Essays on The Political Economy of Civil Wars in Developing Countries

by

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To Carolina, Patricia, Rodrigo, and Matilde, as well as the victims of the Colombian armed conflict.

Para Carolina, Patricia, Rodrigo, y Matilde, así como a las víctimas del conflicto armado en Colombia.

Curriculum Vitae

The author was born on the twentieth of November, 1990, in Cali, Colombia. From 2007 to 2012, he attended Universidad de San Buenaventura, Cali, and obtained a Bachelor of Arts degree in Economics. Then, he attended Universidad Icesi, Cali, from 2013 to 2015, thanks to a scholarship from the same university, and received a Master of Science degree in Economics. In 2016, he attended the Universidad del Rosario in Bogotá, Colombia, on a scholarship from the same institution. In 2021, he graduated with a Master of Arts in Economics of Public Policy from the Universidad del Rosario Graduate School of Economics. In 2022, he was appointed Associate Professor and Faculty Director of the Master of Social Policy program in the Economics Department at Universidad Javeriana – Cali.

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Resumen

Desde muy pequeño fui consciente de la historia de violencia en Colombia. Eso implicó que pudiera vivir diferentes hitos históricos del conflicto armado del país. Por ejemplo, la muerte de Pablo Escobar y la eventual desmantelación del Cartel de Cali. Escuché desde las noticias las consecuencias de la violencia paramilitar en el momento que más disfrutaban de un poder político y militar a nivel local en Colombia. Al mismo tiempo, las FARC iniciaban un acuerdo de paz con el entonces presidente de Colombia Andrés Pastrana. Sin embargo, estás conversiones no llevaron al resultado esperado. La llegada de Álvaro Uribe al poder trajo consigo la implementación de la *Seguridad Democrática* lo cual generó un incremento significativo de la lucha contra grupos insurgentes. Un nuevo acuerdo de paz se inició con la guerrilla de las FARC, esta vez con resultados encaminados a terminar con el conflicto armado en Colombia. A pesar de que este acuerdo afectó de forma positiva la vida de muchas personas, especialmente aquellas asentadas en territorios tradicionalmente afectadas por el conflicto armado colombiano, hay mucho para hacer en el proceso de implementación. Todos estos eventos mencionados someramente en la descripción anterior afectaron las dinámicas de violencia a nivel local en Colombia. ¿Por qué la violencia es un fenómeno social tan común en Colombia? Responder esta pregunta no es tan simple. Esta pregunta me motivó a encaminar mis estudios doctorales a entender las dinámicas de violencia en Colombia, particularmente esas dinámicas asociadas al desarrollo del conflicto armado en el país. Los capítulos que acá presento tratan de examinar los efectos inesperados de políticas públicas encaminadas a reducir la violencia. Estas intervenciones, sin embargo, tuvieron el efecto opuesto. Estos capítulos investigan sobre el impacto de la guerra contra las drogas y del acuerdo de paz con las FARC firmado en el 2016 sobre las dinámicas de violencia a nivel local en Colombia.

En el capítulo 1 argumentamos que procesos de paz pueden, de manera inadvertida, incrementar la violencia selectiva contra la población civil cuando estos procesos son incompletos en dos importantes dimensiones. Primero, sólo una fracción de los grupos armados activos participan en el acuerdo. Segundo, un gobierno central legítimo no puede establecer una presencia institucional permanente en áreas previamente controladas por los grupos que participaron en el acuerdo. Bajo estas dos condiciones, el vacío de poder puede atraer grupos armados activos quienes se involucran en el uso de violencia

selectiva control la población civil para obtener control territorial. Cuando estudiamos la experiencia reciente en Colombia, encontramos que el cese al fuego permanente declarado por la guerrilla de las FARC en el 2014 generó un incremento de la violencia contra líderes sociales perpetrada por grupos armados que no estuvieron involucrados en el proceso de paz en áreas controladas por las FARC. El objetivo de esta violencia es consolidar el dominio en estas áreas. La violencia selectiva es reducida por ciertos factores tales como la capacidad estatal, y es exacerbada en lugares que son más valiosos entendidos como la presencia de conflictos sobre la posesión de la tierra.

En el capítulo 2 analizamos si el uso de la violencia en una guerra civil es restringido por la necesidad que tienen actores armados de asegurar el control territorial. En especial, el artículo examina el efecto causal de las operaciones de erradicación aérea dirigidas a reducir la producción de coca en los patrones de violencia ejercida contra la población civil por parte de la guerrilla de las FARC y grupos paramilitares, dos de los grupos armados más reconocidos en la historia del conflicto armado en Colombia. Los resultados muestran que las operaciones de erradicación impulsaron la violencia contra la población civil. En general, estos resultados sugieren que disputas por el control territorial son generadas por la presencia militar del estado, más que por significar un choque económico negativo. Los repertorios y los objetivos de violencia dependen de dos factores: la importancia estratégica de un territorio, y el nivel de cooperación entre la población civil y los grupos armados.

En el capítulo 3 investigamos las consecuencias de expresar las preferencias por la paz o la guerra en Colombia, en donde la mayoría de las personas votaron en contra del acuerdo de paz final alcanzado entre la guerrilla de las FARC y y el gobierno en un plebiscito por la paz sostenido en Octubre del 2016. Usamos un diseño de regresión discontinua en donde la proporción de votos es usada como la variable de puntaje, e identificamos un incremento diferencial de la violencia en municipios que no aprobaron el plebiscito. Este efecto se concentra en municipios previamente controlados por las FARC y en municipios donde se reporta la presencia de cultivos de coca y minería. Estos resultados apoyan el argumento que el acuerdo de paz representó una oportunidad para los grupos armados no acogidos por el acuerdo para luchar por las rentas económicas previamente controladas por la guerrilla de las FARC. Estos grupos usan el resultado del plebiscito por la paz como una señal para determinar el costo de

controlar territorios donde estuvo las FARC.

Introduction

I was aware of the high levels of violence in Colombian society since I was a child. I lived through various historical turning points in Colombia's armed conflict. First, there was the assassination of Pablo Escobar and the downfall of the Cali cartel. Then I witnessed a surge in paramilitary violence at the height of its political and military power. Simultaneously, the FARC entered into peace talks with Colombia's then-President Andrés Pastrana's administration. Eventually, such negotiations collapsed, and the fight against insurgent groups intensified, primarily in response to Alvaro Uribe's *Seguridad Democrática* approach. A new peace agreement with the FARC insurgency, this time fruitfully concluded, impacted the lives of many people, particularly those living in areas traditionally afflicted by armed conflict. Even in that case, there is much to be done in order to properly implement the final agreement signed on December 2016. Along with this very brief and superficial description of Colombia's civil war, all of these events have had an impact on violence trends. Why is violence so common in Colombian society? The answer to this question is not so simple to obtain. That is why I decided to focus my PhD research on understanding the dynamics of violence in Colombia as they relate to the evolution of its armed conflict. The chapters presented here, in particular, elaborate on the unintended consequences of policy interventions aimed at reducing violence. These interventions, on the contrary, had the opposite effect. These chapters investigate the impact of the war on drugs and the peace agreement with the FARC insurgency on violence dynamics at the local level in Colombia.

In Chapter 1, we argue that peace agreements may inadvertently increase selective violence against civilians when they are incomplete in two key dimensions. First, only a fraction of the existing armed groups participates in the agreement. Second, the legitimate government fails to establish an institutional presence in the areas previously controlled by those who do participate. Under these two conditions, the resulting vacuum of power may attract active armed groups who engage in selective civilian victimization to obtain control. Studying the recent Colombian experience, we find that the permanent ceasefire declared by the FARC insurgency in 2014 led to a surge in the targeting of community leaders in former FARC strongholds, perpetrated by armed groups excluded from the peace process, with the goal of consolidating their dominance in those areas. Critically, selective victimization is attenuated by some dimensions of

state capacity and exacerbated in places that are more valuable as proxied by the existence of recent land conflicts.

In Chapter 2, I analyze whether the use of violence in a civil war is bounded by the need of armed actors to secure territorial control. Specifically, the paper examines the causal effects of aerial spraying operations launched to eradicate coca production on patterns of civilian victimization committed by the FARC insurgency and paramilitary groups, two of Colombia's most well-known non-state armed organizations. The results show that aerial eradication operations trigger violence against civilians perpetrated by these two groups. In general, the findings suggest that territorial control disputes appear to be influenced by the presence of government security forces rather than the potential negative economic impact of aerial eradication operations. Repertoires and targets of violence are dictated by two main factors: the strategic importance of the territory and the level of cooperation between combatants and civilians.

In Chapter 3, we investigate the consequences of expressing preferences about peace and conflict in Colombia, where the majority of people voted against the final peace agreement reached between the FARC insurgent and the government in a referendum in October 2016. We employ a regression discontinuity design with the referendum vote share as the score variable, and we identify a differential increase in violent events in municipalities that did not approve the peace agreement. This effect is concentrated primarily in former FARC strongholds and municipalities where coca is cultivated, and mining is practiced. These findings support the view that the peace agreement was regarded as an opportunity for non-state armed organizations that had not yet been disarmed to potentially contest economic rents previously controlled by the FARC insurgency. Such organizations use the outcome of the peace referendum as a signal to determine what FARC strongholds control.

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Foreword

This thesis is a collection of joint and solo essays. The first chapter is a collaboration with Mounu Prem, Dario Romero, and Juan Fernando Vargas. The second chapter represents a solo project. Finally, the third chapter is a joint work with Paola Zamora-Riaño.

Chapter 1

Civilian Selective Targeting: The Unintended Consequences of Partial Peace

1.1 Introduction

Peace agreements are usually imperfect and far from comprehensive. They need to address the specificities of particular conflicts, and are shaped by both internal and external political constraints (Doyle and Sambanis, 2000). Indeed, the concept of 'peace' goes well beyond the absence of war and should "incorporate the conditions under which states have little need or incentive to use violence against their citizens, and conversely citizens have little motivation or incentive to challenge the state by force of arms" (Regan, 2014). This constitutes a magnificent challenge. For instance, a large body of literature has studied how peace "spoilers" –organized (armed or unarmed, local or international) groups or leaders– attempt to undermine peace agreements with violent, economic or political pressure in a variety of contexts (See for example Stedman, 1997; Newman et al., 2006; Hoddie and Hartzell, 2010; Le Billon, 2012).

The limitations of peacemaking are exacerbated in internal conflicts with multiple actors if a peace deal is made with only a fraction of the active armed groups. The probability that in multi-party conflicts all stakeholders simultaneously favor peace over fighting is very low (Stedman, 2003). Moreover, in such circumstances, there is

no guarantee that violence will end, and in fact conflict levels may even *increase.*[1]

An additional factor that can aggravate the unintended security deterioration following peace agreements is the government's failure to establish institutional presence in areas formerly controlled by the groups with whom a peace agreement is made. Lack of state capacity in the territory has been shown to favor the incidence of violence (e.g. Fearon and Laitin, 2003a; Ch et al., 2018), especially in settings of rugged terrain such as Colombia, Afghanistan, Peru and many others (Carter et al., 2019). Because non-state actors often establish state-like social order within the specific strategic territories that they control (Arjona, 2016a), their withdrawal following the peace agreement may result in violent territorial contestation by other (non-state) organizations if the government does not protect and institutionalize these territories first.

Based on these two observations, we posit that *partial* peace agreements, that fail both to incorporate all the existing armed groups and to establish institutional presence in areas previously controlled by the groups who do participate of the agreement, generate a vacuum of power in some territories that may attract active armed groups. In turn, such armed groups are likely to engage in selective civilian victimization disproportionally targeted against local leaders. This is because local leaders help mobilize communities to demand redistributive policies, implement local development projects, and denounce malfeasance of local politicians as well as human rights abuses (CINEP, 2020; Lobo et al., 2016). This makes some types of leaders an obstacle to many economic and political interests, and thus at risk of being targeted by armed groups who seek territorial dominance and oppose land restitution, environmental protection, or the voluntary substitution of illegal crops among other local development initiatives.

In order to provide formal empirical support to our conjecture using fine-grained subnational longitudinal variation, we study the recent experience of Colombia. After over five decades of civil war, at the end of 2016 the government signed a peace agreement with the country's largest and oldest guerrilla, the *Revolutionary Armed Forces of Colombia* (FARC from the Spanish acronym). While the conflict with FARC ended as a result of the agreement, other groups such as the *National Liberation Army*

[1]Franke and Öztürk (2015) and König et al. (2017) show that, when there are more than two parties involved in conflicts with complex network structures, partial peace deals may backfire.

(ELN from the Spanish acronym), criminal bands of former paramilitary groups, and FARC dissidents that opposed an agreement with the government, were excluded from the negotiations.

At the end of 2014 the final stage of the peace negotiations began. As a way to signal both commitment toward ending the war and internal cohesiveness, FARC declared a permanent ceasefire that precluded both any armed confrontation with government as well as any dispute against other illegal armed groups. The ceasefire was largely met until replaced in August 2016 by the definitive ceasefire and the subsequent disarmament of FARC. In this respect, the ceasefire is the *de facto* end of FARC as an insurgent group, and it provides a cleaner temporal variation than the actual signature of the peace agreement.

Most importantly, the ceasefire constituted a clear incentive for other armed groups to attempt achieving the control of FARC strongholds, especially since the government forces failed to occupy and build institutional capacity in such areas (see section 1.2.2 for a discussion of the available qualitative evidence). This resulted in the systematic assassination of local community leaders. The final peace agreement, signed at the end of 2016, is probably the most important political achievement for a country that faced over five decades of internal armed conflict. However, the simultaneous unprecedented surge in the assassination of social leaders, which we study in this paper, casted a shadow over the euphoria generated by the end of the conflict with FARC.

Our estimation strategy exploits the temporal variation provided by the permanent ceasefire and the spatial variation given by pre-ceasefire FARC territorial dominance as well as the proximity of areas with presence of other armed groups which were excluded from the peace agreement. Since closer targets are easier to be attacked in irregular wars (Mueller et al., 2019), this proximity determines the cost advantage of other armed groups in disputing former FARC strongholds given the vacuum of power created by the ceasefire and the subsequent FARC withdrawal to a handful of territories.

We find that the killing of social leaders increased disproportionally after the start of FARC's permanent ceasefire in places previously dominated by this insurgency and located in the proximity of areas with presence of other armed groups. Consistent

with our theoretical argument, we find no disproportionate surge of selective civilian victimization after the ceasefire neither in former FARC strongholds that are not disputed by other armed groups nor in places that are close to other armed groups but did not use to be controlled by FARC. Moreover, our results suggest that killing of social leaders is not driven by a differential trend of the overall homicide rate, and thus it is not explained by either a strategy of indiscriminate killings of civilians (or a differential change of reporting rates in previously FARC-controlled areas after the ceasefire).

This paper contributes to the existing literature in several ways. First, we emphasize how peace agreements may backfire if they generate territorial vacuums of power that are not quickly filled by the legitimate state. In particular, our results suggest that partial pacification processes can exacerbate violence by other existing armed groups, aimed at controlling pacified territories. Indeed, the killing of social leaders in Colombia has largely undermined the legitimacy of the peace agreement. Second, we contribute to the recent literature about the factors that help the success of violence reduction security programs (see for instance Fearon et al., 2009; Berman et al., 2013; Hartman et al., 2021), by exploring what mechanisms exacerbate or attenuate the killing of social leaders following the ceasefire. Specifically, we emphasize the importance of state capacity, judicial effectiveness, and well-specified land property rights in reducing the incentives of other armed groups to target social leaders for territorial domination. Third, our paper also relates to the literature studying how policies aimed at reducing illegal activities can increase violence in the form of armed territorial disputes (see for example Werb et al., 2011 and Dell, 2015). Finally, this paper contributes to a growing literature regarding the consequences of Colombia's peace agreement with FARC (see, e.g., Prem et al., 2020b, 2021c; Guerra-Cújar et al., 2020).

1.2 Partial peace and selective civilian targeting in multi-party conflicts

In this section we highlight our contribution considering the existing literature. This paper does not propose a novel theory of selective civilian targeting. Rather, our argument emphasizes how the territorial contestation, a key element of most theories,

interacts in multi-party conflicts with weak state capacity so that selective civilian targeting can become systematic, widespread, and persistent to an extent of threatening the stability of a peace agreement. The second contribution of our paper is empirical. While we provide rigorous and robust evidence for Colombia, we believe that our findings extend to most multi-party conflicts for which peace agreements are partial and state capacity lacking.

