Has Colombian legislation affected domestic violence reports and health outcomes?

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Abstract

In Colombia, three out of ten women have been victims of domestic violence at some point in their lifetime. Specific laws have been created in the last 20 years to avoid underreports of partner crime offenses and decrease domestic violence. This article aims to analyze the effect of the reporter and the femicide law on domestic violence reports. The former allowed any person who witnesses domestic violence to report it to the police, and the latter increased the years of jail for a person who kills a woman for being a woman. As a secondary goal, it studies the impact of the femicide law on self-reported health outcomes. I find evidence that the two laws helped increase reports to the police and had a modest but significant effect on better self-reported health outcomes.

Keywords: Domestic violence reports, Health outcomes, Legislation, Colombia

JEL classification K38, J12, I10

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1. Introduction

In Latin America, especially in Colombia, domestic violence is a problem that has affected most of the population. According to Profamilia (2015), in 2015, 31.9% of women were victims of physical violence from their spouses. Domestic violence is not only a matter of safety; it can lead to consequences on physical and mental health (Hernández 2021; F. Magnusson et al. 2021; Liu et al. 2021; J. Campbell 2002; J. Campbell and Lewandowski 1997) as well as affect economic outcomes as labor participation and productivity.

To tackle the prevalence of domestic violence and reduce the number of perpetrators who go unpunished, during the last 20 years, different laws have been implemented to increase conviction time and investigations against victimizers. In 2012, the reporter law[2] established that all people who witness domestic violence can directly report the issue to the police. Before that, the victim was the only person who could report it to the police to start a formal investigation. Although the victim is affected and, therefore, more likely to make a complaint, it may not happen because the victimizer lives at home and could inflict fear on the victim. In addition, victims may have an economic dependency or want to avoid social backlash by making it public and being re-victimized. So, accepting external witnesses may increase the report of domestic violence cases and diminish the pressure of reporting. The second law of interest is the femicide law[3]. It established a new kind of crime in Colombia[4],

[2] Law 1542 from July 2012. It was passed in 2012 and applied immediately after its publication.
[3] Law 1761 from July 2015. It was passed in 2015 and applied immediately after its publication.
[4] To be judged for a gender crime, the victimizer must have incurred on the following conditions: a) Having a family relationship, friendship, or work relationship with physical, sexual, or psychological history before the crime. b) Committing sexual exploitation on the body and life of the woman or having oppression and dominance over her life decisions and her sexuality. c) Committing a crime because the victimizer has a power relationship over the women in terms of personal life, economic, sexual, military, political, or socio-cultural conditions. d) Committing the crime to generate dishonor or terror, e) Having a history or evidence of violence or threat in the domestic, family, work, or school environment or gender violence against the victim, regardless of whether it has been reported or not. f) Holding the victim without communication or deprived of his freedom of movement before his death. (Congreso de la Republica 2015).

which says that someone who kills a woman for being a woman or her gender condition will be condemned with a severe sentence. Under this law, killing a woman who has been a victim of domestic violence may increase at least four years of jail for the perpetrator; therefore, this law may decrease domestic violence. Before that, femicide crimes were condemned as homicide and the years of prison were the same for women and men. Also, according to criminal records, the majority of femicide claims after implementation show that the victimizer is more likely to be a family member (Database of Femicide 2022). Usually, people are not aware of changes in legislation, but these two laws have been well known for every Colombian due to their publicity (El Tiempo 2012; 2015; El Espectador 2012; El País 2012; Vanguardia 2015; Telesur 2015; Semana 2015). For instance, the Google search of the Word "Femicide" increased after the law's implementation (See appendix 1)[5]. Therefore, they may impact the number of domestic violence cases reported to the police.

Given the changes in legislation that Colombia has implemented, this article aims to identify the effectiveness of the laws and how they could have impacted women's health outcomes. Specifically, this article has two goals. First, it will analyze the effect of reporter and femicide laws on household violence reports against women in Colombia. Second, it will study whether the femicide law increased the probability of having a better self-reported health status. Although all domestic violence cases do not necessarily translate into reports, the lack of annual data on the Demographic, Health, and Household Survey (DHS) makes it challenging to study domestic violence at the individual level. This also means that this paper focuses on domestic violence reports and does not include people who have not reported.

[5] Appendix 1 shows Google trends in Colombia of the word "femicide." Before the implementation, the search for that word was scarce.

However, given that health outcomes might variate due to domestic violence, changes in health induced by the law may indicate whether the law effectively reduced it.

The literature in domestic violence in Colombia has mostly focused on analyzing its determinants (Ribero and Sánchez 2004; Sandoval and Otálora 2017; Barón-Rivera 2010; Friedemann-Sánchez and Lovatón 2012; Iregui-Bohórquez, Ramírez-Giraldo, and Tribín-Uribe 2015; Luz Magdalena 2005), its effects on labor market participation (Fajardo-Gonzalez 2021), and its changes due to Covid-19 (Alvarado and Pradilla 2021). Fajardo-Gonzalez (2021) identifies that women who suffer domestic violence are more likely to find a job as a way to break the violence cycle. Alvarado and Pradilla (2021) show that during Covid, the reports of domestic violence decreased, perhaps due to fear and repression from the perpetrator at home. Overall, the papers emphasize that domestic violence is prevalent in Colombia (Fajardo-Gonzalez 2021; Alvarado and Pradilla 2021). However, none of them have analyzed the effects of legislation on domestic violence and whether increasing years of jail helps to empower women to seek police help. It may have happened because the police reports were publicly available only in 2020, and the DHS dataset is only provided every five years, which does allow continuity to determine the impact.

