Conflict and Female Leadership: Evidence from Colombia*

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May 12, 2026

Abstract

I examine whether female leadership reduces violence using close elections in Colombian municipalities and a novel dataset on guerrilla commanders. A female mayor reduces guerrilla attacks by up to 60%, with larger effects when the local guerrilla commander is also female. The reduction reflects de-escalatory behavior on both sides, with female mayors organizing more peace-oriented initiatives and female commanders retaliating less after crackdowns. Campaign manifestos and observed behavior reveal underlying gender gaps in preferences for de-escalation. Finally, I develop a bargaining model with gender-specific commitment credibility that rationalizes these findings and helps rule out alternative mechanisms.

JEL codes: D02, D74, J16, O12.

Keywords: Gender, leaders, conflict.

*I am immensely grateful to Siwan Anderson, Claudio Ferraz, Nathan Nunn, Dominic Rohner, and Felipe Valencia-Caicedo for their help and dedication. I would also like to thank Cesi Cruz, Patrick Francois, Jaime McCasland, Thorsten Rogall and Juan Fernando Vargas for their comments and suggestions, as well as participants at NBER SI, NEUDC, CEPR, LACEA-LAMES, RIDGE, APSA conference, CEA, AYEW, LBS's TDC, GLAD, UCLA's Politics of Development Lab, UBC's Development and Political Economy lunch and Universidad de los Andes department seminar for their helpful comments. I would also like to thank Criselda Lobo for her time.

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Introduction

Men and women differ systematically in preferences and behavior. Decades of research document gender gaps in risk-taking, competition, negotiation, and decision-making under uncertainty (Croson & Gneezy, 2009; Niederle & Vesterlund, 2007; Babcock & Laschever, 2021; Bowles, Babcock, & Lai, 2007).[1] These differences extend to positions of leadership, where female leaders adopt distinct managerial styles (Eagly, Johannesen-Schmidt, & van Engen, 2003) and allocate public resources along different priorities (Chattopadhyay & Duflo, 2004; Beaman, Chattopadhyay, Duflo, Pande, & Topalova, 2009; Clots-Figueras, 2012). Whether such differences also shape leaders' conduct in armed conflict, one of the most consequential domains of leadership, remains an open question.[2]

The stakes of this question are unusually high. Armed conflict claims the lives of more than 100,000 people each year worldwide, with vulnerable populations bearing a disproportionate share of the cost (Herre, Rodés-Guirao, & Roser, 2024). Moreover, both the frequency and intensity of conflicts have risen sharply over the past decade (Rohner, 2024). Yet theoretical predictions on the role of female leaders in conflict are ambiguous. On one hand, female leaders may de-escalate violence by drawing on preferences for cooperation and dialogue, as a substantial qualitative and theoretical literature on gender and conflict resolution argues (Ruddick, 1982; Tickner, 1988; Goldstein, 2003; Caprioli, 2000; Melander, 2005). On the other, female leadership may be perceived as weakness by adversaries and invite more frequent attacks, as Dube and Harish (2020) document for medieval European queendoms. The two channels push in opposite directions, and which dominates, if either, will depend among others on incentives that vary across types of leadership (e.g., electoral support, tenure limits, outside options). Ultimately, whether women in positions of power can alter the dynamics of modern armed conflicts is a question that has not been causally answered.

I turn to the later stages of the Colombian armed conflict to address it. Colombia is a modern democracy with competitive local elections, sufficient female candidates to enable causal identification, and a long-running guerrilla insurgency in which violence has remained substantial for decades. Using mayoral elections closely contested between male and female candidates, I implement a regression discontinuity design that compares municipalities where a woman narrowly won to those where she narrowly lost. I find that the election of a female mayor leads to roughly 6 fewer attacks

[1] These patterns are also documented outside the social sciences, with evidence of behavioral differences across primates and other species (Stockley & Bro-Jørgensen, 2011).

[2] For studies of how other personal characteristics of leaders shape conflict dynamics, see Horowitz, Stam, and Ellis (2015).

per 100,000 inhabitants by left-wing guerrilla groups over the electoral cycle, a 60% reduction relative to mean violence in this period (1997-2016).

On the other side of the conflict, I examine female leadership within guerrilla groups. I construct a novel dataset on the structure, spatial distribution, and gender composition of the guerrilla command hierarchy. I find that areas under the command of a female guerrilla leader show lower levels of violence. These data also allow a direct test of a long-standing claim in the gender and negotiation literature: that interactions between two female leaders generate increasing marginal returns in de-escalation, driven by shared preferences for non-violent engagement (Tannen, 1994; Cameron, 1998). Combining the mayoral RDD with cross-sectional variation in the gender of the local commander, I find that the decline in violence is both larger in magnitude and more precisely estimated in municipalities where a female mayor was narrowly elected and a female commander operates in the same area.

To understand the mechanism behind these effects, I first document direct evidence of de-escalation efforts by female leaders on both sides. Using a novel dataset on peace-oriented initiatives at the municipal level, I show that female mayors are significantly more likely to organize such actions. Existing scholarship documents that guerrilla groups in Colombia are responsive to civilian collective action and public sentiment (Lehoczki & Ayala Castiblanco, 2024); consistent with this, guerrilla violence declines following these initiatives. A similar pattern of de-escalation is present in guerrilla groups: female-led units are less likely to retaliate against civilians following government operations.

These patterns reflect broader gender gaps in preferences for de-escalation, both stated and revealed. Using a novel dataset of mayoral campaign manifestos and an LLM, I find that female candidates place greater emphasis on de-escalation and community-oriented themes, with no systematic differences across other policy dimensions. Consistent with these stated preferences, municipalities led by female mayors exhibit higher trust in the mayor, greater use of local conflict resolution institutions, and broader participation in local initiatives. I formalize these gaps in a bargaining model of interaction between a mayor and a guerrilla commander, in which gender shapes the credibility of commitments to non-violence. Unlike canonical contest and bargaining models, this framework jointly accounts for equilibrium violence and female mayor $\times$ female commander complementarity (see Jackson and Morelli (2011) for a survey).

The model also yields two empirical predictions, which I take to the data. First, the reduction in violence depends on the costs of de-escalation. Second, it reflects a change in the mode of conflict rather than a broader weakening of guerrilla presence, as evidenced by the stability of extortion rates, public investment, and land redistri-

bution under female mayors. Local economic conditions therefore remain unchanged, and neither households nor the municipal government adjust their behavior. Taken together, the evidence points to strategic restraint rather than a fundamental change in territorial control or armed group activity as the channel through which female leadership reduces conflict violence.

Related literature This paper contributes to three strands of literature. First, it relates to previous studies of the role of women leaders in conflict. Most closely related is Dube and Harish (2020), who provide the first causal evidence on this question by studying medieval European queendoms. They find that queens were more likely to be involved in conflicts, both as attacked parties (perception of vulnerability) and as initiators (signaling of strength). This paper extends this strand of the literature to a contemporary democratic setting in which institutional features and the nature of armed actors differ substantially. I find that female leadership is associated with less violence rather than more, a pattern consistent with the contrast in institutional environments and modes of conflict.[3]

This paper is also related to the extensive literature on the causes and consequences of conflict.[4] Recent studies document the role of ethnicity, government policy, elites, and institutions as determinants of conflict, as well as the consequences of conflict on economic development.[5] Most closely related is work on how leaders' characteristics shape conflict dynamics (Horowitz et al., 2015), to which this paper contributes by causally estimating the role of the leaders' gender.

Finally, this paper relates to existing work on female political leadership and performance in office (Chattopadhyay & Duflo, 2004; Clots-Figueras, 2012; Beaman et al., 2009; Iyer, Mani, Mishra, & Topalova, 2012; Brollo & Troiano, 2016; Chauvin & Tricaud, 2024). This literature has linked female leadership to differential legislation and public goods provision, lower corruption, and higher reporting of gender-based vio-

[3]Other related studies of gender and conflict have focused on the victimization of women in conflict settings, leaving aside their potential role as leaders. This literature spans multiple disciplines, including economics (Guarnieri & Tur-Prats, 2023; Caprioli, 2000) and political science (Melander, 2005; Koch & Fulton, 2011; Best, Shair-Rosenfield, & Wood, 2019).

[4]See Blattman and Miguel (2010), Silwal, Anderton, Brauer, Coyne, and Dunne (2021), and Rohner (2024) for surveys. The paper also engages with theoretical models of conflict based on bargaining problems (Jackson & Morelli, 2011) and with studies of civilian collective action and armed group behavior (Arjona, 2016; Kaplan, 2017)..

[5]Previous work on the Colombian conflict includes Bautista, Galán Guerrero, Robinson, Torres, and Torvik (2024) on the background of paramilitary leaders; Fergusson, Querubin, Ruiz-Guarin, and Vargas (2019); Acemoglu, Robinson, and Santos (2013); Acemoglu, García-Jimeno, and Robinson (2015); Acemoglu, Fergusson, Robinson, Romero, and Vargas (2020); Prem, Rivera, Romero, and Vargas (2019) on the political roots of conflict; Dube and Vargas (2013) on the responsiveness of violence to macroeconomic variables; Ibáñez and Vélez (2008) on forced displacement; Angrist and Kugler (2008); Mejia and Restrepo (2013) on drug production and trafficking.

lence, among other outcomes. I contribute by studying the effects of female leadership on a different outcome: the incidence of conflict violence. Unlike most of this evidence, I study politicians elected in the absence of gender quotas or reserved seats.

The remainder of this paper proceeds as follows. The next section provides background on the Colombian conflict and female political leadership, together with a description of the main data sources. Section 3 details the empirical strategies, and Section 4 presents the main results. Section 5 validates the empirical design and presents robustness analyses. Section 6 examines how and why female leaders opt for less violence. Section 7 concludes.

2 Data and empirical setting

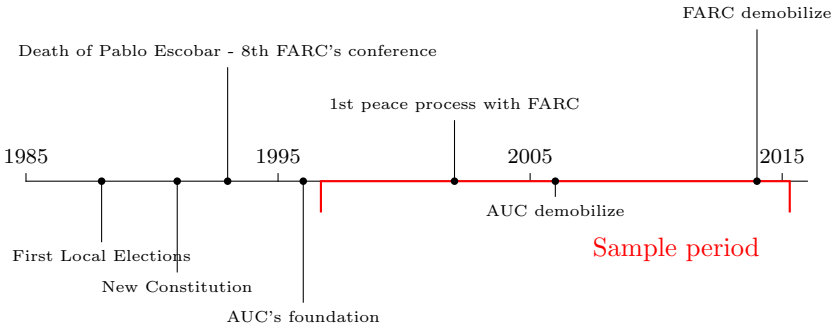
Estimating the effect of female leadership on conflict violence requires variation in leader gender that is plausibly exogenous to violence, sustained and well-documented conflict, and data on leadership across the conflict's multiple actors. In this section, I argue that Colombia satisfies all three requirements. Close mayoral elections provide quasi-random variation in leader gender at the local level. Detailed event-level data document the country's armed conflict since the mid-1980s. And the historical record allows me to map the gender of guerrilla commanders to specific territories, a rare feature in conflict studies.

2.1 The Colombian conflict

Colombia was immersed in an armed conflict between guerrillas, paramilitary groups, and government forces from the late 1940s until 2016. While the nature of the conflict evolved over the decades, by the mid-1990s, illegal actors could broadly be classified into two groups. On one side were left-wing communist guerrillas, whose objective was to overthrow the government. On the other side were right-wing paramilitary groups, which fought for territorial control necessary to continue their illicit activities (Bergquist, Peñaranda, & Sánchez, 2001; Rivera, 2007).[6] Figure 1 summarizes the key events of the conflict through the FARC's demobilization in 2016.

[6]The Colombian conflict has been extensively examined, as in the work by Safford and Palacios (2002) and Palacios (2012). There is a consensus that the roots of the guerrilla movements can be traced back to the government's neglect of the central highlands in Colombia, coupled with the prevalence of anti-imperialist and communist ideologies during the Cold War in Latin America. In contrast, the emergence of paramilitary groups is closely tied to the surge in cocaine trafficking and the entanglement of the landed and political elites with drug trafficking organizations.

Figure 1: Relevant events for the Colombian conflict since 1985



Notes: The figure shows the principal events related to the armed conflict in Colombia, starting in 1985 and ending with the FARC's demobilization in 2016. Two main periods can be identified: 1) Rise of big drug cartels and private armies (1985-1993). 2) Armed confrontation between guerrillas, paramilitaries and the government (1993-2016). The armed conflict formally ended after the FARC demobilization, despite the existence of other (minor) guerrilla groups. Paramilitary groups formally demobilized in 2006, losing their status as conflict actors.

Conflict data

The main source of data on conflict violence is an updated version of the dataset compiled by Restrepo, Spagat, and Vargas (2003) and maintained through 2018 by the *Universidad del Rosario*. This dataset provides daily counts of violent events in each Colombian municipality between 1984 and 2018. The events are categorized based on reports from the local NGO *CINEP* (Centro de Investigación y Educación Popular), which draws on local and national media as sources for their reports.[7]

Each violent event in the dataset is classified as either a one-sided attack (an uncontested one-sided episode of violence like a shooting or a kidnapping) or a clash (a violent confrontation between different actors). Importantly, one-sided attacks that elicit a response from the attacked side are coded as clashes. The data also includes date of the incidents, the municipality(ies) affected, the identity of the group(s) involved (guerrillas, paramilitaries, or state forces), as well as the count of casualties, injuries, and captures. Given the ongoing nature of this conflict, there is no information on the side who initiated a clash. In cases involving multiple actors, all parties involved are listed.

2.2 Politics and the emergence of female local leadership

The first local elections in Colombia were held in 1988. Before then, mayors and governors were appointed by the president's party, rendering these offices inaccessible

[7]CINEP used 1984 as a starting point for their first report – written in 1996 – due to a lack of reliable violence data before that year. The series of reports, *"Noche y Niebla"*, is available at https://www.nocheyniebla.org. An example of these reports can be seen in Appendix Figure A2.

to a broad segment of the population, including those advocating for more progressive agendas. Historically, women were among those significantly underrepresented in the spheres of power, and thus had limited access to political office (Aviel, 1981; Fergusson & Vargas, 2013). A constitutional reform in 1991 further opened the party system, allowing non-traditional and local political movements to contest for power.

Colombian mayors Mayors are elected to four-year terms in a multi-party system with no reelection. They serve as the highest authority in a municipality, preparing and executing the municipal budget, raising local taxes, supervising public works, and liaising with higher levels of government. Although they lack formal authority over national police or military forces, mayors often coordinate with higher-level authorities on security matters and are frequently the only visible state presence in their municipalities. These institutional relationships are summarized in Appendix Figure A1.

In this context of elite control and low representativeness, women emerged as political outsiders advocating for peace and the rights of disadvantaged communities (Capote Díaz, 2012; Herrera & Pertuz Bedoya, 2015). While still low in absolute terms, the proportion of female mayors doubled between 1997 and 2015. By 2015, women held one in every ten mayoral seats and placed in the top two positions in nearly 25% of mayoral races.[8] Figure 2 shows the share of local elections in which a female candidate participated or won between 1997 and 2015.

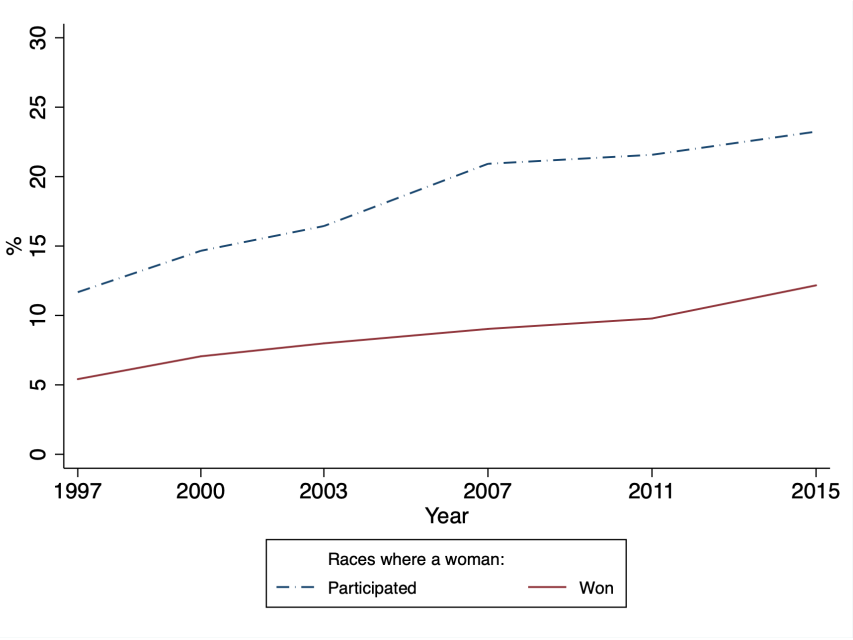
The path to public office for these women often began with grassroots work and peace advocacy, with many activists engaging armed actors in nonviolent ways to negotiate conflict resolutions for their communities.[9] A notable example is Gloria Cuartas, elected mayor of Apartadó in 1994.[10] A highly regarded local activist since the late 1980s, Cuartas served as a housing councilor for conflict victims, a role from which she actively opposed armed groups in the region. In 1994 she was nominated for mayor by a coalition of "minor" political parties, and during her tenure the *Comunidad de Paz de Apartadó* was founded (Mosquera, 2000). This was a community organization aimed at mitigating violence through solidarity, mutual aid, international advocacy,

[8]Women remain underrepresented across political institutions: 20% of Congress members and 17% of state deputies in 2019 (U.N., 2020). Only one woman served on the government's peace-talk negotiation committee.

[9]For example, some activists assisted their communities in dealing with guerrillas by acting as intermediaries between them and international organizations (e.g., IRC) to secure the release of hostages. See this BBC article on Piedad Córdoba.

[10]Apartadó is a strategically positioned municipality in northwestern Colombia, located along the corridor linking the Pacific Ocean and the Caribbean. The area serves as a primary route for illegal activities and has been a site of violent conflict involving various armed groups since the 1980s. See Appendix Figure A3 for a visual reference.

Figure 2: Evolution of female participation and success in local elections. 1997-2015



Notes: Percentage of female candidates (dashed line) and mayors (solid line) in each local election during the sample period.

and cooperative activities such as agricultural training programs.

Cuartas's trajectory is illustrative of a broader pattern that I formalize in later sections: female mayors in Colombia are systematically more likely to pursue de-escalation, both in their public statements and through community-oriented governance. I argue that these gender differences in leadership styles, well documented in other policy domains but largely overlooked in conflict settings, are central to understanding why conflicts unfold as they do. This paper provides the first evidence that these behaviors form the core mechanism through which female leadership reduces violence.

Electoral data

I use electoral data for Colombian municipalities from 1997 to 2015, sourced from the National Registry Office (*Registraduría General de la República*). The data cover six electoral cycles between 1997 and 2015 and include the vote count, full legal name, gender, and party/coalition affiliation for each candidate. The 1997 starting point reflects data availability: prior to 1997, the National Registry recorded only total vote counts and the elected candidate's name, not the full slate.[11]

[11]Local terms were also irregular before 2003, lasting two years between 1992 and 1994 and three years between 1994 and 2003. Since 2003, terms have been standardized at four years. The sample ends in 2015 because the next electoral cycle (2019) took place after the FARC's demobilization in 2016.

2.3 Women in the guerrillas

As in politics, women who rose to leadership in the FARC stood out from their male counterparts through ideological commitment and, in some cases, even educational attainment. Below, I describe the FARC and women's place within it before turning to specific cases.

