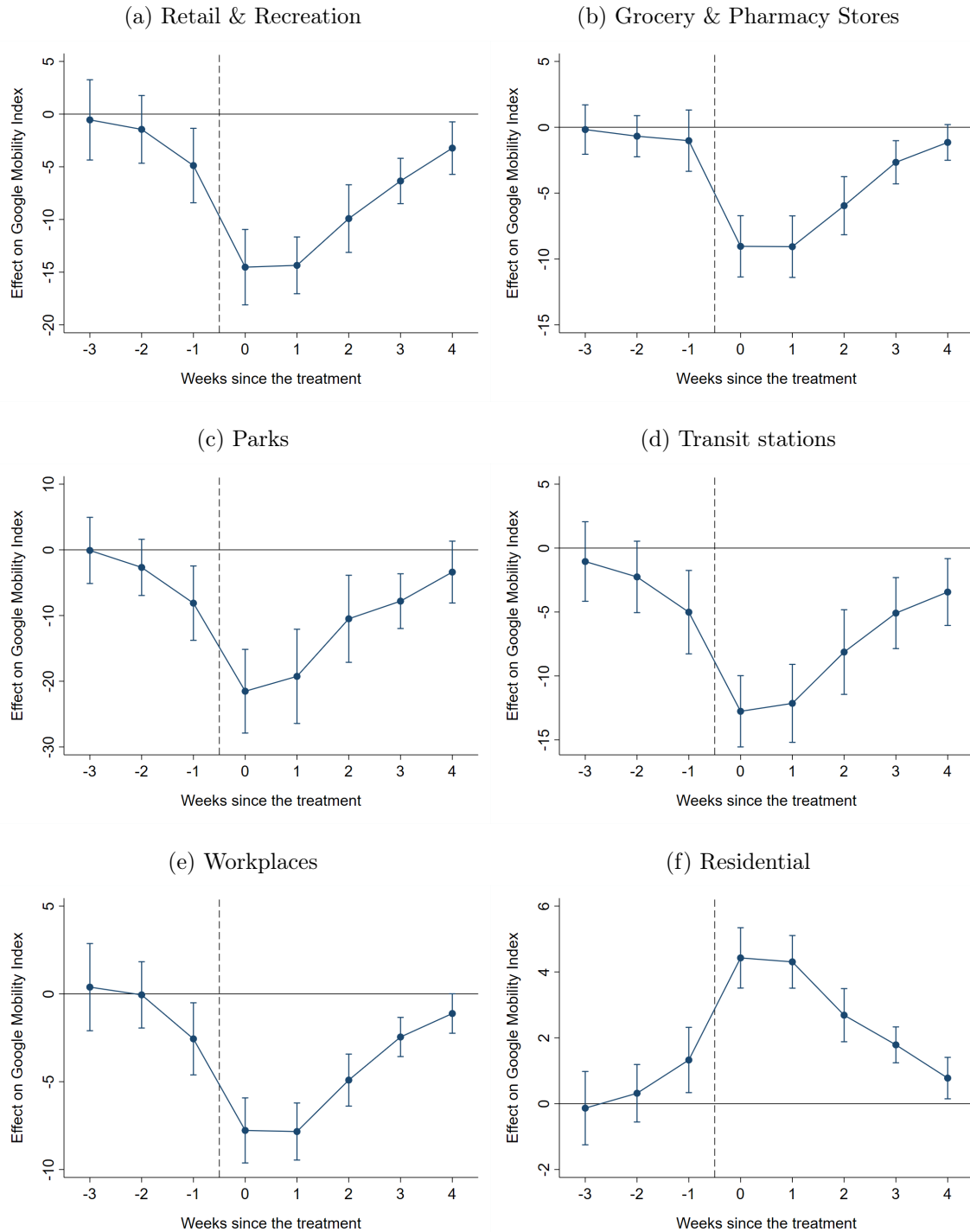
Notes: The figure plots the event study results for each keyword from Google Trends separately and 95%-confidence intervals. Here I consider only the timing of the first treatment for each region i . Average Google Hit is calculated by including the following queries: 1522, violenza domestica, violenza sulle donne, maltrattamenti in famiglia and denuncia violenza.

Figure A.4.6: The effect of the Red Zone on Google Mobility Index



Notes: The figure plots the results when applying the did imputation command written by [Borusyak et al. \(2021\)](#) for each index and 95%-confidence intervals. Here I consider only the timing of the first treatment for each region i . Each index is smoothed to the 7-day average to correspond to our weekly data. The index shows the number of visitors (or time spent at home for the 'Residential' category) in categorized places. The category "Retail and recreation" includes places like restaurants, cafes, shopping centers, theme parks, museums, libraries, and movie theaters. The "Grocery and pharmacy stores" category includes grocery markets, food warehouses, farmers' markets, specialty food shops, drug stores, and pharmacies. The Public transport station includes public transport hubs such as subway, bus, and train stations. "Park" is considered as the number of visitors in local parks, national parks, public beaches, marinas, dog parks, plazas, and public gardens.

Figure A.4.7: The effect of the Red Zone on Google Mobility Index (Event study)



Notes: The figure plots the event study results for each index and 95%-confidence intervals. Here I consider only the timing of the first treatment for each region i . Each index is smoothed to the 7-day average to correspond to our weekly data. The index shows the number of visitors (or time spent at home for the 'Residential' category) in categorized places. The category "Retail and recreation" includes places like restaurants, cafes, shopping centers, theme parks, museums, libraries, and movie theaters. The "Grocery and pharmacy stores" category includes grocery markets, food warehouses, farmers markets, specialty food shops, drug stores, and pharmacies. The Public transport station includes public transport hubs such as subway, bus, and train stations. "Park" is considered as the number of visitors in local parks, national parks, public beaches, marinas, dog parks, plazas, and public gardens.