In other countries, there is a growing literature on femicides. For instance, in South America, a study shows a negative correlation between women in decision-making positions as congress representatives and femicide (Saccomano 2017). For Peru, Quispe Ilanzo et al. (2018) found that the femicide rate and the risk of extreme violence against women increased during 2009-2015, ranking the country with the second highest domestic violence cases in the region. In the European Union, one of the countries with the highest rate of domestic violence is Italy, where three out of ten women in the 16-70 age range have suffered violence,

physical or sexual (Colagrossi et al. 2022), with the majority of cases occurring at home (Zara and Gino 2018). Although most of the research related to the topic comes from descriptive analysis from fields outside of economics, such as law and psychology, it is instructive for understanding the importance and prevalence of this problem. The only paper that applies an advance econometric approach for trying to identify causality is Colagrossi et al. (2022). It focuses on understanding how news on femicides in Italy causes changes in helpline reports. Its findings show that news related to femicides encourages women to increase their reports on the helpline. This article is the closest study to my paper. However, the authors do not focus on the effects of legislation and analyze the impact on health outcomes, which is this research's aim.

In this sense, this article builds on the literature by providing causal evidence of the impact of two laws created to decrease violence and crimes against women. Analyzing the effectiveness of these laws gives new evidence to policymakers in the domestic violence area and provides insights into how Colombian legislation may influence people's behavior. In addition, it has been unexplored how this legislation may have impacted the health outcomes of Colombian women. Thus, this article also will identify whether the law changes have affected health outcomes.

The results show that the laws positively affected the number of reports of domestic violence against women. In the case of the reporter law, where any witness can report domestic violence, the number of reported cases increased because more people can complain. Women who were not reporting due to fear, economic dependency, or any other reason could benefit from this law. More reports do not mean that domestic violence increases. It may indicate more punishment for people who committed crimes, and in the

long term, it may cause a decrease in experienced domestic violence. In the femicide law, the expected sign of the effect is not predictable a priori. For instance, given that the years of jail increased for gender crimes, it could cause a decrease in cases because one of the causes for being sentenced to a gender crime is to have a domestic violence report. Therefore, this may inflict fear on the victimizer. However, a second possibility is a positive effect, which can be explained as an increase in reports of domestic violence, given that women have more awareness of the legislation and the consequences of not reporting. Then, it may induce them to make more complaints. The results confirm the latter, indicating a possible change via women empowerment.

The results on health outcomes are modest but statistically significant and with the expected sign. Women are more likely to have better health status and fewer hospitalizations and health problems after the femicide law. Although the effect is not causal, it may indicate that even though there are more domestic violence reports, they are not necessarily related to an increase in suffering from domestic violence itself, given that the health outcomes have improved.

2. Empirical strategy

This first part of the article studies the effect of reporter and femicide laws on the reported domestic violence cases in Colombia. For that, I use a difference-in-difference as an econometric approach. It controls possible effects that may have impacted violence in regions and time. It also eliminates fixed effects caused by cultural influence or macroeconomic conditions over time. Due to the lack of household-level variables on domestic violence, the

unit is municipalities by gender; the outcome variable is estimated as the number of cases reported divided by population.

In the femicide law, the counterfactual is based on gender. The control group is municipalities-men. In other words, the unit of analysis is broken into female and male to create a counterfactual group. The fact that the femicide law only affects women allows us to identify male domestic violence reports as untreated by the law; therefore, the difference-in-difference regression could estimate coefficients that approximate the true effect.

For reporter law, where both women and men could be affected, the control is the reports of violence outside the household for males. Even though the law aimed to protect women and decrease impunity against them, it is general and only established that people who witness domestic violence can directly report it. It can affect violence against men, and as a result, using men as control may violate the stable unit treatment value assumption (SUTVA). Therefore, records of violence outside the household are a close variable that meets the control requirements of not being affected by the treatment.

A difference-in-difference model is used to identify the causal effects on domestic violence reports of allowing external complainers in domestic violence (reporter law) and creating femicide crime. The following equation describes the estimation.

1) $$y_{mt} = \beta_1 D_m + \beta_2 T_t + \beta_3 T_t * D_m + \beta_4 X_{mt} + \beta_5 \delta_m + \beta_6 \gamma_t + \epsilon_{mt}$$

Where y_{mt} is the rate of cases for m municipality at t time, X_{mt} represents a matrix of control variables, T_t is a dummy variable that takes the value of one after the law was implemented and zeroes otherwise. D_{mt} represents the control group (municipalities' rates of

violence against men). The estimated coefficient of β_3 on the interaction between D_{mt} and T_t provides the effect of the law. The δ_m and γ_t are the municipality and time-fixed effects.

The matrix of control variables includes kidnapping and homicide rates. The two variables are identified by time, gender, and municipality. According to the ecological model, violence can be more likely to occur in places with a violent environment. Societal and community factors increase the risk of being exposed to domestic violence (World Health Organization 2012). Studies in Peru and Colombia have shown that internal conflict has a positive relationship with domestic violence (Gutierrez and Gallegos 2016; Alvarado and Pradilla 2021). Thus, including as covariates kidnapping and homicide is supported by the theory.

In addition, I estimated a dynamic difference-in-difference, also called a placebo test or event study, to show no effect or tendency before the law was implemented (Huntington-Klein 2021). It differs from equation 1) in the term $\sum_{k=-\tau}^{\tau} \beta_k D_m 1\{T_t = k\}$, which provides coefficients before and after the treatment. Where T_t represents the period when the placebo treatment is given and is equal to zero just before it starts and one after that. k denotes the analysis period and varies from $-\tau$ at the beginning and τ at the end. X_{mt} is a matrix of control variables (kidnapping and homicide rates). The δ_m and γ_t are the municipality and time-fixed effects (See equation 2).