1.2.1 Civilian victimization

Civilian targeting has been considered a central driver of civil war violence at least since the work of Galula (1964), Clutterbuck (1966), and Thompson (1966). An extensive literature has argued that violence against civilians in civil war is neither the result of irrational factors such as emotions nor driven by pre-existing ideological disputes, but rather responds to strategies, incentives, and constraints. This literature is vast, and a far from comprehensive list includes Mason and Krane (1989); Goodwin (2001); Kalyvas (2006b); Humpreys and Weinstein (2006); Eck and Hultman (2007); Downes (2007); Kalyvas and Kocher (2007); Lyall (2009b); Kocher et al. (2011); Condra and Shapiro (2012a); Lyall et al. (2013); Toft and Zhukov (2015); Schwartz and Straus (2018b); and Huber (2019).[2] Several accounts of civilian targeting in civil war distinguish between indiscriminate and selective violence.[3]

The former does not take into account the identity and behavior of victims, and often backfires (Kalyvas, 2006b; Lyall, 2019). This occurs because, when civilian violence is executed *en masse*, it exacerbates existing grievances and creates new discontent among civilians, who seek revenge against the perpetrators of violence and may thus share information with or even join rival armed groups.[4] This can be exacerbated if, as a result of the indiscriminate violence, assets and other sources of income get destroyed thus lowering the opportunity cost for civilians of joining an armed group (Dube and Vargas, 2013a; Blattman and Annan, 2016).

[2]See Lyall (2019) and Berman and Matanoc (2015) for recent reviews.

[3]Steele (2017) discusses yet another category: 'collective' targeting occurs when entire communities are targeted based on a shared non-ethnic characteristic, such as their political alignment.

[4]On the provision of information to rivals, see Berman et al. (2011) and Shaver et al. (2016). Balcells (2017a) and Petersen (2001) provide examples of revenge-seeking civilian mobilization for the cases of the Spanish Civil War and the anti-Soviet resistance in Lithuania, respectively.

In turn, selective violence occurs when targets are chosen on the basis of their identity and actions. It is perpetrated to create fear among civilians in order to encourage support allegiance in contexts of territorial contestation such as the setting studied in this paper (Kalyvas, 2006b; Wood, 2010; Vargas, 2016; De la Calle, 2017). Indeed, our argument that FARC's de facto withdrawal from its strongholds following its declared permanent ceasefire attracted other armed groups that sought to control these territories and, to that end, engaged in the killing of key local community leaders, is consistent with several theories of selective civilian targeting.

For instance, Kalyvas (2006b) argues that the amount of selective violence perpetrated by an armed group is inversely related to their level of territorial control: the higher the control, the less necessary it is that the armed group engages in violence. Further, to Wood (2010), the engagement in violence against civilians is related to insurgent capacity: weak groups cannot obtain civilian loyalty by providing selective benefits (such as security provision) and thus have an incentive to (temporarily) target civilians to expand the support infrastructure. In contrast, more capable and stronger rebels can rely more on benefits to sustain allegiance. Finally, De la Calle (2017) discusses how in already consolidated areas rebels seek to remain clandestine and civilian targeting is avoided because, otherwise, communities could turn against armed groups and bring down the clandestine structures.

While there are other theories that deal with civilian victimization in contexts other than territorial contestation (e.g. Alesina et al. (2019) and Robinson and Torvik (2009) emphasize the electoral incentives that motivate the use of violence against civilians), all these accounts are observationally consistent with our argument that the start of the permanent ceasefire and the subsequent territorial dispute that other armed groups engaged in former FARC strongholds triggered a cycle of selective targeting of civilians. But in our context there are other key ingredients that make the recent Colombia experience salient because of the large, widespread, systematic, and persistent trend in the assassination of local community leaders.

1.2.2 Lack of state capacity and the power vacuum

First, with the exception of Wood (2010), the theories of civilian targeting in civil war do not directly discuss how varying levels of state capacity at the local level can either

exacerbate or attenuate violence. Even Wood (2010) limits his analysis to state-inflicted violence (which interacts with the rebels' own strength to determine the intensity of civilian targeting). But the state's *institutional* presence (both military and otherwise) is rarely accounted for in the study of violence against civilians. This contrasts with the strand of the literature that has studied the relationship between state capacity and the success of peace building efforts in post-conflict settings (see for example DeRouen Jr et al., 2010). Post-conflict reconstruction hinges not only upon governments' ability to consolidate the monopoly of violence in the territory, but also upon its institutional presence to support legal economic activities, the consolidation of an active civic society, and the sound implementation of the peace agreement. Examples of how peace agreements have failed because of state weakness include Somalia and Burundi.[5]

We join these two literatures (the study of selective civilian targeting and the role of state capacity in promoting resilient peace agreements) and argue that the lack of state presence at the local level exacerbates the vacuum of power generated by the *de facto* demobilization of an armed group and thus increases the incentive for other armed groups to seek control of these strategic territories. As argued above, the need to consolidate an initial critical mass of supporters, informants, and providers of supplies and shelter pushes these groups to selectively target community leaders. In turn, a weak an absent state that is unable to provide security and fails to implement the provisions of the peace agreement at the local level will exacerbate these incentives.

In the case of Colombia, anecdotal evidence largely suggests that, neither during the peace negotiations (amidst which the ceasefire was declared) nor after the peace agreement was signed, the government was able to occupy FARC strongholds. For instance, in 2015 President Juan Manuel Santos dismantled the *Unidad Administrativa Especial para la Consolidación Territorial*, a government's bureau that was created in 2011 and was tasked with the goal of establishing institutional presence in the territories formerly controlled by armed groups. Moreover, while the implementation of the peace agreement was supposed to focus on 170 municipalities that had been traditionally vulnerable to conflict activity (the so called Development Programs with Territorial Focus, PDET from the Spanish acronym), this initiative did not take off

[5] A related but different branch of the literature focuses on the relationship between state capacity and civil war *onset* (Fearon and Laitin, 2003a; Taydas and Peksen, 2012).

before the end of our sample period.

By and large, the weakness of the Colombian state in some parts of the territory is responsible for the failure of the government's recent attempts to protect local social leaders. In 2016, the National Protection Unit (UNP from its Spanish acronym) increased the protection schemes available to human rights defenders and other civilians whose life had been threatened. However, the budget of the UNP is too low relative to the number of people who request protection. According to Human Rights Watch (2021), out of 13,000 protection requests received in 2019, the UNP only afforded to protect 1,900 people. In addition to the lack of budget, there have been complaints about the cumbersome requirements imposed by the UNP to provide protection, as well as about the UNP's understaffing and delays to granting protection schemes (Human Rights Watch, 2021). Moreover, protection schemes may backfire as they draw attention. The government also implemented an early warning system based on threat reports. However, while 90% of the alerts corresponded to threats against social leaders, at least a third of them eventually ended up being killed (Human Rights Watch, 2021).

1.2.3 Multy-party conflict

A third ingredient for our observed empirical patterns (a widespread, large, and persistent victimization of local community leaders) is that the resulting power vacuum is binding. This means that there must be other illegal actors that are attracted by the window of opportunity of ruling new strategic territories. This is the case on conflicts that feature multiple armed groups. We posit that the type of territorial disputes that are more likely to be conducive to selective civilian killing are precisely those that result from partial peace agreements featuring civil wars with a multiplicity of actors. This is not exceptional, Christia (2012) studies 'multiparty' civil wars (civil wars in which there are three or more major domestic combatant groups) and finds that these constitute a sizable subsample (about half of all the conflict years) of all civil wars defined by Fearon and Laitin (2003a). In addition to Colombia, salient examples include Afghanistan, Bosnia, Lebanon, and Iraq.

1.2.4 Our argument

Each one of these phenomena (civilian targeting in the context of territorial contestation, multi-party conflicts, partial peace agreements, and power vacuums due to state weakness) have been studied in the literature, albeit mostly independently from one another.

Our main focus is on the first factor and document that, instead of being a localized and short-lasting episode of civilian victimization, the recent extraordinary surge in the killing of local community leaders in Colombia is both widespread and persistent. We argue that this is likely explained by the fact that the territorial contestation that resulted from FARC's *de facto* withdrawal from its strongholds following the permanent ceasefire declared in late 2014, coexisted with other key factors, such as the existence of multiple illegal armed groups and the lack of state capacity (after a long history of armed conflict in a highly fragmented territory).

In this sense, Colombia is not exceptional. Our argument is consistent with several historical and contemporaneous case studies, in which incomplete peace agreements paired with territorial disputes have resulted in the escalation of selective targeting of civilians. Examples include the Indo-Sri Lanka Peace Accord in 1987 (which excluded the Tamil Tigers), the Arusha Accords in 2000 (which excluded the CNDD-FDD), and most of Myanmar's bilateral ceasefires that preceded the Nationwide Ceasefire Agreement in 2015. In addition, the cases of Guatemala, Sierra Leone, and Nepal stand out to illustrate how partial peace agreements and territorial power vacuums result in selective civilian victimization.

1.3 Background

1.3.1 The Colombian conflict and the recent peace process

The Colombian civil war started with the foundation of left-wing guerrillas FARC and ELN in the mid 1960s. Both groups claim to represent the rural poor and have fought for over 50 years with the stated aim of overthrowing the government. In order to finance the protracted war, both groups have been profiting from several forms of illegal activities localized within the Colombian territory (Richani, 1997). This implies that sub-national territorial dominance is an important intermediate objective of the

armed groups.

The conflict was a Cold War proxy until the end of the 1980s, but escalated during the 1990s fueled by the involvement of the guerrillas in illegal drug trafficking and the consolidation of right wing paramilitary groups. The formation of paramilitary groups dates back to the late 1960s. As part of the war against "internal enemies," the US *National Security Doctrine* legitimized the military as the force ultimately responsible for security and development in Latin America. In Colombia, this encouraged the enactment of Decree 3398 of 1965 and Law 48 of 1968, which allowed civilians to be trained and armed by the military to fight the newly created communist insurgencies.[6]

In the mid 1990s, the paramilitaries effectively became a third force in the conflict, when splintered paramilitary armies colluded under the umbrella organization of the *United Self-Defense Groups of Colombia* (AUC by its Spanish acronym). Through the end of the 1990s and the first half of the 2000s, the counterinsurgency strategy of paramilitaries was based on perpetrating massacres targeted at civilians, thought to constitute the local 'infrastructure of guerrillas' (Restrepo et al., 2004; Aranguren, 2001).

In October 2012, the Colombian government and FARC started peace negotiations in Havana, with the oversight of the Norwegian and Cuban government. While the four-year long process was characterized by constant ebb and flow, one of the most significant milestones was the establishment of a permanent ceasefire by FARC on December 20th, 2014. In fact, as a result of the ceasefire, FARC withdrew their troops to more remote areas where military contact with government security forces and other armed groups was unlikely to take place. Likewise, although the ceasefire involved primarily the government security forces, a clash with another armed structure, in the midst of a ceasefire, would have impacted the negotiations and the public opinion greatly. This explains why FARC's offensive activities drop by 98% during this period (CERAC, 2016). Indeed, the ceasefire was largely met until followed by the bilateral definitive ceasefire and then by the final disarmament in 2016.

[6] An additional small number of paramilitary groups emerged as self-defense forces, organized by rural elites to oppose guerrilla extortion.

During the same period, and especially since the start of the ceasefire, the Colombian government did little to establish institutional presence in the territories that were controlled by the insurgent group (Shapiro et al., 2019). Together with FARC's inability to respond violently during the ceasefire and the fact that FARC troops stated to concentrate in a handful of territories that later on became the target of the reintegration programs, by and large this constituted a vacuum of power that made attractive for other armed groups (specifically the ELN and former paramilitary criminal bands) to try to establish their dominance in previously FARC-controlled territories.

1.3.2 Local social leaders and their targeting in Colombia

Local social leaders organize people in their communities around specific goals, helping mobilize them to demand services and redistribution from the state (such as a more equal land distribution), implement projects from the ground (such as rural roads or productive projects), oppose policies they consider harmful for the community (such as mining extraction or other potentially environmentally harmful projects), and defend human rights (for instance by denouncing violations and their perpetrators). Ultimately, leaders are responsible for coordinating communities to engage in collective activities that are thought to increase their wellbeing (CINEP, 2020; Lobo et al., 2016).

While the social identity of leaders varies widely depending on the local interests that they promote, some types or leaders are more or less likely to be victimized depending on the local political context as well as on the capacity of the state to prevent and punish violence against them. Human rights defenders in conflict-affected areas, environmental leaders in the agricultural and mining frontiers, and peasant leaders that advocate for land restitution in places that have faced high levels of dispossession or for voluntary crops's substitution in areas that are suitable to illegal crops, are some examples of the types of local leaders and why they are at risk. Social leaders constitute an obstacle for many economic and political interests, including illegal armed groups's attempts to control strategic territories. Silencing them helps thwart communities' voice and mobilization capacity.

The conditions underlying the killing of social leaders such as the opposing interests of local communities with those of outsider organizations and the low levels of state

presence in large parts of the Colombian territory are not new. Indeed, the persecution of social leaders dates back at least to the emergence of the paramilitary groups, when leaders were seen as an instrument of the communists "subversion" (Gallón et al., 2013). Steele (2017) argues that, historically, leaders were selectively assassinated in Colombia at the same time that "regular" people were collectively displaced as complement strategies used especially by paramilitaries to facilitate territorial control.

More recently, however, the targeting of social leaders was exacerbated by the territorial dispute triggered by FARC's *de facto* withdrawal from its former strongholds after the start of the permanent ceasefire.[7] This encouraged community leaders and activists to raise their voices to demand basic services and infrastructure from the government as they thought the conflict has ended. Formerly dispossessed peasants who fled the conflict also returned to claim their lands and re-unite with family and friends. But the central state failed to take control over these areas and brought neither development projects nor security. Instead, other armed groups stepped in to replace FARC's rule and take over its illegal activities. For the reasons described in this section, local leaders and activists constitute a threat for the interests of these groups.[8]

A group of leaders that has been hit by violence in a particularly high fashion are leaders of local community councils (see Table A.3.1 in the Appendix A). These councils constitute the primary organizational structure of local communities in both rural hamlets and urban neighborhoods. In the former, they are the main intermediary between peasant communities and the government, and are key in helping the state implementing micro-level policies, including those agreed in the peace settlement with FARC, such as land restitution, illegal crops' substitution, and the promotion of local development initiatives. Council leaders encourage political participation, channel the demands of the community, oversee the performance of locally-elected bodies and the execution of projects, and report cases of corruption and criminal activity that affect

[7] In recent years, almost all of the killings have taken place in the regions that FARC abandoned. See "Peacetime Spells Death for Colombia's Activists", by Nicholas Casey. Published by *The New York Times* on 10/13/2028. Available from: `https://nyti.ms/2QQp2Rb` (last accessed November 30, 2018).

[8] While local leaders have been sometimes accused (especially by the right and some sectors of the military) of being FARC supporters or remnants of the old FARC local governance, the legal basis of such claims is at best weak (Comisión Interamericana de derechos humanos, 2019). Instead, the stigmatization of leaders corresponds to a strategy to somehow justify their victimization.

the community.[9]

On the other hand, as suggested by Table A.3.1, leaders of the LGBT movement, leaders or students or teachers' organizations and women who are vocal of feminist movements, are targeted in much lower proportions. We hypothesize that this is mainly because of two reasons. First, the type of interests that these leaders promote are much less likely to oppose the interests of violent groups. Second, the nature of these type of movements is relatively more urban, and so these leaders are, in principle, located in environments with stronger state institutions.

1.4 Data

1.4.1 Killing of social leaders

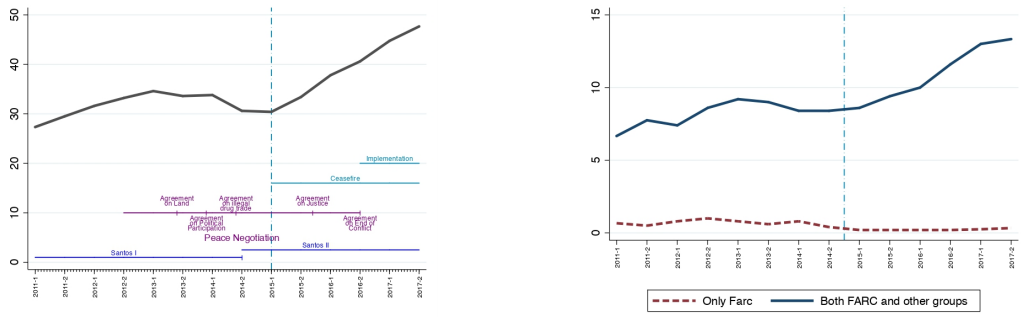
The killings of social leaders comes from a Colombian Human Right NGO called *Somos Defensores*. Appendix A.0.1 provides details on the primary sources and main descriptive statistics of the dataset. A *social leader* is defined by the NGO as an activist that represents the interests of local vulnerable communities. Social leaders include local community council members, representatives of ethnic (indigenous and Afro-Colombian) communities, unionists, and environmental advocates among others (Programa Somos Defensores - PNGPDDH, 2008).