5. Conclusion

This Ph.D. dissertation sheds light on the crucial worldwide problem of violence against women calling up the interest of economists, sociologists, and politicians in recent decades. Despite the politicians and organizations fighting for gender equality, the official statistics provide a clear picture of this global tragedy. According to the World Health Organization, violence affects about 1 in 3 women around the world.

The outcomes of this dissertation contribute to academic research and offer a set of three papers from an in-depth literature review to empirical consideration of the problem of violence against women. Throughout the dissertation, various econometrics methods and tools have been applied: regression discontinuity design (RDD), difference in difference with staged adoption, event study design, synthetic control methods. To conduct this research, I use various data, such as helpline calls, homicide and violence data, surveys, and Google tools.

In this thesis, I try to understand the trends of the scientific world publications on violence against women and expand the existing literature by considering new evidence on this problem. In particular, I find the effect of women's political leadership in local government on homicides and violence against women in Brazil. The presence of a female mayor in Brazilian municipalities is associated with a sizable reduction in femicide and violence against women over the 4-year term: 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). I also contribute to expanding the literature concerning the problem of domestic violence in Italy and advance the literature on the effects of COVID-19 on domestic violence, by extending the analysis to the later months of the pandemic. I demonstrate that the effect of the lockdown restrictions in the red zone affects domestic abuse. This effect is stronger during the initial shock period, in particular in the first two weeks following the Decree-law on November 4, 2020, which divided Italy into 4 zones (red, orange, yellow, and white), corresponding to risk scenarios of the spread of Covid-19.

As far as future research is concerned, I outline two lines that stem from the study process of this dissertation. First, I need to conduct more research to empirically test through which channels women in politics are affecting violence (e.g., a role model effect or policy changes). Second, further separate analysis of survey data is needed to fill out the picture of my research agenda.

Bibliography

References

- Abiona, O. and M. F. Koppensteiner (2018). The impact of household shocks on domestic violence: Evidence from tanzania. *Available at SSRN 3301756*.
- Aboagye, R. G., J. Okyere, A.-A. Seidu, J. E. Hagan, and B. O. Ahinkorah (2021). Experience of intimate partner violence among women in sexual unions: is supportive attitude of women towards intimate partner violence a correlate? In *Healthcare*, Volume 9, pp. 563. Multidisciplinary Digital Publishing Institute.
- Abramsky, T., S. Lees, H. Stöckl, S. Harvey, I. Kapinga, M. Ranganathan, G. Mshana, and S. Kapiga (2019). Women's income and risk of intimate partner violence: secondary findings from the maisha cluster randomised trial in north-western tanzania. *BMC public health 19*(1), 1–15.
- Agüero, J. M. (2021). Covid-19 and the rise of intimate partner violence. *World development 137*, 105217.
- Aguirre, E. et al. (2019). *Domestic Violence and Women's Earnings: Does Frequency Matter?* Department of Economics and Related Studies, University of York.
- Ahinkorah, B. O. (2021). Polygyny and intimate partner violence in sub-saharan africa: Evidence from 16 cross-sectional demographic and health surveys. *SSM-Population Health 13*, 100729.
- Aizer, A. (2010). The gender wage gap and domestic violence. *American Economic Review 100*(4), 1847–59.
- Akyol, P. and M. G. Kirdar (2020). Does education really cause domestic violence? replication and reappraisal of "for better or for worse? education and the prevalence of domestic violence in turkey". Technical report, IZA Discussion Papers.
- Akyol, P. and M. G. Kirdar (2021). Does education really cause domestic violence? revisiting the turkish data.
- Alabi, T. A. and M. J. Ramsden (2021). Gender differences in the acceptance of wife-beating in nigeria: evidence from the 2018 demographic and health survey. *Heliyon 7*(10), e08191.
- Alhabib, S., U. Nur, and R. Jones (2010). Domestic violence against women: Systematic review of prevalence studies. *Journal of family violence 25*(4), 369–382.

- Allen, E. M., L. Munala, and J. R. Henderson (2021). Kenyan women bearing the cost of climate change. *International Journal of Environmental Research and Public Health* 18(23), 12697.
- Amaral, S. (2017). Do improved property rights decrease violence against women in india? *Available at SSRN 2504579*.
- Amaral, S. and S. Bhalotra (2017). Population sex ratios and violence against women: The long-run effects of sex selection in india. *Available at SSRN 3055794*.
- Amaral, S., S. Bhalotra, and N. Prakash (2021). Gender, crime and punishment: Evidence from women police stations in india.
- Amuedo-Dorantes, C. and E. Arenas-Arroyo (2019). Police trust and domestic violence: Evidence from immigration policies.
- Amuedo-Dorantes, C. and M. Deza (2019, December). Can Sanctuary Polices Reduce Domestic Violence? IZA Discussion Papers 12868, Institute of Labor Economics (IZA).
- Andarge, E. and Y. Shiferaw (2018). Disparities in intimate partner violence among currently married women from food secure and insecure urban households in south ethiopia: a community based comparative cross-sectional study. *BioMed research international* 2018.
- Anderberg, D., N. Mantovan, and R. M. Sauer (2021, June). The Dynamics of Domestic Violence: Learning About the Match. IZA Discussion Papers 14442, Institute of Labor Economics (IZA).
- Anderberg, D., H. Rainer, and F. Siuda (2020). Quantifying domestic violence in times of crisis.
- Arenas-Arroyo, E., D. Fernandez-Kranz, and N. Nollenberger (2021a). Intimate partner violence under forced cohabitation and economic stress: Evidence from the covid-19 pandemic. *Journal of Public Economics* 194, 104350.
- Arenas-Arroyo, E., D. Fernandez-Kranz, and N. Nollenberger (2021b). Intimate partner violence under forced cohabitation and economic stress: Evidence from the covid-19 pandemic. *Journal of Public Economics* 194, 104350.
- Bagues, M. and P. Campa (2021). Can gender quotas in candidate lists empower women? Evidence from a regression discontinuity design. *Journal of Public Economics* 194, 104315.
- Baltrunaite, A., P. Bello, A. Casarico, and P. Profeta (2014). Gender quotas and the quality of politicians. *Journal of Public Economics* 118, 62–74.