2) $y_{mt} = \sum_{k=-\tau}^{\tau} \beta_k D_m 1\{T_t = k\} + \beta_4 X_{mt} + \beta_5 \delta_m + \beta_6 \gamma_t + \epsilon_{mt}$

As the estimation method for regressing the difference-in-difference and the dynamic models, I used Ordinary Least Squares (OLS). The standard errors were clustered at the municipality level for all the femicide and reporter law specifications.

The second part of the paper analyzes how domestic violence has affected self-reported health status. For this part, the reduced form equation that describes it is given by

3) $y_{it} = \beta_1 G_i + \beta_2 T_t + \beta_3 T_t * G_i + \beta_4 X_{it} + \beta_5 \delta_g + \beta_6 \gamma_t + \epsilon_{imt}$

Where y_{it} is the health outcome[6] for the person i at time t. G_i represents the treatment for i specified by gender; men are the counterfactual, and women are the treated group. T_t is a dummy variable that takes the value of one after July 2015 and zero before that[7]. δ_g and γ_t denote gender and time-fixed effects. X_{it} represents a matrix of control variables at the individual level. The control vector includes education level, age, marital status, ethnicity, states, and kind of health insurance (subsidized or private). These cofounders may have an impact on both health outcomes and domestic violence. So, controlling for them is crucial to finding causal results. In addition, those variables are found as specific determinants of violence in Colombia (Fajardo-Gonzalez 2021; Barón-Rivera 2010). Regressions were estimated with Ordinary Least Squares with robust standard errors for all the health outcome specifications.

[6] There are three binary outcomes of interest. Whether or not the person has had a hospitalization in the last 12 months, a good or very good health status, and health problem in the last 30 days.

[7] Given that the Survey has cross-sectional data, each person is only seen once

3. Data and descriptive statistics

The information used in this paper includes multiple institutional data from public sources for Colombia. The domestic violence data comes from National Police for 2010 - 2019[8]. The dataset contains the daily records[9] of domestic violence discriminated by gender, age group, place of occurrence (Departments and municipalities), kind of aggression (using a knife; a gun, blunt weapon, or without any weapon), and age group (child, teenager, and adult). Also, the Colombian National Police is the source for the other variables: daily data on kidnapping, homicides[10], and violence outside the household by municipality and gender. Demographic data from the Administrative Department of National Statistics (DANE for its acronym in Spanish) is used to build the rate of domestic violence in municipalities.

The second source of information is the National Survey of quality of life (ENCV for its Spanish acronym). This dataset contains random cross-sectional data with national representativeness and annual frequency. The Survey contains information at household and individual levels, with variables related to health, education, labor market, and housing conditions. This dataset will analyze the impact of femicide law on self-reported health status. The period from 2012 to 2016 is used for this purpose. The year 2017 is not used, given the lack of comparability with the other surveys due to a change in the sample size and structure.

[8] The data could be downloaded on the following websites:
The domestic violence reports from Colombian National Police: https://www.policia.gov.co/delitos-de-impacto/violencia-intrafamiliar
Kidnapping and homicides: https://www.policia.gov.co/grupo-informacion-criminalidad/estadistica-delictiva
Demographic data from the Administrative Department of National Statistics: Demografía y población (dane.gov.co)
National Survey of quality of life:
https://microdatos.dane.gov.co/catalog/MICRODATOS/about_collection/8

[9] The dataset includes daily information. It was aggregated monthly by summing all cases in a given month and dividing them over the municipality population by gender.

Colombia has 1,123 municipalities; however, not all municipalities reported information on domestic violence. Several reasons can explain this phenomenon. It may be because there are no cases to report (the dataset only includes values greater than zero), reporting is not part of the culture, or there is no police station available to report it. Therefore, the sample includes 1,101 municipalities with at least one domestic violence case from 2010- to 2019. The reported cases are not continuous during the analysis period for municipalities that have a small number of reports, for example, one case of domestic violence in January, followed by a missing value in February. In those cases, no reporting values were replaced by a zero.

Table 1 provides the mean annual crime rates per 100,000 individuals in Colombia and its major cities. The results show that domestic violence and violence outside the household have increased for females and males. Kidnapping has decreased during the period, and homicides decreased at the national level but without a clear trend in Cali and Medellin.

Table 2 includes descriptive statistics of the National Survey of the quality of life variables. Approximately every year there are 53% of women, the majority of the population has secondary education[11] (42%), and 61% are married or cohabitating. The sample distribution shows that, on average, 9% were hospitalized in the last 12 months, 48% had subsidized health insurance, and 76% had a very good or good health status.

[11] The secondary school includes middle school and high school that normally are taught in the same institution.

Table 1. Annual crime rates per 100,000 individuals in Colombia and its major cities

Year	2010		2015		2019	
	Female	**Male**	**Female**	**Male**	**Female**	**Male**
National						
Domestic violence	85.0	18.8	267.9	54.9	363.4	103.0
Violence outside household	86.8	155.9	152.3	225.2	211.9	273.1
Kidnapping	0.3	1.0	0.2	0.7	0.1	0.3
Homicide	5.3	64.1	4.4	50.5	4.3	48.0
Bogota						
Domestic violence	87.3	18.9	286.4	73.5	682.5	252.0
Violence outside household	101.4	161.4	144.0	226.4	268.9	335.1
Kidnapping	0.1	0.3	0.2	0.3	0.0	0.1
Homicide	3.4	35.1	3.1	35.2	2.4	26.3
Medellin						
Domestic violence	18.0	8.0	375.9	104.6	609.2	179.8
Violence outside household	13.6	46.1	125.4	157.2	209.8	251.4
Kidnapping	0.2	0.6	0.5	0.6	0.1	0.1
Homicide	7.0	129.4	3.4	41.0	3.7	45.7
Cali						
Domestic violence	172.7	39.1	296.2	81.7	440.2	142.5
Violence outside household	187.6	260.2	217.3	310.5	263.1	385.1
Kidnapping	0.4	1.3	0.1	0.5	0.2	0.2
Homicide	7.8	148.0	8.3	121.2	5.3	100.4

Notes: There are municipalities where a case of domestic violence was never reported during the analysis period. Those places were dropped, and the total population is based on 1,101 municipalities where at least one case of domestic violence was reported from 2010-2019. The rates are the sum of the number of cases each year over the total population for each gender.