The FARC Among the numerous guerrilla groups in Colombia since the 1960s, the largest and most influential was the *Fuerzas Armadas Revolucionarias de Colombia* (FARC).[12] The FARC was organized hierarchically: a central command (the *Estado Mayor*) directed regional Blocks, which in turn comprised multiple local Fronts. Originally created and led by two men, the FARC exhibited a significant gender imbalance, with only a small number of women ever reaching the rank of *Front Commander* (Criselda Lobo, personal communication, February 10, 2021).[13]

Despite this imbalance, the FARC's gender practices were relatively progressive compared to other armed organizations. The group used a tenure system based on ideological commitment, with no formal consideration of gender for promotion (Barrios Sabogal & Richter, 2019).[14] In addition, the FARC explicitly praised women's role as peacemakers and community leaders. To illustrate this point, Appendix Section E reproduces excerpts from FARC leaders' statements to this effect. At the same time, life in the FARC posed particular challenges for women that contributed to the scarcity of female leaders.[15]

Following demobilization, the FARC's political party (*Fuerza Alternativa Revolucionaria del Común*, also FARC) was granted five Senate seats for the 2018–2022 cycle. The party selected Criselda Lobo and Victoria Sandino as senators based on their influence within the organization, their experience in the ranks, and their relatively high human capital. Among the unsuccessful candidates was Erika Montero, the sole female mem-

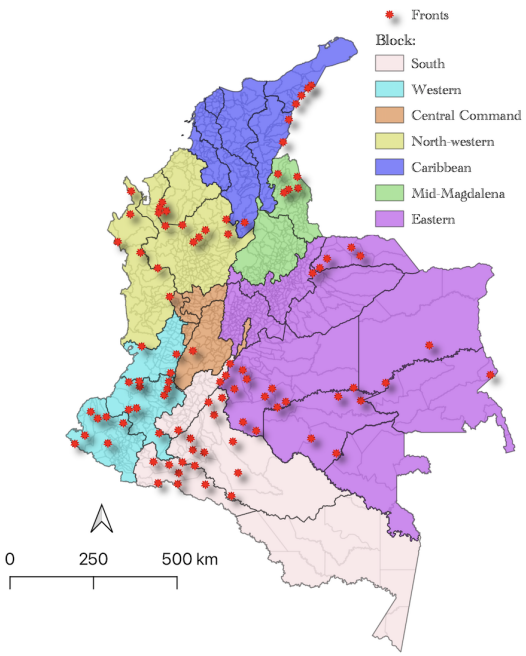
[12]The FARC was created in 1963 in the Andean region of central Colombia. Over the next 40 years, it expanded across the country, reaching over 70% of municipalities and enlisting over 21,000 combatants at its peak (Osorio, Mohamed, Pavon, & Brewer-Osorio, 2019). The group demobilized in 2016 after a peace process with the government.

[13]Women are estimated to have made up 30% of FARC combatants (Gutiérrez Sanín, 2004; Universidad Nacional de Colombia, 2017), an unusually high share for an illegal armed group despite the gender imbalance.

[14]This contrasts with paramilitary groups, where masculinity and brutality were central to their group identity, to the extent that gender-based violence was frequently used as a tool to instill terror in local communities (Cruz & Olarte, 2021; Wirtz et al., 2014).

[15]Most notably, motherhood was treated as incompatible with guerrilla life: women who wished to have children faced a choice between handing the child over to someone outside the militia or desertion, the latter making them targets of the organization (Criselda Lobo, personal communication, February 10, 2021; Stanski (2006); Richani (2013)).

Figure 3: Jurisdiction of FARC blocks and location of fronts



Notes: FARC's administrative division according to *Verdad Abierta* (2021). Blocks are color coded with bright areas indicating a more active presence of the respective unit. Fronts are represented as dots in their most recent location.

ber of the *Estado Mayor*, the FARC's central command.[16] Montero was a seasoned combatant who rose to lead the FARC's north-western *Block* in the early 2000s, after a brief period of incarceration on charges of terrorism and rebellion.

Data on the territorial organization and female leadership in the *FARC*

To study the role of female leadership in the guerrilla, I compiled a novel dataset on the administrative and spatial distribution of the FARC over time. I digitized a series of maps from Medina-Gallego (2011) and the local NGO *Verdad Abierta* (*Verdad Abierta*, 2021), allowing me to geolocate each *Block* and *Front* of the FARC, along with its area of influence.[17,18] Figure 3 shows the spatial distribution and geographical boundaries of the FARC units according to *Verdad Abierta*: Blocks are color-coded, with brighter areas indicating stronger unit presence, and Fronts are depicted as black dots. Blocks are larger entities encompassing multiple Fronts.

[16]Sandino holds a bachelor's degree in journalism, an unusual qualification within the FARC. Lobo did not pursue post-secondary education but had completed schooling, which placed her ahead of many fellow combatants given the limited schooling available within the ranks (Universidad Nacional de Colombia, 2017). For brief biographies, see Appendix Section D.

[17]Verdad Abierta is a digital-press outlet founded in 2007 by the *Fundación Ideas para la Paz* (FIP), with the goal of "reconstructing, preserving, and disseminating the historical and judicial truth about the Colombian armed conflict." See www.verdadabierta.com.

[18]The FARC's hierarchical structure is described in Appendix Section C, Figure C1.

I complement these data with information on the gender of each unit's command structure, drawing on news articles, intelligence reports, and qualitative interviews to identify the names or aliases of leaders within each Block and Front during the sample period. These sources allow me to determine whether a unit had a female leader at any point during the period analyzed. They do not allow me to track the exact tenure of each leader or the exact period during which each unit was active; I therefore construct different measures of exposure and conduct exercises to bound the results, returning to this point in later sections. For a detailed overview of sources by unit, see the Online Appendix.

3 Empirical Strategy and Descriptive Statistics

3.1 Regression Discontinuity

I estimate the causal effect of female political leadership on conflict in Colombia using a regression discontinuity design that exploits close mayoral elections between a male and a female candidate.[19] A simple comparison of municipalities where a woman won to those where a man won would conflate the effect of female leadership with the determinants of female electoral success. The RDD addresses this concern by restricting attention to races decided by narrow margins, where the gender of the winner is plausibly unrelated to other municipality characteristics. Under continuity of potential outcomes at the threshold, this comparison identifies the local average treatment effect of electing a female mayor. Section 5 presents evidence supporting this assumption.

The baseline sample consists of mayoral elections in which a male and a female candidate finish in the top two. Let $X_{i,p}$ denote the female candidate's margin of victory, defined as her share of the votes cast for the top two candidates centered at 0. The treatment indicator $F_{i,p}$ equals one whenever $X_{i,p} > 0$. I restrict my attention to races with $|X_{i,p}| < h$. For bandwidth selection, bias correction, and inference I follow Calonico, Cattaneo, Farrell, and Titiunik (2019), using the MSE-optimal bandwidth, bias-corrected point estimates, and robust standard errors.

Equation (1) shows the main empirical specification used to identify the effect of female

[19] Brollo and Troiano (2016) and Fergusson et al. (2019) employ similar designs in also similar contexts in Latin America.

political leadership on conflict violence.

$$y_{i,p} = \alpha + \gamma F_{i,p} + f(X_{i,p}) + \varepsilon_{i,p} \tag{1}$$

where $y_{i,p}$ is the outcome in municipality i during electoral period p, γ is the coefficient of interest, $f(X_{i,p})$ is a polynomial in the running variable, and $\varepsilon_{i,p}$ is an error term. In the baseline specification, $y_{i,p}$ is the number of one-sided violent attacks by armed actor, normalized by population and electoral period length, and $f(X_{i,p})$ is linear on each side of the threshold. I show robustness to alternative outcome normalizations in Section 5 and to alternative polynomial orders in Table 2 and Appendix Table B6.

3.2 Panel fixed-effects specification

To examine the relationship between female guerrilla leadership and conflict violence, I compare municipalities where the local guerrilla unit had a female commander to those where it did not. The estimating equation is

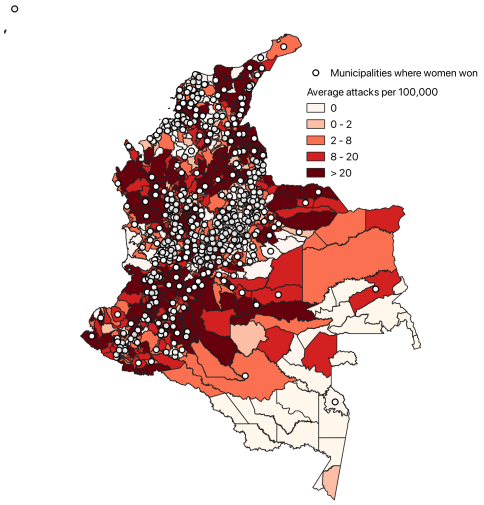
$$y_{i,t} = \alpha_t + \alpha_i + \beta FC_{i,t} + Z_{i,t}\Gamma + \varepsilon_{i,t} \tag{2}$$

where the unit of observation is municipality i in year t. $y_{i,t}$ is the same outcome as in equation (1) but aggregated annually, $FC_{i,t}$ equals one if the guerrilla unit operating in i in year t has a female commander, and $Z_{i,t}$ is a vector of time-varying and time-invariant municipality covariates. α_t and α_i are year and municipality fixed effects; in specifications where municipality fixed effects cannot be identified, I use state fixed effects α_s instead. Standard errors are clustered at the commander level, since the same commander can be in charge of units operating across several neighboring municipalities. The coefficient β captures the conditional correlation between female guerrilla leadership and violence.

3.3 Descriptive statistics

Figure 4 shows the spatial distribution of guerrilla attacks and municipalities with female mayors over the sample period. Violence concentrates in three areas: the northwestern strategic corridor between the Caribbean and the Pacific, the eastern frontier with Venezuela, and the Andean region in the southwest. Appendix Figure A4 shows a similar distribution of paramilitary attacks, consistent with the two armed factions contesting the same territories. Female electoral success, by contrast, displays

Figure 4: Geographical distribution of guerrilla attacks between 1998 and 2016 and female electoral success



Notes: Color shading indicates the incidence of guerrilla attacks between 1998 and 2016, normalized per year and per 100,000 inhabitants. Violence data are from (Restrepo et al., 2003), updated by Universidad del Rosario. Dots mark municipalities that elected a female mayor between 1998 and 2016.

no comparable spatial concentration, a pattern consistent with the orthogonality between female mayors and the determinants of conflict that the RDD requires. Section 5 formalizes this evidence.

Table 1 presents summary statistics for the main variables; a detailed description of each variable and its source appears in Appendix Table B1. The unit of observation is the municipality-electoral period in which a woman finished in the top two, yielding 1,045 observations across the seven electoral cycles between 1997 and 2016. The average municipality experiences three guerrilla attacks per year per 100,000 inhabitants and two operations by government forces against illegal actors. Paramilitaries are largely absent from direct clashes with either guerrillas or the state, while government action is dominated by the national army, which carries out 85% of all state operations. Guerrilla attacks produce on average 5.7 casualties per 100,000 inhabitants per electoral cycle, twice as many as those generated by paramilitary forces.

Turning to electoral outcomes and candidate characteristics, women won 44% of the races in which they finished in the top two and ran for traditional parties in 44% of cases.[20] Municipalities in the sample have an average population of 37,000, roughly half of which lives in rural areas; two in five were pre-colonial indigenous settlements;

[20]Only 2% of the time (approximately 20 races) did female candidates run under left-wing parties or coalitions.

Table 1: Descriptive Statistics of main variables (Sample: Electoral races where a woman won or came second)

	Mean	Std. Dev	Median	Min	Max
Panel A: Violence outcomes					
Average yearly # of ... per 100,000 inhabitants during government period					
Attacks					
Guerrilla	2.0	6.1	0	0	71
Paramilitary	1.1	4.1	0	0	65
Actions					
Army	1.6	6.8	0	0	119
Police	0.6	2.3	0	0	38
Clashes involving					
Guerrilla	1.4	6.0	0	0	94
Paramilitary	0.1	0.8	0	0	13
Army	1.3	5.7	0	0	94
Police	0.2	1.2	0	0	19
Casualties					
Guerrilla	5.7	29.8	0	0	423
Paramilitary	2.9	17.0	0	0	407
Panel B: Electoral variables					
Vote share	0.481	0.120	0.487	0.0	1.0
% of victories	0.443				
Panel C: Female candidates characteristics					
% of female candidates that represent:					
Traditional parties	0.440				
Right-wing parties	0.128				
Left-wing parties	0.022				
Panel D: Other variables					
Total population	37019	217572	12434	976	6302881
Rurality Index	0.562	0.233	0.597	0.0	1.0
Distance to capital (km)	74.28	51.93	64.39	0	376
Transfers	750.35	865.13	625.99	0	11185
Functionaries investigated*	76.2	651	21.00	0	17813
Indigenous settlement (%)	0.412				
Current smuggling route (%)	0.267				
XIX century smuggling route (%)	0.043				

Notes: 1,045 observations in all panels. Vote share in panel B is the female candidate's share of the votes cast for the top two candidates. Traditional parties in panel C are the Liberal and Conservative parties. Ideology in panel C is drawn from Fergusson et al. (2019). In panel D, the rurality index is the ratio of rural to total population; distance to capital is the straight-line distance to the state capital; transfers correspond to non-automatic transfers from the central government; officials investigated is the number of civil servants prosecuted by the Attorney General's office on corruption-related charges; indigenous settlement is an indicator for whether the municipality was a pre-colonial settlement; smuggling routes are indicators for whether the municipality is crossed by each route type. * Only 786 observations available.

one in four is crossed by an illicit smuggling route; and the average distance to the state capital is 75 kilometres. Local officials in these municipalities are subject to 76 ongoing corruption investigations on average.[21]

4 Main results: female leadership and violence

4.1 Municipal mayors - RDD results

To evaluate the effect of female leadership on conflict violence, I begin by estimating Equation (1) using as outcomes various measures of conflict violence. These results are presented in Table 2. In particular, I use the yearly average number of one-sided attacks per 100,000 inhabitants and per electoral cycle as the dependent variable in columns 1-6, an indicator of experiencing any attack in column 7, and an indicator of civilian casualties in column 8. Columns 2-4 include different sets of controls and fixed effects, while column 5 allows for a second-degree polynomial of the vote share at both sides of the discontinuity, and column 6 does not impose any restriction on the polynomial degree on either side. Panel A uses guerrilla attacks as outcomes, while panel B focuses on paramilitary attacks. In all panels and regressions I follow Calonico et al. (2019) and present in my baseline specification the bias-corrected and robust optimal bandwidth. Figure 5 shows the graphical representation of the result in column 4 of panel A (after standardization).

Across columns and panels, the first pattern to highlight is the robust negative effect of the (narrow) victory of a female candidate for mayor on the (normalized) number of guerrilla attacks. In the baseline specification (column 4), the decline in violence amounts to 66% of the average conflict incidence or, put another way, 1.3 attacks less per year and 100,000 inhabitants. This stands in contrast to the null-effect on paramilitary violence, which is consistently smaller in magnitude (ranges between one-fourth and two-thirds of the effect on guerrilla violence) and non-statistically different from zero across columns (I come back to this in Section 6).

Previous research on the Colombian conflict has found connections between certain municipal characteristics like inequality or historical state presence and violence. To ensure that the result found in column 1 is not masking the correlation between one of these characteristics and conflict violence, I expand the model defined in Equation (1) by including different sets of control variables in columns 2-4. In particular, column 2 introduces economic development and government revenue measures from 1993

[21] All of these characteristics correlate with conflict intensity in Colombia and are included as controls in the main estimations.

Table 2: Effect of female electoral success on conflict violence - Baseline results

Dependent variable is:	Yearly average # of attacks per 100,000 inhabitants						Attacks indicator	Casualties indicator
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Guerrilla Violence								
Female mayor	-1.200**	-1.426**	-1.308**	-1.306**	-1.768**	-1.306**	-0.149*	-0.141*
	(0.571)	(0.614)	(0.564)	(0.602)	(0.731)	(0.602)	(0.077)	(0.073)
Observations	1045	1045	946	1045	1045	1045	1045	1045
Mean of dep. var	1.979	1.979	1.979	1.979	1.979	1.979	0.243	0.224
Panel B: Paramilitary Violence								
Female mayor	-0.267	-0.271	-0.384	-0.105	-0.234	-0.105	0.129	0.059
	(0.705)	(0.736)	(0.731)	(0.687)	(0.707)	(0.687)	(0.161)	(0.162)
Observations	1045	1045	946	1045	1045	1045	1045	1045
Mean of dep. var	1.069	1.069	1.069	1.069	1.069	1.069	0.200	0.185
Controls:								
Development	X	✓	✓	✓	✓	✓	✓	✓
Historical	X	X	✓	✓	✓	✓	✓	✓
Year Fixed Effects	X	X	X	✓	✓	✓	✓	✓
Degree of polynomial	1	1	1	1	2	Flex	1	1

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Observation is the municipality per electoral period. Optimal Calonico et al. (2019) robust bandwidth and bias-corrected estimators used in all regressions. Each coefficient reports a different regression. Running variable is the share of votes out of the two highest votings for female candidate. Panel A only includes conflict events perpetrated by the guerrillas. Panel B only includes conflict events committed by paramilitary groups. Development controls are: population, % of rural population, GINI, poverty index and urbanization index all measured in 1993; tax income, central government transfers and municipal expenditure, all measured in 1996. Historical controls are: # of public and municipal employees, # of police stations and % of paved roads, all drawn from Acemoglu et al. (2015) and measured in 1995; indicators of indigenous settlement, European settlement during the colonies, historical land conflict and historical violence. All control variables are further defined in appendix Table B1. Descriptive statistics included in Table 1. "Flex" polynomial stands for flexible (different) polynomials on both sides of the discontinuity. Dependent variables in columns 7 and 8 are indicators of whether municipality experienced any attack or conflict related civilian casualty respectively.

and 1996 respectively (the closest pre-sample points in time available in each case). Column 3 further includes historical indicators of state presence. Finally, column 4 adds year fixed effects.[22] The results across the four columns show that the baseline effect remains stable in terms significance and magnitude (around 60% of the average conflict incidence) after including these controls. These findings provide additional evidence against the presence of an unaccounted-for municipal characteristic that could confound the baseline effect.

Columns 7 and 8 explore alternative measures of conflict victimization, yielding similar results. Column 7 explores the extensive margin of the effect and shows that the election of a female candidate reduces the probability of enduring a guerrilla attack during the electoral cycle by 80%, compared to the average likelihood of an attack. Likewise, Column 8 uses as dependent variable the probability of civilian casualties in guerrilla attacks in the municipality during the electoral cycle. There, I observe an 84% reduction in this probability following the election of a female mayor. Overall, these two columns show that the effect found on the normalized number of attacks is not spuriously determined by the conflict metric used, but rather that it represents a broader trend in conflict victimization.[23]

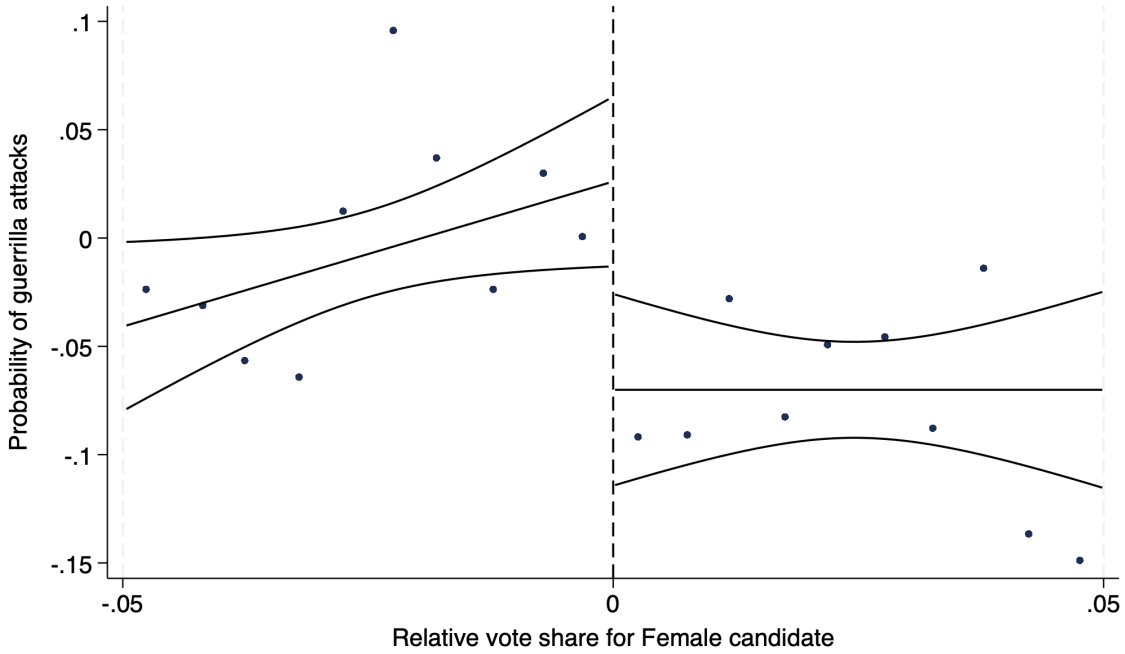
Table 2 also shows stark differences in both the magnitude and significance of the effect of female leadership on guerrilla and paramilitary violence across specifications. This pattern indicates that female leadership is not simply capturing broader local violence trends and does not represent a general solution to violence. Rather, the results suggest that the observed decline in violence is driven by a response to female leadership that is specific to guerrilla groups.