- Baltrunaite, A., A. Casarico, P. Profeta, and G. Savio (2019). Let the voters choose women. *Journal of Public Economics* 180, 104085.
- Barili, E., V. Grembi, and A. Rosso (2021). Domestic violence and gender stereotypes: Perceptions, justifications, and reactions. *Justifications, and Reactions (June 7, 2021)*.
- Basar, F. and N. Demirci (2018). Domestic violence against women in turkey. *Pakistan journal of medical sciences* 34(3), 660.
- Baskaran, T., S. R. Bhalotra, B. K. Min, and Y. Uppal (2018). Women legislators and economic performance. *IZA Discussion Paper*.
- Baysan, C., M. Burke, F. González, S. Hsiang, and E. Miguel (2018). Economic and non-economic factors in violence: Evidence from organized crime, suicides and climate in mexico. Technical report, National Bureau of Economic Research.
- Beaman, L., R. Chattopadhyay, E. Duflo, R. Pande, and P. Topalova (2009). Powerful women: does exposure reduce bias? *The Quarterly journal of economics* 124(4), 1497–1540.
- Beaman, L., E. Duflo, R. Pande, and P. Topalova (2012). Female leadership raises aspirations and educational attainment for girls: A policy experiment in india. *science* 335(6068), 582–586.
- Beigelman, M. and J. Vall Castelló (2020). Covid-19 and help-seeking behavior for intimate partner violence victims.
- Beland, L.-P. and D. A. Brent (2018). Traffic and crime. *Journal of Public Economics* 160, 96–116.
- Beland, L.-P., A. Brodeur, J. Haddad, and D. Mikola (2020). Covid-19, family stress and domestic violence: Remote work, isolation and bargaining power.
- Benavides, M., J. León, M. Etesse, L. Espezúa, and J. Stuart (2019). Exploring the association between segregation and physical intimate partner violence in lima, peru: the mediating role of gender norms and social capital. *SSM-Population Health* 7, 100338.
- Berniell, I. and G. Facchini (2021). Covid-19 lockdown and domestic violence: Evidence from internet-search behavior in 11 countries. *European Economic Review* 136, 103775.
- Bettio, F., E. Ticci, and G. Betti (2018). A fuzzy approach to measuring violence against women and its severity. Technical report, GLO Discussion Paper.
- Bhalotra, S., E. Brito, D. Clarke, P. Larroulet, and F. J. Pino (2021). Dynamic impacts of lockdown on domestic violence: Evidence from multiple policy shifts in Chile. Technical report.

- Bhalotra, S. and I. Clots-Figueras (2014). Health and the political agency of women. *American Economic Journal: Economic Policy* 6(2), 164–97.
- Bhalotra, S., D. GC Britto, P. Pinotti, and B. Sampaio (2021). Job displacement, unemployment benefits and domestic violence.
- Bhalotra, S. R., U. Kambhampati, S. Rawlings, and Z. Siddique (2020, January). Intimate Partner Violence : The Influence of Job Opportunities for Men and Women. Policy Research Working Paper Series 9118, The World Bank.
- Bhona, F. M. d. C., C. F. d. P. Gebara, A. R. Noto, M. d. T. Vieira, and L. M. Lourenço (2019). Socioeconomic factors and intimate partner violence: a household survey. *Trends in Psychology* 27, 205–218.
- Borusyak, K., X. Jaravel, and J. Spiess (2021). Revisiting event study designs: Robust and efficient estimation. *arXiv preprint arXiv:2108.12419*.
- Brink, J., P. Cullen, K. Beek, and S. A. Peters (2021). Intimate partner violence during the covid-19 pandemic in western and southern european countries. *European journal of public health* 31(5), 1058–1063.
- Brollo, F. and U. Troiano (2016). What happens when a woman wins an election? Evidence from close races in Brazil. *Journal of Development Economics* 122, 28–45.
- Bruce, R., A. Cavgias, L. Meloni, and M. Remígio (2022). Under pressure: Women’s leadership during the COVID-19 crisis. *Journal of development economics* 154, 102761.
- Brühlhart, M., V. Klotzbücher, R. Lalive, and S. Reich (2021). Distress and anxiety during the covid-19 pandemic as revealed through helpline calls.
- Bucheli, M. and M. Rossi (2017). Attitudes towards intimate partner violence against women in latin america. *Available at SSRN 2857151*.
- Burgos-Muñoz, R. M., A. N. Soriano-Moreno, G. Bendezu-Quispe, D. Urrunaga-Pastor, C. J. Toro-Huamanchumo, and V. A. Benites-Zapata (2021). Intimate partner violence against reproductive-age women and associated factors in peru: evidence from national surveys, 2015–2017. *Heliyon* 7(7), e07478.
- Calonico, S., M. D. Cattaneo, M. H. Farrell, and R. Titiunik (2019). Regression discontinuity designs using covariates. *Review of Economics and Statistics* 101(3), 442–451.
- Calonico, S., M. D. Cattaneo, and R. Titiunik (2014). Robust nonparametric confidence intervals for regression-discontinuity designs. *Econometrica* 82(6), 2295–2326.
- Calvi, R. and A. Keskar (2021). ’til dowry do us part: Bargaining and violence in indian families.