Table 2. Descriptive statistics Survey of National Survey of quality of life

	2014		2015		2016	
	Female	Male	Female	Male	Female	Male
Hospitalization %						
No	90.73	93.34	89.54	92.84	89.36	93.02
Yes	9.27	6.66	10.46	7.16	10.64	6.98
Health status %						
Bad	25.5	18.94	28.11	19.96	26.05	18.83
Good	74.5	81.06	71.89	80.04	73.95	81.17
Having a health problem in the last 30 days %						
No	89.76	91.97	90.67	92.94	92.7	94.08
Yes	10.24	8.03	9.33	7.06	7.3	5.92
Age (mean)	43.7	43.0	43.8	43.0	44.0	43.3
Education %						
None	6.04	6.27	5.61	5.77	5.66	5.77
Primary	30.54	32.89	29.74	31.36	28.25	29.95
Secondary	42.24	41.76	41.4	41.8	41.52	42.19
Higher	21.17	19.08	23.24	21.07	24.58	22.1
Marital Status %						
Cohabitating	30.58	32.96	31.59	33.96	32.07	34.50
Widowed	9.29	2.38	8.57	2.18	8.75	2.51
Divorced	13.71	7.38	15.64	8.27	14.05	7.70
Single	17.89	26.42	17.02	25.55	18.31	26.13
Married	28.54	30.86	27.17	30.05	26.82	29.16
Ethnicity %						
Indigenous	3.21	3.63	3.98	4.20	3.99	4.14
Gypsy, Raizal, Palenque	0.20	0.22	0.13	0.17	0.17	0.15
Afro-Colombian	10.46	10.92	7.69	8.09	7.63	7.78
None	86.13	85.24	88.19	87.54	88.21	87.93
Insurance Type %						
Contributory	49.27	49.96	51.39	52.67	50.8	52.62
Subsidized	50.5	49.8	48.45	47.13	49.06	47.1
Do not know	0.23	0.24	0.16	0.2	0.14	0.28
Observations	21,728	19,294	24,636	21,550	24,384	21,605
Expanded sample	14,445,209	13,149,059	14,805,289	13,359,517	15,087,911	13,862,875

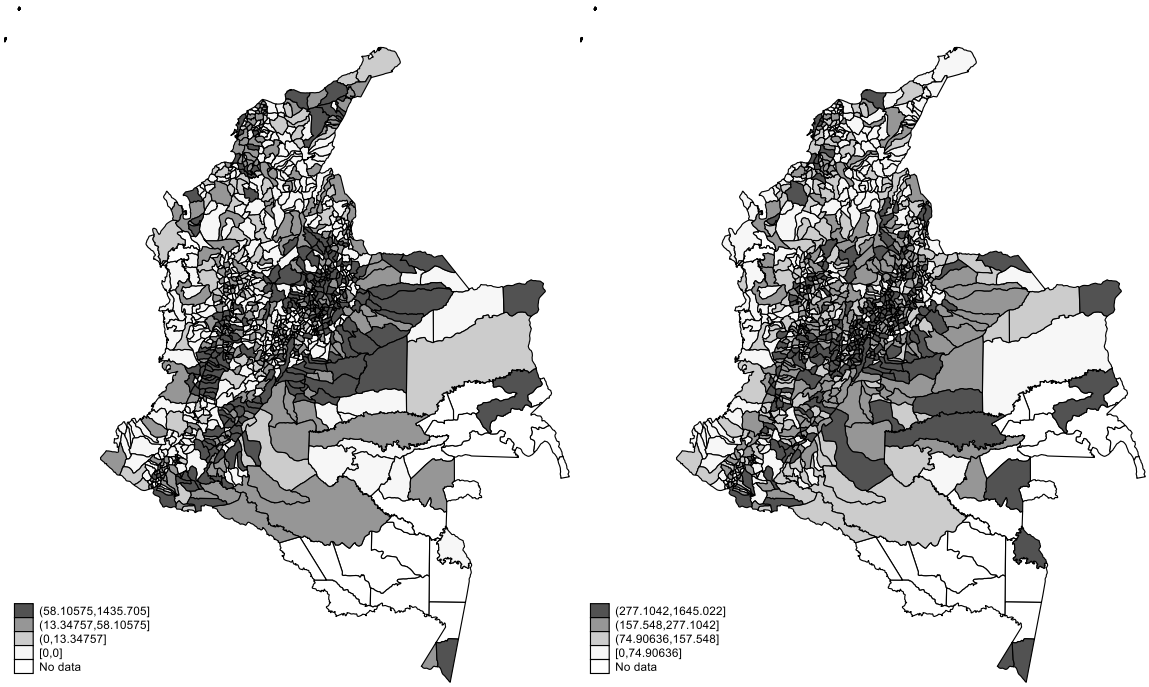
Notes: Only those observations with no missing value on the interest variables during each year were included. The statistics were estimated using weights that expanded the sample at the national level.

Graph 1 shows domestic violence rates against women per 100,000 females in each municipality[12]. The maps represent the years 2010 and 2019. Both show a concentration of cases in the Midwest of Colombia. The main difference between both maps is that the north part has decreased its rate, and the mid-south has increased. These regions have the poorer

[8] Thee domestic violence rates for the years 2010 and 2019 were estimated as the sum of cases each year over the population in each municipality.

population in the country. The white areas represent municipalities that have never reported cases from 2010 to 2019. They mainly belong to the south and west of Colombia, located in the Amazon jungle.