Our analysis covers the period 2011:1 to 2017:2, since the start of Juan Manuel Santos' presidential term. During this period, 490 leaders were murdered (35 per semester). Before the ceasefire (until 2014:2), 250 killing cases are recorded (31 per semester). After the ceasefire there are 240 cases recorded (40 per semester). This increase can be seen in Panel A of Figure 1.1, that shows the evolution of the number of leaders killed during our sample period. In turn, Figure 1.2 presents the spatial

[9]The Ministry of Interior estimates that the circa 64,000 local community councils in Colombia affiliate about 7 million people. Councils are present throughout the entire country except in the indigenous territories, which feature other type of organizations (albeit also targeted by armed groups seeking territorial control). See "Si no protegen a los líderes comunales el Acuerdo de Paz fracasa", *La Silla Vacía*, 08/13/2018. Available from: `https://m.lasillavacia.com/si-no-protegen-los-lideres-comunales-el-acuerdo-de-paz-fracasa-67442?utm_source=newsletter&utm_medium=email&utm_campaign=Las2520cuatro2520patas2520de2520La2520Silla` (last accessed November 30, 2018).

distribution of assassinations by municipality during the entire period of analysis. Overall, killings are concentrated in the periphery of the country, in places relatively far from the big cities and characterized by a rather weak presence of the state. This is consistent with our interpretation that leaders are targeted in areas that are being violently disputed by armed groups after the *de facto* withdrawal of FARC.

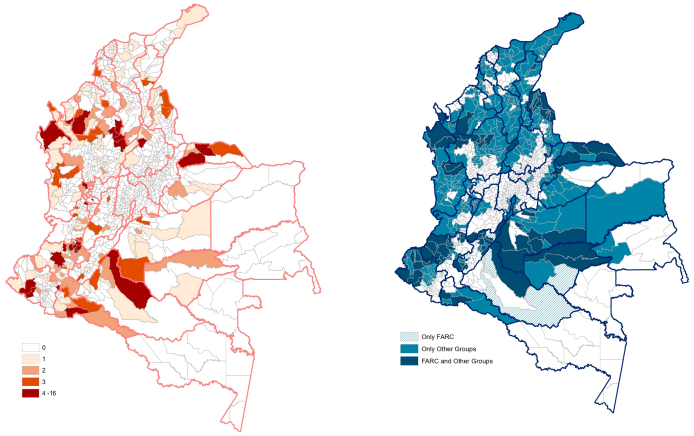
Figure 1.1: Evolution of social leaders killings.



(a) Aggregate (b) Split by type of municipality

Notes: This figure presents the evolution of killings of social leaders from 2010 to 2017. Panel A presents the distribution of total cases per semester and adds the description of the peace process. In panel B we split the sample by type of municipality, distinguishing between municipalities with FARC presence and above the median of exposure to other armed groups and municipalities with FARC presence but not exposed. In both panels we show one-year moving averages to smooth the data.

Figure 1.2: Spatial distribution of social leaders' killings and armed groups' presence



Notes: The map on the left presents the spatial distribution of killings of social leaders for the sample 2011 to 2017. The map on the right shows the spatial distribution of armed groups based on presence between 2011 and 2014.

1.4.2 Armed groups presence and exposure

Turning to our measures of armed groups presence, we use the violence dataset originally compiled by Restrepo et al. (2004), and updated through 2014 by Universidad del Rosario. This dataset codes violent events recorded in the *Noche y Niebla* reports from the NGO *Centro de Investigación y Educación Popular* (CINEP) of the Company of Jesus in Colombia, which provides a detailed description of the violent event, date, the municipality in which it occurred, the identity of the perpetrator, and the count of victims involved in the incident.[10] Specifically, we create a dummy for *FARC presence* if there was at least one violent case by FARC in the period 2011:1–2014:2, after president Juan Manuel Santos took office and before the beginning of the ceasefire.

Measuring the influence exercised by an armed group over a specific location is extremely challenging. Indicators of presence and non-violent coercion over a large set of municipalities cannot be systematically recorded in an objective way. Violence, on the other hand, while more easily observed, is only imperfectly correlated with territorial dominance. However, non-violent dominance is unlikely to occur without any violence inflicted in the past, either as a way to legitimize influence with the citizenry or to oust any contesting (legal or illegal) group. It is thus reasonable to assume that the ability to inflict localized violence over a certain period could be expected to translate into influence in different ways. We thus follow a growing empirical literature on the Colombian conflict (see e.g. Ch et al., 2018; Acemoglu et al., 2013a), and use past violence over a period of years as an (imperfect) indicator of influence.[11]

To measure the intention of other armed groups to dispute the control of a specific area, we follow Acemoglu et al. (2015) to create a measure of *exposure to other armed*

[10] *Noche y Niebla* sources include (Restrepo et al. 2004, p. 404) "1. Press articles from more than 20 daily newspapers of both national and regional coverage. 2. Reports gathered directly by members of human rights NGOs and other organizations on the ground such as local public ombudsmen and, particularly, the clergy." Notably, since the Catholic Church is present in even the most remote areas of Colombia, we have extensive coverage of violent events across the entire country.

[11] Arjona and Otálora (2011) compare existing databases of civil war violence in Colombia to survey evidence on armed groups' presence (for the small subsample of municipalities for which the latter is available) and conclude that while violence is likely to *underestimate* –by roughly the same magnitude- both guerrilla and paramilitary control, there is a non-negligible correlation between both measures.

groups (neo-paramilitary criminal bands and the ELN guerrilla). Appendix **??** provides further details on the construction of this measure.

In Figure 1.2, we present the spatial distribution of armed group presence across municipalities. Municipalities marked with blue lines represent those with only FARC presence, the ones with light blue show the presence only by other armed groups, while the ones with a darker blue highlight the ones with presence of FARC and other armed groups. By comparing the left and right panels of Figure 1.2 it can be seen that municipalities with a darker red (higher number of assassinations) tend to be the same as the ones with darker blue (presence of FARC and other armed groups).

Finally, we split the evolution of killings by type of armed group presence since 2011. We divide the municipalities in two groups: presence of both FARC and other groups and presence of FARC only (see Figure 1.1 panel B). In general, we do not see any differential time pattern between these two types of municipalities before the ceasefire. However, there is a large increase in the number of killings in municipalities with presence of both FARC and other armed groups after the ceasefire. This already suggests that FARC areas exposed to the influence of other armed groups experienced an increase in killings after the ceasefire. Section 1.5 describes how we explore this idea more formally.

1.4.3 Other data

We complement these data with a large set of municipality-level characteristics from an annual panel constructed by *Centro de Estudios sobre Desarrollo Económico* (CEDE) at Universidad de los Andes. This dataset includes socioeconomic and geographical information for all the municipalities in Colombia. We gathered information on population, presence of coca plantations, altitude, size of the municipality, distance to the closest mayor city, tax revenue, an index for sound fiscal policy, literacy rate, and an index of rurality. Table 1.1 of the Appendix presents summary statistics for our sample of 1,069 municipalities that includes all municipalities with a population of less than 200,000. We drop mayor cities and capitals that are mainly urban and less affected by the conflict.[12] In turn, Table 1.2 presents differences in observables between type of

[12] All our results are robust to including all Colombian municipalities.

armed group presence at the municipality level before the ceasefire.

Table 1.1: Descriptive Statistics: Time-invariant variables

	Mean	Std. Dev.	Min	Max
Social leaders killings				
Dummy of any killing	0.021	0.144	0.0	1.0
Number of killings	0.026	0.189	0.0	5.0
Rate of killings	0.113	1.051	0.0	38.4
Illegal groups presence				
FARC	0.093	0.290	0.0	1.0
Exposure to other armed groups	0.128	0.325	0.0	1.3
Exposure to neo-paramilitary groups	0.103	0.292	0.0	1.3
Exposure to ELN	0.035	0.178	0.0	1.2
Geographic				
Altitude (Km)	1.149	0.903	0.0	3.1
Distance to main city kms	80.772	55.551	0.0	376.1
Rural share	0.579	0.229	0.0	1.0
Municipal area in km^2	865.268	2996.145	15.0	65674.0
Basic socioeconomic				
Log (population)	9.489	0.948	6.9	12.2
Poverty index	69.924	15.631	14.3	100.0
Literacy rate	83.661	8.447	30.0	97.8
Language test scores	47.977	2.200	38.4	57.1
Math test scores	47.863	2.694	39.4	61.7
Fiscal				
Log (Tax income)	6.726	1.408	0.0	12.1
Good fiscal policy index	66.239	9.359	0.0	94.2

Notes: Control variables measure before 2010. Altitude above sea level of the urban center of each municipality. Distance is linear distance to the state's capital. Rural share is the percentage of population outside urban center. Municipal area official in km^2. Total municipal population (in logs). Proportion of people in poverty according to multidimensional index. Percentage literate population. Math and language scores is the municipal average scores per area for high-school graduates in the official standardized test. Tax income is municipal total amount collected taxes. Good fiscal policy index of efficiency, legal requirements and management of the fiscal resources.

Table 1.2: Descriptive Statistics by illegal groups presence

	Presence	Presence No Presence	FARC	FARC	Presence No Presence	Other Groups	Only FARC vs. Both FARC and Other Groups
	Presence	No Presence	(1)	FARC	No Presence	(2)	(3)
Social leaders killings							
Dummy of any killing	0.013	0.071	0.058	0.012	0.065	0.052	0.038
	(0.111)	(0.256)	[0.000]	(0.111)	(0.246)	[0.000]	[0.024]
Number of killings	0.016	0.088	0.073	0.016	0.077	0.061	0.049
	(0.156)	(0.359)	[0.000]	(0.162)	(0.317)	[0.000]	[0.026]
Rate of killings	0.078	0.368	0.290	0.079	0.322	0.243	0.209
	(0.996)	(1.848)	[0.000]	(0.952)	(1.972)	[0.000]	[0.099]
Geographic							
Altitude (Km)	1.174	0.898	-0.276	1.206	0.663	-0.542	-0.134
	(0.913)	(0.759)	[0.001]	(0.902)	(0.765)	[0.000]	[0.436]
Distance to main city kms	79.506	93.178	13.673	77.516	108.588	31.071	25.678
	(55.226)	(57.459)	[0.023]	(50.911)	(80.600)	[0.000]	[0.057]
Rural share	0.573	0.635	0.062	0.589	0.490	-0.099	-0.004
	(0.229)	(0.214)	[0.006]	(0.225)	(0.241)	[0.000]	[0.944]
Municipal area in km^2	689.221	2590.182	1900.961	777.914	1611.679	833.764	1140.908
	(2633.129)	(5095.280)	[0.000]	(3048.350)	(2389.998)	[0.001]	[0.149]
Basic socioeconomic							
Log (population)	9.438	9.990	0.552	9.410	10.170	0.760	0.322
	(0.945)	(0.829)	[0.000]	(0.923)	(0.891)	[0.000]	[0.099]
Poverty index	69.088	78.115	9.026	69.398	74.423	5.026	7.552
	(15.640)	(13.013)	[0.000]	(15.606)	(15.183)	[0.001]	[0.016]
Literacy rate	84.128	79.089	-5.038	84.067	80.193	-3.873	-7.021
	(7.988)	(11.109)	[0.000]	(8.176)	(9.865)	[0.000]	[0.000]
Language test scores	48.048	47.283	-0.765	48.070	47.182	-0.888	-0.973
	(2.198)	(2.112)	[0.001]	(2.186)	(2.171)	[0.000]	[0.014]
Math test scores	47.977	46.736	-1.241	47.944	47.169	-0.774	-0.971
	(2.684)	(2.531)	[0.000]	(2.689)	(2.648)	[0.003]	[0.061]
Fiscal							
Log (Tax income)	6.692	7.055	0.363	6.667	7.224	0.557	0.250
	(1.432)	(1.097)	[0.002]	(1.358)	(1.704)	[0.001]	[0.346]
Good fiscal policy index	66.222	66.406	0.184	66.211	66.474	0.263	-0.831
	(9.558)	(7.153)	[0.813]	(8.953)	(12.339)	[0.826]	[0.560]

Notes: Control variables measured before 2010 and social leader killings before 2014:2. Column 1 reports the differences between municipalities with FARC presence and municipalities with no presence of any group. Column 2 reports differences between municipalities with presence of other armed groups and municipalities with no presence of any group. Column 3 reports differences between municipalities with presence of FARC only and municipalities with presence of both FARC and other armed groups. p-value in square brakets.

1.5 Empirical strategy

Our identification strategy exploits the timing of the permanent ceasefire announced by FARC on December 20, 2014, during the peace negotiations with the Colombian government, and the spatial distribution of illegal armed groups in Colombia prior to the ceasefire. Since we are interested in how the killing of social leaders changed after the ceasefire in places with FARC presence that, in addition, are exposed to the influence of other armed groups, the main empirical strategy is based on a *difference-in-difference-in-differences* or triple differences model.[13] More formally, using the subindex m to denote municipalities and t to denote time, we estimate:

$$\begin{aligned} y_{mdt} =& \alpha_m + \delta_{dt} + \beta_1 \times \text{FARC}_m \times \text{ExposureOthers}_m \times \text{Cease}_t + \beta_2 \times \text{FARC}_m \times \text{Cease}_t \\ &+ \beta_3 \times \text{ExposureOthers}_m \times \text{Cease}_t + \sum_{c \in \mathbf{X_m}} \gamma'(c \times \alpha_t) + \epsilon_{mdt} \end{aligned} \tag{1.1}$$

where y_{mdt} is one of our measures of leaders killed,[14] FARC_m is a dummy that takes the value one for municipalities with FARC presence as measured before the ceasefire, and ExposureOthers_m is our measure of exposure to other armed groups which, as explained in the previous section, comes from the interaction of a dummy of presence of other armed groups and the vector of distance-penalized vicinity. $Cease_t$ is a dummy that takes the value one after the start of the permanent ceasefire, in the first semester of 2015. α_m and δ_{dt} are municipal and department-time fixed effects that capture any time-invariant municipal-level heterogeneity and any aggregate time shock at the department level, respectively.[15] Given that municipality characteristics are different between the ones affected and not-affected by conflict, we add municipality characteristics measured before the ceasefire (X_m) interacted with the time fixed effects to flexibly control for differential trends parametrized by each one of the municipal attributes. Finally, the error term ϵ_{mdt} is allowed to be spatially and timely correlated, using the structure suggested by Conley (1999) and Conley (2016).

Our coefficient of interest is β_1 which captures the differential change in the killing

[13] The underlying double-differences models are not consistent with our argument, and indeed can be used as placebo exercises (see Table A.3.2 in the Appendix A).

[14] These include the total number of killings, a dummy variable for any leader being killed in a municipality, or the rate of killings per 100,000 municipal inhabitants.

[15] Colombia is divided into 31 excluding the capital city and San Andrés island.

of social leaders after the ceasefire in municipalities with FARC presence and that are exposed to the influence of other armed groups, relative to the change in municipalities with only FARC presence (but not exposed) or in municipalities exposed (but without FARC presence), taking into account: i) any differential effects driven by fixed municipality characteristics over time; ii) any aggregate time shock at the department level; and iii) differential municipal trends based on a large set of pre-treatment characteristics. The main identification assumption is that, in the absence of the ceasefire, the killing of social leaders in municipalities with FARC presence and exposed to other armed groups would have evolved in a similar way than the killing of leaders in other municipalities.[16]

1.6 Results

1.6.1 Main results

We start by describing, on Table 1.3, the empirical estimates of the main specification given by regression model 1.1. Recall that our main coefficient of interest is the (triple) interaction between a (pre-ceasefire) FARC presence indicator, the municipal "exposure" to the influence of other armed groups –given by the (distance penalized) vicinity of either neo-paramilitary criminal bands or ELN strongholds- and a dummy that captures the period after the announcement of the permanent ceasefire.

We measure the killing of social leaders in different ways. Columns 1 and 2 of Table 1.3 compute the rate of killings by 100,000 inhabitants (of the municipality where the death is recorded). Columns 3 and 4 use the non-normalized count of social leaders killed. Columns 5 and 6 focus on the extensive margin, coding a dummy variable that takes value one if at least one single leader is killed in a municipality-year.[17] While all specifications include both municipality and and time fixed effects, even columns include all the predetermined municipal controls (described in section 1.4) interacted with the time fixed effects to flexibly control by differential trends parametrized by each one of the municipal attributes.[18]

[16] Appendix **??** reports the estimating equation that is used to partially assess this "parallel trends" assumption.