- Card, D. and G. B. Dahl (2011). Family violence and football: The effect of unexpected emotional cues on violent behavior. *The quarterly journal of economics* 126(1), 103–143.
- Castro, R. J., L. P. Cerellino, and R. Rivera (2017). Risk factors of violence against women in peru. *Journal of family violence* 32(8), 807–815.
- Cerqueira, D. R. d. C. and S. Bueno (2020). *Atlas da violência 2020*. IPEA - Instituto de Pesquisa Economica Aplicada.
- Chalfin, A., S. Danagoulian, and M. Deza (2021, March). Covid-19 has strengthened the relationship between alcohol consumption and domestic violence. Working Paper 28523, National Bureau of Economic Research.
- Chattopadhyay, R. and E. Duflo (2004). Women as policy makers: Evidence from a randomized policy experiment in India. *Econometrica* 72(5), 1409–1443.
- Chaudhuri, T. and A. Mandal (2017). Rape of the subaltern: India’s recent sexual violence in perspective. *International Review of Modern Sociology*, 137–155.
- Chen, G. L., J. G. Silverman, A. Dixit, S. Begum, M. Ghule, M. Battala, N. E. Johns, A. Raj, and S. Averbach (2020). A cross-sectional analysis of intimate partner violence and family planning use in rural india. *EClinicalMedicine* 21, 100318.
- Chin, Y.-M. (2012). Male backlash, bargaining, or exposure reduction?: women’s working status and physical spousal violence in india. *Journal of population Economics* 25(1), 175–200.
- Chin, Y.-M. and S. Cunningham (2019). Revisiting the effect of warrantless domestic violence arrest laws on intimate partner homicides. *Journal of Public Economics* 179, 104072.
- Chirwa, E., R. Jewkes, I. Van Der Heijden, and K. Dunkle (2020). Intimate partner violence among women with and without disabilities: a pooled analysis of baseline data from seven violence-prevention programmes. *BMJ global health* 5(11), e002156.
- Chong, A. and E. L. Ferrara (2009). Television and divorce: Evidence from brazilian novelas. *Journal of the European Economic Association* 7(2-3), 458–468.
- Clark, C. J., G. Ferguson, B. Shrestha, P. N. Shrestha, J. M. Oakes, J. Gupta, S. McGhee, Y. F. Cheong, and K. M. Yount (2018). Social norms and women’s risk of intimate partner violence in nepal. *Social science & medicine* 202, 162–169.
- Clots-Figueras, I. (2012). Are female leaders good for education? Evidence from India. *American Economic Journal: Applied Economics* 4(1), 212–44.

- Colagrossi, M., C. Deiana, D. Dragone, A. Geraci, L. Giua, and E. Iori (2021). Intimate partner violence and help-seeking: The role of femicide news.
- Colagrossi, M., C. Deiana, A. Geraci, and L. Giua (2020). Hang up on stereotypes: Domestic violence and anti-abuse helpline campaign. *Available at SSRN 3643922*.
- Cools, S. and A. Kotsadam (2017). Resources and intimate partner violence in sub-saharan africa. *World Development* 95, 211–230.
- Dang, G., V. S. Kulkarni, R. Gaiha, et al. (2017). What factors can explain the rise and inter-state variation in crimes against women in india? Technical report, GDI, The University of Manchester.
- Das, T. and T. B. Roy (2020). More than individual factors; is there any contextual effect of unemployment, poverty and literacy on the domestic spousal violence against women? a multilevel analysis on indian context. *SSM-Population Health* 12, 100691.
- de Lucena, T. (2021). Leadership & gender composition in managerial positions: Evidence from the brazilian public sector.
- Ditekemena, J. D., C. Luhata, H. M. Mavoko, J. N. Siewe Fodjo, D. M. Nkamba, W. Van Damme, S. H. Ebrahim, C. Noestlinger, and R. Colebunders (2021). Intimate partners violence against women during a covid-19 lockdown period: results of an online survey in 7 provinces of the democratic republic of congo. *International journal of environmental research and public health* 18(10), 5108.
- Domenech del Rio, I. and E. Sirvent Garcia del Valle (2017). Non-partner sexual violence against women in spain: lifetime prevalence, perpetrators and consequences on mental health. *Journal of Public Health* 39(4), 738–744.
- Dunkle, K., A. Gibbs, E. Chirwa, E. Stern, I. Van Der Heijden, and L. Washington (2020). How do programmes to prevent intimate partner violence among the general population impact women with disabilities? post-hoc analysis of three randomised controlled trials. *BMJ global health* 5(12), e002216.
- Durevall, D. (2021). Gender policy and intimate partner violence in colombia.
- Ebrahim, N. B. (2021). Correlates of non-partner physical violence among ethiopian women. *Societies* 11(3), 68.
- Eckel, C. and P. Grossman (2008). Differences in the Economic Decisions of Men and Women: Experimental Evidence. In C. R. Plott and V. L. Smith (Eds.), *Handbook of Experimental Economics Results* (1 ed.), Volume 1, Part 4, Chapter 57, pp. 509–519. Elsevier.