As a way of benchmarking the magnitude of the effects documented in this subsection, Miguel, Satyanath, and Sergenti (2004) find that a negative economic shock of five percentage points to GDP (10 times the yearly average economic growth in their sample) doubles the likelihood of conflict. In my most comparable specification in column 7, where the outcomes are defined more closely, I find that the victory of a female mayoral candidate reduces the likelihood of conflict by 80%, which is in the same order of magnitude as the authors' findings. Overall, the results in Table 2 show that female electoral success had a negative effect on conflict incidence in Colombian

[22] All control variables vary smoothly around the threshold, as discussed in the following section (Table 5). The controls included in each column are detailed in the footnote of Table 2. See Appendix Table B1 for variable sources.

[23] A source of concern regarding the measurement of violent attacks is the possibility that they mostly consist of anti-personnel mines explosions. Given that this type of weapon remain active for long periods of time, this would imply that the reduction in attacks is only capturing a reduction in the number of mines *activated* and not a reduction in the number of those *planted*. Appendix table B3 estimates the effect on the number of anti-personnel mines, with null results. The baseline results are identical when controlling for the number of mine-related events in the municipality.

Figure 5: Baseline effects



Notes: Baseline effects. Non-biased corrected estimators and robust standard errors. Optimal Calonico et al. (2019) bandwidth at each side of the discontinuity. Dependent variable is the average residualized number of guerrilla attacks per year and 100,000 inhabitants.

municipalities.

4.2 Female leadership in the guerrilla

I next examine the relationship between the presence of female guerrilla commanders and conflict violence. This analysis serves two purposes. First, it assesses whether the effects documented in Table 2 extend beyond local mayors, providing a test of the external validity of the previous results. Second, by studying a distinct form of female leadership, it helps rule out the possibility that the earlier findings are driven solely by unobserved characteristics of politicians, since such an explanation would not predict any systematic relationship between female guerrilla leadership and violence.

Before turning to the estimation of equation (2), I first define how I measure the presence of female commanders ($FC_{i,t}$). Given the structure of the data on the FARC described in Section 2, it is not possible to precisely track the presence of each unit (and its line of command) in every municipality and year. I therefore construct $FC_{i,t}$ using two complementary definitions, which I label "stability" and "visibility." Under the "stability" definition, a municipality is classified as being under the influence of a female-led FARC unit if the unit that operated in the area had a female leader at

any point during the sample period.[24] This definition is expected to bias the estimates downward. Under the more restrictive "visibility" definition, a municipality is considered to be under the influence of a female-led unit only in the year in which the activity of a female leader is directly observed. For the same municipality and unit, any other year with observed activity is classified as male-led, and years without observed activity are assumed to have no FARC presence.[25] This second definition allows for within-municipality comparisons between male- and female-led units over the sample period.

I use these definitions to examine the relationship between female guerrilla leadership and violence in Table 3. Specifically, I estimate equation (2) using the number of guerrilla attacks per 100,000 inhabitants per year as the dependent variable, and I vary both the guerrilla unit of analysis and the definition of $FC_{i,t}$ across columns. Because female commanders are not randomly assigned to guerrilla units, the coefficients should be interpreted as descriptive correlations rather than causal effects. Columns 1 and 2 focus on FARC blocks, whereas columns 3 and 4 focus on fronts. Columns 1 and 3 use the "stability" definition, while columns 2 and 4 use the "visibility" definition. All regressions include year and state fixed effects, with standard errors clustered at the commander–year level. The results show that municipalities under the jurisdiction of a female-led FARC unit experience fewer guerrilla attacks, regardless of the definition or type of unit considered, although the estimates in column 1 are less precise. In terms of magnitude, female-led units are associated with a reduction of between 1.2 and 1.4 attacks per year per 100,000 inhabitants, corresponding to roughly 50–60% of the average incidence of violence in the sample. This magnitude is comparable to the effect of the narrow election of a female mayor on conflict violence documented above.

4.3 Interaction between female leaders

The results in the previous two subsections suggest that complementarities between female leaders may amplify the impact on conflict violence, a prediction also supported by existing evidence in related fields. For instance, research in linguistics has shown that women employ different, less confrontational communication strategies when interacting with each other compared to those they use with men (Tannen, 1994).[26] Similarly, while the economics literature has rarely examined interactions between women in informal settings (Anderson, 2022), laboratory evidence suggests that

[24] This approach is particularly appropriate for blocks, which are larger units with relatively stable areas of operation and command structures over time, and is more restrictive when applied to fronts.

[25] Figure A5 illustrates changes over time in the fronts operating in the central Andean region between 2002 and 2010.

[26] For a comprehensive review of the related literature, see Cameron (1998).

Table 3: Female guerrilla leadership and conflict

Dep. var: yearly avg. # of guerrilla attacks (per 100,000 inhabitants)				
	(1)	(2)	(3)	(4)
	FARC structure with female influence			
	Block		Front	
Female FARC commander	-0.149	-1.405**	-1.319**	-1.205**
	(0.360)	(0.622)	(0.598)	(0.404)
Observations	6007	2175	2175	1023
Mean of dep. var			2.195	
FARC variation:	Stability	Visibility	Stability	Visibility

Notes: Standard errors clustered at the commander-year in parentheses. *** p<0.01, ** p<0.05, * p<0.1. OLS estimations using municipalities × year as observation in all columns. All regressions include year and region fixed effects. Columns 1 and 3 only use the cross-sectional variation in the presence of FARC structures (i.e., holds the presence of a Block/Front constant over time). Columns 2 and 4 use the time-series variation (i.e., allows the presence of a Block/Front to vary over time). Columns 1 and 2 use blocks as FARC structures, columns 3 and 4 use fronts. FARC structures as defined by (*Verdad Abierta*, 2021) and (Medina-Gallego, 2011)

women perform cognitive tasks better when teamed up with other women (Gneezy, Niederle, & Rustichini, 2003). Thus, studying female leaders in the Colombian guerrillas contributes valuable evidence on gendered interactions in informal—i.e., non-sanctioned—settings, and deepens our understanding of female leadership on conflict violence.

I test these ideas in two different ways in Table 4. In columns 1 through 4, I estimate the RDD model defined in Equation (1), dividing the sample of contested races between municipalities where the local guerrilla unit was female-led (columns 1 and 3) and those where it was not (columns 2 and 4). Columns 1 and 2 use blocks as the FARC unit of interest, while columns 3 and 4 use fronts. For all columns, I use the "stability" definition of presence, and leave the corresponding regressions using the alternative assumption for the Appendix Table B2. The results across these columns reveal that the effect of female (political) leadership on violence is both larger in magnitude and more statistically significant when considering municipalities under the influence of female-led guerrilla units. In columns 5 and 6, I estimate Equation (2), adding an indicator of whether the mayor is a woman and an interaction between this variable and the indicator for a female guerrilla commander. The results align with those in the previous columns, once again showing a negative and significative correlation between the interaction term and the number of guerrilla attacks.

Taken together, the results presented in Table 4 are both remarkable and straightforward: violence decreased more in municipalities under the influence of a guerrilla unit with a high-ranking female commander, regardless of the exact definition of unit

Table 4: Complementarities in the interaction between female leaders

Dep. var: number of one-sided guerrilla attacks	(per 100,000 inhabitants and electoral cycle)					
	(1)	(2)	(3)	(4)	(5)	(6)
Estimation:	RD - split sample by gender of commander				OLS - yearly sample	
Gender of commander:	Female	Non female	Female	Non female		
Female mayor	-8.216**	1.571	-5.967*	-0.652		
	(3.884)	(3.763)	(3.056)	(6.356)		
Female commander × female mayor					-0.087**	-0.164*
					(0.003)	(0.013)
FARC unit:	Block	Block	Front	Front	Block	Front
Year Fixed effects:	✓	✓	✓	✓	✓	✓
Municipality Fixed effects:	X	X	X	X	✓	✓
Observations	115	123	67	80	6826	3301
Mean of dep. var	3.819	4.048	2.562	4.526	0.430	

Notes: Robust standard errors clustered at the commander level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Columns 1-4 correspond to RD regressions with the baseline sample split according to the gender of the FARC commander in the municipality. Columns 1 and 3 use municipalities where the guerrilla commander was a woman. In columns 1-4: linear local polynomials and optimal Calonico et al. (2019) robust and bias-corrected estimators and bandwidths; running variable is the share of votes out of the two highest votings for female candidate. Yearly two-way fixed effects regressions in columns 5 and 6. Columns 5 and 6 control for (time varying) population. Columns 1, 2 and 5 use blocks as FARC structures, columns 3, 4 and 6 use fronts. FARC structures as defined by (*Verdad Abierta*, 2021) and (Medina-Gallego, 2011). All regressions use the "visibility" definition for FARC presence.

or female leadership. They show that the interactions between female leaders created complementarities that contributed to a further decline in violence, ranging from 100% to 240% of the sample average. Although these results are somewhat imprecisely measured, they suggest that the combined effect of female leaders on both sides contributed to a de-escalation of conflict that exceeded the impact of each leader individually.

5 Validation of the empirical design and robustness analysis

The validity of the findings in Section 4 rests on several assumptions regarding the data and the estimation choices. This section evaluates whether the key identification assumptions of the RDD hold in this setting and examines the sensitivity of the results to alternative samples, variable definitions, and model specifications. Overall, the analysis shows that the estimated effects are robust and consistent with a causal interpretation of the relationship between female leadership and conflict violence.

5.1 Balance on observable characteristics

A key concern for the regression discontinuity design is the possibility that the victory of a female candidate is correlated with unobserved municipal characteristics that both favor women in close elections and independently affect conflict. To address this concern, I estimate equation (1) using a wide set of observable municipal characteristics—both time-invariant and time-varying—as outcomes. As shown in Table 5, I find no significant relationship between having a female mayor and any of these characteristics beyond a marginally significative uptick in baseline poverty.[27]

Panel A presents balance tests for time-varying fiscal and administrative characteristics, including municipal income, expenditures, payroll costs, voter turnout, council size, and partisan concentration. Panel B examines time-invariant geographic and historical characteristics, such as area, altitude, ruggedness, soil quality, colonial settlement patterns, early land conflict, and the presence of latifundia in 1960. Panel C focuses on pre-period time-varying characteristics, including population size, inequality, poverty, rurality, tax revenue, and central government credit.

Overall, municipalities where a female candidate narrowly won or lost are highly comparable along observable dimensions, supporting the validity of the research design and the causal interpretation of the effect of female mayoral leadership on conflict incidence.

5.2 Politician characteristic RD

A related concern, formalized by (Marshall, 2024), is that the gender of a politician may be correlated with unobserved personal traits. When gender is used as the source of discontinuity, the estimated effect may therefore reflect the influence of such characteristics rather than gender per se.

Although Colombian electoral data are limited in terms of observable politician attributes, I am able to measure four key characteristics that the literature has shown to vary systematically by gender: ideology, elite status, experience, and age.[28] I use these characteristics in two exercises. First, I treat each of them as an outcome and

[27] All regressions use the optimal bandwidth from the baseline specification (Table 2, column 4). Appendix Table B4 reports results using regression-specific optimal bandwidths, which are identical in terms of statistical significance and magnitude.

[28] These four characteristics have been shown to vary systematically by gender in prior work. (Edlund & Pande, 2002) document that female politicians in the U.S. hold more left-wing ideologies; (Aviel, 1981) show that women in Colombia were less likely to belong to traditional elites; (Daniele, Dipoppa, & Pulejo, 2023) show that exposure to violence shapes the career paths and choices of politicians; and (Cutler & Kaufman, 1975) document that ideology evolves over the life cycle.

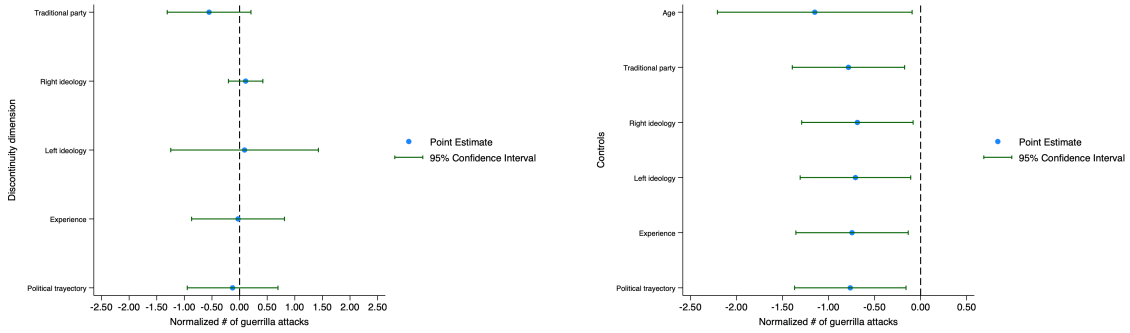
Table 5: Balance on observable characteristics
Optimal Bandwidth

	Mean	Point estimate	Std. Error	p-value
Panel A: Time varying characteristics:				
Total income	8.98	-.0025	.187	.989
Total expenditure	9.05	.0157	.198	.937
Payroll expenses	1636	1104	958	.249
Per capita turnout	.446	-.0142	.0233	.541
Council HHi - votes	.281	.0123	.0231	.594
Council HHi - seats	.32	-.00309	.0274	.91
Panel B: Time invariant characteristics:				
Area (km^2)	749	-473	398	.235
Altitude (masl)	1074	76.4	168	.649
Soil suitability index	2.81	.337	.388	.386
Flatness index	7.65	-.802	1.12	.473
Distance to state capital (km)	74.3	-4.23	10	.673
Distance to Bogotá (km)	315	4.54	41.2	.912
(log) distance to state capital (km)	4.13	-.132	.135	.326
(log) distance to Bogotá (km)	5.52	.052	.157	.741
Historical land conflict	.0565	-.0463	.0533	.384
(log) Cadastral value (1960)	9.55	-.276	.25	.27
(log) Latifundia (1960)	.543	.134	.244	.582
Historical land conflict	.0565	-.0463	.0533	.384
Indigenous settlement	.412	-.0378	.102	.71
Spanish occupation	.385	.0213	.091	.815
XIX century smuggling route	.0431	.0532	.0423	.209
Current smuggling route	.267	-.0387	.08	.629
Panel C: Baseline:				
Population	32773	14450	18539	.436
Ethnic pop. > avg.	.284	.0054	.139	.969
Poverty index	.524	.0666	.0394	.091
Rurality index	.598	.0348	.0494	.481
GINI	.456	.00342	.00791	.665
Unmet Basic Needs index	49.4	1.33	4.92	.786
Total income	5170	5065	5213	.331
Tax revenues	1618	2357	2575	.36
Total expenditure	5710	6690	7784	.39
Government Credit	271	-56.9	135	.674

Notes: all regressions use the optimal (Calonico et al., 2019) bandwidth used in the baseline model (Table 2, column 4). Column 1 shows the sample mean for each variable, Column 2 the (bias-corrected) effect of having a female mayor on each variable. Column 3 shows the robust standard errors. Column 4 shows the p-values of the test $coeff = 0$. Total income, expenditure and payroll expenses, tax revenue and government credit measured all in millions of Colombian Pesos (COP). Council concentration measured through Herfindahl-Hirschman index computed for the election held simultaneously to the mayor election. Vote/seats concentration defined as the ratio between the number of votes/seats a party receives and the total number of votes/seats in the election. Historical land conflict, indigenous settlement and Spanish occupation are indicators of whenever a municipality experienced the relevant event. Population, rurality and poverty indexes and GINI coefficient measured in 1993. Financial variables in panel C measured in 1996.

re-estimate equation (1) to test whether any of these traits exhibit a discontinuity at the gender threshold. Second, I re-estimate the baseline model including each characteristic as an additional control. The results are presented in Figure 6. Panel A shows that none of these characteristics displays a discontinuous change at the cutoff. Panel B shows that the estimated effect of female leadership on violence remains stable after introducing each control separately (joint inclusion is not feasible due to power limitations).

Figure 6: Politician characteristic RD



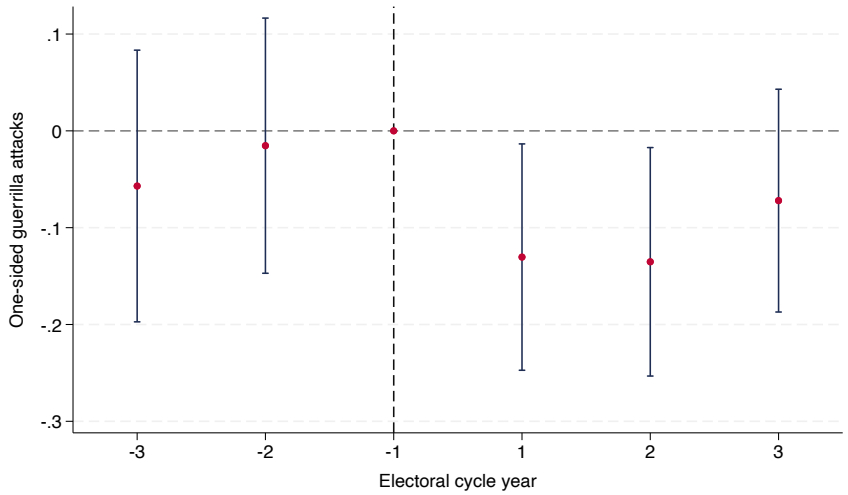
Notes: Each coefficient reports the estimated discontinuity at the zero margin of victory from separate regression discontinuity estimations, using each politician characteristic as the outcome. Panel A reports RD estimates for ideology, elite status, experience, and age. Panel B reports the estimated effect of female leadership on conflict violence after introducing each characteristic as an additional control. All specifications use the optimal bandwidth from the baseline RD, include the same set of fixed effects as the main specification, and report robust standard errors. Bars denote 95% confidence intervals.

5.3 Event Study

As a further robustness check, I estimate an event-study model that relies on weaker identifying assumptions than the regression discontinuity design. To do so, I re-estimate equation (2), replacing the $FC_{i,t}$ indicator with an indicator for a female mayor, $F_{i,t}$. I present the results of this alternative empirical strategy in two complementary ways. In Figure 7, I follow a dynamic event-study approach in which a municipality is considered treated from the moment a female mayor assumes office until she leaves it. These specifications include municipality and year fixed effects (two-way fixed effects) and control for the partisan affiliation of the top two contenders in the election. The estimates show no evidence of differential pre-trends prior to treatment, supporting the validity of the parallel trends assumption. The decline in violence emerges shortly after a female mayor takes office and persists throughout her tenure.

Appendix Table B5 presents the corresponding differences-in-differences estimates using various measures of conflict and alternative sets of controls. In these specifications, $F_{i,t}$ equals one during the tenure of a female mayor and zero otherwise. Overall, the

Figure 7: Female mayors' effect on conflict violence - Event study



Notes: Point estimate and 95% confidence intervals. Each coefficient shows the effect of female leadership on the number of one-sided guerrilla acts of violence. Period "-1" corresponds to the year when the elections are held (one year prior the event). All regressions include municipality and year fixed effects, and control for the partisan affiliation of the top two contenders in the race.

results in Figure 7 and Table B5 indicate that the negative effect of female political leadership on conflict violence documented in the previous section is not an artifact of the identification strategy, as it persists across empirical approaches.