Graph 1. Domestic violence rate per 100,000 women in Colombia, 2010 and 2019

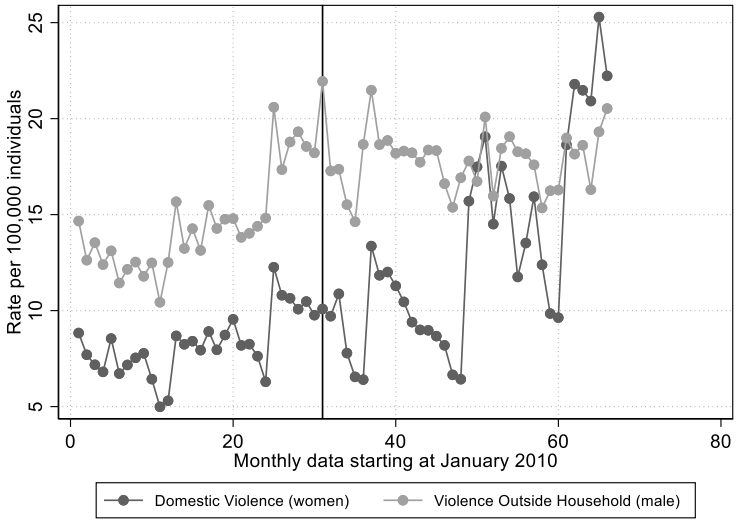


Notes: The municipalities in white color represent places where never was reported a case of domestic violence during the period 2010-to 2019. The zero cases represent municipalities where at least one case was registered after 2010 and before 2019. The rates are the total cases for each year over the population of women.

Graph 2 shows the parallel trends in domestic violence against women and the rates of violence outside the household for men. The results show a similar tendency before the reporter law, with a monthly report of around eight cases per 100,000 women. After that, the number of domestic violence cases increased and almost equaled the violence outside the household for men, which was nearly two times higher. The results in both cases seem to have seasonality, with spikes in January-February and declines at the end of the year

(November-December). The seasonality presented in domestic violence reports is similar to the unemployment rate, with the highest values during the first two months of the year and lower values in the last trimester (See Appendix 2). However, although they share the same spikes and downs, their long-term tendency is not the same, with an increasing rate of domestic violence reports and unemployment declines.

Graph 2. Violence against women and violence outside the household against men per 100,000 (Reporter Law)

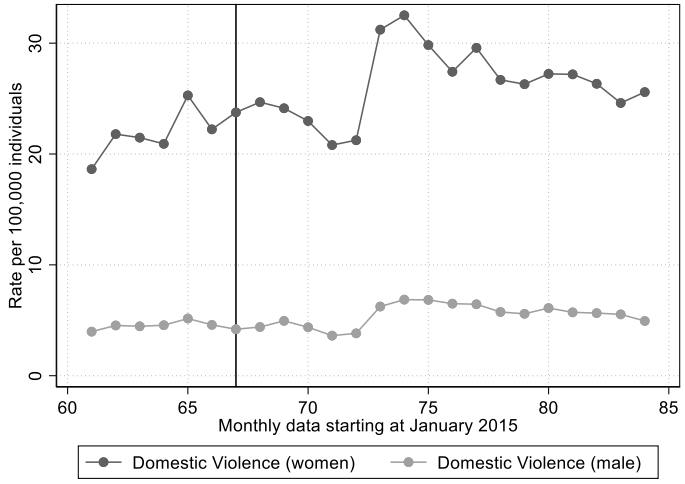


Notes: The graph presents monthly data starting in January 2010. The rates are the sum of the number of cases each month over the total population for each gender. The vertical line represents the date of the reporter law (July 2012).

Given that domestic violence against women and violence outside the household against men seem to get closer after the reporter law, the latter cannot be used as a control for the femicide law. Graph 3 presents domestic violence against women and men. Only six months before the second treatment were used where the parallel assumption seems to hold to run the difference-in-difference model (See graph 4). Before that period, because of the

effect of the reporter law, the trend of domestic violence rates by gender diverged. For this reason, I only used six months as a pre-trend.

Graph 3. Domestic violence against women and men per 100,000 (Femicide law)



Notes: The graph presents monthly data starting in January 2015 and ending in December 2016. The rates are the sum of the number of cases each month over the total population for each gender. The vertical line represents the date of the femicide law (July 2015).

4. Results

Table 3 presents the differences-in-difference regression for reporter law. The results show an increase of 0.5 reports per 100,000 women. The coefficient is statistically significant when the standard errors are clustered at the municipality level. Kidnapping and homicides are positively associated with the number of domestic cases reported. The results agree with the ecological model theory. It states that a violent environment, such as having high rates of kidnapping and homicides, affects domestic violence due to increased tolerance and indifference towards aggressive behaviors, which is confirmed with significant and positive signs for those variables.

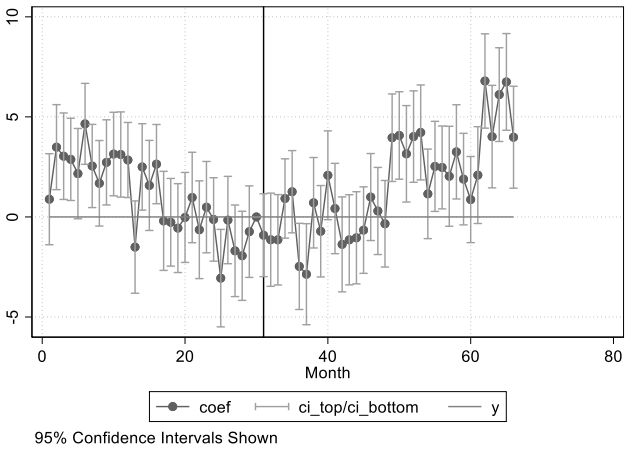
Graph 4 shows the dynamic difference-in-difference result. It exhibits a null effect during the period immediately to the treatment but a positive and significant impact of close to 5 reports per 100,000 women in subsequent months. This finding meets the previous results from the difference-in-difference regression, supporting the reporter's aim of allowing an external person to report a domestic violence case to help increase the formal investigations against the perpetrators.