- Ekhtor-Mobayode, U. E., L. C. Hanmer, E. C. Rubiano Matulevich, and D. J. Arango (2020, March). Effect of Armed Conflict on Intimate Partner Violence : Evidence from the Boko Haram Insurgency in Nigeria. Policy Research Working Paper Series 9168, The World Bank.
- Erten, B. and P. Keskin (2021). Female employment and intimate partner violence: evidence from syrian refugee inflows to turkey. *Journal of Development Economics* 150, 102607.
- Esie, P., T. L. Osypuk, S. R. Schuler, and L. M. Bates (2019). Intimate partner violence and depression in rural bangladesh: accounting for violence severity in a high prevalence setting. *SSM-population health* 7, 100368.
- Fajardo-Gonzalez, J. (2020). Domestic violence, decision-making power, and female employment in colombia. *Review of Economics of the Household* 19(1), 233–254.
- Fan, X. and M. V. Loria (2020). Intimate partner violence and contraceptive use in developing countries. *Demographic Research* 42, 293–342.
- Fernández-Kranz, D., N. Nollenberger, et al. (2020). Bargaining under threats: The effect of joint custody laws on intimate partner violence.
- Ferreira, F. and J. Gyourko (2014). Does gender matter for political leadership? The case of US mayors. *Journal of Public Economics* 112, 24–39.
- Finkelhor, D., R. J. Gelles, G. T. Hotaling, M. A. Strauss, et al. (1983). *The dark side of families: Current family violence research*. Sage.
- Galiani, S. and B. Quistorff (2017). The synth_runner package: Utilities to automate synthetic control estimation using synth. *The Stata Journal* 17(4), 834–849.
- Gao, Y., Y. Wang, X. Mi, M. Zhou, S. Zou, and H. Zhou (2021). Intimate partner violence against women living in inadequate conditions in sub-saharan africa: a meta-analysis of demographic and health survey data. *International journal of environmental research and public health* 18(19), 10138.
- Garcia-Hombrados, J. and M. Martínez-Matute (2021). Specialized courts and the reporting of intimate partner violence: Evidence from spain. *Available at SSRN 3957860*.
- Gautam, S. and H.-S. Jeong (2019). Intimate partner violence in relation to husband characteristics and women empowerment: evidence from nepal. *International journal of environmental research and public health* 16(5), 709.
- Gelles, R. and M. Straus (1979). Determinants of violence in the family: Toward a theoretical interpretation. *Contemporary Theories About the Family, Free, New York*.

- Gibbs, A., K. Dunkle, and R. Jewkes (2018). Emotional and economic intimate partner violence as key drivers of depression and suicidal ideation: A cross-sectional study among young women in informal settlements in south africa. *PloS one* 13(4), e0194885.
- Goemans, S. L., A. Singh, A. K. Yadav, L. McDougal, A. Raj, and S. H. Averbach (2021). The association between intimate partner violence and recent self-managed abortion in india. *AJOG Global Reports* 1(4), 100029.
- González, L. and N. Rodríguez-Planas (2020). Gender norms and intimate partner violence. *Journal of Economic Behavior & Organization* 178, 223–248.
- Gonzalez, L. and N. Rodríguez-Planas (2021, July). Gender Norms and Intimate Partner Violence. IZA Discussion Papers 14550, Institute of Labor Economics (IZA).
- Grogger, J., S. Gupta, R. Ivandic, and T. Kirchmaier (2020, December). Comparing conventional and machine-learning approaches to risk assessment in domestic abuse cases. Working Paper 28293, National Bureau of Economic Research.
- Gulesci, S., M. P. Beccar, and D. Ubfal (2021). Can youth empowerment programs reduce violence against girls during the covid-19 pandemic?
- Gupta, J., T. C. Willie, C. Harris, P. A. Campos, K. L. Falb, C. G. Moreno, C. D. Olavarrieta, and C. A. Okechukwu (2018). Intimate partner violence against low-income women in mexico city and associations with work-related disruptions: a latent class analysis using cross-sectional data. *J Epidemiol Community Health* 72(7), 605–610.
- Haushofer, J., C. Ringdal, J. P. Shapiro, and X. Y. Wang (2019). Income changes and intimate partner violence: Evidence from unconditional cash transfers in kenya. Technical report, National Bureau of Economic Research.
- Hayes, B. E. and K. A. Boyd (2017). Influence of individual-and national-level factors on attitudes toward intimate partner violence. *Sociological Perspectives* 60(4), 685–701.
- Heath, R., M. Hidrobo, and S. Roy (2020). Cash transfers, polygamy, and intimate partner violence: Experimental evidence from mali. *Journal of Development Economics* 143, 102410.
- Hellmann, D. F., M. W. Kinninger, and S. Kliem (2018). Sexual violence against women in germany: prevalence and risk markers. *International journal of environmental research and public health* 15(8), 1613.
- Henke, A. and L. Hsu (2022). Covid-19 and domestic violence: Economics or isolation? *Journal of family and economic issues*, 1–14.