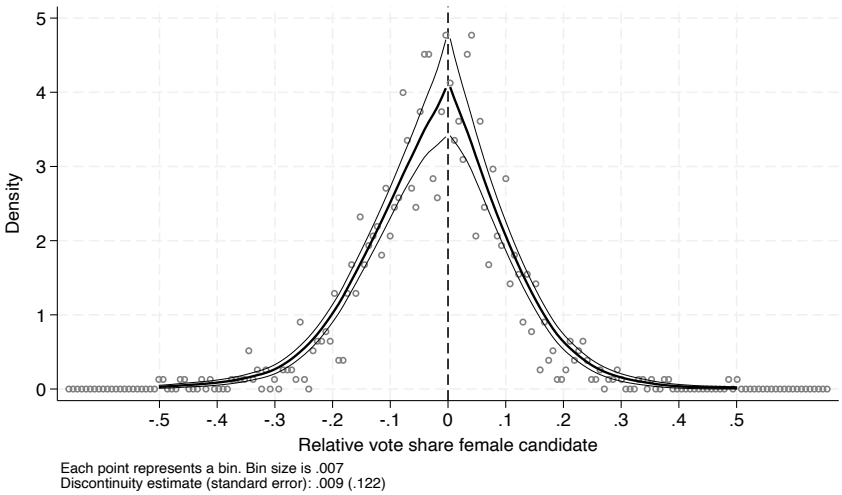
5.4 Additional RD assumptions

To further support the argument above, I look for evidence of manipulation of the electoral results in the sample of races under consideration. If candidates somehow anticipated that elections were going to be closely contested, they could have had incentives to influence the outcomes through means like fraud or vote buying to secure their victory. This, in turn, would undermine the assumption that election outcomes were "as good as random" when the margin of victory for the elected candidate was narrow.

Following (McCrary, 2008), I show the distribution of the running variable across the sample in Figure 8. As observed, there are no discontinuities around the threshold, which indicates that the candidates were not able to anticipate the outcome of these narrow elections beforehand. Taken together, these two exercises show that there are no confounding variables that can explain the victory of female candidates.

A recent discussion in the literature has pointed out that using close elections as quasi-random experiments is problematic in certain contexts where democracy may not be as robust as traditionally assumed (Eggers, Fowler, Hainmueller, Hall, & Snyder Jr,

Figure 8: McCrary test for sorting around the threshold

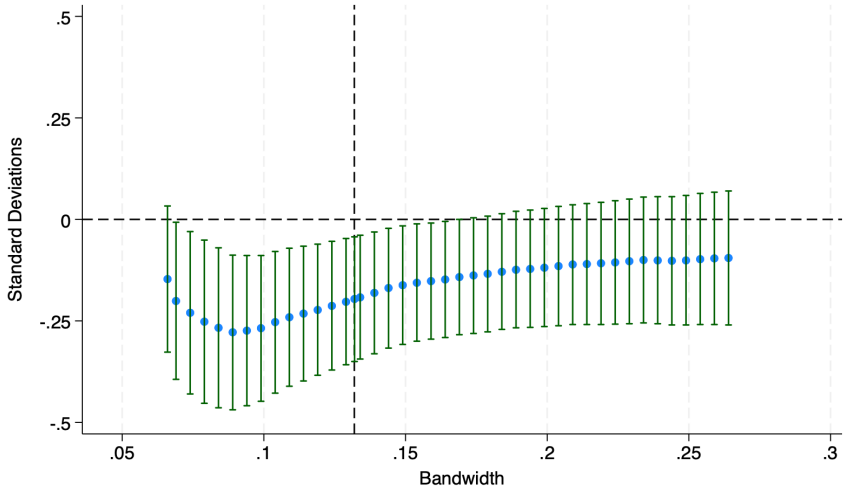


2015). Importantly, the validity of a close election hinges on the assumption that no actor, whether political or armed, can manipulate the outcome to favor their preferred choice.[29] To address this concern, I estimate the model defined by Equation (1) using as outcome the number of attacks carried out by each armed actor in the year immediately preceding the elections. The results of this placebo exercise are presented in Appendix Table B7. Overall, there is no statistically significant relationship between the margin of victory and the number of attacks carried out by either the guerrillas or the paramilitaries in the year preceding the election. In the same spirit, Appendix figure A6 shows the results of the estimation of Equation (1) using alternative cutoffs on the running variable as placebo exercises. The results, once more, show no effect at these alternative cutoff points. Taken together, these exercises suggest that the results in Table 2 are not driven by the behavior of the armed actors in the period leading up to the election or by spurious data patterns.

I further demonstrate the validity of the RD design by considering the possibility that political actors manipulate the result of local elections. In such a case, then both the drop in violence and the "closeness" of the election would be capturing the same underlying phenomenon. Namely, the capture of the municipalities' political institutions by an interest group. Although it is not directly observable, it is possible to approximate this "capture" using the results of local legislative elections. In essence, the argument is that political actors who aim to benefit from influencing the outcome of mayoral elections would have the same incentives to manipulate the results of local legislative elections. Political parties would only be able to accurately predict

[29]There is no consensus in the literature as of what a "strong democracy" is. I follow (Barber, 2003) and assume that a strong democracy, in terms of elections, is one where they are not influenced or controlled by any type of actor (i.e., "fair").

Figure 9: Robustness to different bandwidths



Notes: Point estimate and 95% confidence intervals for different bandwidths, ranging from half the optimal (Calonico et al., 2019) up to double its value. Robust standard errors and optimal biased-corrected estimators in all regressions. Standardized effects. Linear local polynomials on both sides of the discontinuity.

and influence the result of a mayoral election whenever they have a strong signal of their electoral strength such as the results of the elections for local legislative. Thus, although imperfectly, the results of City Council elections serve as proxies for the manipulation of the mayoral election results. To test for this possibility, I use data on the political affiliation of Council members in each municipality between 1992 and 2015 to measure the extent of electoral competition in each municipality. Panel A of Table 5 shows that there is no statistical difference in the extent of partisan concentration in Councils between municipalities with and without a female mayor, defined as a Herfindahl-Hirschman concentration index of the number of votes or seats received by a party.

5.5 Robustness

This subsection demonstrates the robustness of the baseline results presented in Section 4. I begin by examining the sensitivity of the regression discontinuity estimate (i.e., Table 2, column 4) to the choice of bandwidth. Figure 9 plots the (standardized) estimated effect and corresponding confidence intervals for various bandwidths, ranging from half to double the optimal one. The figure shows that the effects remain robust to the choice of bandwidth (in a close vicinity), and only losing significance and precision when using considerably small values.

Next, I shift my focus to the definition of the dependent variable. In the previous section, I used the yearly average number of attacks per 100,000 in habitants during

an electoral cycle as the dependent variable, an assumption that I relax in Table 6. Column 1 of uses the inverse hyperbolic sine transformation of the dependent variable, resulting in minimal changes (if any, the estimated effect is even more substantial, representing a 75% reduction from the sample average). Columns 2 and 3 delve deeper into this point by using the number of attacks and the number of attacks per 100,000 inhabitants as the dependent variables, respectively. Once again, the effect remains consistently negative and statistically significant across all columns, with comparable magnitudes.

The baseline RDD specification encompasses all elections and violent events from 1997 (marking the earliest fully recorded election) to 2016 (the year of the FARC's demobilization). However, it's important to note that peace negotiations between the government and the FARC had already commenced in 2014. To show that the main effect observed in Table 2 is not driven by the period during which peace talks were underway, I extend and restrict the sample period in columns 4 and 5 of Table 6, considering years up to and including 2018 and 2014, respectively. In both cases, the effect's magnitude remains stable, although it loses some statistical significance. Finally, to mitigate the potential impact of exceptionally violent municipalities, I exclude the top 5% most violent municipalities from the sample in column 6. As before, this does not yield significant changes in terms of effect magnitude or significance.

Table 6: Robustness of baseline results

Dependent variable is the # of guerrilla attacks measured as:						
	IHS	Count	Per 100,000	Until 2018	Until 2014	Outliers
	(1)	(2)	(3)	(4)	(5)	(6)
Female mayor	-0.340**	-0.728*	-3.032*	-0.706*	-0.680*	-0.817*
	(0.148)	(0.393)	(1.688)	(0.416)	(0.395)	(0.452)
Observations	1045	1045	1045	1045	1045	993
Mean of dep. var	0.424	1.108	6.251	1.157	1.073	0.794

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Observation is the municipality per electoral period. Optimal Calonico et al. (2019) robust bandwidth and bias-corrected estimators used in all regressions. Each coefficient reports a different regression. Running variable is the share of votes out of the two highest votings for female candidate. Column 1 uses the inverse hyperbolic sine transformation of the number of guerrilla attacks as the dependent variable. Column 2 uses the raw count of attacks as dependent variable. Column 3 uses the # of attacks per 100,000 inhabitants (not normalized by # of years). Column 4 extends the sample period up to 2018. Column 5 reduces the sample size up to 2014. Column 6 drops the top 5% most violent municipalities in the sample.

Finally, I test the robustness of the results to the inclusion of fixed effects at different levels of geographical variation. Table B8 shows how the results hold even when including region or state fixed effects (columns 1, 2, 4, and 5), and when including FARC-block fixed effects (columns 3 and 6). The results are consistent with the baseline specification, showing a negative and significant drop in the number of guerrilla

attacks, and a null effect on paramilitary violence.

6 Mechanism: collective action and preferences

Having established that female leaders in Colombia causally reduce conflict-related violence, this section studies the mechanisms underlying this effect. I begin by documenting that female mayors actively signal a willingness to de-escalate violence to armed actors. These signals elicit a strategic response from guerrilla groups, which subsequently reduce their levels of violent activity. I further show that these initiatives are part of a broader effort by female mayors to build and sustain local peace coalitions, which also manifests in greater success at fostering peaceful cohabitation within their municipalities.

This pattern of de-escalation is mirrored on the side of armed groups: female guerrilla commanders respond to government crackdowns with significantly lower levels of retaliatory violence. Taken together, these results indicate that the observed decline in violence under female leadership reflects a mutually reinforced process of de-escalation driven by both female mayors and female commanders.

I then turn to the preferences underlying this behavior. Using a novel dataset of campaign manifestos, I document systematic gender differences in how armed conflict is framed in candidates' electoral campaigns, consistent with stronger preferences for peace among female candidates. Survey data on trust, civic participation, and use of local conflict resolution institutions point in the same direction. I formalize the strategic interaction in a simple bargaining model with gender-specific commitment credibility, and test its two distinctive predictions in the data. A final subsection rules out leading alternatives.

6.1 De-escalation behavior

This subsection documents how female mayors invest in peace-oriented actions and how these efforts elicit strategic responses from guerrilla groups in the form of reduced violence. Female mayors undertake visible initiatives that communicate a credible commitment to cooperation and alter the strategic calculus of armed actors operating in their municipalities. A parallel pattern emerges within guerrilla ranks: female commanders display greater restraint following government operations. Columns (1)-(3) of Table 7 present the evidence.

I begin by documenting gender differences in the creation of peace-oriented initiatives

by municipal governments. I draw on data from the Colombian NGO CINEP (Centro de Investigación y Educación Popular, 2026), which systematically collects information on collective events reported in local news outlets and classifies those explicitly aimed at peace-building. These initiatives range from short-run actions, such as rallies and seminars, to longer-term efforts, including the creation of local marketplaces and community productive associations.[30] Importantly, CINEP records the individual, group, or institution responsible for organizing each event. I use the number of peace initiatives organized by the mayor in a given municipality as the outcome variable in column (1) of Table 7. The estimates show that female mayors are significantly more likely than male mayors to organize such initiatives.

Guerrillas' response A central feature of Colombian guerrillas' objective function, well documented in the literature, is that violence was never pursued solely for profit (Cook, 2011). While armed groups relied on extortion and other illicit activities to finance their operations, their broader goal was to reshape local political order and mobilize support among the rural population (Lehoczki & Ayala Castiblanco, 2024). As a result, guerrilla violence was constrained by concerns about legitimacy and popular backing, particularly among peasants whom these groups explicitly viewed as a core constituency. Peace-oriented initiatives can therefore affect guerrillas' strategic environment by raising the political and social costs of violence against civilians. Appendix Section E provides documentary evidence from guerrilla statements and correlational evidence linking violence to local inequality and rural conditions, reinforcing the view that armed groups internalized these constraints when choosing their level of violence.

Columns (2) and (3) in Table 7 test whether guerrilla violence responds to signals of peace. Column (2) relates guerrilla attacks in period t to the occurrence of peace initiatives in $t-1$, showing that municipalities that organized peace initiatives experience fewer guerrilla attacks in the subsequent year. The lagged structure mitigates concerns that peace initiatives merely proxy for contemporaneous violence trends and is consistent with an interpretation in which guerrilla groups adjust their behavior in response to visible efforts toward non-violent coexistence.

Column (3) extends this logic to the behavior of guerrilla leadership itself. It examines guerrilla attacks in period t as a function of army attacks in $t-1$, allowing the response to vary by the gender of the local guerrilla commander. While army operations are, on average, followed by increased guerrilla violence, this response is significantly attenuated when the local commander is female. Female commanders are thus less likely to escalate violence following state attacks.

[30] While heterogeneous in form, all initiatives share the explicit objective of de-escalating conflict or fostering peaceful relations.

Taken together, the evidence in this subsection points to de-escalation on both sides of the conflict. Female mayors invest in peace-oriented initiatives that signal a credible commitment to cooperation. Guerrilla groups respond strategically to these signals by reducing violence, particularly when legitimacy and civilian support are at stake. Female guerrilla commanders display greater restraint in responding to external shocks, further dampening cycles of retaliation. Violence declines not because female leaders concede resources or authority, but because they reshape expectations and incentives in ways that make cooperation sustainable.

Table 7: Mechanisms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable is:	Peace initiatives	Guerrilla attacks per 100,000		Manifesto: peace	Manifesto: sports	Trust in mayor	Local conflict resolution
Female mayor	0.315*			2.792**	-0.074	0.080**	0.049*
	(0.178)			(1.182)	(0.745)	(0.034)	(0.026)
Peace initiatives in (t-1)		-0.020*					
		(0.002)					
Female commander			-0.005*				
			(0.001)				
Army actions in (t-1)			0.116***				
			(0.001)				
Army (t-1) × female commander			-0.053*				
			(0.001)				
Observations	4,349	168,696	91,584	1,114	1,114	4,519	2,952
Mean of dep. var	0.089	0.033	0.033	21.588	15.631	0.563	0.539

Notes: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors are clustered at the commander level in columns (2)-(3); at the municipality level in columns (4)-(5); and at the municipality × electoral-cycle level otherwise. All specifications are OLS with year fixed effects. Unit of observation: municipality-year in columns (1)-(3); elected mayor (program) in columns (4)-(5); individual respondent in columns (6)-(7). Manifesto regressions in columns (4)-(5) control for total program length and include state fixed effects. LAPOP regressions in columns (6)-(7) include municipality and year fixed effects and control for respondent gender and education. Dependent variables: (log) number of peace initiatives organized by the mayor (CINEP, column 1); guerrilla attacks per 100,000 inhabitants (columns 2-3); count of peace- and sports-related keywords identified by an AI tool (columns 4-5); indicators for above-median trust in the mayor and above-median use of local conflict-resolution mechanisms (columns 6-7). All outcomes defined in Appendix Table B1.

6.2 Stated and revealed preferences for de-escalation

This subsection examines the preferences underlying the de-escalation behavior documented above, drawing on two complementary sources. Stated preferences are recovered from a novel dataset of campaign manifestos. Revealed preferences are inferred from individual survey responses on trust in the mayor and use of local institutions for conflict resolution.

Stated preferences Elucidating the preferences of elected officials is inherently challenging, particularly when the individuals in question are no longer active in the public

sphere.[31] To address this limitation, I construct a novel dataset of campaign manifestos for Colombian mayors elected between 2003 and 2015. A campaign manifesto outlines a candidate's proposed government program and is intended to inform voters' electoral choices. While the Colombian electoral authority began encouraging candidates to submit these programs for archival in 2001, submission only became mandatory after 2015, so coverage during the sample period depends largely on private collection efforts. I therefore rely on the archives assembled by the Escuela Superior de Administración Pública (ESAP) and web-scrape all available documents. The final sample contains 1,162 distinct programs—approximately 20% of the universe of mayoral elections—of which about 10% correspond to female candidates, with roughly uniform coverage over time.

These documents vary widely in format and content, which prevents the direct application of standard machine-learning methods. To accommodate this lack of structure, I rely on two complementary unstructured text-mining approaches. The first applies a supervised classification procedure that assigns each term in the corpus to thematic categories. The second adopts a keyword-based approach in which predefined sets of terms are supplied to the algorithm, which then computes their relative frequency within each document. Appendix Section F describes both procedures in detail and the full set of results across thematic categories under both methods are reported in Appendix table B9. Figure F3 displays the most common words appearing in the programs of female and male candidates; consistent with both groups targeting the same electorate, there are no salient gender differences in the most frequently used terms, suggesting that any differences documented below reflect candidates' preferences rather than voters' demand.

Columns (4) and (5) of Table 7 report the headline results, using the keyword-based approach. Female candidates use significantly more peace-related language than their male counterparts (column 4), while showing no corresponding gender difference on a placebo category of sports-related terms (column 5). The pattern is robust to the supervised classification method, to additional thematic categories (violence and infrastructure), and to a sub-sample restricted to programs that explicitly mention armed conflict, all reported in Appendix Table B9.

These results mirror those found in the seminal work by Chattopadhyay and Duflo (2004) in suggesting that female politicians differ from their male counterparts in policy-relevant preferences. In the Colombian context, these differences emerge specifically on the dimension of violence and peace because public order was the most salient

[31] This challenge is especially acute when studying politicians who held office decades ago, since even when they can be reached, their preferences toward issues such as peace are likely to have evolved.

political issue during the sample period.[32] It therefore follows naturally that peace and security dominated both campaign discourse and subsequent policy agendas, and the gender gap in peace-oriented language is consistent with differences in preferences over conflict and cooperation.

Revealed preferences Stated preferences in manifestos capture what candidates say they value during the campaign. To examine whether these stated priorities translate into how citizens engage with their leaders and with their institutions, I turn to survey data from the Latin American Public Opinion Project (LAPOP, 2018), a nationally representative survey that has been conducted regularly in Colombia since 2001. While LAPOP is not representative at the municipal level, its sampling is balanced across regions and, importantly, is not systematically correlated with local conflict intensity or the presence of female mayors.

Columns (6) and (7) of Table 7 relate female mayoral leadership to two measures of revealed preference. Column (6) uses an indicator for above-median trust in the mayor, capturing the credibility of the local leader in the eyes of residents. Column (7) measures above-median reliance on local authorities for resolving disputes. Appendix Table **??** reports analogous estimates for additional outcomes, including interpersonal trust and participation in community organizations.

The estimates point to two complementary channels. Trust in the mayor rises by roughly 14 percent of the mean under female leadership, consistent with the credibility-of-commitment mechanism formalized in the next subsection. Reliance on local institutions for resolving disputes also increases, indicating that the effect extends beyond the citizen-government relationship to broader patterns of community coordination and dispute resolution through non-violent channels.

Taken together, the manifesto evidence on stated preferences and the survey evidence on revealed preferences point to systematic gender differences in how leaders and constituencies orient toward conflict and de-escalation. The next subsection formalizes these patterns in a bargaining model with gender-specific commitment credibility.

6.3 Model

In this subsection, I sketch a simple theoretical framework to formalize the preference-based mechanisms documented above. Two local leaders negotiate over the allocation

[32]By 2016, more than eight million individuals or about 16% of the populationhad been directly affected by the conflict; see Acero et al. (2022).

of a fixed surplus: a guerrilla commander who uses the threat of violence as an instrument to extract resources, and a mayor who can commit to de-escalate in exchange for peace, with the credibility of that commitment varying by gender. In equilibrium, the model predicts that female mayors will uphold their commitments and thus avoid violence more frequently, that complementarities will arise between female leaders, and that violence will still occur on the equilibrium path. More details and all formal derivations are deferred to Appendix Section G.

Each period, guerrillas choose an investment in violent capacity that is costly but increases their ability to extract resources, along with an extortion rate. Peasants receive a fixed surplus and decide whether to comply by paying the extortion or refuse: if they refuse, they face the full level of violence implied by guerrilla investment; if they comply, violence may still occur with some probability that depends on whether the mayor is able to uphold her commitment to de-escalation. At the beginning of the period, the two leaders bargain over the optimal level of violent investment, anticipating that this investment determines the extortion rate and that violence may still occur even following compliance. This negotiation follows a standard Nash bargaining structure.

The model's distinctive feature is that the gender of each leader shapes equilibrium outcomes. Pure contest models, in which leaders expend resources on fighting rather than committing to peace, lack a commitment dimension and cannot accommodate credibility-based de-escalation (Jackson & Morelli, 2011). Standard bargaining models without a gender wedge predict no role for leaders' gender in equilibrium. By admitting gender-specific parameters on both sides, the framework jointly accounts for equilibrium violence under female mayors and the female mayor $\times$ female commander complementarity documented in column (3) of Table 7. It also delivers two further predictions, which I take to the data in the next subsection.