Table 3. Difference-in-difference model for violence against women per 100,000 (Reporter law)

VARIABLES	(1)	(2)
Reporter	0.563*	0.546*
	(0.291)	(0.979)
Kidnapping		0.684**
		(0.316)
Homicides		0.220**
		(0.105)
Constant	9.896***	9.771***
	(0.0794)	(0.0976)
Mean of the rate of violence outside the household (control group)	13.56	13.56
Observations	145,332	145,332
R-squared	0.229	0.229

Notes: Column 1 is a model without covariates. Model 2 includes controls for kidnapping and homicides. The dependent variable is the rate per 100,000 individuals. It is estimated as the sum of cases divided over the population in each municipality by gender. The standard errors in parentheses are clustered at the municipality level. *** p<0.01, ** p<0.05, * p<0.1

Graph 4. Coefficient of domestic violence against women per 100,000, reporter law



Notes: The graph has monthly data starting in January 2010. The vertical line represents the date of the reporter law (July 2012).

Table 4 presents the difference-in-difference for the femicide law. The coefficient is significant and indicates an increase of 3.2 reports per 100,000 women after the femicide law. In this case, kidnapping and homicides have negative signs on the number of reports, which indicates that municipalities with high delinquency have lower cases. One possible explanation for this issue is that persons are still afraid of reporting in those areas, given the potential repercussions they can face in a municipality with high delinquency (kidnapping and homicides).

The changes in signs in homicides and kidnapping between the reporter law and the femicide regressions exhibit a possible problem in the specification. However, during 2017 there was a transition in the internal conflict given the peace agreement, and kidnapping and homicides decreased in rural places. Therefore, a negative coefficient may show the evolution of conflict from rural to cities. For that reason, a regression excluding the period from 2017 to 2019 is run. The results show no effect on homicides on domestic violence

against women, and kidnapping loses significance. Therefore, it seems likely that the peace agreement had changed the domestic violence reports against women, concentrating the information on less dangerous areas. These results do not necessarily imply that there are no domestic violence cases in unsafe regions; this may indicate that they report less.

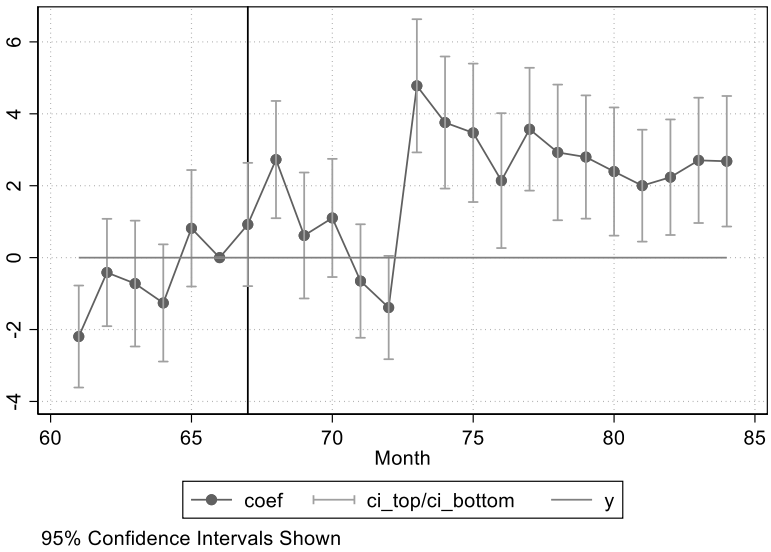
The dynamic difference-in-difference is presented in graph 5. The results are consistent with the no-dynamic model, with an increase of 3 reported cases per 100,000 females. This number is relatively high, knowing that the domestic violence rate for women in the previous months before the intervention was approximately 22 cases per 100,000 females. Also, the graph shows that the change in reports took around five months to react to the femicide law, but after that, it kept a similar trend.

Table 4. Difference-in-difference for domestic violence against women per 100,000 (femicide law)

VARIABLES	(1) Without Controls 2015-2019	(2) With Controls 2015-2019	(3) Without Controls 2015-2016	(4) With Controls 2015-2016
Femicide Law	3.225***	3.227***	2.783***	2.784***
	(0.312)	(0.312)	(0.318)	(0.318)
Kidnapping		-0.660***		-0.495*
		(0.218)		(0.299)
homicides		-0.0736***		-0.0151
		(0.0267)		(0.0251)
Constant	7.858***	7.896***	7.530***	7.541***
	(0.140)	(0.140)	(0.119)	(0.120)
Mean of the rate of domestic violence (control group)	2.751	2.751	2.423	2.423
Observations	132,120	132,120	52,848	52,848
R-squared	0.285	0.285	0.349	0.349
Municipality FE	YES	YES	YES	YES
Monthly FE	YES	YES	YES	YES

Notes: The dependent variable is the rate per 100,000 individuals. The standard errors in parentheses were clustered at the municipality level. *** p<0.01, ** p<0.05, * p<0.1.

Graph 5. Coefficients of domestic violence against women per 100,000, femicide law



Notes: The graph has monthly data starting in January 2015. The vertical line represents the date of the femicide law (July 2015).