- Hessami, Z. and M. L. da Fonseca (2020). Female political representation and substantive effects on policies: A literature review. *European Journal of Political Economy* 63, 101896.
- Hoehn-Velasco, L., A. Silverio-Murillo, and J. R. B. de la Miyar (2021). The great crime recovery: Crimes against women during, and after, the covid-19 lockdown in mexico. *Economics & Human Biology* 41, 100991.
- Honnakatti, D. et al. (2020). A comparative study of violence against working and non working women. *A Comparative Study of Violence Against Working and Non Working Women (April 6, 2020)*.
- Hossain, M., M. Asadullah, A. Rahaman, M. Miah, M. Z. Hasan, T. Paul, M. A. Hossain, et al. (2021). Prediction on domestic violence in bangladesh during the covid-19 outbreak using machine learning methods. *Applied System Innovation* 4(4), 77.
- Ingram, M. C. and M. M. da Costa (2019). Political geography of violence: Municipal politics and homicide in brazil. *World Development* 124, 104592.
- Islam, M., M. S. Ahmed, and S. K. Mistry (2021). Factors associated with women's approval on intimate partner violence in bangladesh: A cross-sectional analysis of latest demographic and health survey 2017–18. *Heliyon* 7(12), e08582.
- Iyengar, R. (2009). Does the certainty of arrest reduce domestic violence? Evidence from mandatory and recommended arrest laws. *Journal of public Economics* 93(1-2), 85–98.
- Iyer, L., A. Mani, P. Mishra, and P. Topalova (2012). The power of political voice: women's political representation and crime in India. *American Economic Journal: Applied Economics* 4(4), 165–93.
- Jensen, R. and E. Oster (2009). The power of TV: Cable television and women's status in India. *The Quarterly Journal of Economics* 124(3), 1057–1094.
- Jewkes, R., K. Otjombe, K. Dunkle, M. Milovanovic, K. Hlongwane, M. Jaffer, M. Matuludi, V. Mbowane, K. L. Hopkins, N. Hill, et al. (2021). Sexual ipv and non-partner rape of female sex workers: Findings of a cross-sectional community-centric national study in south africa. *SSM-mental health* 1, 100012.
- Jha, C. K. and S. Sarangi (2018). Women and corruption: What positions must they hold to make a difference? *Journal of Economic Behavior & Organization* 151, 219–233.
- Jonker, I. E., D. A. Lako, M. D. Beijersbergen, M. Sijbrandij, A. M. van Hemert, and J. R. Wolf (2019). Factors related to depression and post-traumatic stress disorder in shelter-based abused women. *Violence against women* 25(4), 401–420.

- Kalokhe, A., C. Del Rio, K. Dunkle, R. Stephenson, N. Metheny, A. Paranjape, and S. Sahay (2017). Domestic violence against women in india: A systematic review of a decade of quantitative studies. *Global public health* 12(4), 498–513.
- Kayaoglu, A. and A. Kayaoglu (2019). Intimate partner violence against women in turkey: Evidence from a national household survey. Economic Research Forum (ERF).
- Kelly, J. T., E. Colantuoni, C. Robinson, and M. R. Decker (2021). Quantifying the ripple effects of civil war: how armed conflict is associated with more severe violence in the home. *Health and human rights* 23(1), 75.
- Khan, M. N. and M. M. Islam (2018). Women’s attitude towards wife-beating and its relationship with reproductive healthcare seeking behavior: a countrywide population survey in bangladesh. *PLoS One* 13(6), e0198833.
- Khan, Z., Y. F. Cheong, S. S. Miedema, R. T. Naved, and K. M. Yount (2020). Women’s experiences of economic coercion and depressive symptoms in matlab, bangladesh. *SSM - Population Health* 12, 100641.
- Knight, B. G. and A. Tribin (2020). Immigration and violent crime: Evidence from the colombia-venezuela border. Technical report, National Bureau of Economic Research.
- Köksal, S., L. M. Pesando, V. Rotondi, and E. Şanlıtürk (2021). Harnessing the potential of online searches for understanding the impact of covid-19 on intimate partner violence in italy.
- Kotsadam, A. and E. Villanger (2020). Jobs and intimate partner violence-evidence from a field experiment in ethiopia.
- Lacey, K. K., R. Parnell, S. R. Drummond-Lewis, M. Wood, and K. Powell Sears (2021). Physical intimate partner violence, childhood physical abuse and mental health of us caribbean women: The interrelationship of social, contextual, and migratory influences. *International journal of environmental research and public health* 19(1), 150.
- Lee, D. S., E. Moretti, and M. J. Butler (2004). Do voters affect or elect policies? evidence from the us house. *The Quarterly Journal of Economics* 119(3), 807–859.
- Leslie, E. and R. Wilson (2020). Sheltering in place and domestic violence: Evidence from calls for service during covid-19. *Journal of Public Economics* 189, 104241.
- Leyaro, V., P. Selaya, and N. Trifkovic (2017). *Fishermen’s wives: On the cultural origins of violence against women*. Number 2017/205. WIDER Working Paper.
- Luca, D. L., E. Owens, and G. Sharma (2015). Can alcohol prohibition reduce violence against women? *American Economic Review* 105(5), 625–29.