[17] This attenuates concerns about potential measurement error in the count of leaders, or the possibility that the results are driven by a higher density of social leaders in places with FARC

Table 1.3: Killing of social leaders, FARC presence, and exposure to other armed groups

	Killing rate		Number of killings		Any killing	
	(1)	(2)	(3)	(4)	(5)	(6)
Cease × FARC × ExposureOthers	0.418**	0.452**	0.106**	0.111**	0.065*	0.068*
	(0.183)	(0.188)	(0.044)	(0.044)	(0.035)	(0.035)
Cease × FARC	−0.137	−0.132	−0.021	−0.024	−0.007	−0.011
	(0.107)	(0.114)	(0.018)	(0.019)	(0.016)	(0.017)
Cease × ExposureOthers	−0.255***	−0.279***	−0.036***	−0.041***	−0.026**	−0.031***
	(0.095)	(0.099)	(0.013)	(0.014)	(0.011)	(0.011)
Observations	14966	14966	14966	14966	14966	14966
Municipalities	1069	1069	1069	1069	1069	1069
Municipality FE	✓	✓	✓	✓	✓	✓
Department-Period FE	✓	✓	✓	✓	✓	✓
Controls		✓		✓		✓
Avg Dep Var	0.101	0.101	0.028	0.028	0.021	0.021
SD Dep Var	1.083	1.083	0.219	0.219	0.144	0.144

Notes: This table presents the results from the main specification in equation (1.1). We exploit municipal-level variation by semester, over the period 2011:1 to 2017:2. Columns (1) and (2) use the number of homicides of social leaders over total population, columns (3) and (4) use as dependent variable the total number of homicides of social leaders, while columns (5) and (6) use a dummy that takes the value one if there was at least one social leader assassinated. *Cease* is a dummy that takes the value one for the period after 2015:1. *FARC* is a dummy for those municipalities with FARC presence. *ExposureOthers* is a continuous variable that measures ELN or paramilitary groups presence in the municipality or their (distance-penalized) vicinity. Predetermined municipal controls includes logarithm of the population in 2010, municipality area, average elevation, distance to the closest major city, share of population under poverty, literacy rate, math and language test scores, index of rurality, log of tax income and index of good fiscal policy. Errors in parentheses control for spatial and first-order time correlation (see Conley, 1999, Conley, 2016). We allow spatial correlation to extend to up to 279 km from each municipality's centroid to ensure that each municipality has at least one neighbor. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

In all cases, the coefficient of interest is positive and significant. This suggests that social leaders are differentially targeted after the ceasefire in areas both formerly controlled by FARC and exposed to other armed groups. According to the magnitude of the estimate reported in Column 1, in places controlled by FARC prior to the ceasefire, a one standard deviation increase in the average municipal exposure to other armed groups (equal to 0.325, see second Panel from the top of Table 1.1, Column 2) increases the rate of leaders killed by 0.14 per 100,000 inhabitants ($=0.418 \times 0.325$) after the start of the permanent ceasefire. This effect is statistically significant at 5%, and it implies that the pre-ceasefire mean of the social leaders' homicide more than rate doubles. Adding the differential trends parametrized by the predetermined controls, the equivalent estimated coefficient reported in Column 2 of Table 1.3 is slightly bigger in magnitude and implies an increase in the rate of leaders killed of 0.15 per 100,000 inhabitants ($=0.452 \times 0.325$). It is also significant at the 5% level.

The estimate reported in Column 3 of Table 1.3, which focuses on the count of leaders killed, implies that in FARC-controlled areas a one standard deviation increase in the average municipal exposure to other armed groups increases the number of leaders killed by 0.03 ($=0.09 \times 0.325$) after the ceasefire. Again, this implies that the pre-ceasefire mean of the count of leaders killed doubles[19].

Finally, one potential concern given the low average of killings per semester, could be that our results are driven by a few outliers with a large number of killings in a given semester. To deal with this concern we present results on the extensive margin of killings. Column 5 implies that in places where FARC was present prior to the ceasefire a one standard deviation increase in the average municipal exposure to other armed groups increases the probability of a leader being killed in 2.1 percentage points.[20] This is equivalent to an 100% increase in the probability of any leader being killed in a municipality pre-ceasefire and it is significant at the 10% level.[21]

presence and exposed to other armed groups.

[18] In Table A.3.3 we estimate the main regression using two alternative models that take into account the count nature of our dependent variable, namely Negative Binomial and Conditional Poisson models. In both cases we find similar results to the ones presented in Table 1.3.

[19] Allowing for differential trends parametrized by predetermined controls does not change the magnitude of the estimated coefficient substantially (see Column 4).

[20] A similar strategy was implemented by Crost et al. (2016) in an empirical setting with a low average of incidents per month.

[21] When the controls are added the estimated coefficient and the significance level remain the same

Table 1.3 also reveals that in municipalities exposed to the violent influence of other armed groups, but not previously controlled by FARC, there is a statistically significant drop in the killing of social leaders after the start of the permanent ceasefire. Moreover, in places dominated by FARC but not exposed to other armed groups, there is no significant differential change in the targeting of leaders. These results are consistent with our interpretation that it is the attempt at controlling territories previously dominated by FARC what drives the targeting of social leaders when the ceasefire provides the opportunity. Moreover, this evidence is also consistent with other armed groups substituting their violent effort to places formerly controlled by FARC and away from other places, after the ceasefire.

To test this more directly, in Table A.3.2 of the Appendix we present results from two *difference-in-differences* models, based on only the interaction between the ceasefire dummy and FARC presence (Panel A) and on the interaction between the ceasefire dummy and the exposure to other armed groups (Panel B). Consistent with our argument, we find no differential effects in municipalities previously controlled by FARC and non-robust negative relation in municipalities exposed to other armed groups. This again suggests that the main driving force for the increase in social leaders assassinations is the vacuum of power generated by the ceasefire *and* the exposure to other armed groups.

To partially test the identification assumption that, in the absence of the ceasefire, the killing of social leaders in municipalities with FARC presence exposed to other armed groups would have evolved in a similar way than the killing of leaders in other municipalities, and at the same time get a sense of how persistent is the differential targeting of leaders during the post ceasefire period, we present the results from estimating equation 1.2. This is a non-parametric version of the main empirical specification (equation 1.1).

The "parallel trends" assumption can be partially assessed by estimating following

(Column 6).

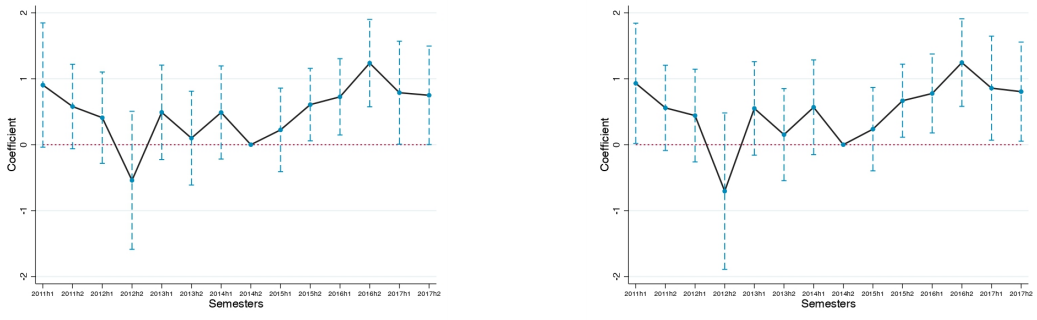
dynamic version of (1.1):

$$y_{mdt} = \alpha_m + \delta_{dt} + \sum_{j \in T} \text{FARC}_m \times \text{ExposureOthers}_m \times \delta_j^1 + \sum_{j \in T} \text{FARC}_m \times \delta_j^2 + \sum_{j \in T} \text{ExposureOthers}_m \times \delta_j^3 + \sum_{c \in \mathbf{X_m}} \gamma'(c \times \delta_t) + \epsilon_{mdt} \tag{1.2}$$

where T includes all semester of our sample period but the second semester of 2014, which is the period right before the ceasefire. The parameters δ_j^1 can be interpreted as the differential killings in municipalities with FARC presence that are exposed to the influence of other armed groups in year-semester j, relative to the year-semester right before the ceasefire.

The results are shown in Figure 1.3, where we plot the point estimates associated with the triple interaction of interest, together with the 95% confidence interval. The estimates plotted in Panel A included no controls and those of Panel B include the pre-determined controls interacted with the time fixed effects. Both cases include the municipality and time fixed effects. In neither case are there statistically significant coefficients in the years prior to the ceasefire, and the point estimates move around 0. This supports our choice of our *difference-in-differences* empirical strategy. However, the point estimates increase in magnitude after the start of the permanent ceasefire (with a slight decline in the last two semesters), and most of them are statistically significant.

Figure 1.3: Dynamic estimation and parallel trends Homicides of Social Leaders over Total Population.



(a) Without controls (b) With controls

Notes: This figure presents the coefficients from our dynamic specification presented in equation 1.2. We present the point estimates of the regression and the confidence of interval at the 90%.

We also conduct a more parametric test for differential trends during the pre-ceasefire period in following Muralidharan and Prakash (2017). In this test we interact a linear trend with FARC presence and other armed group exposure, FARC presence, and other armed group exposure and test for the significance of the coefficient for the triple interaction. We find no evidence of differential pre-trends (see Table A.3.4).

Finally we conduct a placebo exercise using the sign of the land agreement by FARC and the government during the peace negotiations in Havana in May 2013.[22] The regressions have the same structure as the one discussed in (1.1) but instead of a *Cease* dummy we add a *Placebo* dummy which takes the value one after the first semester of 2013. In this analysis we only focus on the sample 2011:1-2014:2, as to capture pre-ceasefire effects. We find that there is no differential increase in killings of social killers after this agreement in FARC dominated areas and exposed to other armed groups (see Table A.3.5). These results are consistent with the absence of differential pre-trends before the ceasefire and support the main result that most of the effect is driven by the ceasefire.

1.6.2 Further robustness

Our measure of exposure to the violent influence of other armed groups, based on a flexible neighborhood definition proposed by Acemoglu et al. (2015), interacts a dummy of presence of either neo-paramilitary criminal bands or the ELN guerrilla with a vector of (distance-penalized) neighboring municipalities (see section 1.4 for details). Thus, in our baseline measure a municipality m is more or less exposed to these groups depending on whether (and how many of) its neighboring municipalities experience their presence, and on how far is the centroid of these municipalities from that of m (after controlling for the average slope of the land between the two centroids).

Our results are not driven by using this specific measure of exposure. On the one hand, a simpler alternative measure defines exposure as the share of m's neighbors with presence of other armed groups. On the other hand, a more general measure does not restrict the distance-penalized indicator to m's neighbors, and instead uses all municipalities in Colombia (see Tables A.3.6 and A.3.7 in the Appendix). Overall,

[22] This was the first out of six agreements signed between the government and FARC, and was part of the main political agenda by FARC.

this is reassuring of our territorial dispute interpretation, as the surge in the killing of leaders in former FARC-dominated territories after the permanent ceasefire are driven by the exposition to other armed groups.

Our results are also not driven by lumping together neo-paramilitary criminal bands and ELN in the "other armed groups" category. These illegal armed actors have several differences, including their political objectives and their military strategy, which arguably involve different relationships with civilians.[23] Importantly, however, because of the irregular nature of Colombia's internal conflict, controlling valuable municipalities is instrumental to both groups (Berman and Matanoc, 2015).

Table 1.4 shows the results from estimating equation 1.1, using the rate of leaders killed as dependent variable, but including in the measure of other armed groups only the neo-paramilitary criminal bands (Columns 1 and 2) or only the ELN guerrilla (Columns 3 and 4).[24] Interestingly, FARC-dominated municipalities experience a differential surge in the rate of leaders killed after the start of the permanent ceasefire when they are exposed to the violent influence of either group, as measured separately. Moreover, in spite of the difference in the size of the reported estimated coefficients in Table 1.4, the economic magnitude of the effect is essentially equivalent.

Focusing on the even columns, which flexibly control for municipal-specific pre-determined characteristics, we find that in places with FARC presence prior to the ceasefire, a one standard deviation increase in the average municipal exposure to neo-paramilitary criminal bands (to the ELN) increases the rate of leaders killed by $0.364 \times 0.292 = 0.11$ ($0.356 \times 0.178 = 0.06$) per 100,000 inhabitants after the start of the permanent ceasefire. Recall that this effect, which in both cases is significant at conventional levels, is equivalent to doubling the rate of leaders killed relative to its pre-period mean.

Appendix A.0.1 tests if our results are exacerbated after the peace agreement

[23] Some of these differences are discussed in section 1.3.

[24] In Table A.3.8 we present a similar specification but where we include both neo-paramilitary and ELN interactions in the same regression. We find similar results in terms of magnitudes, while the point estimates are only marginally significant.

Table 1.4: Killing of social leaders by exposure to different armed groups

	Neo-Paramilitary		ELN	
	(1)	(2)	(3)	(4)
Cease × FARC × ExposureOthers	0.369*	0.403**	0.403**	0.449**
	(0.204)	(0.206)	(0.198)	(0.199)
Cease × FARC	−0.101	−0.132	−0.076	−0.061
	(0.101)	(0.107)	(0.091)	(0.100)
Cease × ExposureOthers	−0.244**	−0.263**	−0.239**	−0.250***
	(0.113)	(0.118)	(0.098)	(0.096)
Observations	14966	14966	14966	14966
Municipalities	1069	1069	1069	1069
Municipality FE	✓	✓	✓	✓
Department-Period FE	✓	✓	✓	✓
Controls		✓		✓
Avg Dep Var	0.101	0.101	0.101	0.101
SD Dep Var	1.083	1.083	1.083	1.083

Notes: This table presents the results from the main specification in equation (1.1). The dependent variable is the number of homicides of social leaders over total population. In columns (1) and (2) *ExposureOthers* is a continuous variable that measures paramilitary groups presence in the municipality or their (distance-penalized) vicinity, while in columns (3) and (4) is a continuous variable that measures ELN presence. See Table 1.3 for more details on variables definition, predetermined controls, and standard errors. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

between FARC and the government was signed and its implementation started at the beginning of 2017. We reject this conjecture.

1.6.3 Type of targeted leaders

As discussed in section 1.3.2, the label 'social leader' encompasses several different type activists that represent different 'communities' and hence have different motives and work for different causes. Table A.3.1 lists the different leaders included in the *Somos Defensores* data, such as leaders of community councils, ethnic groups, labor unions, teachers, sexual minorities, etc. Arguably, however, not all such leaders are equally attractive as potential targets of armed groups seeking territorial control. The qualitative discussion of section 1.3.2, in fact, implies that a specially risky category is that of leaders of local community councils or peasants dispossessed from their land.

To investigate the effect of the ceasefire on the killing of different type of leaders, we repeat Panel B of Figure 1.1 by splitting the evolution of killings into four categories: leaders of local community councils, leaders of peasant and conflict-related organizations, leaders of ethnic (indigenous or Afro-Colombian) communities, and a residual category of 'other' leaders. This is reported in Figure A.3.1. We note a stark increase in the killings of the first two categories (Panels A and B) right after the start of the permanent ceasefire, in places with both FARC presence and exposed to other armed groups in the pre-ceasefire period (but not in places with just FARC presence). However, we do not find a similar trend in either the category of ethnic leaders or in the residual category (Panels C and D).

A more formal test is presented on Table A.3.9 of the appendix, where we re-run the baseline empirical specification and study the effect of the ceasefire on the killing of leaders of different types, in places with both FARC presence and exposed to other armed groups. While the estimated coefficient of interest is positive throughout, it is only statistically significant (at the 5%) for the case of local community council leaders. While this is consistent with the anecdotal discussion provided above, these results have to be interpreted with caution given that splitting the dependent variable by type of leader leaves us with very few events per category.

1.6.4 Potential mechanisms

We now study the potential mechanisms behind the increased targeting of leaders in former FARC strongholds exposed to other armed groups, after the start of the ceasefire. To that end we estimate heterogenous effects for a range of municipal characteristics (see section A.0.2 for more details about the implementation of these tests). Specifically, we look at three broad set of factors: the demand for land restitution, the (lack of) state capacity, and the economic attractiveness of the municipality. We also, rule out that the killing of social leaders responds to other violent dynamics that lead to indiscriminate violence in some municipalities.

Land restitution claims

The lack of land property rights in rural areas has been at the heart of the Colombian conflict since its initial stages (Albertus and Kaplan, 2012; Flores, 2014). Traditionally, left-wing guerrillas have been in favor of communal rural lands and the right of peasants to appropriate idle land and peripheral 'baldíos'. On the other hand, right-wing paramilitary groups have helped local landowners and drug lords concentrate and formalize land, often through the use of violence and intimidation (Ch et al., 2018). Indeed, most of the victims of the armed conflict (7.4 out of 8.5 million as recorded by the *Unique Victims' Registry*) are IDPs, and many of them were dispossessed from their land by illegal armed groups, especially the paramilitary.