Table 5 shows the effects of the femicide law on self-reported outcomes in health. The coefficients were consistently significant, with the expected sign, but the impact was small. For instance, women are more likely to have better health status (0.9 pp), fewer hospitalizations (0.06 pp) (although the coefficients are not significant), and fewer health problems (0.9 pp) compared to men after the femicide law.

Table 5. Difference-in-difference femicide, Health Outcomes[13]

VARIABLE	(1) Health status	(2) Health status	(3) Hospitaliza-tion	(4) Hospitaliza-tion	(5) Health problem	(6) Health problem
Femicide* Gender	0.00743*	0.00931***	-0.000682	-0.000559	-0.00913***	-0.00941***
	(0.00387)	(0.00353)	(0.00247)	(0.00246)	(0.00253)	(0.00251)
Constant	0.746***	1.020***	0.0748***	0.0630***	0.0965***	0.0687**
	(0.00179)	(0.00751)	(0.00108)	(0.00516)	(0.00121)	(0.00531)
Mean of the Dependent variable (control group)	0.756	0.756	0.0752	0.0752	0.0864	0.0864
Observations	218,661	218,661	218,661	218,661	218,661	218,661
Gender FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Covariates	NO	YES	NO	YES	NO	YES

Notes: Columns 1, 3, and 5 are models without covariates. Models 2, 4, and 6 include controls for age, education, marital status, ethnicity, type of health insurance, and states. The dependent variable is binary in all cases and was run under a linear probability model. Health status is 1 if the person has a good or very good health status and 0 otherwise. Hospitalization is a variable that takes the value of 1 if the person was hospitalized in the last 12 months and 0 otherwise. Health problems is a binary variable that takes the value of 1 if the person has a health issue during the last 30 days. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

5. Discussion and limitations

This paper showed that the legislation implemented in Colombia to attack domestic violence positively affected the increase in domestic violence reports. This does not necessarily mean that there are higher rates of domestic violence. It can indicate the awareness of laws and the hope that the perpetrator faces legal repercussions. The reporter law has a positive effect on increasing reports in the dynamic and difference-in-difference specifications. However, given that the impact is not immediate, the difference-in-difference model (which aggregates in one coefficient all the change) has a small coefficient. Still, when the effect is disaggregated, the estimate is close to 5 cases per 100,000 females, likely due to additional

[13] Parallel trend graphs are provided in the appendix.

reports from a third party. The femicide law shows a positive and significant effect on increasing reports. The law might raise awareness and empower women to report these issues. Also, this can happen given that women may believe reporting to the police will decrease the odds of having later femicide.

Although the laws implemented in Colombia have not been analyzed in a quantitative framework, literature related to the effects of regulations in domestic violence arrest on mortality has been done in the United States. While previously found mandatory arrests in domestic violence reports led to an increase in intimate partner homicides (Iyengar 2009), recently (Chin and Cunningham 2019) stated that there was no effect from having mandatory arrests. This questioned whether policies intended to decrease domestic violence had the wanted outcome. Given the lack of data on the matter in the Colombian case, the goal was not to analyze mortality or even experience domestic violence itself but rather to see how the reports changed, given the legislation. Whether or not laws have affected outcomes such as mortality or experienced domestic violence in Colombia are questions that need to be addressed in future research.

Even though the effect of femicide law on health outcomes has not been extensively studied, well-documented literature has shown a negative relationship between violence and health outcomes (World Health Organization 2012; J. Campbell 2002; J. Campbell and Lewandowski 1997; Alloush and Bloem 2022; Hernández 2021). Nevertheless, this paper can only identify a small correlation effect of the law on any self-reported health outcomes. It might confirm that despite the increase in the number of domestic violence reports, the violence that women experienced in their homes may not have increased. This is reflected in

the better health outcomes, which could have deteriorated (at least in theory) if they suffered from more domestic violence.

This research has several limitations. First, given the lack of data for estimating the changes in domestic violence, the results were aggregated at the municipality level, which does not allow control for individual characteristics and eliminates the possibility of seeing if there are heterogeneous effects. Second, there is no certainty whether changes in reports translate to an increase or decrease in domestic violence. It could only be studied with surveys with individual-level data on domestic violence. It allows finding females who do not report but have been victims, increasing the sample of women impacted by the law. However, the lack of annual frequency in the DHS, and the inexistence sources of information related to the topic, make it challenging to measure domestic violence by methods other than police reports. Third, given the lack of instruments for domestic violence, the difference-in-difference model for health care uses a reduced form specification which cannot be described as causal. Fourth, the paper focuses on municipalities with no-missing information on domestic violence during 2010-2019. Even though the areas uncovered by the study are almost uninhabited, omitting them might bias the estimates due to selection.

6. Conclusions

As far as I am aware, this is the first study to analyze the effectiveness of the laws intended to tackle domestic violence in Colombia. In this developing country, three out of ten women are victims of physical violence from their spouses at any time in their life. Particularly, two laws were of interest to this study. The reporter law declared that any person who witnesses domestic violence could directly report it to the police, which may increase the odds of

having a report from a third party. The femicide law increased the years of jail compared to other homicides against women without gender or domestic motive.

The results show a positive effect on increasing the domestic violence reports against women, especially after the femicide law, indicating that they could have effectiveness. The paper also analyzes whether the femicide law changed women's health outcomes. The results reveal that females had better health status and fewer health problems, indicating that although the reports increased, domestic violence may not have risen for them.

More studies should evaluate the policies implemented to avoid creating ineffective legislation. In that sense, future work may focus on whether increasing years of jail in a femicide crime reduce mortality against women in Colombia. Also, surveys that report domestic violence at the individual or household level must be done to analyze the effects of reports and on experiencing it. Additional studies need to be done not only in Colombia but in other Latin-American countries such as Peru, where six out of ten women are victims of domestic violence, which not only might have physical but mental and economic consequences.