- MacDonald, Z. (2002). Official crime statistics: their use and interpretation. *The Economic Journal* 112(477), F85–F106.
- Machado, A. L., M. Muller, and S. H. Van Wie (2020). Fear is what weighs most: Experiences of women in situations of violence in accessing support services in brazil. *World Bank Policy Research Working Paper* (9186).
- Mavisakalyan, A. and A. Rammohan (2020). Female autonomy in household decision-making and intimate partner violence: evidence from pakistan. *Review of Economics of the Household* 19(1), 255–280.
- McCrary, J. (2008). Manipulation of the running variable in the regression discontinuity design: A density test. *Journal of Econometrics* 142(2), 698–714.
- Miller, A. R., C. Segal, and M. K. Spencer (2020, November). Effects of the covid-19 pandemic on domestic violence in los angeles. Working Paper 28068, National Bureau of Economic Research.
- Miller, A. R., C. Segal, and M. K. Spencer (2021, October). Effects of covid-19 shutdowns on domestic violence in us cities. Working Paper 29429, National Bureau of Economic Research.
- Muratori, C. et al. (2021). The impact of abortion access on violence against women. Technical report, University of Turin.
- Nabaggala, M. S., T. Reddy, and S. Manda (2021). Effects of rural–urban residence and education on intimate partner violence among women in sub-saharan africa: a meta-analysis of health survey data. *BMC women’s health* 21(1), 1–23.
- Napolitano, F., L. Gualdieri, G. Santagati, and I. F. Angelillo (2018). Violence experience among immigrants and refugees: a cross-sectional study in italy. *BioMed research international* 2018.
- Ogum Alangea, D., A. A. Addo-Lartey, E. D. Chirwa, Y. Sikweyiya, D. Coker-Appiah, R. Jewkes, and R. M. Adanu (2020). Evaluation of the rural response system intervention to prevent violence against women: findings from a community-randomised controlled trial in the central region of ghana. *Global health action* 13(1), 1711336.
- Ohlan, R. (2021). Economic violence among women of economically backward muslim minority community: the case of rural north india. *Future Business Journal* 7(1), 1–11.
- Papageorge, N. W., G. C. Pauley, M. Cohen, T. E. Wilson, B. H. Hamilton, and R. A. Pollak (2021). Health, human capital, and domestic violence. *Journal of human resources* 56(4), 997–1030.

- Perez-Vincent, S. M., E. Carreras, M. A. Gibbons, T. E. Murphy, and M. A. Rossi (2020). Covid-19 lockdowns and domestic violence. *Inter-American Development Bank: Washington, DC, USA* 4.
- Perova, E. and S. A. Reynolds (2017). Women’s police stations and intimate partner violence: Evidence from brazil. *Social Science & Medicine* 174, 188–196.
- Perrotta Berlin, M., G. Immordino, F. F. Russo, and G. Spagnolo (2019). Prostitution and violence: Evidence from sweden. Technical report, SITE Working Paper.
- Petrosky, E., J. M. Blair, C. J. Betz, K. A. Fowler, S. P. Jack, and B. H. Lyons (2017). Racial and ethnic differences in homicides of adult women and the role of intimate partner violence—united states, 2003–2014. *MMWR. Morbidity and mortality weekly report* 66(28), 741.
- Piquero, A. R., W. G. Jennings, E. Jemison, C. Kaukinen, and F. M. Knaul (2021). Domestic violence during the covid-19 pandemic-evidence from a systematic review and meta-analysis. *Journal of Criminal Justice* 74, 101806.
- Plášilová, L., M. Hla, L. Krejčová, and K. Klapilová (2021). The covid-19 pandemic and intimate partner violence against women in the czech republic: incidence and associated factors. *International journal of environmental research and public health* 18(19), 10502.
- Porter, C., M. Favara, A. Sánchez, and D. Scott (2021). The impact of covid-19 lockdowns on physical domestic violence: Evidence from a list randomization experiment. *SSM - Population Health* 14, 100792.
- Purcell, L. N., D. Ellis, T. Reid, C. Mabedi, R. Maine, and A. Charles (2021). In-home interpersonal violence: Sex based prevalence and outcomes. *African journal of emergency medicine* 11(1), 93–97.
- Raghavendra, S., K. Kim, S. Ashe, M. Chadha, F. A. Asante, P. T. Piironen, and N. Duvvury (2019). The macroeconomic loss due to violence against women and girls: the case of ghana. Technical report, Working Paper.
- Raifman, S., M. Puri, J. Arcara, and N. Diamond-Smith (2021). Is there an association between fertility and domestic violence in nepal? *AJOG Global Reports* 1(2), 100011.
- Raj, A., N. E. Johns, K. M. Barker, and J. G. Silverman (2020). Time from covid-19 shutdown, gender-based violence exposure, and mental health outcomes among a state representative sample of california residents. *EClinicalMedicine* 26, 100520.
- Rashad, A., M. Sharaf, et al. (2017). *Income inequality and violence against women: Evidence from India*. University of Alberta Faculty of Arts Department of Economics.

- Ravindran, S. and M. Shah (2020). Unintended consequences of lockdowns: Covid-19 and the shadow pandemic. Technical report, National Bureau of Economic Research.
- Rayhan, I. and K. Akter (2021). Prevalence and associated factors of intimate partner violence (ipv) against women in bangladesh amid covid-19 pandemic. *Heliyon* 7(3), e06619.
- Ruiz-Pérez, I., V. Escribà-Agüir, I. Montero-Pinar, C. Vives-Cases, M. Rodríguez-Barranco, J. Plazaola-Castaño, E. Jiménez-Gutiérrez, M. Fuentes-Pujol, I. Rohlf-Barbosa, P. Blanco-Prieto, et al. (2017). Prevalence of intimate partner violence in spain: A national cross-sectional survey in primary care. *Atencion primaria* 49(2), 93–101.
- Sabia, J. J., A. K. Dills, and J. DeSimone (2013). Sexual violence against women and labor market outcomes. *American Economic Review* 103(3), 274–78.
- Sanz-Barbero, B., P. L. Pereira, G. Barrio, and C. Vives-Cases (2018). Intimate partner violence against young women: prevalence and associated factors in europe. *J Epidemiol Community Health* 72(7), 611–616.
- Schmidheiny, K. and S. Siegloch (2019). On event study designs and distributed-lag models: Equivalence, generalization and practical implications.
- Schmidheiny, K. and S. Siegloch (2020). On event studies and distributed-lags in two-way fixed effects models: Identification, equivalence. Technical report, Technical Report, and Generalization. Discussion Paper.
- Seidu, A.-A., R. G. Aboagye, B. O. Ahinkorah, C. Adu, and S. Yaya (2021). Intimate partner violence as a predictor of marital disruption in sub-saharan africa: A multilevel analysis of demographic and health surveys. *SSM-Population Health* 15, 100877.
- Serrano-Montilla, C., I. Valor-Segura, J.-L. Padilla, and L. M. Lozano (2020). Public helping reactions to intimate partner violence against women in european countries: The role of gender-related individual and macrosocial factors. *International journal of environmental research and public health* 17(17), 6314.
- Shakya, H. B., J. M. Perkins, M. Traeger, A. C. Tsai, D. R. Bangsberg, B. Kakuhikire, and N. A. Christakis (2018). Social network correlates of ipv acceptance in rural honduras and rural uganda. *SSM-Population Health* 4, 236–243.
- Siddique, Z. (2021). Media reported violence and female labor supply. *Economic Development and Cultural Change* forthcoming.
- Silva, L. E. L. d. and M. L. C. d. Oliveira (2015). Violence against women: systematic