Law 1448 of 2011 (known as the 'Victims and Land Restitution Law') provided the legal framework for conflict victims to obtain assistance and reparations from the government, including humanitarian aid, psychological assistance, and a large set of material reparations. This package notably includes land restitution. To facilitate the latter, the law created the *Land Restitution Unit*, a Presidential special unit in charge of receiving all the land restitution requests and of overseeing the subsequent judicial and administrative restitution processes.[25]

Given the above discussion, we posit that the incentive of illegal armed groups to dispute the territories with prior FARC dominance following the start of the ceasefire

[25]Between 2012 and 2017 over 204 thousand hectares of land had been restituted (Unidad Administrativa Especial de Gestión de Restitucioón de Tierras, 2018).

is larger in municipalities that, since the enactment of Law 1448, have had a larger share of land claimed for restitution. In addition, we also expect that in this case the perpetrators are more likely to be neo-paramilitary criminal bands, which either directly benefited or represent groups of society who benefited from earlier land dispossession. This goes in line with some anecdotal accounts, which suggest that a non-negligible share of social leaders killed in Colombia are leaders of local community councils who specialize in mobilizing land-dispossessed victims to claim their land.[26]

Column 1 of Table 1.5 reports the estimated coefficient of the four-way interaction term described in equation A.2.2.1. In this case, the potential mechanism Z_m is a dummy variable that equals one for municipalities with land restitution claims above the median.[27] We find that municipalities with FARC presence and that are exposed to other armed groups experienced a larger boost in the killing of social leaders after the start of the ceasefire if they also had a relatively large number of land restitution requests.[28] Moreover, as expected, this heterogeneous effect is entirely driven by the killings perpetrated by neo-paramilitary criminal bands, and not by the ELN guerrilla.[29]. Again, this result suggests that other armed groups target local leaders whose activity constitutes a threat group's particular interests in a specific territory.

State presence

We have argued that the very nature of the peace process with FARC –that excluded other armed groups from the negotiations- constitutes a threat to the sustainability of the achieved 'peace' if not accompanied by state-led efforts to bring its capacity to the territory and consolidate its institutional presence. This argument can be extended to

[26]See "Si no protegen a los líderes comunales el Acuerdo de Paz fracasa", *La Silla Vacía*, 08/13/2018. Available from: `https://m.lasillavacia.com/si-no-protegen-los-lideres-comunales-el-acuerdo-de-paz-fracasa-67442?utm_source=newsletter&utm_medium=email&utm_campaign=Las2520cuatro2520patas2520de2520La2520Silla` (last accessed November 30, 2018).

[27]Specifically, we measure the intensity of the demand for land restitution using the number of requests for land restitution at the municipal level. Our dataset includes all the requests since the creation of the *Land Restitution Unit* until June 2015. However, our measure is only for the pre-ceasefire period.

[28]In our four-way interaction between FARC, other armed groups, and land restitution requests, 64% of the cases of municipalities with FARC and exposure to other armed groups have a large number of land restitution requests.

[29]Result available upon request.

Table 1.5: Heterogeneous effects by municipality characteristics

	Land Restitution	Judicial Inefficiency	Electoral Risk	Military Presence	Coca Suitability
	(1)	(2)	(3)	(4)	(5)
Cease × FARC × ExposureOthers × Z	0.746*	5.169**	1.523**	−0.276*	0.238
	(0.386)	(2.309)	(0.619)	(0.141)	(0.417)
Cease × FARC × Z	−0.049	−0.110	−0.491*	0.205**	0.277
	(0.210)	(0.691)	(0.280)	(0.102)	(0.368)
Cease × ExposureOthers × Z	−0.151	−1.396	−0.412	0.032	−0.356**
	(0.197)	(0.887)	(0.470)	(0.046)	(0.169)
Cease × FARC × ExposureOthers	0.001	−0.001	0.250	0.497***	0.392
	(0.304)	(0.259)	(0.177)	(0.188)	(0.312)
Cease × FARC	−0.113	−0.130	−0.041	−0.150	−0.359
	(0.130)	(0.140)	(0.129)	(0.111)	(0.341)
Cease × ExposureOthers	−0.200	−0.189**	−0.212***	−0.281***	−0.102
	(0.178)	(0.093)	(0.068)	(0.098)	(0.079)
Cease × Z	0.056	0.092	−0.077*	−0.018	−0.036
	(0.041)	(0.132)	(0.043)	(0.019)	(0.036)
Observations	14966	14966	14966	14966	14966
Municipalities	1069	1069	1069	1069	1069
Municipality FE	✓	✓	✓	✓	✓
Department-Period FE	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓
Avg Dep Var	0.101	0.101	0.101	0.101	0.101
SD Dep Var	1.083	1.083	1.083	1.083	1.083

Notes: This table presents the results from the main specification in equation (A.2.2.1). The dependent variable is the number of homicides of social leaders over total population. *Land restitution* is a dummy for those municipalities with the number of request for land restitution over the size of the municipality being above the median. *Judicial inefficiency* is the share of justice employees under disciplinary investigations. *Electoral Risk* is a dummy that takes the value of one if the municipality had abnormal behavior during the previous three congressional elections. *Military presence* is the logarithm of the distance to the closest military unit. *Coca suitability* is a dummy that takes the value one if the index for coca suitability from Mejía and Restrepo (2015) is above the median of the empirical distribution weighted by the exposure to coca plantations in neighboring municipalities. See Table 1.3 for more details on variables definition, predetermined controls, and standard errors. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

the degree of existing state capacity (prior to the ceasefire) in the municipalities with FARC presence. In principle, areas with existing state institutions would make it more costly for other armed groups to take control of the vacant territories by targeting the local populations.

However, it is worth noting that the concept of "state presence" encompasses different –and potentially contrasting– dimensions. In the case of Colombia, with a long and well-documented history of collusion between some factions of the military and illegal paramilitary groups (Staff et al., 1996; Romero, 2003; Dube and Naidu, 2015), military presence should be distinguished from other forms of state institutional presence, such as a strong judiciary or the existence of free and fair elections.[30] Indeed, to the extent that there was at least some collaboration between the military and illegal armed groups during our sample period, whereby the army protected, shared intelligence, or provided other types of support to the paramilitary, military presence could potentially *exacerbate* the risks faced by local leaders.[31]

We explore this idea formally by testing the extent of which different measures of pre-determined state capacity at the municipal level attenuate or exacerbate the targeting of social leaders by other armed groups in previously FARC-controlled areas after the start of the ceasefire. To that end, we use a measure of local judicial inefficiency (Column 2 of Table 1.5), electoral risk (Column 3), and the distance to the nearest military unit (Column 4) as proxies of state capacity to explore potential heterogeneous effects of our main result.[32] Conceptually, both judicial inefficiency and

[30]Paramilitary groups were first created in Colombia with the enactment of law 48 of 1968, that established protocols for the armed forces to arm and train civilians as a counter-insurgency strategy in conflict-affected areas. These organizations were then made illegal by the Constitutional Court in 1989. Some factions of the army, however, continued collaborating, now under the table, with paramilitary forces.

[31]As an extreme case example, the Colombian armed forces have also been accused of directly perpetrating the assassination of local leaders. According to CINEP (2020), between 2016 and 2018 14 leaders were killed by the army and the police. As of 2020, the Inspector General's Office was investigating 18 cases involving acts of violence from government forces against local leaders (International Crisis Group, 2020). Moreover, the armed forces have also been shown to have killed hundreds of civilians when the government of President Uribe (2002-2010) provided incentives to kill or capture insurgents (Acemoglu et al., 2020).

[32]To measure judicial inefficiency, we follow Acemoglu et al. (2020) and use data from Colombia's *Inspector General Office*, the institution in charge of disciplinary oversight of all public servants. Based on an event-based dataset with all processes arising from complaints against public servants from 1995 to 2010, we compute judicial inefficiency as the ratio between the number of complaints against

electoral risk are proxies of lack of the type of state capacity that should mitigate the risk faced by local leaders. Municipalities with either of these characteristics are likely to engage in more monitoring and law enforcement. In contrast, as explained above, the proximity of the military could potentially be a source of empowerment for certain illegal groups.

The four-way interaction with judicial inefficiency and electoral risk measures are positive and significant, suggesting that when the local judiciary is inefficient and local electoral institutions are weak and manipulable (an inverse proxy of state capacity), illegal armed groups find it easier to get away with the killing of local community leaders.[33] Specifically, we find that a one standard deviation increase in the level of judicial inefficiency (0.08) increases the rate of leaders killed in 0.12 ($=4.932 \times 0.08 \times 0.325$).[34] This is equivalent to doubling the sample mean. Moreover, as in the case of land restitution we find that the effect is mainly driven by exposure to paramilitary groups, which are the ones that have been more involved in scandals related to co-opting local judges (see López 2007, Ávila and López 2010).[35] Also we find that a municipality with higher electoral risk had an increased the number of killings in 1.514 cases.

In Column 4 of Table 1.5, we test for heterogeneous effects related to the vicinity to military units, as measured by the logarithm of the distance between the military base and the municipal centroid.[36] We find that a negative and significant four-way interaction.[37] This suggests that municipalities closer to a military unit experience a

judicial officials in a specific municipality and all the complaints against any public servant in that same municipality. To measure electoral risk, we use data from *Misión de Observación Electoral*. According to this NGO, a municipality's electoral risk is high if it experienced persistent abnormalities during the previous three elections. These include: atypical voting shares for some candidate, abnormal behavior of either void votes or unmarked ballots (over two standard deviations higher than the national mean) and an atypical turnout.

[33]Acemoglu et al. (2020) show that one source of local judicial inefficiency is the capture by groups with *de facto* political power to get away with unlawful behavior.

[34]In our four-way interaction between FARC, other armed groups, and judicial inefficiency, 70% of the cases of municipalities with FARC and exposure to other armed groups have judicial inefficiency.

[35]Results available upon request.

[36]A military unit is defined as a brigade headquarter, which includes several battalions, and it can have from 500 to 5,000 soldiers.

[37]In our four-way interaction between FARC, other armed groups, and military presence, 72% of the cases of municipalities with FARC and exposure to other armed groups have military presence.

higher rate of leaders killed. As discussed, this is consistent with the evidence that documents illegal links between some factions of the armed forces and paramilitary groups (see Álvarez, 2015, CNMH, 2018, for additional qualitative evidence).

The validity of these results rely on two important assumptions. First, the degree of state presence was already different across FARC strongholds and the rest of the country prior to the start of the ceasefire. Second, our argument about the window of opportunity generated by the vacuum of power that followed the ceasefire assumes that state capacity did not differentially change after the ceasefire in both types of municipalities. The latter point is important because it also rules out a potential strategic behavior of the government whereby state presence is *reduced* in former FARC strongholds as a way to facilitate the arrival of illegal groups and the elimination of some forms of community collective action.

Tables A.1.2 and A.1.3 of the Appendix suggest that both of these assumptions are plausible. First, Table A.1.2 shows that, prior to the start of the ceasefire, municipalities with FARC presence had higher judicial inefficiency and electoral risk, as well as lower administrative and fiscal capacity (in the form of per capita tax revenues, expenditures and the reception of transfers from the central government). Second, Table A.1.3 uses the proxies of state capacity for which we have enough time variation and documents that neither proxy changes significantly in FARC-affected areas, relative to other municipalities, after the start of the ceasefire.

Economic incentives

Third, to test for differential effects based on the availability (or potential) of illegal rents, we add estimate a heterogeneous effect based on the *coca suitability* of each municipality (see Mejía and Restrepo 2015).[38] As reported on Column 5 of Table 1.5, we do not find that more leaders are killed in places with higher coca suitability.[39] Moreover, this no-result is robust to measuring coca with actual coca availability (the share of municipal land cultivated with coca) or the availability of (legal or illegal)

[38]Prem et al. (2021b) show that after a naive policy announcement about crop substitution in 2014 there was an increase in coca cultivation in areas with more coca suitability.

[39]In our four-way interaction between FARC, other armed groups, and coca suitability, 70% of the cases of municipalities with FARC and exposure to other armed groups have high coca suitability.

Table 1.6: Overall homicides rate, FARC presence, and exposure to other armed groups

	Homicide rate	
	(1)	(2)
Cease × FARC × ExposureOthers	4.787	4.221
	(3.825)	(3.635)
Cease × FARC	−2.084	−1.568
	(2.177)	(2.230)
Cease × ExposureOthers	−3.688**	−4.210***
	(1.521)	(1.526)
Observations	14966	14966
Municipalities	1069	1069
Municipality FE	✓	✓
Department-Period FE	✓	✓
Controls		✓
Avg Dep Var	12.595	12.595
SD Dep Var	28.347	28.347

Notes: This table presents the results from the main specification in equation (1.1). The dependent variable is the total number of homicides excluding social leaders over total population. See Table 1.3 for more details on variables definition, predetermined controls, and standard errors. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

natural-resource mines. Overall our results do not support the idea that the economic value of municipalities exacerbate the killing of social leaders.

Indiscriminate violence as an alternative explanation

As a final attempt to identify the potential mechanism explaining our main result we investigate the effect of the ceasefire on the aggregate homicide rate of municipalities. Our story requires that the killing of social leaders is driven by the selective targeting of leaders so as to thwart collective action at the local level, and not by indiscriminate municipal violence. To rule out that our results are explained by an aggregate increase in insecurity in FARC-dominated territories exposed to other armed groups after the ceasefire, that mechanically translates into more leaders killed, Table 1.6 estimates equation 1.1 using as dependent variable the overall municipal homicide rate. The coefficient of interest, associated with the triple interaction, is not statistically significant. This is reassuring that social leaders are being selectively targeted by other armed groups.

1.7 Conclusions

Territorial contestation by armed groups in the context of civil war often involves the selective killing of civilians. This strategy, which has been documented by a vast literature in political science, is used to encourage allegiance, as well as to achieve informal collaboration, prevent defections, mobilize supporters, and increase military strength. In this paper, we posit that peace agreements may trigger territorial disputes and thus the selective targeting of civilians if two key conditions are present. First, not all the active armed groups are included in the peacemaking efforts. Second, the legitimate government fails to establish key components of state presence in the areas formerly controlled by the groups who participate in the agreement. That these two conditions can ignite selective violence against civilians is consistent with the post-agreements dynamics of countries such as Guatemala, Nepal, and Sierra Leone.

We test the conjecture formally by leveraging the subnational longitudinal variation provided by the recent peace process in Colombia between the FARC insurgency and the central government. Our estimation strategy exploits the temporal variation given by the ceasefire as well as the cross-sectional variation given by the presence of FARC and the exposure to the influence of other armed groups. We do so in a triple differences model that controls for two-way fixed effects and for differential trends parametrized by a large set of pre-determined municipal controls.

We show that the recent surge in the systematic killing of local social leaders in Colombia can be –at least partially– explained by the vacuum of power that FARC's permanent ceasefire left in this group's controlled areas, which encouraged other illegal armed groups seeking to occupy these areas to target local community leaders. Our results are not explained by the overall municipal homicide rate which suggests that they are not caused by either a differential change in reporting after the ceasefire or by a strategy of indiscriminate violence against civilians. In addition, we show that the killing of leaders is exacerbated in areas with high demand for land restitution and a weaker state capacity in the form of an inefficient local judiciary and high electoral risk.

Overall, the selective killing of civilians, we argue, constitutes an unintended negative consequence of a partial pacification process that was not accompanied by an effort

to consolidate the control of the territory by the legitimate state. In the case of Colombia, despite the historical importance and the tremendous opportunity of the peace agreement with the FARC, the recent surge in the killing of social leaders may be the beginning of a new and more sophisticated stage of social disruption. We hope to be wrong.

Chapter 2

The Strategic Use of Violence: The Impact of The War On Drugs On Civilian Victimization in Colombia

2.1 Introduction

Political violence has killed about 100 million people worldwide since 1900 (Valentino, 2004). During the Vietnam War, two million Vietnamese civilians were killed (Shenon, 1995). Recent wars, such as those in Afghanistan and Iraq, have led to the deaths of 26,000 and 134,000 civilians, respectively (Crawford, 2011; Iraq Body Count, 2005). Colombia's armed conflict, which had been the longest-running civil war in the Western Hemisphere until recently, killed at least 220.000 people between 1958 and 2012. (Centro Nacional de Memoria Histórica, 2013). The motivation for certain armed actors to employ violence to coerce the civilian population appears to be self-evident: they view civilian population targeting as a means of achieving specific objectives.

Civilians are not passive participants in the intricacies of a civil conflict. More importantly, they regularly assist warring sides by supplying economic and social resources, intelligence, recruits, and other essential inputs (Valentino, 2014). Armed actors are urged to interact with civilians in order to gather those resources and retain territorial control.(Wood, 2014a; Wimmer and Miner, 2019). There are fewer incentives for armed actors to commit deadly violence against the civilian population when the

former can sustain significant popular support (Wood, 2014b). When armed actors, on the other hand, are not locally supported, they are more inclined to use coercion against civilians to prevent defection (Wood, 2014b; Schwartz and Straus, 2018a).

Military capabilities, on their own, are not sufficient to vindicate civilian victimization. Political factors are also important (Besley and Persson, 2011; Balcells, 2011, 2017b; Heger, 2015). Armed actors can leverage on civilians' political attitudes to identify their ideological leanings. First, political preferences determine the extent to which people would collaborate with armed actors. Second, if a local community is politically motivated to work with other rival factions, such preferences may warn armed actors to potential threats. Third, political violence occasionally nurtures personal feuds motivated by rivalry and revenge dynamics. Finally, armed actors taking part in democratic elections may regard civilian victimization as extremely costly (Heger, 2015). To some extent, factors such as labor returns, armed group internal organization, and rebel governance all contribute to the dynamics of violence against the civilian population as well (Humphreys and Weinstein, 2006; Kalyvas, 2006a; Arjona, 2016b; Gutiérrez and Wood, 2014).