6.4 Predictions

The model delivers two testable implications. First, guerrillas will invest in violence regardless of the mayor's gender whenever the relative cost of violence is sufficiently low. Consequently, female mayors should be less effective at reducing violence in areas where the marginal benefit of violence is high. To test this implication, I follow Dell (2015) and geocode smuggling routes across Colombia using information from two independent sources to minimize measurement error: reports by the national NGO Fundación Ideas para la Paz (FIP) and the international NGO International Crisis Group (ICG).[33] Appendix Figure G5 shows the distribution of these routes across the

[33]For more information on the FIP, see their website. The report used is (Cajiao, González, Pardo, & Zapata, 2018). For information on ICG, visit their website. The report used is (IGC, 2017).

country. A municipality is defined as being crossed by a smuggling route if it lies along either of the mapped paths. I then estimate the baseline RD separately for municipalities located along smuggling routes and those that are not.[34]

Table 8: Predictions from the model

Model:	RD (1)	RD (2)	OLS (3)	OLS (4)	RD (5)	RD (6)
Dependent variable is:	Guerrilla attacks - Drug route	Guerrilla attacks - No drug route	Extortion rate	Threats rate	Total public investment	Land redistribution
Female mayor	0.325	-1.392**	-0.467	-9.069	0.023	-0.001
	(0.964)	(0.650)	(0.318)	(8.652)	(0.248)	(0.052)
Observations	279	766	9,832	12,034	1,045	1,045
Mean of dep. var	2.387	1.830	2.906	121.090	-2.358	0.474

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Columns 1, 2, 5, 6, and 7 estimate the RD model defined in equation (1); columns 3 and 4 estimate the OLS regression defined in equation (2). Unit of observation is the municipality-electoral period in columns 1, 2, 5, 6, and 7, and the municipality-year in columns 3 and 4. All regressions include the set of controls used in the baseline specification and year fixed effects. RD models use the optimal Calonico et al. (2019) robust bandwidth and bias-corrected estimators. Columns 1 and 2 split the column 5 sample by smuggling route, following Dell (2015). Column 7 uses a reduced sample because private investment data are available only for part of the sample period. Dependent variables: guerrilla attacks per 100,000 inhabitants (columns 1-2); reported extortion and threats by armed groups per 100,000 (columns 3-4); average log per-capita total public investment over the electoral cycle (column 5); indicator for above-median land redistribution (column 6); log per-capita private investment (column 7). All outcomes further defined in Appendix Table B1.

The results, presented in columns 1 and 2 of Table 8, show that the reduction in violence is statistically significant only in municipalities that are not located along smuggling routes. In these municipalities, the decline ranges between 55 and 75 percent of the average level of guerrilla violence, whereas in municipalities along smuggling routes the estimates range between 9 and 12 percent and are not statistically significant. These findings confirm the model's prediction that guerrilla groups are less willing to de-escalate conflict when the relative cost of maintaining violent capacity is low.

Second, the model predicts that extortion should be unrelated to the mayor's gender, as the equilibrium share of resources transferred to guerrilla groups is determined by the guerrillas' capacity for violence rather than by the credibility of peace commitments. This implies that lower violence under female leadership should not be accompanied by gender differences in the extortion rate. To test this, I estimate equation (2) using the (normalized) number of reported cases of extortion and threats by armed groups as outcomes. Columns 3 and 4 of Table **??** show no statistically significant relationship between the gender of the mayor and these measures of extortion, consistent with the model's prediction. Because equilibrium extortion does not vary with the mayors' gender, the economic fundamentals faced by local actors and the municipal government

[34]As a robustness check, I also use the paths of nineteenth-century gold-smuggling routes as a source of heterogeneity, with identical results reported in the Appendix.

should remain unchanged as well regardless of the gender of the mayor.

Consistent with this prediction, I find no evidence that female mayors alter the local economic landscape. Using municipal accounts data from the National Planning Office (DNP) and the same RD specification as in the baseline, column (5) of Table 8 reports the effect on log per-capita total public investment over the electoral cycle. The estimate is small and statistically indistinguishable from zero. Column (6) examines land redistribution, an outcome over which mayors exercise direct authority through their responsibility for updating the land cadaster, a necessary first step for any reform. The estimate is again indistinguishable from zero. Appendix Table B10 reports analogous results for the disaggregated public investment categories (education, sanitation, housing) and for private investment, all consistent with the absence of a systematic effect on local economic conditions.[35]

These results support the model's central mechanism: gendered credibility in peace commitments shapes the scope for negotiated de-escalation without altering the underlying extortion or the economic conditions facing local actors. The evidence shows that the reduction in violence under female leadership reflects strategic restraint and a shift in the mode of conflict rather than a broader weakening of guerrilla activity. The next subsection discusses alternative explanations.

6.5 Ruling out alternative explanations

The decline in guerrilla violence following the election of a female mayor could, in principle, reflect mechanisms other than changes in local coordination and preferences for de-escalation. Two natural alternatives are political alignment between female leaders and armed groups, and differential responses by third parties such as the national government or other armed actors.

First, the reduction in violence might arise if female mayors were systematically more aligned with guerrillas' ideological objectives or represented a stronger break from traditional political elites. I examine this possibility by testing for heterogeneity in the baseline effect along multiple dimensions of ideology and partisanship, including party affiliation, traditional versus non-traditional political movements, and incumbency status. Across specifications, the decline in violence persists within ideological groups and does not differ systematically by partisan alignment, indicating that the main effect is not driven by ideological affinity or political outsider status. Detailed results are reported in Appendix Tables B12 and B13. The data show some evidence that the defeat of traditional political forces is associated with lower violence (columns

[35] Appendix Table B11 shows also no effect on the actual provision of each of these public goods.

3 and 4 of Table B12), but the gender effect remains when the sample is restricted to races where both candidates represented traditional parties (column 2 of Table B13).

Second, the observed effect could reflect differential responses by third parties rather than changes in guerrilla behavior. For example, the national government might increase military presence in female-led municipalities, or other armed groups might alter their activity in response to female electoral victories. I test these possibilities by examining army and police actions, paramilitary activity, and multiple measures of central government transfers and credit. I find no evidence that female mayors trigger differential responses along any of these margins. These results suggest that neither state intervention, the behavior of other armed actors, nor regional conflict dynamics explain the decline in guerrilla violence that follows the election of a female mayor (see Appendix Tables B14 and B15).

Taken together, these exercises show that the reduction in violence under female leadership is unlikely to be driven by political alignment or third-party intervention. Instead, they reinforce the interpretation that the effect operates through changes in local coordination and strategic interaction, consistent with the mechanisms documented above.

7 Conclusion

The role of female leadership in shaping events within an armed conflict has been a relatively overlooked topic in empirical economic studies. This paper addresses this gap by investigating the impact of female leadership in the context of the Colombian conflict from 1997 to 2016. Using data on closely contested mayoral elections between male and female candidates, as well as novel information on the locations and gender of guerrilla commanders, I find that female leadership on either side of the conflict is associated with a significant reduction in the incidence of violence. Additionally, I document the presence of complementarities in interactions between female leaders.

Underlying this reduction are gender gaps in preferences for de-escalation and in the credibility of peace commitments, formalized in a bargaining model with gender-specific parameters for both leaders. The reduction reflects strategic restraint rather than a weakening of guerrilla presence. The pattern is therefore neither universal nor narrowly Colombian: it depends on the institutional features of the armed actor on the other side of the bargain. For example, Paramilitary organizations, whose internal norms and gender composition differ sharply from those of guerrilla groups, did not respond similarly to female mayoral leadership.[36] These differences plausibly reduced

[36]See, among others, Salazar (2019) and Vega (2019).

the scope for non-violent engagement by female mayors when facing predominantly male paramilitary organizations.

Finally, the results offer a cautiously optimistic perspective on conflict resolution. While female leadership does not appear to transform local economic fundamentals in the short run, it leads to meaningful reductions in violence—a dimension of conflict that disproportionately affects the poorest and most vulnerable. Back-of-the-envelope calculations suggest that policies increasing women's representation in local political office could therefore generate large humanitarian gains. For instance, extrapolating the estimated effects to a setting such as India's local reservation system implies a reduction on the order of 250,000 deaths since 1993.

Taken together, the findings highlight how changes in representation can shape the dynamics of conflict, even in environments where violence has long been seen as entrenched.

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Appendix

A Figures

Figure A1: Key aspects of the relationship between conflict actors in Colombia

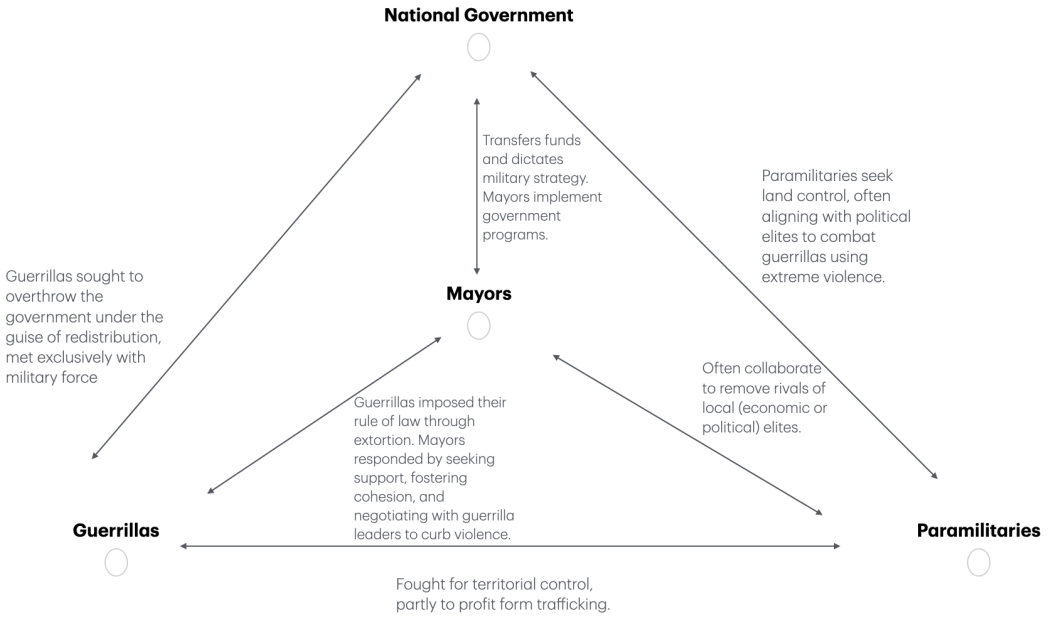
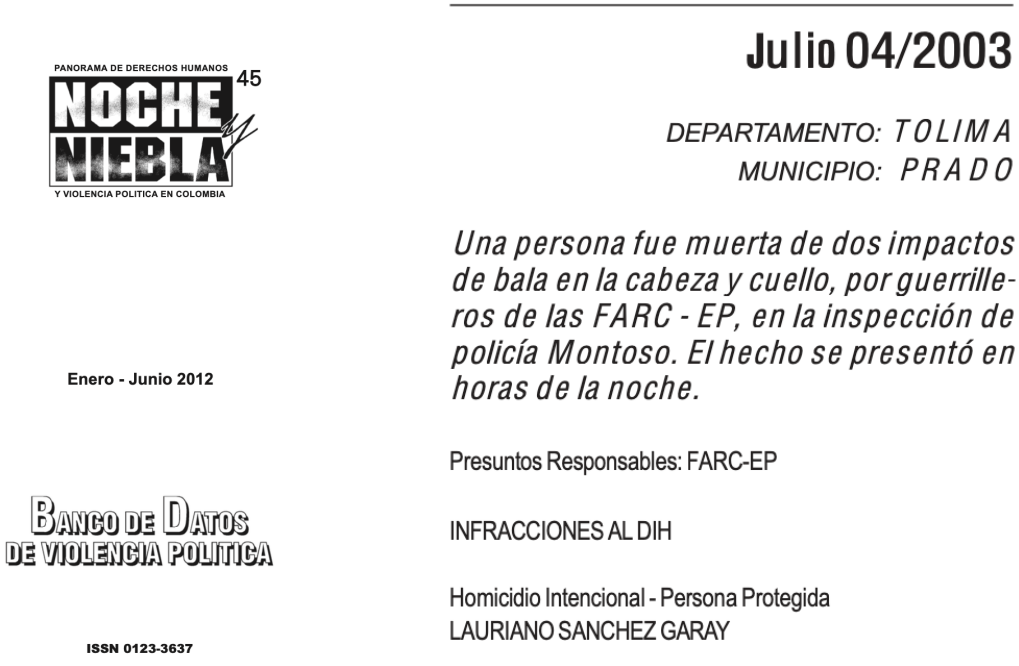


Figure A2: Extract from a "Noche y Niebla" report


PANORAMA DE DERECHOS HUMANOS
NOCHE Y NIEBLA 45
Y VIOLENCIA POLITICA EN COLOMBIA

Enero - Junio 2012

BANCO DE DATOS DE VIOLENCIA POLITICA

ISSN 0123-3637

Julio 04/2003

DEPARTAMENTO: TOLIMA
MUNICIPIO: PRADO

Una persona fue muerta de dos impactos de bala en la cabeza y cuello, por guerrilleros de las FARC - EP, en la inspección de policía Montoso. El hecho se presentó en horas de la noche.

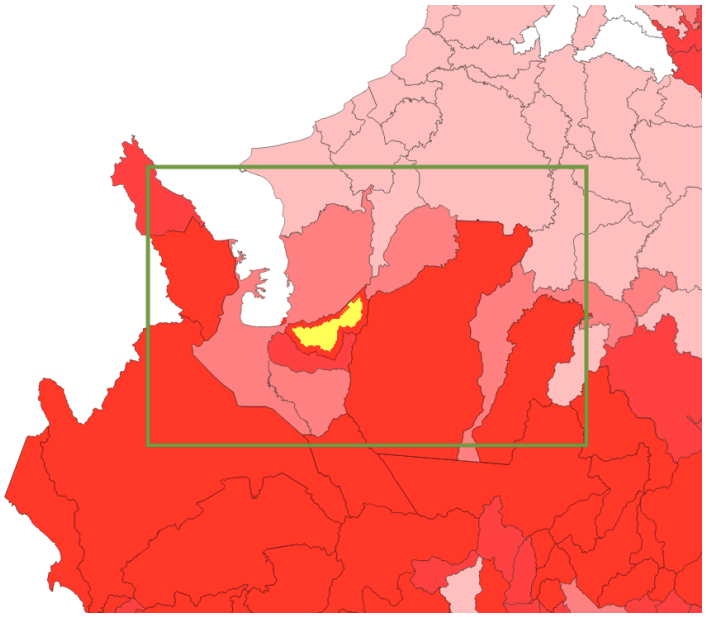
Presuntos Responsables: FARC-EP

INFRACCIONES AL DIH

Homicidio Intencional - Persona Protegida
LAURIANO SANCHEZ GARAY

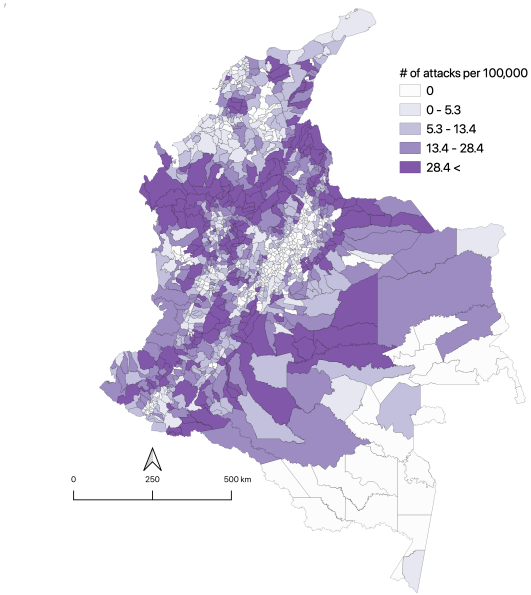
Notes: Left panel shows the cover page of the report recording the events of the second semester of 2003. Right panel shows an actual report of an event. In this case, it documents the decease of a peasant following an attack by the FARC guerrilla to the police station of the municipality.

Figure A3: Geographical location of Apartadó and violence incidence



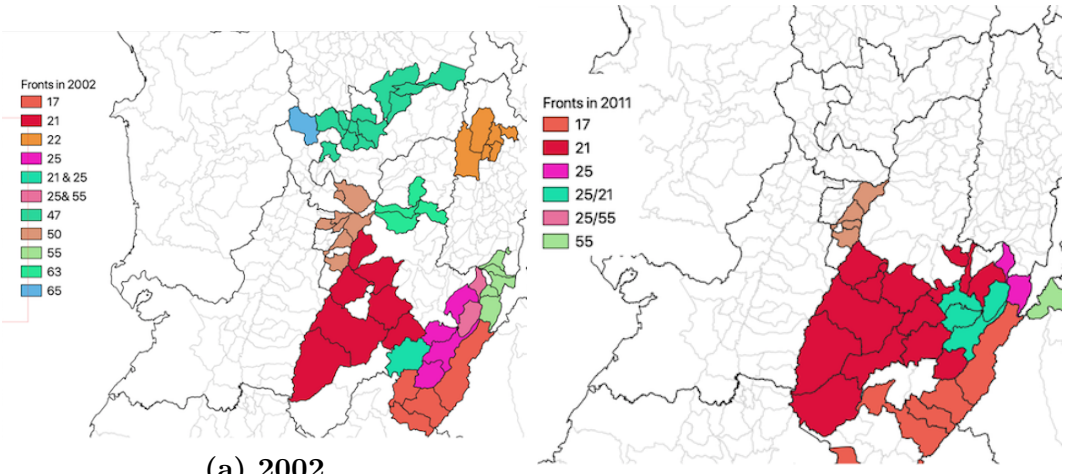
Notes: Close up to the isthmus in the north-west region of Colombia. Apartadó highlighted in yellow. Darker shades of red correspond to higher incidence of violence between 1997 and 2015.

Figure A4: Geographical distribution of paramilitary attacks between 1998 and 2016



Notes: Incidence of paramilitary attacks between 1998 and 2016 color coded. All data drawn from Restrepo et al. (2003), and normalized by year and 100,000 inhabitants.

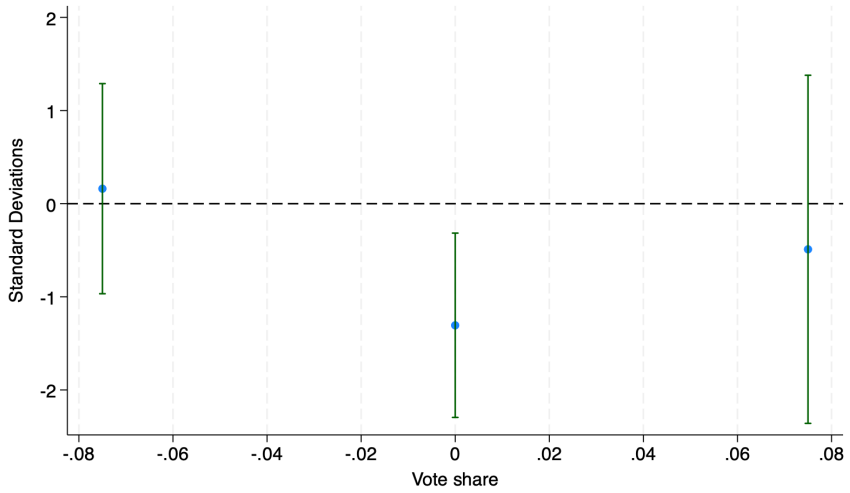
Figure A5: Fronts of the Central Joint Command (CCC) in 2002 and 2010



(a) 2002 **(b) 2010**

Notes: the figure shows the evolution in time of the location of a series of fronts belonging to the Central Joint Command of the FARC, between 2002 and 2010. The region corresponds to the central Andes mountains, and to the departments of Tolima, Huila, Valle del Cauca, Quindio, Meta and Cundinamarca.

Figure A6: Robustness to alternative cutoffs



Notes: Point estimate and confidence intervals for alternative cutoffs, ranging from -0.075 to 0.075 (approximately a standard deviation of the vote share around the threshold). Robust standard errors, optimal biased-corrected estimators and optimal (Calonico et al., 2019) bandwidth in all regressions. All regressions include year fixed effects. Linear local polynomials on both sides of the discontinuity.