- review of the brazilian scientific literature within the period from 2009 to 2013. *Ciência & Saúde Coletiva* 20, 3523–3532.
- Siwach, G. (2018). Crimes against women in india: Evaluating the role of a gender representative police force. *Available at SSRN 3165531*.
- Sorrentino, A., C. Guida, V. Cinquegrana, and A. C. Baldry (2020). Femicide fatal risk factors: A last decade comparison between italian victims of femicide by age groups. *International journal of environmental research and public health* 17(21), 7953.
- Soumah, M. M. and O. Diop (2020). Domestic violence in dakar. *Forensic science international: reports* 2, 100109.
- Steele, S. J., N. Abrahams, K. Duncan, N. Woollett, B. Hwang, L. O’Connell, G. van Cutsem, and A. Shroufi (2019). The epidemiology of rape and sexual violence in the platinum mining district of rustenburg, south africa: Prevalence, and factors associated with sexual violence. *PloS one* 14(7), e0216449.
- Svec, J. and T. Andic (2018). Cooperative decision-making and intimate partner violence in peru. *Population and Development Review* 44(1), 63–85.
- Tawfik, G. M., K. A. S. Dila, M. Y. F. Mohamed, D. N. H. Tam, N. D. Kien, A. M. Ahmed, and N. T. Huy (2019). A step by step guide for conducting a systematic review and meta-analysis with simulation data. *Tropical medicine and health* 47(1), 1–9.
- Tunc, E. B., H. Cılgin, S. Tunc, C. Oner, and B. Catak (2021). Social determinants of sexual violence against pregnant women. *Clinical Epidemiology and Global Health* 10, 100706.
- Uduji, J. I., E. N. Okolo-Obasi, and S. A. Asongu (2021). Corporate social responsibility and traditional practices recognised as violence against women in nigeria’s oil region. *Development in Practice*, 1–15.
- Valentine, A., I. Akobirshoev, and M. Mitra (2019). Intimate partner violence among women with disabilities in uganda. *International journal of environmental research and public health* 16(6), 947.
- Viero, A., G. Barbara, M. Montisci, K. Kustermann, and C. Cattaneo (2021). Violence against women in the covid-19 pandemic: A review of the literature and a call for shared strategies to tackle health and social emergencies. *Forensic science international* 319, 110650.
- Vives-Cases, C., D. L. Parra-Casado, J. F. Estévez, J. Torrubiano-Domínguez, and B. Sanz-Barbero (2021). Intimate partner violence against women during the covid-

- 19 lockdown in Spain. *International journal of environmental research and public health* 18(9), 4698.
- Willie, T. C., C. Bastida, C. D. Olavarrieta, A. Scolese, P. A. Campos, K. L. Falb, and J. Gupta (2020). Socioecological determinants of community resource utilisation among low-income women in Mexico City who experienced male-to-female intimate partner violence. *Global public health* 15(11), 1627–1638.
- Wiltshire, J. C. et al. (2021). allsynth: Synthetic control bias-correction utilities for Stata. In *2021 Stata Conference*, Number 15. Stata Users Group.
- Xiao, Y. and M. Watson (2019). Guidance on conducting a systematic literature review. *Journal of Planning Education and Research* 39(1), 93–112.
- Yakubovich, A. R., H. Stöckl, J. Murray, G. Melendez-Torres, J. I. Steinert, C. E. Glavin, and D. K. Humphreys (2018). Risk and protective factors for intimate partner violence against women: Systematic review and meta-analyses of prospective–longitudinal studies. *American journal of public health* 108(7), e1–e11.
- Yaya, S., M. O. Kunnuji, and G. Bishwajit (2019). Intimate partner violence: a potential challenge for women’s health in Angola. *Challenges* 10(1), 21.
- Zegenhagen, S., M. Ranganathan, and A. M. Buller (2019). Household decision-making and its association with intimate partner violence: Examining differences in men’s and women’s perceptions in Uganda. *SSM-population health* 8, 100442.
- Zhang, Y. and R. V. Breunig (2021). Gender norms and domestic abuse: evidence from Australia. *Tax and Transfer Policy Institute-working paper* 5.
- Zilkens, R. R., D. A. Smith, M. C. Kelly, S. A. Mukhtar, J. B. Semmens, and M. A. Phillips (2017). Sexual assault and general body injuries: A detailed cross-sectional Australian study of 1163 women. *Forensic science international* 279, 112–120.