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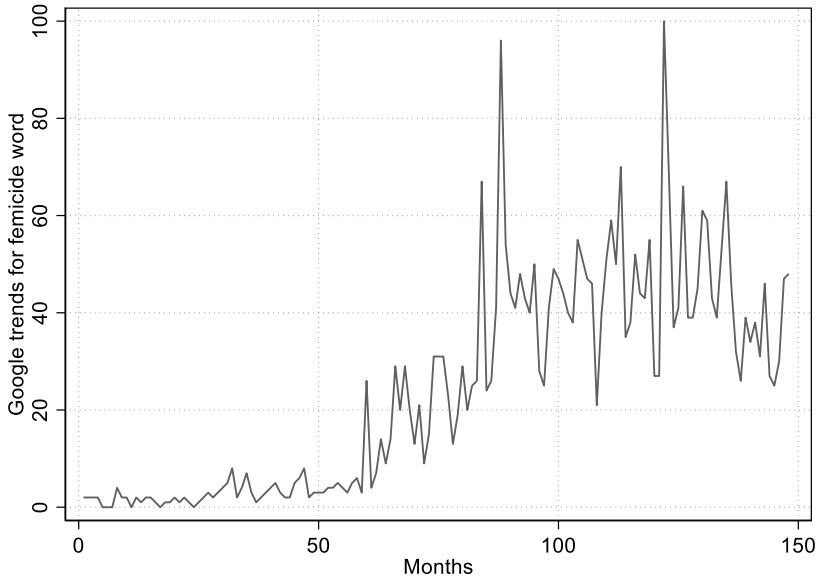
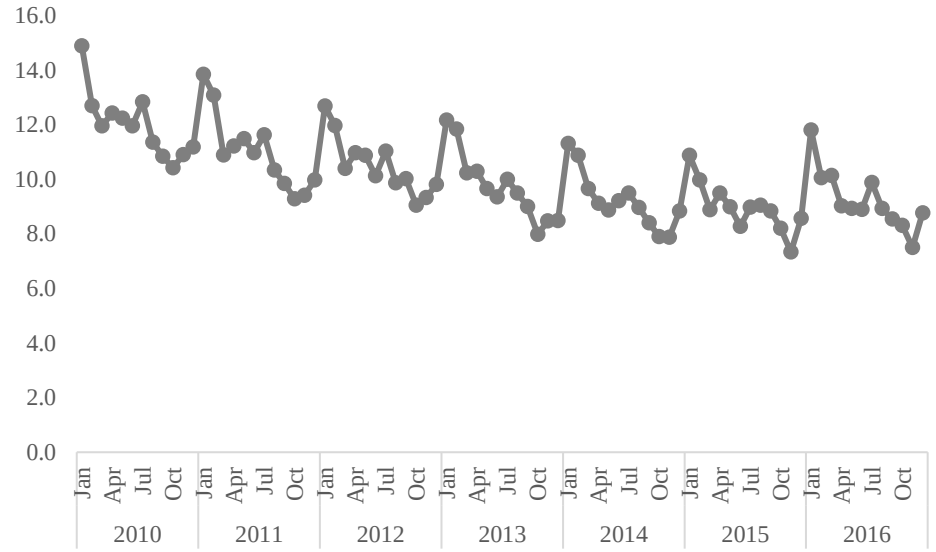
Appendix 1. Google trends for the word "Femicide."



Notes: The graph has monthly data starting in January 2010.

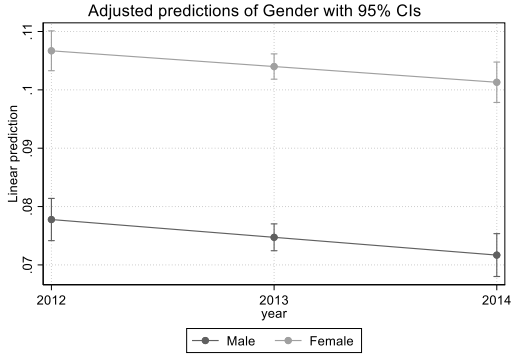
Appendix 2. Unemployment rate in Colombia, 2010-2016



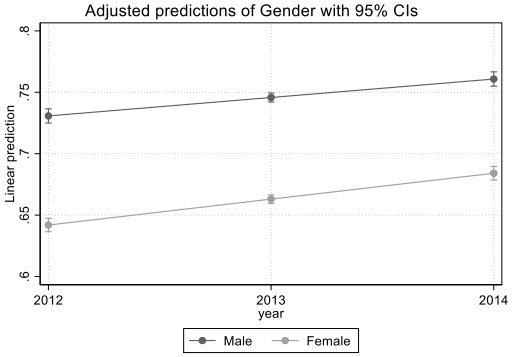
Notes: The Administrative Department of National Statistics (DANE for its acronym in Spanish) estimates the unemployment rate. The data presents seasonality with spikes in January and declines in December. The tendency during 2010-2016 was an overall decline in the unemployment rate.

Appendix 3. Fitted trends comparison for health outcomes

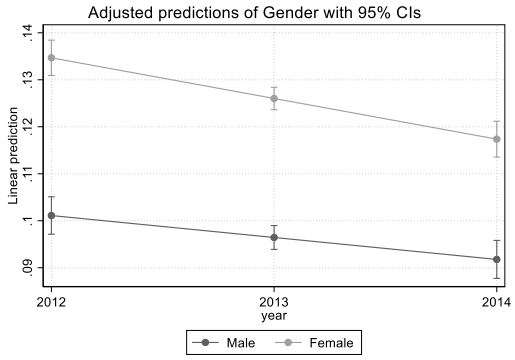
A. Hospitalization



B. Health status



C. Health problems



Notes: The graphs come from regression of the outcome variable on the interaction between gender and year.