B Tables

Table B1: Variables and sources

Variable	Description	Source
Panel A. Dependent variables: Violence		
Attacks (by group)	Average yearly number of attacks during term in office (per 100,000 inhabitants) perpetrated by guerrillas/paramilitaries. Attacks are defined as Restrepo et al. (2003) and correspond to a violent episode that is not an open confrontation between two groups.	Restrepo et al. (2003) and updated until 2018 by Universidad del Rosario.
Total attacks	Sum of attacks by guerrillas and paramilitaries	
Clashes (by group)	Average yearly number of clashes during term in office (per 100,000 inhabitants) involving guerrillas/paramilitaries/army. Clashes are defined as in Restrepo et al. (2003): armed confrontation between two distinct groups.	
Actions (by group)	Sum of attacks and clashes (if by group, attacks perpetrated by and clashes involving the group).	
Police actions/clashes	Average yearly number of actions/clashes during term in office (per 100,000 inhabitants) undertaken by the police against (with) conflict actors.	
Politically motivated (attacks)	Similar definition as above, but only including (attacks) where the main motive is identified as being a political according to Restrepo et al. (2003)	
Combatants demobilization	# of voluntarily demobilized guerrilla and paramilitary members during electoral cycle.	Acevedo and Bornacelly (2014) with data from Ministry of Defense
Panel B. Other dependent variables		
Government Transfers	Income transferred to municipality by national government entities (logarithm of millions of COP).	Acevedo and Bornacelly (2014) with data from National Planning Department (*DNP*)
Capital Transfers	Capital revenue from national transfers (logarithm of millions of COP).	
Government Credit	Net income provided by Central Government in the form of credit (logarithm of millions of COP).	
Non-Government transfers	Income from transfers by non-government entities (logarithm of millions of COP).	
% of income corresponding to transfers/own resources	Percentage of total income from transfers/own resources.	
% of expenditure in investment	Fraction of total expenditure that corresponds to investment items	

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Table B1 – Variables and sources, continued from previous page

Variable	Description	Source
# of servants prosecuted	Number of top local officials (at the rank of Secretary) prosecuted for corruption by *Procuraduría General de la Nación*.	General Attorney's Office *Procuraduría General de la Nación*.
# of students enrolled	Total number of students enrolled in pre-school, primary and high school.	Acevedo and Bornacelly (2014) with data from National Statistical Agency (*DANE*)
Child Mortality Index	Number of child deceased per 1000 alive births.	
Share of land reallocated	(Hectares of land reallocated / municipality area)	Faguet, Sánchez, and Villaveces (2020)
Potential for land reallocation	(Hectares vacant public land / municipality area)	
Relative Transparency	Indicator of whether local government is considered more transparent than State and National	LAPOP (2018)
Budget meeting attendance	Indicator of whether respondent has attended a meeting to discuss municipalities budget in previous year	
Resources execution	Indicator of whether respondent beliefs investment resources should be executed by mayor	
Trust in mayor	Trust in a scale from 0 (minimum) to 7 (maximum)	
Panel C. Forcing Variable		
Female candidate vote share	Share of votes received by female candidate out of the total voting for the top 2 candidates. Centered around 0 so that positive values indicate the victory of a woman.	Colombian National Registry Office.
Panel D. Other covariates		
Political & historic		
Partisan affiliation	Party under which the candidate run in the election (main if run for a coalition)	Colombian National Registry Office
Traditional parties	Partido Liberal and Partido Conservador de Colombia.	Colombian National Registry Office
Council HHI index	Herfindahl-Hirschman index of partisan concentration in Council per municipality-electoral cycle	Colombian National Registry Office
Ideology	Classification between right wing and left wing parties by Fergusson et al. (2019) based on party's statues and/or candidate's campaign program.	Fergusson et al. (2019)
Historical drug routes	Indicator of whether a route used for illegal gold trafficking in the XIX-th century crosses the municipality	Laurent (2008)

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Table B1 – Variables and sources, continued from previous page

Variable	Description	Source
Presence of historic violence	Indicator of the occurrence of historic violence events (1948–1953) in the municipality	Acevedo and Bornacelly (2014).
Historical land conflicts	Indicator of whether the municipality experienced land tenure–related conflicts between 1900–1920.	
Indigenous Settlement	Indicator of whether the municipality was an indigenous settlement before the arrival of the Spaniards	
Spanish Occupation	Indicator of whether the municipality was a Spanish settlement during the Colonial times	
# of municipal employees	Number of people employed by municipality in 1995.	Acemoglu et al. (2015)
Demographic		
Initial population	Number of inhabitants in the municipality in 1993	Acevedo and Bornacelly (2014) with data from DANE
% of urban population	Share of population that lives in the urban municipal head,	
GINI	Estimated GINI coefficient (1993).	
Unmet Basic Needs Index	In 1993	
Geographic covariates		
Area	km^2	Acevedo and Bornacelly (2014) with data from Agustin Codazzi Geographic institute.
Current drug routes	Indicator of whether the municipality is identified by either source to be part of a route allegedly used by illegal armed groups to export drugs and import weapons	Cajiao et al. (2018) and IGC (2017)
Distance to department capital	Straight line distance to the capital of the department in which the municipality is located. (km)	
Index of rurality	(Rural population / total population) in municipality(1993).	Acevedo and Bornacelly (2014) with data from DANE
% of paved roads	Measured in 1995	Acemoglu et al. (2015)
% of dirt roads	Measured in 1995	
Financial covariates		
Tax revenue.	Tax revenue in 1987 (logarithm of millions of COP).	Acevedo and Bornacelly (2014) with data from *DNP*

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Table B1 – Variables and sources, continued from previous page		
Variable	Description	Source
Total expenditure	Municipal expenditure in 1987 (logarithm of millions of COP)	
Transfers from Central Government	Transfers from central government in 1987 (logarithm of millions of COP).	
Panel E. FARC spatial distribution		
Blocks (VA/F&R)	FARC block making presence in a given municipality by source	*Verdad Abierta* (2021)(VA), Medina-Gallego (2011) (F&R)
Fronts (VA/F&R)	FARC front making presence in a given municipality by source	
Gender of unit commander	Indicator of whether the commander of a FARC unit (block/front) was a woman	News articles, intelligence reports & personal communication with ex-FARC members

Table B2: Complementarities in the interaction between female leaders—Alternative specifications

Dep. var: number of one-sided guerrilla attacks	(per 100,000 inhabitants and electoral cycle)					
	(1)	(2)	(3)	(4)	(5)	(6)
Estimation:	RD - split sample by gender of commander				OLS - yearly sample	
Gender of commander:	Female	Non female	Female	Non female		
Female mayor	-2.894**	-0.787	-6.346**	-1.729		
	(1.238)	(0.672)	(2.533)	(2.118)		
Female commander × female mayor					0.018	-0.087**
					(0.051)	(0.003)
FARC unit:	Block	Block	Front	Front	Block	Front
Year Fixed effects:	X	X	X	X	✓	✓
Municipality Fixed effects:	X	X	X	X	✓	✓
Observations					18907	6826
Mean of dep. var					0.430	

Notes: Robust standard errors clustered at the commander level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Columns 1-4 correspond to RD regressions with the baseline sample split according to the gender of the FARC commander in the municipality. Columns 1 and 3 use municipalities where the guerrilla commander was a woman. In columns 1-4: linear local polynomials and optimal Calonico et al. (2019) robust and bias-corrected estimators and bandwidths; running variable is the share of votes out of the two highest votings for female candidate. Yearly two-way fixed effects regressions in columns 5 and 6. Columns 5 and 6 control for (time varying) population. Columns 1, 2 and 5 use blocks as FARC structures, columns 3, 4 and 6 use fronts. FARC structures as defined by (*Verdad Abierta*, 2021) and (Medina-Gallego, 2011). All regressions use the "visibility" definition for FARC presence.

Table B3: Personal mines - Robustness

Dep. var: # of anti-personnel mines:	During the electoral cycle				Yearly average per 100,000 inhabitants			
	Events	Casualties	Injuries	Victims	Events	Casualties	Injuries	Victims
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female mayor	1.099	-0.042	-0.556	-0.674	-4.590	-0.139	-6.065	-7.074
	(5.070)	(0.138)	(0.854)	(0.898)	(35.251)	(0.210)	(5.251)	(5.717)
Observations	1045	1045	1045	1045	1045	1045	1045	1045
Mean of dep. var	8.657	0.333	1.696	2.028	45.328	1.568	7.660	9.228

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Observation is the municipality per electoral period. Optimal Calonico et al. (2019) robust bandwidth and bias-corrected estimators used in all regressions. Each coefficient reports a different regression. Running variable is the share of votes out of the two highest votings for female candidate. All regressions include electoral cycle fixed effects as well as baseline controls. "Victims" is the sum of casualties and injured.

Table B4: Balance on observable characteristics
Different (optimal) bandwidths

	Mean	Point estimate	Std. Error	p-value
Panel A: Time varying characteristics:				
Total income	8.98	-.043	.177	.808
Total expenditure	9.05	-.0494	.176	.78
Payroll expenses	1636	847	842	.315
Per capita turnout	.446	-.0143	.0224	.523
Council HHi - votes	.281	.0152	.0237	.52
Council HHi - seats	.32	.000696	.0282	.98
Panel B: Time invariant characteristics:				
Area (km^2)	749	-399	349	.252
Altitude (masl)	1074	106	160	.507
Soil suitability index	2.81	.319	.371	.39
Flatness index	7.65	-.698	1.07	.516
Distance to state capital (km)	74.3	-5.42	10.5	.606
Distance to Bogotá (km)	315	.26	37.8	.995
(log) distance to state capital (km)	4.13	-.168	.142	.238
(log) distance to Bogotá (km)	5.52	.0425	.145	.769
Historical land conflict	.0565	-.0419	.052	.42
(log) Cadastral value (1960)	9.55	-.247	.251	.324
(log) Latifundia (1960)	.543	.197	.257	.444
Historical land conflict	.0565	-.0419	.052	.42
Indigenous settlement	.412	-.0401	.097	.679
Spanish occupation	.385	.0218	.0854	.798
XIX century smuggling route	.0431	.0465	.0381	.222
Current smuggling route	.267	-.0205	.0742	.783
Panel C: Baseline:				
Population	32773	12121	17691	.493
Ethnic pop. > avg.	.284	.0159	.123	.897
Poverty index	.524	.0666	.0394	.091
Rurality index	.598	.0249	.045	.581
GINI	.456	.00403	.00729	.58
Unmet Basic Needs index	49.4	.806	4.28	.851
Total income	5170	2512	2937	.392
Tax revenues	1618	1027	1239	.407
Total expenditure	5710	2645	3523	.453
Government Credit	271	-53	66	.422

Notes: all regressions use the optimal (Calonico et al., 2019) bandwidth. Column 1 shows the sample mean for each variable, Column 2 the (bias-corrected) effect of having a female mayor on each variable. Column 3 shows the robust standard errors. Total income, expenditure and payroll expenses, tax revenue and government credit measured all in millions of Colombian Pesos (COP). Council concentration measured through Herfindahl-Hirschman index computed for the election held simultaneously to the mayor election. Vote/seats concentration defined as the ratio between the number of votes/seats a party receives and the total number of votes/seats in the election. Historical land conflict, indigenous settlement and Spanish occupation are indicators of whenever a municipality experienced the relevant event. Population, rurality and poverty indexes and GINI coefficient measured in 1993. Financial variables in panel C measured in 1996.

Table B5: Female political leadership and conflict violence — Differences in differences

Dep. var: one-sided attacks by guerrillas						
	Count				Indicator	Normalized
	(1)	(2)	(3)	(4)	(5)	(6)
Female mayor	0.002	-0.019***	-0.124***	-0.128***	-0.088***	-0.722***
	(0.007)	(0.007)	(0.020)	(0.021)	(0.017)	(0.115)
Observations	36,048	36,048	36,048	36,048	36,048	36,048
R-squared	0.000	0.209	0.212	0.212	0.185	0.089
Mean of dep. var			0.032		0.025	0.179
Controls:	X	X	X	✓	X	X
Fixed Effects :						
Municipality	X	✓	✓	✓	✓	✓
Year	X	✓	✓	✓	✓	✓
State × election	X	X	✓	✓	✓	✓
Party	X	X	✓	✓	✓	✓

Notes: standard errors clustered at the municipality × electoral cycle in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Observation is the municipality per year. Controls are those included in table 2. These are: population, % of rural population, GINI, poverty index and urbanization index all measured in 1993; tax income, central government transfers and municipal expenditure, all measured in 1996; # of public and municipal employees, # of police stations and % of paved roads, all drawn from Acemoglu et al. (2015) and measured in 1995; indicators of indigenous settlement, European settlement during the colonies, historical land conflict and historical violence. All control variables are further defined in appendix Table B1. Descriptive statistics included in Table 1

Table B6: Higher order polynomials - Robustness

Dep. var: yearly avg. # of guerrilla attacks per 100,000 inhabitants				
	(1)	(2)	(3)	(4)
Female mayor	-1.200**	-1.636**	-1.947**	-1.860*
	(0.571)	(0.738)	(0.871)	(0.952)
Polynomial degree:	1	2	3	4

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Observation is the municipality per electoral period. 1,045 observations in all regressions. Mean of dependent variable is 1.979. Optimal Calonico et al. (2019) robust bandwidth and bias-corrected estimators used in all regressions. Each coefficient reports a different regression. Running variable is the share of votes out of the two highest votings for female candidate.

Table B7: Violence in the year previous to the female victory - Identification

Dependent variable is:	Yearly average # of attacks per 100,000 inhabitants					Attacks indicator	Casualties indicator
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Guerrilla Violence							
Female mayor	-0.276	-0.340	-0.221	-0.122	-0.300	-0.036	-0.052
	(0.222)	(0.224)	(0.217)	(0.223)	(0.248)	(0.067)	(0.061)
Observations	1045	1045	946	946	1045	1045	1045
Mean of dep. var	0.668	0.668	0.668	0.668	0.668	0.148	0.137
Panel B: Paramilitary Violence							
Female mayor	-0.049	-0.091	-0.171	-0.189	-0.235	-0.024	-0.026
	(0.171)	(0.169)	(0.177)	(0.185)	(0.194)	(0.047)	(0.045)
Observations	1045	1045	946	946	1045	1045	1045
Mean of dep. var	0.281	0.281	0.281	0.281	0.281	0.080	0.087
Controls:							
Development	X	✓	✓	✓	X	X	X
Historical	X	X	✓	✓	X	X	X
Year Fixed Effects	X	X	X	✓	X	X	X
Degree of polynomial	1	1	1	1	2	1	1

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Observation is the municipality per electoral period. 1,045 observations in all regressions. Optimal Calonico et al. (2019) robust bandwidth and bias-corrected estimators used in all regressions. Each coefficient reports a different regression. Running variable is the share of votes out of the two highest votings for female candidate. Panel A only includes conflict events perpetrated by the guerrillas. Panel B includes conflict events committed by paramilitary groups. Development controls are: population, % of rural population, GINI, poverty index and urbanization index all measured in 1993; tax income, central government transfers and municipal expenditure, all measured in 1987. Historical controls are: # of public and municipal employees, # of police stations and % of paved roads, all drawn from Acemoglu et al. (2015) and measured in 1995; indicators of indigenous settlement, European settlement during the colonies, historical land conflict and historical violence. Dependent variables in columns 6 and 7 are indicators of whether municipality experienced any attack or conflict related civilian casualty respectively.

Table B8: Robustness: geographic fixed effects

Dependent variable is the yearly average # of attacks per 100,000 inhabitants by...						
	Guerrillas			Paramilitaries		
	(1)	(2)	(3)	(4)	(5)	(6)
Female mayor	-2.289***	-2.845***	-1.113**	-0.172	-0.716	-0.157
	(0.653)	(0.626)	(0.565)	(0.686)	(0.681)	(0.667)
Controls:						
Baseline controls	✓	✓	✓	✓	✓	✓
Year Fixed Effects	✓	✓	✓	✓	✓	✓
Region Fixed Effects	✓	X	X	✓	X	X
State Fixed Effects	X	✓	X	X	✓	X
Block Fixed Effects	X	X	✓	X	X	✓

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Observation is the municipality per electoral period. 1,045 observations in all regressions. Optimal Calonico et al. (2019) robust bandwidth and bias-corrected estimators used in all regressions. Each coefficient reports a different regression. Running variable is the share of votes out of the two highest votings for female candidate. All regressions include year-fixed effects as well as the baseline set of controls.

Table B9: Robustness: preferences towards peace—full results

	Words classification				*AI keywords*				
Dependent variable is the # of words per program that relate to:	Peace	Conflict	Infrastructure	Sports	Peace		Conflict	Infrastructure	Sports
					Unconditional	Conditional			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel B: Log (1 +#)									
Female mayor	2.641**	1.114	-0.749	-0.128	2.792**	2.887**	-0.213	-3.446	-0.074
	(1.200)	(1.119)	(1.130)	(0.859)	(1.182)	(1.205)	(0.268)	(2.615)	(0.745)
Observations	1,114	1,114	1,114	1,114	1,114	1,093	1,114	1,114	1,114
Mean of dep. var	20.540	14.565	19.828	14.889	21.588	22.004	1.942	60.986	15.631
Panel B: Log (1 +#)									
Female mayor	0.155**	0.099	0.009	0.052	0.155**	0.160**	-0.043	0.036	0.079
	(0.065)	(0.066)	(0.057)	(0.059)	(0.069)	(0.065)	(0.064)	(0.044)	(0.050)
Observations	1,114	1,114	1,114	1,114	1,114	1,093	1,114	1,114	1,114
Mean of dep. var	2.639	2.289	2.774	2.517	2.692	2.744	0.649	3.832	2.532
Panel C: Inverse Hyperbolic Sine (#)									
Female mayor	0.169**	0.112	0.012	0.061	0.164**	0.171**	-0.053	0.041	0.089
	(0.074)	(0.077)	(0.064)	(0.068)	(0.079)	(0.072)	(0.082)	(0.046)	(0.056)
Observations	1,114	1,114	1,114	1,114	1,114	1,093	1,114	1,114	1,114
Mean of dep. var	3.214	2.825	3.383	3.101	3.274	3.337	0.831	4.495	3.120

Notes: Standard errors clustered at the municipality level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Observation unit is the elected mayor. All regressions control for the total number of words used in the program, and include year and state fixed effects. Columns (1)-(4) use as dependent variable the # of (peace/conflict/infrastructure/sports) terms found in each program after classifying the universe of words used in programs. Columns (5)-(9) use as dependent variable the # of (peace/conflict/infrastructure/sports) terms found in each program, as defined by an Artificial Intelligence tool. Column (5) uses the total # of peace-related terms in all programs, while column (6) uses the total # of peace related terms found in those programs that make at least one mention to conflict in any terms. Panel A uses the logarithm of the total number of terms + 1 as dependent variable. Panel B uses the inverse hyperbolic sine transformation of the total number of terms as dependent variable.

Table B10: Economic consequences of conflict de-escalation—full set of outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable is:	Public investment in					Private Investment	Land distribution
	Total	Education	Sanitation	Housing	PC		
Female mayor	0.023	0.750	0.897	0.786	0.148	0.832	0.001
	(0.248)	(0.823)	(0.812)	(0.775)	(0.140)	(0.537)	(0.014)
Observations	1045	1045	1045	1045	1045	496	12026
Mean of dep. var	-2.358	5.601	5.957	5.619	-0.165	-5.950	0.474

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Observation is the municipality per electoral period. All regressions include the set of controls used in the baseline specification and year fixed effects. Optimal Calonico et al. (2019) robust bandwidth and bias-corrected estimators. Each coefficient reports a different regression. Running variable is the share of votes out of the two highest votings for female candidate. Dependent variables are: average log total public investment per capita (column 1); average log public investment per capita in education, health services and housing in columns 2-4 respectively; a principal components index constructed with all the items of public expenditure (column 5); the log of per-capita private investment in the municipality (column 6); and an indicator of whether municipality redistributed more land than the median municipality. All outcomes are further defined in appendix Table B1.