Do non-state armed organizations use violence strategically? This is an important issue to address because it provides the framework for pacification strategies aimed at reducing the pain and suffering of innocent people during civil conflicts, and countering any mechanism that promotes violence on ongoing civil wars. The purpose of this paper is to analyze whether the use of violence in a civil war is bounded by the need to secure territorial control. Specifically, the paper examines the causal effects of aerial spraying operations to eradicate coca production on patterns of civilian victimization committed by the FARC insurgency and paramilitary groups, two of Colombia's most well-known non-state armed organizations. Shocks to coca production have been shown to influence conflict outcomes in Colombia (Dube and Vargas, 2013b; Abadie et al., 2015; Dube and Naidu, 2015; Wright, 2020).

This paper exploits municipal-monthly data on aerial spraying operations launched to eradicate coca production. Because both the FARC and paramilitary groups were involved in illicit drug-trafficking, such operations could be regarded as a negative economic shock for non-state armed organizations' rents (Saab and Taylor, 2009; Abadie

et al., 2015). Furthermore, because these operations are frequently accompanied by security personnel, eradication operations may be perceived as a military shock that delivers government presence in the short term. This last argument suggests that aerial eradication operations are fueling confrontations between different armed groups (legal and illegal ones). Since insurgencies and paramilitary groups are militarily weaker than security forces, aerial eradication operations end up jeopardizing FARC's and paramilitary groups' territorial control in municipalities where operations take place. As a result, non-state armed organizations aim to reinforce territorial control in those areas. I adopt the military shock interpretation to show how aerial spraying operations drove non-state armed organizations to consolidate territorial dominance in strategic areas. The contest for territorial domination resulted in violence against the local population living in those territories. The study employs unique microdata on the repertoires of violence perpetrated by non-state armed organizations in Colombia. The dataset distinguishes between different categories of violence: non-lethal and lethal violence, and attacks on the general public, local officials, social leaders, and adversaries' informants. The types and targets of violence varied considerably over time, among municipalities, and among non-state armed organizations, consistent with a logic of strategic use of violence.

I employ a set of meteorological indicators that, in advance, would limit the likelihood of eradication operations being conducted. Then, based on an instrumental variables approach in which I leveraged on random weather fluctuations, the results show that aerial eradication operations trigger violence against civilians. The upsurge in violence is the result of paramilitary groups resorting to both non-lethal and lethal forms of violence. Such violence was indiscriminately aimed at the general public and local community leaders. Unlike paramilitary groups, the FARC used non-lethal means of violence against local officials. Finally, the findings show that, despite the fact that both the FARC and paramilitary groups were equally involved in illicit drug activities, they reacted differently to the same event. Armed actions are prompted by a set of incentives affecting non-state armed organizations. In this case, the FARC relied on the support of the local population to expand its illegal enterprise more than paramilitary groups did. As a result, local populations are less vulnerable to FARC-related violence than to paramilitary violence simply because they have some degree of agency in opposition to the FARC's mandate.

The *de facto* presence of the government in areas where it has historically been absent sparks off the response from non-state armed organizations. Aerial eradication operations prompted an increase in combats between security forces and irregular elements in localities where operations were carried out. Overall, the findings appear to indicate that non-state armed organizations entered in confrontations with security forces following aerial eradication efforts. The government's presence forced the FARC and paramilitary groups to operate under strict limitations in municipalities they controlled, and pushed them to solidify territorial control. To avoid territory losses, the FARC needed to employ violence strategically. In essence, patterns of violence against civilians are led by the military power of non-state armed organizations and the presence of security forces.

This paper contributes to the current literature in various ways. First, it addresses directly to the research on civilian victimization by explaining what factors might influence the use of violence against civilians during ongoing civil wars. Second, the paper highlights the shortcomings of studying the dynamics of civil conflicts using aggregate metrics of violence. The assumption that all types of violence are equivalent and that a non-state armed organization employs them without any strategical regard is a misleading fact. The findings show that non-state armed organizations are limited by the degree of violence they are willing to inflict on civilians. Depending on the constraints that a non-state armed organization binds, certain forms of violence provide different strategic advantages. Third, the study refers to the research on the unintended consequences of the war on drugs and how such policies might backfire if they create incentives for violent actors to punish and coerce civilians.

Numerous barriers exist in the study of the strategic use of violence in ongoing civil wars. The primary obstacle is the lack of data or the limitations of the information that is already available (Blattman and Miguel, 2010). Abadie et al. (2015) previously conducted an econometric evaluation of Plan Colombia, assessing the impact of aerial eradication operations on the dynamics of violence in Colombia between 1999 and 2005 at the local level. They found an increase in guerrilla attacks following eradication in sprayed regions in both the short and long terms. The increase in violence is being driven by battles between security forces and the insurgency, as well as the killing of

combatants and civilians. While Abadie et al. (2015) solely look at the influence of aerial spraying on guerrilla violence, the present paper focuses at the impact of aerial eradication on guerrilla violence as well as violence committed by other armed actors. Finally, I resort to different definitions of violence.

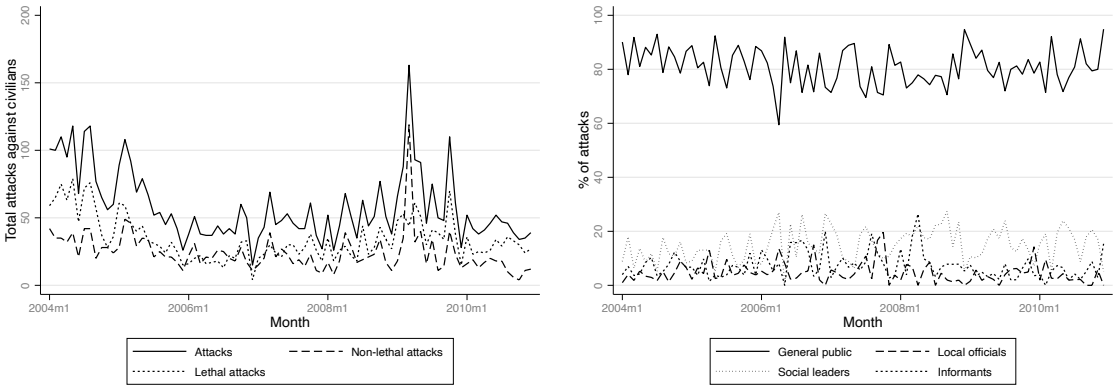
A series of questions remain unsolved yet. This paper focuses on the causal effects of aerial eradication operations on violence against civilians perpetrated by armed actors. Other sorts of unexpected shocks are likely to have driven non-state armed organizations to resort to different victimization strategies. In addition, this paper does not investigate the causal effect of civilian victimization on civilian collaboration. Future research should help to clarify whether civilian victimization is an effective strategy for a non-state armed organization to obtain territorial control and civilian collaboration (Kalyvas, 2006a; Lyall, 2009a; Condra et al., 2010; Condra and Shapiro, 2012b; Condra and Wright, 2019; Wright et al., 2019; Prem et al., 2021a).

2.2 Theory and empirical expectations

During an ongoing civil war, civilian victimization varies greatly over time. Figure A.3.1 shows that there is a temporal fluctuation in the number of attacks directed at civilians by non-state armed organizations in Colombia from 2004 to 2010. Aggregate metrics, on the other hand, hide various patterns of violence. Consider the difference between lethal and non-lethal violence. Figure A.3.1 depicts temporal intervals in which lethal violence is the most common type of victimization, while non-lethal violence predominates on a few other moments. For example, while lethal violence reaches its apex in 2004, non-lethal violence reaches its highest level in 2009.

When studying violence against civilians, it is crucial to assess the intention of such victimization. Figure 2.1b depicts the percentage of attacks by target category: i) the general public, ii) local officials, iii) local community leaders (social leaders), and iv) informants. Figure 2.1b demonstrates that the target of attacks changes over time. Though most victimization is directed at the general public, non-state armed organizations also focus their violence towards certain segments of the population: influential civilian figures.

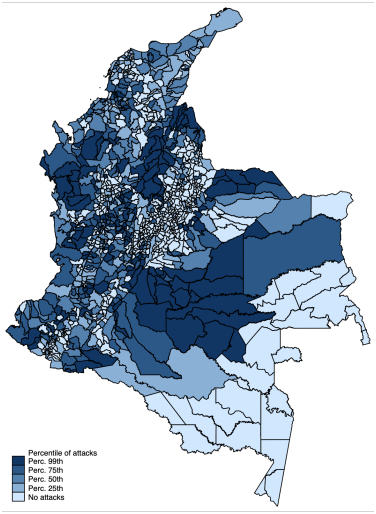
Figure 2.1: Civilian victimization in Colombia, 2004-2010.



(a) Attacks (b) Targets

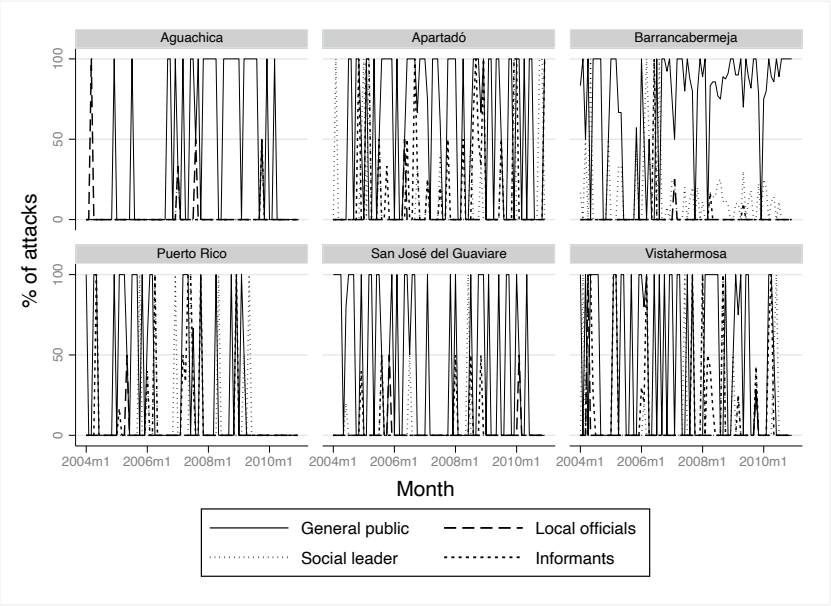
Furthermore, civilian victimization in Colombia exhibits spatial patterns. Figure 3.2 divides Colombian municipalities into quartiles based on the overall number of attacks on civilians per 100,000 population from 2004 to 2010. The darkest municipalities are considered the most violent ones. Violence against civilians, as depicted, is highly localized. The attacks appear to be concentrated in jurisdictions of Chocó, Antioquia, Bolívar, Santander, Norte de Santander, Arauca, Meta, Nariño, and Putumayo.

Figure 2.2: Distribution of attacks against civilians at the municipal level in Colombia, 2004-2010.



Finally, the targets of violence vary considerably on a local level. Figure 3.3 depicts the percentage of attacks classified by type of target in Colombia's six most violent municipalities between 2004 and 2010. It illustrates that the target of civilian victimization varies according to municipality. For example, violence in Apartadó (Antioquia) primarily targets the general public and informants, but violence in Barrancabermeja (Santander) primarily targets the general public and social leaders. Except for Barrancabermeja, practically every other municipality report a high level of violence against local officials. Violence against informants and social leaders appears to be irrelevant in Aguachica (Cesár).

Figure 2.3: Target of attacks against civilians, 2004-2010.



What explains such temporal and spatial variation in the repertoires of violence and the targets of that violence throughout a civil war? I propose that the answer addresses two conditions that are directly related to territorial control: i) the strategic value of territory, and ii) the extent to which civilians collaborate with combatants, or more broadly, with non-state armed organizations. Territory is a key factor in determining the onset and duration of a war, and territorial disputes are a major cause of armed conflict around the world (Toft, 2014). After all, a non-state armed organization requires a physical location in which to safely assemble military camps,

plot strategies, ensure protection from adversaries' attacks, and store its armament (De La Calle and Sánchez-Cuenca, 2015). The ability to exercise territorial control displays the non-state armed organization's military capability (Carter, 2010).

Permanent military presence in controlled territories is a difficult task for armed actors, especially if they dominate large areas and have limited access to resources. Armed actors are compelled to use violence more effectively under this scenario in attempt to uphold territorial control. This is a crucial task to do, as non-state armed organizations are well aware that successful territory control results in civilian collaboration. This is illustrated by the fact that the greater the territorial control of a non-state armed organization, the greater the level of civilian collaboration (Kalyvas, 2006a).

The logic of my argument is straightforward. A non-state armed organization seeks civilian collaboration in order to support the fighting, and therefore leverage some relative advantage against its rivals. It can accomplish this in a number of different ways, both violent and non-violent. On the other hand, the primary objective of civilians in an ongoing civil war is to keep themselves safe, and the right approach is to empathize with the most powerful armed group. Though the civilian population might not align with the goals and ideals of an armed actor, this does not preclude them from cooperating with a non-state armed organization. Then, the civilian population will provide resources, intelligence, or even political support, as long they feel they are protected from any threat. This statement leads to another condition that must be met in order to ensure the existence of any sort of civilian collaboration with armed actors in a civil war, which is that armed actors must be capable of providing security to those who collaborate with them. That is, the civilian population must be confident that their collaboration with an armed actor will not result in any repercussion for them; the non-state armed organization must persuade civilians that it is truly more powerful than other warring factions and that it has the capacity to manage long-term territorial control (Kalyvas, 2006a). The way the non-state armed organization signals its military capacity is by the use of force, either to demonstrate its ability to inflict harm on civilians or to defend them from enemies' retaliation. In this sense, the level of violence perpetrated by a non-state armed organization is directly proportional to its ability to maintain territorial control and how much of that control is transmitted

to collaboration from the local population settled on those territories. However, it is necessary to emphasize that a non-state armed organization cannot use violence arbitrarily.

2.2.1 The strategic value of territory

While resources might come from a variety of channels, most non-state armed organizations rely mainly on local civilian support (Kalyvas, 2006a). When communities and combatants trust enough on each other, civilians can be a reliable source of recruits, funding, and information. This could occur because the civilian population feels aligned with the goals of a non-state armed organization, or just because it supplies the community with public goods, such as roads, education, and security.

The strategic value of a territory determines the probability that combatants will continuously encounter with civilians; violent incidents in which combatants and civilians engage are more likely to occur in highly strategic areas where a non-state armed organization plans to operate (Arjona, 2016b). As a result, once disputes over territorial control arise, either because a new armed actor disrupts in a territory or because two opposing groups enter a new territory that has not yet been captured, civilian victimization will become more common as non-state armed organizations rely on local public support to ensure victory in the struggle for territory control. Civilian coercion is one approach for gaining support. This is especially true in places of strategic relevance to the non-state armed organization's objectives; the non-state armed organization will seek to obtain control of territories that provide it with critical resources so that it can thrive. That is:

Hypothesis 1: Disputes over territorial control will exacerbate civilian victimization locally.

The strategic value of a territory is proportional to the level of resource it provides to the combat capabilities of a non-state armed organization. Its coping mechanism for securing territorial control is to intimidate the civilian population to support it. *Hypothesis 1* may therefore explain why civilian victimization would follow spatial patterns in the presence of attractive resources in specific places.

2.2.2 Collaboration between combatants and civilians

When a non-state armed organization already enjoys considerable local support, violence is minimized (Humphreys and Weinstein, 2006; Wood, 2014b,a). As a result, when a non-state armed organization relies significantly on civilian collaboration and enjoys widespread support, indiscriminate violence is unlikely to occur. Despite this, the armed actor still needs to preserve collaboration and dissuade locals from defection. As a result, it foregoes the use of indiscriminate violence in behalf of utilizing selective means of victimization. Selective violence would allow for stronger enforcement from the civilian population while avoiding a non-state armed organization to afford the costs associated with the use of excessive deadly violence (Kalyvas, 2006a). Even when a non-state armed organization seeks to expand its territorial dominance, these constraints persist. That is:

Hypothesis 2: If a non-state armed organization relies significantly on civilian collaboration, territorial disputes will escalate selective violence. Conversely, if a non-state armed organization does not rely on civilian collaboration, territorial control disputes will erupt in indiscriminate violence.

Following *Hypothesis 2*, upsurges in civilian victimization following territorial control disputes would be concealing patterns of violence according to diverse repertories of violence. *Hypothesis 2* establishes that different repertoires of violence could exhibit distinct spatial patterns of victimization depending on how robust the collaboration between civilians and a non-state armed organization is at the time. An armed actor is aware of the different payoffs generated through different victimization strategies, so it employs the one that maximizes the likelihood of the civilian population collaborating with it. For instance, a non-state armed organization may increase the effectiveness of civilian victimization by directing violence at specific members of a local community (Prem et al., 2021a). Similarly, a non-state armed organization might increase the scope and impact of an attack by deploying multiple types of violence. As a result, when assessing the efficacy of selective or indiscriminate violence, a non-state armed organization must also decide the level of lethality of violence. Indeed, the extent of collaboration with the civilian population will determine which combination of target and violence lethality is more suitable for the goals of a non-state armed organization. That is:

Hypothesis 3: If a non-state armed organization relies largely on civilian collaboration, territorial disputes will lead the organization to resort to non-lethal strategies of civilian victimization (non-lethal violence). Conversely, if a non-state armed organization does not rely on civilian collaboration, disputes over territorial control will lead the organization to leverage on any kind of violence (lethal or non-lethal).

Both *Hypotheses 2* and *3* suggest two separate possibilities: i) a non-state armed organization that enjoys strong support locally will resort to selective non-lethal violence in order to keep the local population in check, and ii) non-state armed organization that does not rely on civilian support will indiscriminately use any form of violence. My theoretical argument depicts territorial disputes as a major factor influencing civilian victimization. It establishes that civilian victimization by a non-state armed organization will increase following territorial control disputes. This upsurge, however, will not spread uniformly throughout all territorial disputes, but concentrates in areas with strategic significance for the non-state armed organization. Finally, civilian victimization entails the use of a variety of violent repertoires, with substantial collaboration among civilians and combatants determining whether a non-state armed organization resorts to selective or indiscriminate violence in local territories. Besides repertoires of violence, civilian collaboration influences the degree of lethality of such violent engagements.

2.3 Colombia's civil war

The rise of insurgencies such as the *Revolutionary Armed Forces of Colombia* (FARC, in spanish) and the *National Liberation Army* (ELN, in spanish) in the mid 1960s marked the beginning of Colombia's civil war. Both non-state armed organizations exemplified unresolved political conflicts during the so-called *La Violencia*. The conflict closely followed the Cold War's unfolding during the 1980s, and it erupted in the 1990s due to insurgencies' continued involvement in criminal activities such as drug-trafficking. The FARC was the most active insurgency in this regard, as the ELN only played a minor role in the illicit drug production.

Colombian President Belisario Betancur showed his determination to seek a peaceful

settlement to end violent engagements with leftist insurgencies in 1982. These talks were met with tremendous opposition, mainly from the military and local elites, who saw the peace talks as an opportunity for the FARC to consolidate its power. To obstruct peace talks with the insurgents, the military, local elite, and drug-traffickers formed a criminal coalition known as the *United Self-Defenses of Colombia* (AUC, in spanish). The FARC and AUC were the two most powerful non-state armed organizations in Colombia and both got engaged in the drug-trafficking business receiving a major portion of their funding from that activity. While drug-trafficking income accounted for 48% of FARC's budget, it accounted for 70% of AUC's budget (Saab and Taylor, 2009; Abadie et al., 2015; Fisher and Meitus, 2017).

According to Saab and Taylor (2009), both the AUC and the FARC were involved in the worldwide drug-trafficking business at various stages. Paramilitary groups tightened their presence in foreign markets and developed their "in-house" trafficking capabilities, whilst the FARC remained focused on protection and production, instead delegating the distribution part to external organizations. According to Saab and Taylor (2009), the FARC's decision to refrain from engaging in criminal activities was influenced by political concerns. They were struggling to avoid being regarded as a criminal organization with no political grievances. The AUC was operating at a completely different juncture since its political leanings enforced no constraints on its ability to participate in illicit drugs production.

In terms of illicit drugs cultivation in Colombia, the AUC organized itself to ensure control over vast extensions of land by promoting systematic land expropriations against the local population. Anecdotal evidence tell paramilitary groups killed peasants as they took control of a territory, and then seized rural properties and established control of trafficking routes. At the same time the AUC grew, processed, and transported its own cocaine shipments by itself as it traded its product in international markets (Saab and Taylor, 2009). In contrast, the FARC benefited most from protection fees (or taxes, so-called *gramaje*) imposed on local coca producers, as well as outsourcing its product's marketing in international markets to small external criminal groups (Saab and Taylor, 2009; Fisher and Meitus, 2017).

Coca crops rapidly grew in the second half of the 1990s, coinciding with the

development of Colombia's civil war. Between 1990 and 2000, the planting rate of coca bushes increased from 19% to 74%, making Colombia one of the world's major producers of coca leaves (Rozo, 2012; Mejía, 2016). This production was roughly distributed over 200 municipalities, with about half of all coca crops concentrated within ten municipalities (Mejía, 2016). Colombia was the top cocaine exporter in 2009, accounting for between 60% and 80% of global supply (Fisher and Meitus, 2017; Mejía, 2016). According to Mejía (2016), 55% of cocaine production was exported to North America, while the rest was exported to Europe.

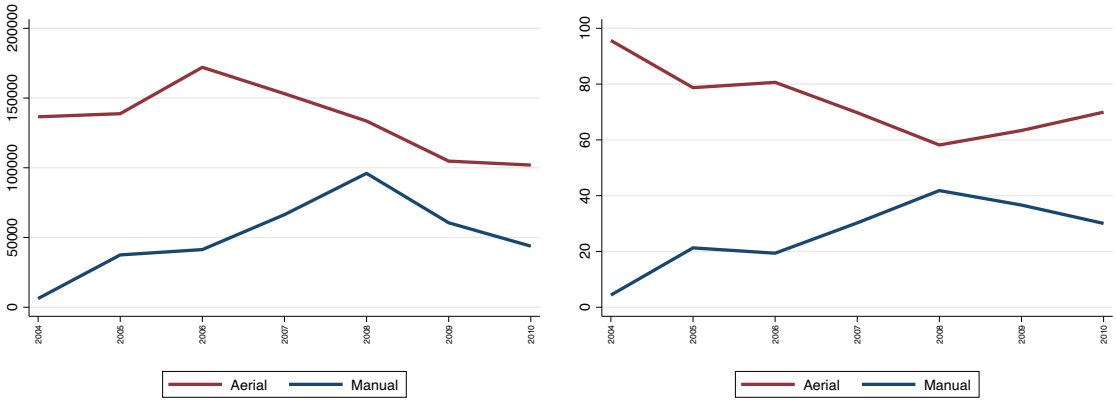
The Colombian government launched a policy in 1999 to reduce cocaine production and challenge the territorial domination of non-state armed organizations. This plan was known as *Plan Colombia* and had outlined a concrete set of goals, including: i) reducing cocaine production and trafficking by half over a six-year period, and ii) improving security conditions at the local level in Colombia by gaining control of areas traditionally dominated by non-state armed organizations (Mejía, 2011, 2016; DNP, 2006). Between 2000 and 2008, the *Plan Colombia* budget averaged US$540 million per year, in addition to the Colombian government's annual investment of US$812 million. In the end, *Plan Colombia* accounted for over 1.1% of Colombia's annual GDP (Mejía, 2016).

2.3.1 Plan Colombia: aerial spraying of coca crops programme

The aerial and manual eradication of coca crops has been the dominant strategy to minimize cocaine production. More than two million hectares of coca bushes have been destroyed in total, with 1.6 million hectares eradicated via aerial spraying and the remaining eradicated via manual efforts (Mejía, 2016).

Since 1978, the Colombian government has used aerial herbicide spraying (mainly glyphosate) to try to eradicate coca cultivation. It accounted for more than 40% of total public spending on anti-drug programs (Rozo, 2012). Figure 3.3 depicts the progress of coca hectares eliminated from 2004 to 2010, separating aerial and manual operations. In 2004, practically all eradication programs relied heavily on aerial spraying. Nonetheless, since 2004, manual eradication operations have grown in importance, accounting for over 40% of eradication activities in 2008. In 2010,

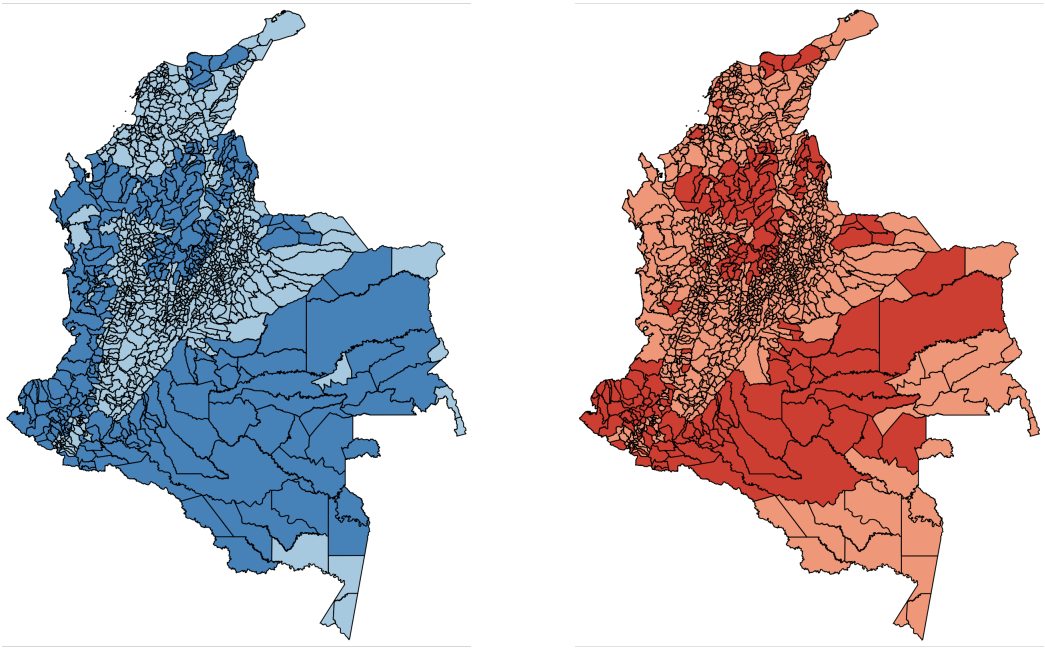
Figure 2.4: Hectares of coca eradicated, 2004-2010.



(a) Levels (b) Proportions

aerial spraying activities stabilized approximately 100.000 hectares, down from 170.000 hectares in 2006. Aerial eradication was the most common type of coca eradication program during the study period.

Figure 2.5: Hectares of coca cultivated and eradicated by municipality, 2004-2010.



(a) Coca production (b) Aerial eradication

Satellite images are used to guide aerial spraying. As a result, locations with a higher reported number of hectares covered by coca bushes are more likely to be targeted by eradication initiatives, simply because such areas are more noticeable (Rozo, 2012). Figure 3.4 depicts the geographic distribution of coca production and eradication, confirming such pattern. Except for a few jurisdictions located at the south of the country and the Pacific region, both maps almost match perfectly. Coca cultivation was expanded over the Pacific, Magdalena Medio, Norte de Santander, Arauca, La Guajira, and the Amazon region. The Pacific Region (Cauca and Nariño), the country's center, Magdalena Medio, Norte de Santander, Arauca, and La Guajira have received the most aerial spraying.

Despite efforts to reduce coca planting, there is no consensus on the policy's real impact. According to some empirical evidence, aerial eradication had no effect on the amount of hectares of coca cultivated. Reyes (2014) concludes that a 1% increase in coca eradication contributes to a 1% rise in coca-cultivated area. Rozo (2012), on the other hand, reveals that following fumigation, harvested area reduces by 1.09 hectares. Aerial spraying has little influence on bushes productivity over lengthy periods of time because coca producers become more skilled and capable of adapting to new security conditions (Rozo, 2012; Mejía and Restrepo, 2009). Mejía et al. (2017) found that spraying 1 hectare reduces coca cultivation by between 0.022 and 0.03 hectares. They find that aerial spraying is not a cost-effective strategy for combating cocaine production in Colombia. The fundamental reason somehow explaining why aerial spraying has not been having any evident impact on cocaine production is that eradication operations has no effect on cocaine retail prices. As a result of their market dominance, non-state armed organizations behave as a monopoly and have the ability to set the prices of cocaine (Gallego and Rico, 2013).

In addition to the ineffectiveness of aerial eradication on impacting coca growing, the use of herbicides such as glyphosate has unanticipated impacts on local population health and detrimental environmental effects (Relyea, 2005; Cox, 2005; Imming, 2010; Camacho and Mejía, 2017). The effect of aerial eradication on conflict outcomes is a less well-studied topic. According to Mejía (2016), drug-related homicides accounted for 25% of all homicides committed between 1994 and 2008, reporting for around 57.000 victims. Abadie et al. (2015) investigates the impact of aerial spraying of coca crops

on conflict dynamics at the local level in Colombia. They show that guerrilla activity increases after eradication in a given area, supporting the premise that guerrilla groups attempt to maintain control of coca fields.

2.3.2 Empirical predictions adapted to the Colombian case

Aerial spraying activities were typically conducted in conjunction with military actions. Because the aircraft used to spray coca fields are not combat-ready, it risks being shot down if it is dispatched without any kind of protection (Reyes, 2014; Wright, 2020). To enhance the security of eradication operations, security forces establish protection perimeters to ensure that herbicides released from small aircraft land on areas that are supposed to be eradicated. They also keep aircraft from being attacked (Policía Nacional de Colombia, 2014). Rebel operatives always try to fight state security forces when the former look to set up the right conditions for aerial eradication operations to be performed. Nevertheless, state forces have an edge in terms of military capability in this regard, therefore any type of resistance is quickly cut off. Aerial spraying activities, in essence, draw the presence of the government, and as a result, non-state armed organizations are driven to retain territorial control, despite their militarily disadvantage to state security forces. The empirical predictions of my theoretical argument is based on the assumption that unexpected aerial eradication operations act as a military shock, causing non-state armed organizations to strive for territorial control. In this way, I can explore the impact of territorial disputes on the repertoires of violence against civilians utilized by two different non-state armed organizations in Colombia, the FARC and paramilitary groups, to impose order and control at the local level.

Though both the FARC and paramilitary groups relied primarily on coca crops to raise funding, these non-state armed organizations potentially leveraged on different victimization strategies in order to obtain and consolidate territorial control. The FARC formed partnerships with other criminal organizations that had the know-how to develop the international market of illicit drugs, as the FARC was only committed to protecting rural coca farmers' production from any dangers. Paramilitary groups established a vertical integration in the cocaine production chain, allowing them to create sufficient capability to conduct business independently (Saab and Taylor, 2009). To put it another way, paramilitary groups relied less on civilian collaboration and

support to produce and export cocaine to international markets. The FARC insurgency, on the other hand, relied more on local producers' willingness to collaborate with them to provide a steady supply of input and produce cocaine for external clients. Under such a premise, and assuming the reasoning in Section 2.2 is valid, I should observe that:

1. Aerial eradication operations exacerbate territorial disputes among different non-state armed actors, resulting in a rise in civilian victimization in coca-producing municipalities.

2. Aerial eradication operations exacerbate FARC's selective and non-lethal victimization strategies in coca-producing municipalities.

3. Aerial eradication operations exacerbate paramilitary groups' indiscriminate civilian victimization in coca-producing municipalities, as well as non-lethal and lethal victimization strategies.

I suggest a mechanism for influencing expected outcomes through the role of aerial spraying operations regarded as a military shock and not as an economic shock. The increase in violence against civilians can be attributed to the battle for territory control by non-state armed organizations following aerial spraying operations. These operations make it difficult for violent actors to operate in territories under their control, forcing them to consolidate and expand control in their current strongholds. As a result, I should point out that:

4. Combats involving security forces and non-state armed organizations are prompted by aerial eradication operations.

5. Aerial eradication operations have no impact on coca production.

The last empirical test is relevant because it allows to discard the interpretation of aerial eradication operations as a negative economic shock triggering violence and thus validating the role of government presence on the dynamics of violence locally.

2.4 Empirical design

2.4.1 Data

Conflict

The paper analyzes data from Universidad del Rosario. This dataset is based on reports from *Noche y Niebla* from the *Centro Nacional de Investigaciones y Educación Popular (CINEP)* to investigate why civilian victimization by non-state armed organizations varies the way it does. The reports document daily conflict-related incidents in Colombia at the local level from 1996 through 2020. The information details each incident in such a way that the type of violence perpetrated by the FARC and paramilitary groups can be classified. The dataset tracks the following types of violence repertoires:

- Total number of attacks: attacks against civilians perpetrated by the FARC and paramilitary groups. This metric excludes collateral damage caused by violent clashes between combatants from various non-state armed organizations or security forces. That is, it assesses the intentional violence directed at people by non-state armed organizations.

- Lethal violence: the number of attacks on civilians that resulted in injuries or deaths.

- Non-lethal violence: the number of attacks against civilians that do not result in civilian casualties. It contains violent encounters that culminated in threats and forced migration.

- Violence against the general public: the number of attacks on members of the general public who are neither local officials, social leaders, or informants.

- Violence against local officials: the number of attacks targeted against local officials.

- Violence against social leaders: the number of attacks targeted against local community leaders.

- Violence against informants: the number of attacks targeted against enemies' informants.