Table B11: Additional measures of public good provision

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable is:	School enrolment	# of teachers	# of schools	% underweight births	Child mortality index	Urbanization rate	Share of land re-distributed
Female mayor	50.150	33.246	-10.932	0.004	4.963	-0.027	0.000
	(66.511)	(67.845)	(33.325)	(0.004)	(10.758)	(0.029)	(0.001)
Observations	810	807	740	810	810	1045	589
Mean of dep. var	918.114	1072.843	248.291	0.072	62.633	0.578	0.002

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Observation is the municipality per electoral period. All regressions include the set of controls used in the baseline specification and year fixed effects. Optimal Calonico et al. (2019) robust bandwidth and bias-corrected estimators. Each coefficient reports a different regression. Running variable is the share of votes out of the two highest votings for female candidate. Dependent variables are: number of students per 100,000 children, # of teachers per 100,000 inhabitants, # of schools per 100,000 inhabitants, ratio of underweight births to total births, number of children under 1 dead each year per 1,000 alive births, share of population residing in rural areas, share of area in the municipality with a cadaster update.

Table B12: Mechanisms: Heterogeneous effects on the partisan affiliation of female mayors.

Dependent variable is yearly average # of guerrilla attacks per 100,000 inhabitants.				
Heterogeneity dimension :	Victory of right-wing candidate	Candidate from a traditional party:		
		Won	Lost	Incumbent
	(1)	(2)	(3)	(4)
Panel A: Municipalities where dimension = 1.				
Female mayor	-1.112	-0.667	-3.189***	-1.665**
	(0.730)	(0.912)	(1.117)	(0.779)
Observations	143	460	446	546
Mean of dep. var	0.203	2.626	2.787	2.609
Panel B: Municipalities where dimension = 0.				
Female mayor	-1.102*	-1.231**	0.335	-0.382
	(0.632)	(0.572)	(0.578)	(0.802)
Observations	902	585	599	499
Mean of dep. var	2.260	1.470	1.377	1.289

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Observation is the municipality per electoral period. Optimal Calonico et al. (2019) robust bandwidth and bias-corrected estimators used in all regressions. Each coefficient reports a different regression. Running variable is the share of votes out of the two highest votings for female candidate. Dependent variables for Panel A are all yearly averages per 100,000 inhabitants. Panel A includes only municipalities that satisfy the condition described in the header of each column. Panel B includes municipalities where said condition is not held. Conditions are: victory of a right-wing candidate (1); victory or defeat of the candidate of a traditional party (2 and 3 respectively); incumbent from traditional party (4). Ideology classifications following (Fergusson et al., 2019). Traditional parties are the Liberal and the Conservative party.

Table B13: Mechanisms: traditional politics and political violence.

Dep. var: average yearly # of guerrilla attacks per 100,000 inhabitants.

	"Traditional" close victory	2 "traditional" candidates	Political Violence	Previous female mayor
	(1)	(2)	(3)	(4)
Traditional mayor	-0.086			
	(0.553)			
Female mayor		-3.365*	-0.454**	-1.188**
		(1.890)	(0.177)	(0.570)
Observations	3196	166	1045	1045
Mean of dep. var	2.000	4.572	0.406	1.979
Controls:				
Previous mayor's gender	X	X	X	✓

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Observation is the municipality per electoral period. Optimal Calonico et al. (2019) robust bandwidth and bias-corrected estimators used in all regressions. Each coefficient reports a different regression. Running variable is the share of votes out of the two highest votings for female candidate. Column 1 includes municipalities where the candidate of a traditional party narrowly won or lost regardless of their gender. Column 2 only includes municipalities where the top 2 candidates represented traditional parties. Column 3 only includes attacks explicitly listed as politically motivated by the perpetrator. Column 4 controls for an indicator of whether a municipality had ever had a female elected as mayor before. "Traditional" parties are the Liberal and Conservative.

Table B14: Mechanisms: the influence of third actors

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Violent intrusion				*Financial intrusion*			
Dependent variable is:	# of actions per 100,000 inhabitants by:			Clashes involving guerrillas	*log of ...*			*% of income are transfers*
	Army	Police	Paramilitary		Gov't transfers	K transfers	Gov't credit	
Female mayor	0.907	-0.271	-0.273	0.467	0.213	0.222	0.064	-0.269
	(1.023)	(0.214)	(0.728)	(0.921)	(0.201)	(0.187)	(0.218)	(0.323)
Observations	1045	1045	1045	1045	959	997	914	738
Mean of dep. var	1.635	0.555	1.167	1.448	8.360	10.267	6.138	8.842

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Observation is the municipality per electoral period. Optimal Calonico et al. (2019) robust bandwidth and bias-corrected estimators used in all regressions. Each coefficient reports a different regression. Running variable is the share of votes out of the two highest votings for female candidate. Dependent variables for columns 1-4 are yearly averages per 100,000 inhabitants. In columns 1-3, actions are the sum of clashes and attacks. In column 6, dependent variable is the logarithm of capital transfers from the central government. All outcomes are further defined in appendix Table B1. Descriptive statistics available in Tables 1.

Table B15: Spillovers from female political leadership — Differences in differences estimates

Dep. var: one-sided attacks by guerrillas	Count				Indicator	Normalized
	(1)	(2)	(3)	(4)	(5)	(6)
Female mayor	0.002	-0.012**	-0.109***	-0.116***	-0.077***	-0.674***
	(0.007)	(0.005)	(0.017)	(0.017)	(0.015)	(0.100)
Female mayor in neighboring municipality	0.002	0.013**	0.043***	0.060***	0.032***	0.117**
	(0.005)	(0.006)	(0.008)	(0.008)	(0.006)	(0.058)
Observations	36,048	36,048	36,048	36,048	36,048	36,048
R-squared	0.000	0.209	0.212	0.213	0.185	0.089
Mean dep. var			0.032		0.025	0.179
Controls:	X	X	X	✓	X	X
Fixed Effects :						
Municipality	X	✓	✓	✓	✓	✓
Year	X	✓	✓	✓	✓	✓
State × election	X	X	✓	✓	✓	✓
Party	X	X	✓	✓	✓	✓

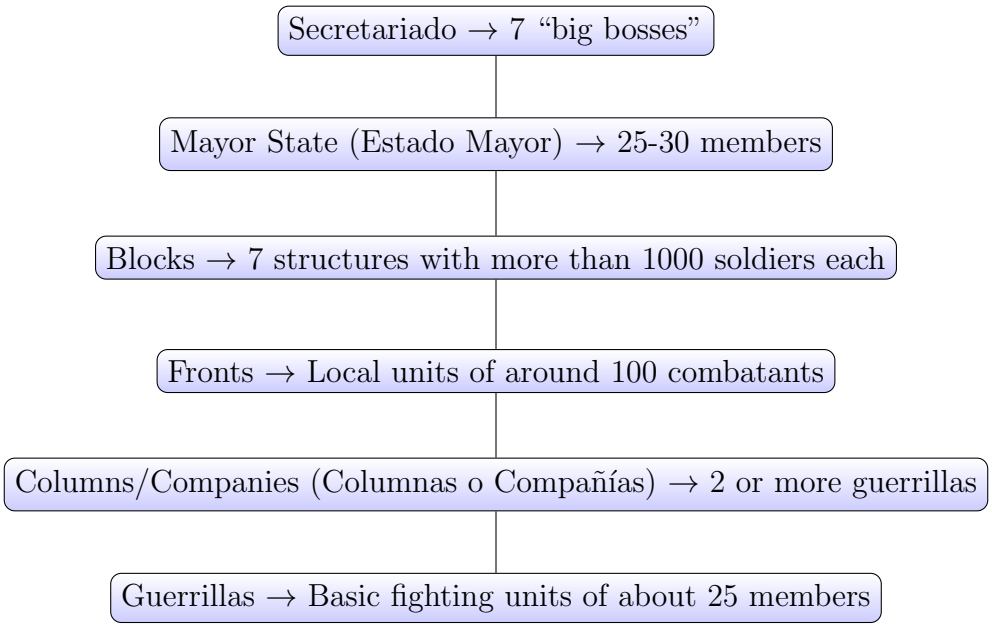
Notes: standard errors clustered at the municipality × electoral cycle in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Observation is the municipality per year. Controls are those included in table 2. These are: population, % of rural population, GINI, poverty index and urbanization index all measured in 1993; tax income, central government transfers and municipal expenditure, all measured in 1996; # of public and municipal employees, # of police stations and % of paved roads, all drawn from Acemoglu et al. (2015) and measured in 1995; indicators of indigenous settlement, European settlement during the colonies, historical land conflict and historical violence. All control variables are further defined in appendix Table B1. Descriptive statistics included in Table 1

C FARC internal structure

The FARC guerrilla was a centralized organization of national scope, led by a group of 7 individuals known as "*Secretariado*". These all-male board of directors was always responsible for deciding the nationwide policy of the guerrillas, while delegating the "regional" decisions and strategies to their subordinates. It is worth highlighting that positions in the *Secretariado* were obtained based on a combination of tenure and proven commitment to the organization (Ávila, 2019).

In 1993, the FARC held their 8th guerrilla conference where they decided to divide the Colombian territory into 7 regions, each of which would fall under the jurisdiction of one of the newly created "*Blocks*" (Medina-Gallego, 2011).[37] Each Block would be further divided into smaller units of a more local scope called "fronts", which became the main acting unit of the guerrilla. Figure C1 below shows the administrative division of the FARC guerrilla. I follow Medina-Gallego (2011) and *Verdad Abierta* (2021) to geocode and identify the jurisdiction of the 7 FARC blocks and over 60 fronts.[38]

Figure C1: FARC's administrative division



Notes: The figure shows a summarized version of the internal hierarchical structure of the FARC. This paper uses the intermediate "blocks" and "fronts" units for lack of more detailed information about the leadership and location of smaller units.

[37] The number of blocks was defined so that each one was led by a member of the *Secretariado*.

[38] I use two different sources given the inaccuracy of these kinds of intelligence data, and show the robustness of my results to the use of either source. The exact number of fronts that existed is contested between different sources.

D Biographies of FARC female leaders

Criselda Lobo

Known amongst her fellow rank members as Sandra Ramírez, Lobo was born in 1964 in the rural area of Sabana de Torres, a municipality located in the northeast region of Colombia close to the frontier with Venezuela. At age 17 she left her family to join the ranks of the FARC where she was eventually assigned to serve as nurse for the Central Joint Command. There, she met alias Manuel Marulanda, one of the founding fathers of the guerrilla who became her sentimental partner for more than 24 years up to his death in 2008. By that moment, Lobo had gained influence within the organization due to both her closeness to the *Secretariado*, but also to her abilities as nurse and communications officer. She was assigned to the first peace delegation sent by the guerrilla to La Habana in 2013 to negotiate with the government of president Juan Manuel Santos, and remained a part of this negotiation team until the final agreement was reached in 2016 (although only occasionally traveling to Cuba). Finally, in 2018 she became one of the 5 ex-FARC members to be elected as Colombian Senators when she filled one of the Congress seats reserved for the organization in the peace agreement.[39]

Victoria Sandino

Born in the coastal municipality of Tierra Alta, Córdoba in 1975 as Judith Simanca Herrera, Sandino became involved with the communist youth movement while still in high school. In 1993, Sandino received her Bachelor's degree in journalism and immediately joined the guerrilla as a public relations commander for the Central Joint Command. In 2013, Sandino joined the first peace commission from the guerrillas and remained a part of it until the final agreement was signed. Sandino was in charged of the gender equality sub-commission during the peace talks. In 2018 she became one of the first ex-guerrilla members in Congress when she received one of the 5 reserved seats for the Senate. From her position as lawmaker, congresswoman Sandino has fought for women rights, gender equality and ethnic communities vindication.[40]

Erika Montero

Little is known about Montero's life, other than she was born as Francy María Orrego in 1960 in Santa Rosa de Osos, a little rural municipality located in between the last of the Andes mountains towards the north-west region of Colombia. Montero was a part of the communist youths during the National Front years and eventually joined the FARC ranks in 1978 after turning 18 years old. She spent her early years as a member of the 5th front, until 1986 when she was named the commander of the 34th front. In 2001 she was captured by the army and sentenced for terrorism and rebellion. In 2003 she was released and went back to the front line of combat in the 49th front. Little after she was named commander of the Northwestern block of the FARC, becoming

[39] Information drawn from an interview with senator Lobo, conducted on February 10th, 2021.
[40] All information drawn from https://partidofarc.com.co

the first (and only woman) to hold such position. In 2015 she became a member of the Mayor State of the guerrilla, once again an unheard of position for a female. In 2018 she run for Congress, but was defeated by her fellow ex-combatants (Lobo and Sandino amongst them) and so she became part of the director's board of the newly founded FARC political party.[41]

[41] All information drawn from https://wikipedia.org

E FARC motives

This appendix provides qualitative and descriptive evidence supporting a key assumption underlying the mechanism developed in the main text and formalized in Appendix Section G: Colombian guerrilla groups internalized political and social constraints when choosing their level of violence. In particular, historical statements by the FARC emphasize the centrality of peasant support, collective organization, and peace-building rhetoric, suggesting that violence against civilians was not purely instrumental.

E.1 Statements of the FARC regarding on gender and female leadership

The following are some extracts of two different statements that the FARC guerrilla made available (while still outside of the law), and that were made available by CEDEMA (www.cedema.org). CEDEMA is an organization devoted to the documentation and study of insurgent organizations in Latin America.

"Aparte de considerarla de manera especial por su condición de mujer colombiana que trabaja por la paz, me dirijo a usted por su condición de líder del movimiento de familiares y militares (captivos) ... por cuya libertad ha librado durante años una incansable batalla."

Timoleón Jiménez
Comandante del Estado Mayor Central de las FARC-EP
Montañas de Colombia, 3 de marzo de 2012.

"Besides holding a special consideration for you due to your role as a Colombian woman that works in search for peace, I address you in your position as (female) representative of (captive) military and police members ... for whose liberty you have fought an endless battle."

Timoleón Jiménez
Commander of the Board of Directors of the FARC-EP
Colombian mountains, March 3rd, 2012.

"Como posición política y de principios, las FARC-EP abogamos por la igualdad de género ... Para nosotros, la mujer es incuestionablemente la garantía de existencia de la sociedad y el alma de la paz."

Delegación de paz de las FARC-EP
La Habana, Cuba. Sede de los díalogos de paz.
Agosto 25 de 2015

"As a political stance, and as a matter of principles, the FARC-EP advocates for gender equality ... For us, women are without a doubt both a guarantee for the existence of society and the soul of any peace effort."

FARC-EP peace delegation.
La Habana, Cuba. Venue for the peace talks.
August 25th, 2015

E.2 Statements of the FARC on their goals and objectives

The Objective Function of Guerrillas: A crucial aspect to consider is the guerrillas' objective function, which has been extensively documented in the literature.[42] While the motivations for guerrilla violence evolved over time, the consensus is that their overarching goal remained constant: to overthrow the political elite and replace it with a 'government of the people". To fund their fight, guerrillas engaged in activities such as extortion, kidnapping, and other forms of organized crime, actions which alienated much of the Colombian public. Still, as Gutiérrez Sanín (2004) notes, '...the guerrillas exhibit behaviors that can't be justified under a purely for-profit framework..." underscoring that their goals extended beyond simple economic gain. To provide empirical support for these arguments, Appendix Table C1 shows the correlation between the frequency of guerrilla attacks and various municipal characteristics, including physical attributes (e.g., altitude, soil quality), time-invariant factors (measured before the sample period—e.g., inequality and rurality indices), and conflict-related factors like the extent of coca cultivation. These results reinforce previous findings that poverty and inequality are primary drivers of guerrilla violence, even after accounting for the presence of coca cultivation. On the same lines, I include below a series of statements drawn from the groups' constitutional documents that highlight the centrality of land reform in their struggle. These texts also show how the FARC viewed the peasantry as a core group of supporters and, thus, ceteris-paribus would not harm them. Taken together, these pieces of evidence serve as a basis for the model developed in the following section, which relies on the guerrillas' need for resources and their disposition to avoid violence (against the peasants) whenever possible.

The following excerpts from the FARC's constitutional documents highlight the organization's emphasis on agrarian reform, collective organization, and alliances with peasants, reinforcing the idea that community support constrained the use of violence.

"La Política Agraria Revolucionaria es condición indispensable para elevar verticalmente el nivel de vida material y cultural de todo el campesinado, librarlo del desempleo, el hambre el analfabetismo y las enfermedades..."	*"The Revolutionary Agrarian Policy is an indispensable condition for drastically raising the material and cultural standard of living for all peasants, freeing them from unemployment, hunger, illiteracy, and diseases..."*
Constitución de las FARC	*FARC's Constitution.*
Montañas de Colombia	*Colombian mountains.*
Julio 20, 1964	*July 20, 1964*

[42]The prominence of guerrilla groups in Colombian public discourse has led to a substantial body of academic work on the subject. See (Brittain, 2010; Cook, 2011; Leech, 2011; Lehoczki & Ayala Castiblanco, 2024) for detailed discussions of the guerrillas' objectives and means.

Table C1: Determinants of guerrilla violence - "Kitchen sink" regression

Dep. var. is the log of the # of guerrilla one-sided attacks during the sample period			
	(1)	(3)	(5)
Area (ha)	4.23e-07***		9.60e-07***
	(1.32e-07)		(2.87e-07)
Elevation (masl)	-6.32e-05*		-5.67e-05*
	(3.32e-05)		(3.15e-05)
log Distance to state capital	0.104**		0.0406
	(0.0486)		(0.0513)
Coffee suitability index	-0.000184***		-0.000174***
	(4.02e-05)		(4.01e-05)
Banana suitability index	-5.87e-05		-3.24e-05
	(4.40e-05)		(4.44e-05)
Oil palm suitability index	0.000124***		3.88e-05
	(3.30e-05)		(3.37e-05)
Smuggling route indicator	0.328***		0.188**
	(0.0799)		(0.0827)
Population		2.20e-06**	8.06e-06***
		(1.04e-06)	(1.34e-06)
% of rural population		-0.277	-0.222
		(0.224)	(0.212)
Income Gini index		3.864**	
		(1.546)	
Unmet Basic Needs index		0.0174***	0.0184***
		(0.00321)	(0.00279)
% of pop in SISBEN		-18.01***	-16.87***
		(3.689)	(3.340)
% of private land		0.745***	
		(0.238)	
Agricultural GDP		-0.261	-0.0638
		(0.227)	(0.205)
Per capita gdp		0.0185**	0.0302***
		(0.00936)	(0.00833)
Ha of coca removed		0.000319*	9.59e-05
		(0.000181)	(0.000170)
Ha of coca		0.000234***	0.000186***
		(6.74e-05)	(6.95e-05)
# of corruption convictions		0.00307*	
		(0.00177)	
% public payroll expenses		0.540	0.125
		(0.438)	(0.394)
Land Gini		0.933**	
		(0.392)	
Observations	1,087	726	920
R-squared	0.428	0.529	0.540
Mean of dependent variable		1.46	

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Municipal level regressions. Outcome variable is the total number of one-sided guerrilla attacks during the sample period. Column 1 includes only geographical (constant) characteristics. Column 2 includes time-varying characteristics, measured in 1993 (before the period studied). Column 3 includes all characteristics. Explanatory variables dropped from column 3 are those that, when included, reduce the sample size considerably.

"Los campesinos e indígenas que quieran beneficiarse de las medidas de la Reforma Agraria Revolucionaria, deberán organizarse en amplios CRAR, o Comité para la Reforma Agraria Revolucionaria, que en el campo se irán transformando en órganos del Nuevo Poder Popular."

FARC
Montañas de Colombia

"Peasants and Indigenous people who wish to benefit from the measures of the Revolutionary Agrarian Reform should organize into broad CRARs, or Committees for the Revolutionary Agrarian Reform, which will gradually transform into organs of the New Popular Power in rural areas."

FARC
Colombian mountains

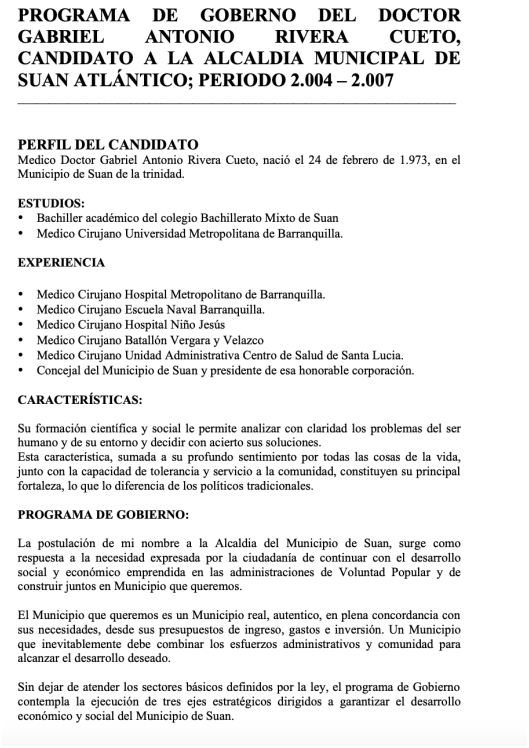
"La realización de este Programa Agrario Revolucionario dependerá de la alianza obrero-campesina y del Frente Unido de todos los colombianos [sic] en la lucha por el cambio de régimen..."

FARC
Montañas de Colombia

"The realization of this Revolutionary Agrarian Program will depend on the worker-peasant alliance and the United Front of all Colombians in the struggle for a change of regime."

FARC
Colombian mountains

Figure F2: Excerpts of government programs



PROGRAMA DE GOBERNO DEL DOCTOR GABRIEL ANTONIO RIVERA CUETO, CANDIDATO A LA ALCALDIA MUNICIPAL DE SUAN ATLÁNTICO; PERIODO 2.004 – 2.007

PERFIL DEL CANDIDATO
Medico Doctor Gabriel Antonio Rivera Cueto, nació el 24 de febrero de 1.973, en el Municipio de Suan de la trinidad.

ESTUDIOS:
- Bachiller académico del colegio Bachillerato Mixto de Suan
- Medico Cirujano Universidad Metropolitana de Barranquilla.

EXPERIENCIA

- Medico Cirujano Hospital Metropolitano de Barranquilla.
- Medico Cirujano Escuela Naval Barranquilla.
- Medico Cirujano Hospital Niño Jesús
- Medico Cirujano Batallón Vergara y Velazco
- Medico Cirujano Unidad Administrativa Centro de Salud de Santa Lucia.
- Concejal del Municipio de Suan y presidente de esa honorable corporación.

CARACTERÍSTICAS:

Su formación científica y social le permite analizar con claridad los problemas del ser humano y de su entorno y decidir con acierto sus soluciones.
Esta característica, sumada a su profundo sentimiento por todas las cosas de la vida, junto con la capacidad de tolerancia y servicio a la comunidad, constituyen su principal fortaleza, lo que lo diferencia de los políticos tradicionales.

PROGRAMA DE GOBIERNO:

La postulación de mi nombre a la Alcaldia del Municipio de Suan, surge como respuesta a la necesidad expresada por la ciudadanía de continuar con el desarrollo social y económico emprendida en las administraciones de Voluntad Popular y de construir juntos en Municipio que queremos.

El Municipio que queremos es un Municipio real, autentico, en plena concordancia con sus necesidades, desde sus presupuestos de ingreso, gastos e inversión. Un Municipio que inevitablemente debe combinar los esfuerzos administrativos y comunidad para alcanzar el desarrollo deseado.

Sin dejar de atender los sectores básicos definidos por la ley, el programa de Gobierno contempla la ejecución de tres ejes estratégicos dirigidos a garantizar el desarrollo económico y social del Municipio de Suan.

(a) Suan

(b) Soledad

Notes: the figure shows the first page of two government programs for municipalities in the state of Atlantico, for the period 2003-2007. The figure highlights the lack of consistency between the programs, as even two of the same state/period look completely different. In particular, the left panel shows a program that begins with a profile of the candidate, and then redacts his proposals in an essay-type of format. The right panel, in contrast, only lists the proposals in bullet points, even using "sections" to divide between different themes.

F Government programs

F.1 Supervised classification of programs

List of words used to identify peace-related programs

(Spanish:) amnistias, civiles, convivencia, defender, defensa, desarme, desplazada, desplazamiento, desprotegidos, humanitario, indefension, liberacion, marginales, marginalidad, miedo, necesitada, pacifista, pacto, paz, protegiendo, protectora, proteger, reconciliacion, restitucion, salvar, salvo, solidarias, solidaridad, temor, tolerante, victima, vida, vulnerables, vulnerabilidad, vulneracion.

(Translated:) amnesty, civilians, coexistence, to defend, defense, disarmament, displaced, displacement, unprotected, humanitarian, undefended, liberation, marginalized, marginality, fear, in need, peaceful, pacifist, pact, peace, protecting, protector, to protect, reconciliation, restitution, to save, safe, solidarity, fear, tolerant, tolerance, victims, life, vulnerable, vulnerability, violation.

List of words used to identify infrastructure-related programs

(Spanish:) canalizacion, acueducto, aereo, alcantarillado, alumbrado, andenes, carretera, avenida, represa, tunel, estructura, infraestructura, obras, pavimentacion, peatonal, potabilizacion, potable, aeropuerto, alcantarillas, canalizar, electricas, hospitalaria, telecom, telecomunicaciones, energetico, contratistas, vis, iluminado, cofinanciacion.

(Translated:) canalization, aqueduct, aerial, sewerage, lighting, sidewalks, road, avenue, dam, tunnel, structure, infrastructure, works, paving, pedestrian, potabilization, potable, airport, sewers, to channel, electrical, hospital, telecom (Public telecommunications company), telecommunications, energy, contractors, VIS (housing program), illuminated, co-financing.

F.2 Key-words based classification of programs

List of key-words related to peace

(Spanish:) justicia (y) reparacion, paz (y) respeto, unidad, tolerancia, cooperacion, respeto, dialogo, compromiso, violencia, defensa, frente, paz, defender, conflictos, conciliacion, acuerdo, convivencia, alianza, resolucion, solidaridad, perdon, sanacion, armonia, comprension, compasion, diplomacia, mediacion, reconstruccion, disculpa, restitucion, desarme, empatia, posconflicto, tranquilidad, coexistir, coexistencia, acuerdos, negociaciones, dialogos, desescalada, pacificacion, generacion de confianza, respeto mutuo, no violencia, hacer paz, justicia transicional, verdad (y) reconciliacion, conflicto armado, proceso de restitucion, intercambio humanitario, desplazamiento forzoso, estado de indefension, des escalar, reduccion (de) tensiones, medidas preventivas, medidas (de) confianza, medidas (de) distencion, cese (al) fuego, liberacion (de) prisioneros, liberacion (de) secuestrados, politica (de) reconciliacion, confianza mutua, medidas (de) seguridad, grupos marginados, resolucion (de) conflictos, derechos humanos, justicia social, poblacion desplazada, resolucion pacifica, participacion ciudadana.

(Translated:) justice and reparation, peace and respect, unity, tolerance, cooperation, respect, dialogue, commitment, violence, defense, front, peace, to defend, conflicts, conciliation, agreement, coexistence, alliance, resolution, solidarity, forgiveness, healing, harmony, understanding, compassion, diplomacy, mediation, reconstruction, apology, restitution, disarmament, empathy, post-conflict, tranquility, to coexist, coexistence, agreements, negotiations, dialogues, de-escalation, pacification, trust building, mutual respect, non-violence, to make peace, transitional justice, truth and reconciliation, armed conflict, restitution process, humanitarian exchange, forced displacement, state of defenselessness, de-escalation, tension reduction, preventive measures, trust-building measures, de-escalation measures, ceasefire, prisoner release, kidnapped release, reconciliation policy, mutual trust, security measures, marginalized groups, conflict resolution, human rights, social justice, displaced population, peaceful resolution, citizen participation.

List of key-words related to infrastructure

(Spanish:) infraestructura para el deporte, zonas francas, parques industriales, zonas industriales, estrategia, infraestructura, construccion, desarrollo, carreteras, puentes, transporte, puerto, energia, agua, saneamiento, contratacion, presupuesto, mantenimiento, vivienda, planificacion, edificios, ferrocarriles, aeropuerto, electricidad, telecomunicaciones, licitacion, urbanizacion, regulacion, proyectos de inversion, espacio publico, instalaciones deportivas.

Figure F3: Most common words (by gender)

(a) Female mayors **(b) Male mayors**

Notes: the figure shows a word-cloud with the most common terms found in the government programs of elected mayors in Colombia between 2003 and 2015, by gender of the official.

(Translated:) sports infrastructure, free trade zones, industrial parks, industrial zones, strategy, infrastructure, construction, development, roads, bridges, transportation, port, energy, water, sanitation, contracting, budget, maintenance, housing, planning, buildings, railways, airport, electricity, telecommunications, bidding, urbanization, regulation, investment projects, public space, sports facilities.

G Complete model

Set-up

Consider the interaction between two groups, the Guerrillas (G) and the Peasants (P). Guerrillas can exert violence on the peasants in order to extract rents from them. Call this violence V and let it be a function of an investment in violence (e.g., arms, soldiers, training) that G makes, $V(I)$. Violence is increasing in the level of investment, with decreasing returns: $V'(I) > 0$, $V''(I) \leq 0$. Investment is costly, with a convex cost function: $c(I)$, $c'(I) > 0$, $c''(I) \geq 0$. Let the total rents available for extraction be denoted by Y, and the fraction paid to the guerrillas denoted by τY.

The problem of the guerrillas can be summarized as:

$$\max_{\{I\}} \quad \tau Y - c(I) \tag{G1}$$

The peasants have to decide whether to pay or not the extortions made by the guerrilla. Whenever they don't pay they have to face the level of violence consistent with the investments that the guerrilla made in the previous period. If they pay, there is still a chance of experiencing violence (trembling hand), which will be a function of how effective the peasants' leader j is at maintaining peace. Let p_j be the probability with which the leader of the peasants upholds peace. This probability captures the credibility with which the mayor's commitment to cooperate in exchange for peace is upheld. The problem of the people can be written as:

$$\max_{\{\pi, \not{\pi}\}} \quad \mathbb{I}_{\pi}\left[p_j(1-\tau)Y + (1-p_j)(Y - V(I))\right] + \mathbb{I}_{\not{\pi}}\left[(Y - V(I))\right] \tag{G2}$$

where π and $\not{\pi}$ stand for "pay" and "not pay" respectively. We assume $j \in \{w, m\}$, with $p_w \geq p_m$. Finally, there is a previous stage where the the leader of both groups Nash-bargain over the level of investment, I.

Optimal τ

G anticipates the problem of the peasants (complete and perfect information) and chooses the maximum level of extortion τ possible given the threat of violence it can create via investment. To do so, G equates the the payoff of the peasants in the case they pay and they don't, yielding:

$$p_j(1-\tau) \ + (1-p_j)(Y - V(I)) \ = \ (Y - V(I))$$

Replacing for τ, one finds the optimal level of "taxation" for every combination of investment and rents.

$$\tau^* = \frac{V(I)}{Y} \tag{G3}$$

In the previous expression, note that the optimal level of taxation does not depend on the gender of either of the leaders. This delivers the first testable implication of the model. Namely, that extortion rates do not depend on the mayor's gender.

Nash Bargaining

In the preliminary stage, both leaders get together to negotiate over the optimal level of investment that G will make, given that they can anticipate the rent extraction for the next period τ, that they are aware of the possibility of "unexpected" violence, and that this level of violence will be a function of the investment. They do so through a Nash Bargain negotiation as follows:

$$\max_{\{I\}} \left[\Pi_p(0) - \Pi_p(I)\right]^{\theta} \times \left[\Pi_G(0) - \Pi_G(I)\right]^{1-\theta} \tag{G4}$$

where θ is the bargaining power of P, $\Pi_p(I)$ and $\Pi_G(I)$ correspond to the benefits of the peasants and the guerrillas under investment I respectively

- Guerrilla's surplus: $\Pi_G(0) - \Pi_G(I)$

From equation (G1), solving for $I = 0$ and $I = I$ and replacing for τ^*, we get:

$$\Pi_G(0) - \Pi_G(I) = V(0) - V(I) - c(0) + c(I) \tag{G5}$$

- Peasants surplus: $\Pi_p(0) - \Pi_p(I)$

Similarly, from equation (G2) we get:

$$p_j\left(1 - \frac{V(0)}{Y}\right)Y + (1-p_j)(Y - V(0)) - \left[p_j\left(1 - \frac{V(I)}{Y}\right)Y + (1-p_j)(Y - V(I))\right]$$

$$\rightarrow \quad \Pi_p(0) - \Pi_p(I) = (2p_j - 1)[V(0) - V(I)] \tag{G6}$$

Replacing equations (G5) and (G6) into (G4) yields the following maximization problem.

$$\max_{\{I\}} \left[(1-2p_j)(V(I) - V(0))\right]^{\theta} \times \left[V(0) - V(I) + c(I) - c(0)\right]^{1-\theta} \tag{G7}$$

Taking first order conditions with respect to I yields:

$$\frac{\theta(1-2p_j)V'(I)}{(1-2p_j)(V(I) - V(0))} + \frac{(1-\theta)(c'(I) - V'(I))}{V(0) - V(I) + c(I) - c(0)} = 0 \tag{G8}$$

rearranging yields:

$$\frac{V'(I)}{V(I) - V(0)} = \left(\frac{1-\theta}{\theta}\right)\frac{c'(I) - V'(I)}{V(I) - V(0) + c(0) - c(I)} \tag{G9}$$

In the expression above, assume for simplicity that $c(0) = 0$. Imposing that $c'(I) > V'(I)$, we get the last prediction of the model:

1. $[V(I) - c(I)] > V(0)$: guerrillas will invest in violence independent of the gender of the mayor whenever the benefits of violence are sufficiently high.

Interaction between female leaders

Assume that G can elect a representative for the negotiation (i.e., their commander), and that said representative can be either a man or a woman. Assume that, just like for P, women are more likely to uphold any agreement in the future and so the probability of violence when a female commander negotiates is larger than when a male does. Call these probabilities p_j^G, where $j \in \{w, /m\}$.

In this scenario, the objective function of P becomes:

$$\max_{\{\pi,\not\pi\}} \quad \mathbb{I}_\pi \left[p_j^G p_j^P (1-\tau)Y + (1 - p_j^G p_j^P)(Y - V(I))\right] + \mathbb{I}_{\not\pi}\left[(Y - V(I))\right] \tag{G10}$$

For simplicity and without loss of generality, assume that $p_j^G = p_j^P \ \forall j$ and let $p_j^G p_j^P = q_{j,j}$. It follows that $q_{w,w} \geq q_{w,m} \geq q_{m,m}$. Equation (G10) can be written as:

$$\max_{\{\pi,\not\pi\}} \quad \mathbb{I}_\pi \left[q_j (1-\tau)Y + (1 - q_j)(Y - V(I))\right] + \mathbb{I}_{\not\pi}\left[(Y - V(I))\right] \tag{G11}$$

And the problem becomes equivalent to (G4). Thus, the interaction of two female leaders—one on each side of the conflict— further decreases the level of violence in equilibrium.

Numerical example

For illustration, let $V(I) = \log(I^2 + A)$ and $c(I) = I/B$. Then, $\tau^* = \frac{\log(I^2+A)}{Y}$, and the Nash Bargaining problem becomes:

$$\max_{\{I\}} \ \left[(1-2p_j)(\log(I^2+A) - \log(A))\right]^\theta \ \times \ \left[\log(A) - \log(I^2+A) + \frac{I}{B}\right]^{1-\theta}$$

Taking logs and F.O.C's yields the following:

$$\left(\frac{2I}{I^2+A}\right)\left(\frac{1}{\log(I^2+A) - \log(A)}\right) = \left(\frac{1-\theta}{\theta}\right)\left(\frac{1}{\log(I^2+A) - \frac{I}{B} - \log(A)}\right)\left(\frac{1}{B} - \frac{2I}{I^2+A}\right)$$

$$\frac{\frac{2I}{I^2+A}}{\log\left(\frac{I^2+A}{A}\right)} = \left(\frac{1-\theta}{\theta}\right) \cdot \frac{\frac{1}{B} - \frac{2I}{I^2+A}}{\log\left(\frac{I^2+A}{A}\right) - \frac{I}{B}}$$

Figure G4 below provides a graphical representation of the solution of the model for $A = 0$, $B = 10$, and different values of θ:

G.1 Figures and Tables

Figure G4: Numerical solution for different values of θ

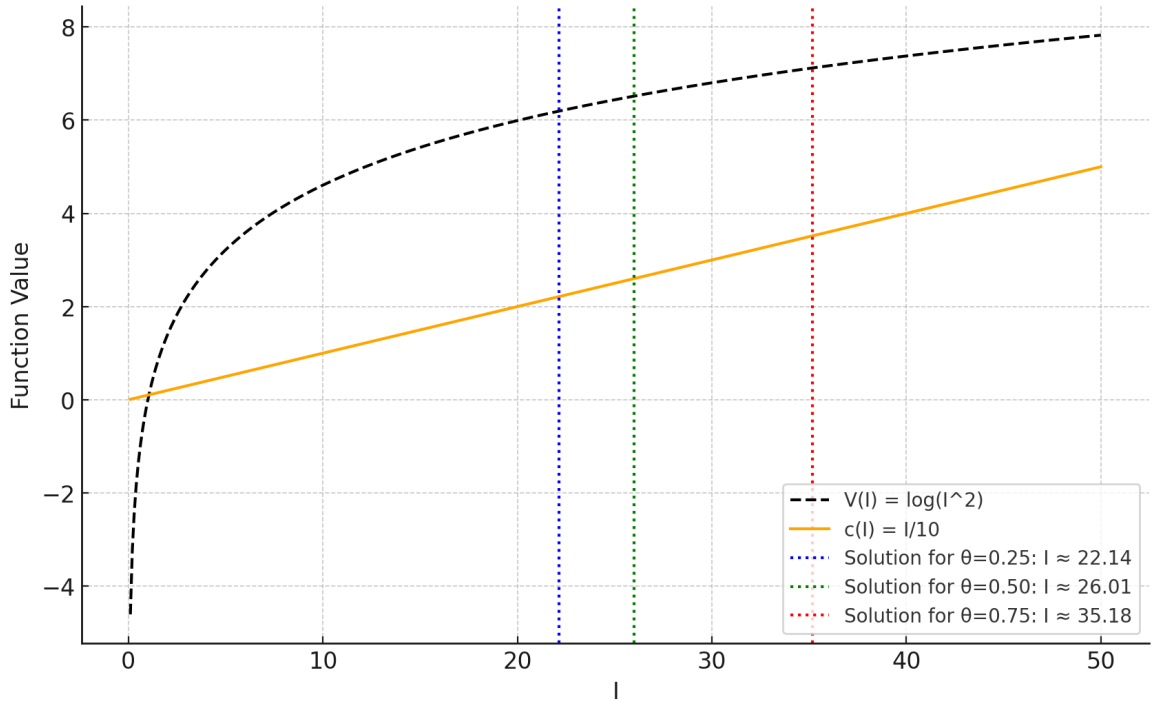
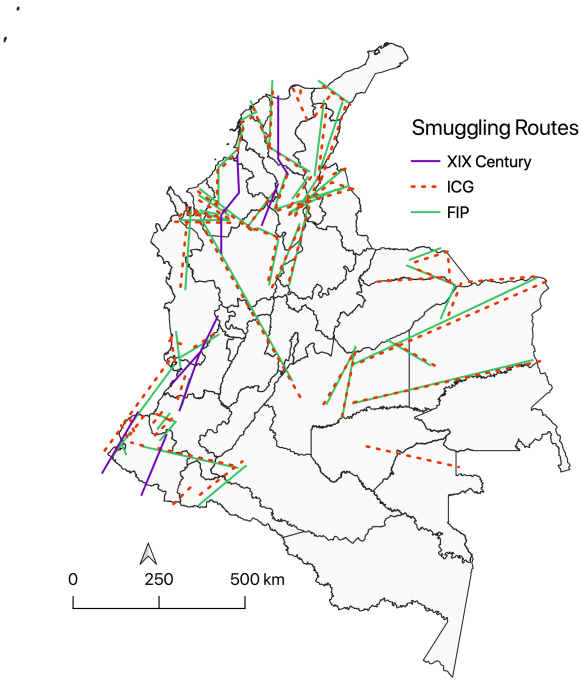


Figure G5: Smuggling routes in Colombia



Notes: "ICG" and "FIP" correspond to contemporaneous drug traffic routes. ICG stands for "International Crisis Group". FIP stands for "Fundación Ideas para la Paz". Green and red (dashed) lines overlap when in the same region. See section Appendix table B1 for more details on sources used.