Measures of civilian victimization are classified according on the type of armed actor. That is, FARC and paramilitary groups. I compiled a monthly dataset at the municipal level from January 2004 to December 2010 including all data above. All measures are normalized to a 100.000 population as well.

Aerial eradication operations

The paper uses information provided by the Ministry of National Defense to assess the progress of eradication efforts in Colombia. The information details daily aerial spraying operations carried out at the municipal level between 2003 and 2014, as well as the amount of hectares of coca that were eradicated in each operation. I compiled a monthly dataset of aerial spraying operations at the municipal level from January 2004 to December 2010. The number of operations, and the municipal eradicated area are all included. On the empirical estimates in Section 2.5, such variables will be exploited as treatment measures.

Additional information

The main empirical strategy presented in the paper is instrumental variables. Given that aerial spraying operations are not deployed randomly, I devise an instrument that is *as good as random* in order to leverage my empirical findings. Weather data from the NCEP Climate Forecast System Reanalysis (CFSR) between January 2004 and December 2010 is used to create the instrument. This information includes: precipitation rates, cloud covering (low and middle cloud layers), and temperature at different isobaric surfaces (1000 mbar, 850 mbar, 700 mbar, 500 mbar, 200 mbar, 50 mbar, and 2 mbar). Finally, I employ a set of socioeconomic and geographic data from CEDE at Universidad de Los Andes. Table 2.1 shows some summary statistics on civilian victimization by the FARC and paramilitary groups during the sample period, as well as summary statistics on aerial eradication operations in Colombia.

Aerial spraying operations have been significantly concentrated, on average, in 2% of Colombian municipalities, covering almost 0.6% of municipal area. Paramilitary violence appears to be more deadly than insurgent violence, particularly in municipalities where coca is cultivated (Gutiérrez-Sanín, 2008). Table 2.2, on the other hand, compares municipalities that cultivate coca against those that do not cultivate coca on a variety of

local characteristics. Coca plantations are commonly found in municipalities located in the Amazonic and Andean regions. These coca-producing municipalities have a smaller population, are more rural, and are located at lower altitudes. Finally, within the universe of coca-producing municipalities, Table A.3.1 contrasts municipalities where aerial eradication operations are carried out against municipalities where such operations do not occur. In general, aerial eradication occurs in impoverished and violent areas, a little closer to urban centers, in comparison to municipalities where coca crops are present but aerial operations are not carried out.

Table 2.1: Summary statistics.

	Mean	Std. Dev.	Min	Max
Aerial eradication operations				
Dummy indicator for any aerial eradication operation	0.021	0.143	0.000	1.000
Number of aerial eradication operations	0.063	0.585	0.000	18.000
Municipal area share affected by aerial eradication operations	0.006	0.078	0.000	6.799
Attacks against civilians within municipality (per 100.000 population)				
Number of total attacks	0.172	1.505	0.000	67.889
Number of total attacks by FARC	0.063	0.936	0.000	57.339
Number of total attacks by paramilitary groups	0.109	1.137	0.000	67.889

Notes: summary statistics are calculated for the sample studied (2004-2010).

The purpose of this paper is to examine the causal effect of aerial eradication operations on civilian victimization in Colombia perpetrated by non-state armed organizations. Evidence shows that eradication efforts are not performed randomly. Coca cultivation is usually undertaken in rural areas of the country where government presence is minimal, there is a high rate of poverty, and there are no incentives to develop legal economic activities (see Tables 2.2 and A.3.1). An OLS estimation of the impact of aerial eradication on civilian victimization non-state armed organizations perpetrate that excludes other factors related to both dependent and independent variables will result in a biased estimate of the real effect of such policy implementation.

Table 2.2: Summary statistics: differences between municipalities that produce and do not produce coca.

	Coca	Non-Coca	Difference
Andean region	0.215	0.608	-0.393
	(0.411)	(0.488)	[0.000]
Caribbean region	0.141	0.170	-0.029
	(0.348)	(0.376)	[0.000]
Pacific region	0.225	0.147	0.078
	(0.418)	(0.354)	[0.000]
Orinoquia region	0.119	0.046	0.073
	(0.324)	(0.210)	[0.000]
Amazonic region	0.300	0.028	0.272
	(0.458)	(0.166)	[0.000]
Total population	31525.200	40462.185	-8936.985
	(52396.711)	(253347.830)	[0.000]
Rurality index	0.668	0.589	0.079
	(0.193)	(0.242)	[0.000]
Municipal area (km^2)	4712.983	663.032	4049.951
	(8548.005)	(1672.962)	[0.000]
Altitude (km)	498.514	1222.773	-724.259
	(672.000)	(1175.676)	[0.000]
Distance to departmental capital (km)	137.472	75.693	61.780
	(86.871)	(53.994)	[0.000]
Distance to Bogotá (km)	412.684	307.470	105.214
	(126.194)	(192.696)	[0.000]
Per capita GDP	3498301.515	6782543.160	-3284241.645
	(2526007.891)	(5796802.911)	[0.000]
Total municipal income	9102.223	14678.784	-5576.561
	(14169.897)	(129143.933)	[0.000]
Total municipal expenditure	8626.448	15037.505	-6411.058
	(12566.602)	(136535.666)	[0.000]
Municipal development index	26.198	35.316	-9.118
	(7.002)	(9.383)	[0.000]
Municipal investment	7258184.878	12598321.890	-5340137.012
	(10328463.898)	(126376490.474)	[0.000]
Lenguage test	45.209	47.332	-2.123
	(3.261)	(3.225)	[0.000]
Math test	48.341	48.885	-0.544
	(1.603)	(1.693)	[0.000]
Low birth weight	27.057	52.070	-25.014
	(67.297)	(456.073)	[0.000]
Homicides per 100.000 population	71.372	60.340	11.032
	(94.863)	(85.199)	[0.000]
Forced migration cases per 100.000 population	4563.362	2201.699	2361.663
	(6254.130)	(5245.738)	[0.000]
Kidnapping cases per 100.000 population	40.245	39.386	0.859
	(63.257)	(198.458)	[0.517]
Abandoned land cases per 100.000 population	16.849	114.505	-97.656
	(12.415)	(326.165)	[0.000]

Notes: summary statistics are calculated for the sample studied (2004-2010).

There exists other possible challenges to causal inference. Civilian victimization could be influencing aerial eradication activities. Local and government officials may prioritize the adoption of pacification programs in places wherein the incidence of violence is high and a non-state agent is in control. To challenge the territorial dominance of non-state armed organizations, these officials may deem that government presence is essential. Increasing government presence typically includes the adoption of anti-narcotics policies, which frequently include aerial eradication. Finally, collecting data on violence and aerial eradication is difficult since it is not always accurate because war settings make it very hard to collect information in an efficient and transparent manner. To address inferential issues of omitted variables bias, reverse causality, and measurement error, I use a two-stage least squares specification to evaluate the causal effect of aerial eradication on civilian victimization perpetrated by the FARC and paramilitary groups.

I estimate the first stage using plausible random weather shocks as well as municipality and time fixed effects in order to compute the fitted value of the number of eradication operations at the municipal level. I also include the distance from airports where these eradication operations are dispatched in order to account for the impact of logistic restrictions on the feasibility of eradication operations. The first stage specification is:

$$Eradication_{it} = \alpha_i + \delta_t + \theta_{it} + \sum_{t=-1}^{-6} (\gamma_{jt} \times x_{jt}) + \sum_{t=-1}^{-6} \left(\lambda_{jt} \times x_{jt}^2\right)$$
$$+ \sum_{t=-1}^{-6} (\gamma_{jt} \times x_{jt} \times x_{-jt}) + \sum_{t=-1}^{-6} \left(\lambda_{jt} \times x_{jt}^2 \times x_{-jt}^2\right) + \sum (Coca_i \times \delta_t) + \varepsilon_{it} \qquad (2.1)$$

where $Eradication_{it}$ corresponds to the number of eradication operations performed in municipality i during month t. I include as regressors (x) a set of meteorological indicators from month -1 to month -6 such as the precipitation rate, cloud cover at different altitudes (low, medium, and high), temperature, and wind speed measures at different isobaric surfaces (30, 50, 200, 500, 700, 850, and 1000 meters). I also include the square of this counts, its interactions, and the interactions of the quadratic terms. For clarification purposes, j stands for the j-element of all municipal characteristics mentioned earlier. On the other hand, $-j$ for all other characteristics different from

the j-element. Finally, α_i and δ_t are municipal and time fixed effects that attempt to account for any constant municipal heterogeneity and aggregate temporal shock. $season_{it}$ is a fixed effect capturing any coca seasonal unobserved heterogeneity at the municipal level. Equation 3.1 also controls by local dynamics of coca production via $\sum (Coca_i \times \delta_t)$. It facilitates in dealing with coca cultivation temporal trends that are jointly related with violence and aerial eradication efforts.

The instruments can be thought of as a way to measure how likely a municipality is to be the target of aerial eradication operations because of random weather conditions and how far it locates from dispatching airports. As Reyes (2014) evidences, such a constraint binds when operations are planned. The instruments serve to indicate that adverse weather conditions make aerial spraying more difficult to happen. Such random weather circumstances increase the cost to carry out spraying programs; random bad weather boosts the costs of aerial spraying programs. Meteorological indicators gives a plausible random variation in the likelihood of aerial eradication operations taking place. If the research design meets two assumptions: i) the instrument is relevant, and ii) the exclusion restriction, the results have a causal interpretation. Weather conditions, such as those considered in Equation 3.1, are likely to change randomly over time in a given place, particularly in the short run. As a result, the application of weather shocks has high identification qualities (Dell et al., 2014; Burke et al., 2015). Previous research has shed insight on the association between conflict and weather patterns. Miguel et al. (2004a), for example, suggests that increased rainfall increases the chance of violence in Africa. Burke et al. (2009) obtains the same results by focusing on temperature conditions. Peasant rebellions in China are caused by insufficient rainfall (Kung and Ma, 2012).

The paper uses random weather conditions to isolate the causal effect of aerial spraying operations on civilian victimization perpetrated by non-state armed organizations. The exclusion restriction, on the other hand, could be violated if the same weather conditions reported in Equation 3.1 affect coca crops yield. If this is the case, meteorological conditions would have an impact on civilian victimization not just through aerial eradication operations, but also through changes in coca crops yield caused by unpredictable weather shocks. Another identification challenge is the possibility that weather conditions have a direct impact on conflict outcomes. To address such concerns, I report empirical

evidence showing this is not the case. Equation 2.2 represents the second stage estimation after the first stage estimation in Equation 3.1:

$$CivilianVictim_{it} = \alpha_i + \delta_t + \lambda_1 \times \widehat{Eradication}_{it} + \sum (Coca_i \times \delta_t) + \epsilon_{it} \qquad (2.2)$$

where $\widehat{Eradication}_{it}$ denotes the fitted value of Equation 3.1. $CivilianVictim_{it}$ denotes any of the measures of violence against civilians described in Section 2.4.1. The coefficient of interest is now λ_1, which captures the causal effect of aerial spraying operations on non-state armed organizations' repertoires of violence against civilians after controlling for municipal invariant heterogeneity, aggregate time shocks, coca cultivation seasonal shocks, and time trends associated with coca production. The random error term is clustered at the municipal-year level. To investigate potential mechanisms driving the results further, I estimate the original specifications in Equation 2.2, dividing the sample into groups based on the variable measuring the heterogeneity.

2.5 Results

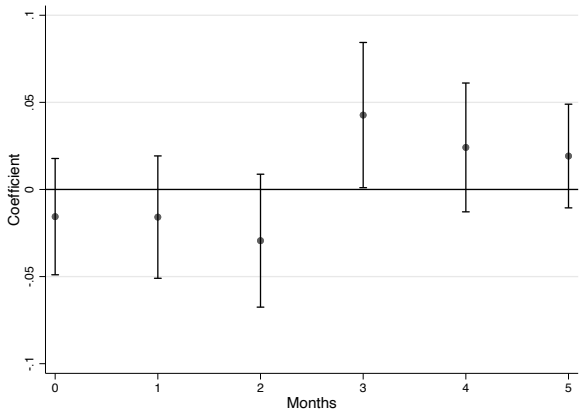
I report contemporaneous and lead effects up to five months after an aerial eradication operation took place for the second stage estimates. Since this is too much information to be presented in just one table, I opted to show the point estimates along with 95% confidence intervals. Also, I omit major urban areas from the sample, that is, municipalities with population higher than 200.000 inhabitants. Finally, all regressions are weighted by the inverse of municipalities' size. By doing this, I am giving more weight to small municipalities compared to large ones.

2.5.1 OLS estimates

The OLS estimates of Equation 2.2 are shown in Figure 3.5. It reports on the average effect of aerial eradication on civilian victimization by the FARC and paramilitary groups in Colombia. It demonstrates that aerial spraying operations have a positive impact on the amount of violent attacks perpetrated against civilians in the municipality where the operations took place at least three months after. In conclusion, the findings suggest that aerial eradication may operate as a driver sparking local conflict, with non-

state armed organizations perpetrating most of that violence in Colombia. However, such estimates are biased. To account for the potential bias, I describe a two-stage least squares specification with one endogenous treatment and several exogenous instrument.

Figure 2.6: OLS estimates of the causal effect of aerial eradication on attacks against civilians.



Notes: the figure presents the point OLS estimates from the main specification of Equation 2.2 with the corresponding confidence intervals at the 95% level. The dependent variable is the number of violent attacks against the civilian population in municipalities where aerial eradication operations ocurred. The mean of the dependent variable is 0.177, and the point estimates were computed with 84.523 observations. The error term controls for clustered correlation at the municipal level.

2.5.2 2SLS estimates: the instruments are relevant

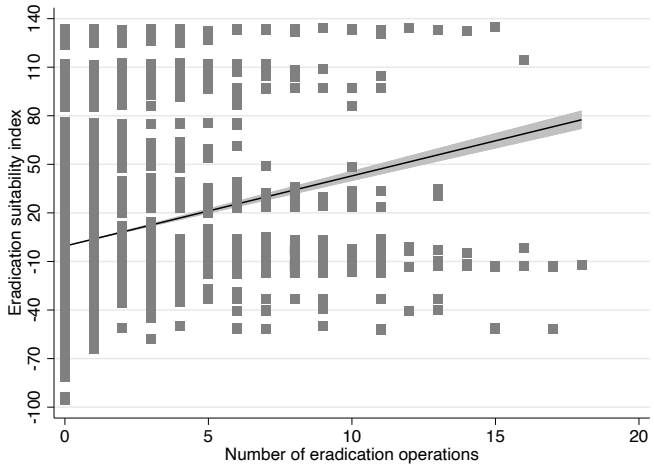
Table 2.3: First stage estimates of the impact of the eradication suitability index on the share of eradicated area.

	Kleibergen-Paap F statistic
Quadratic model	259.265
Linear model	233.244
Precipitation model	35.268
Temperature model	131.240
Wind speed model	210.781
Cloud coverage model	75.065

Notes: Table 3.2 presents estimates of Equation 3.1. The dependent variable is the amount of aerial eradication operations. All columns include municipality and time fixed effects, and coca production time trends. Point estimates were computed with 84.523 observations. Clustered standard errors at the year-municipal level in parentheses. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table 3.2 shows the outcomes of Equation 3.1 in terms of the F statistic. Figure 3.6 depicts the variation of the fitted values from Equation 3.1, which can be interpreted as an eradication suitability index conditioned to external factors such a meteorological conditions, with respect to the actual variation in the monthly number of operations. Between April 2004 and December 2010, the number of aerial eradication missions in Colombia increases directly due to an increase in the suitability index. Table 3.2 demonstrates that meteorological conditions impacts the likelihood of whether or not aerial eradication operations are carried out. In other words, both Table 3.2 and Figure 3.6 confirm the fact that my instruments are relevant. Take, for instance, the quadratic model where the F statistic takes a value of 259. Table 3.2 also reports different specifications of my main instruments based on information from Equation 3.1.

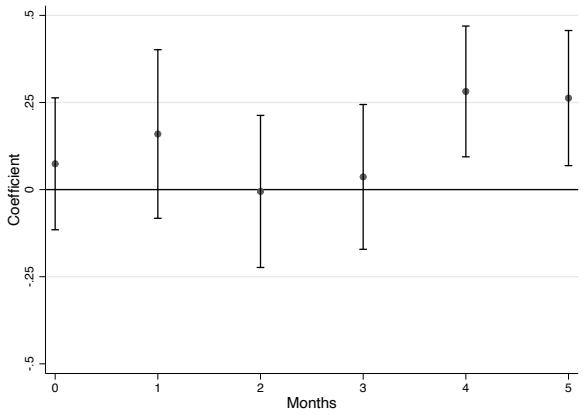
Figure 2.7: The total number of eradication operations versus the eradication suitability index.



2.5.3 2SLS estimates: aerial spraying triggers violence against the civilian population

If empirical predictions are correct, aerial eradication operations will be followed by an increase in the overall amount of attacks perpetrated against civilians. I anticipate such effects as non-state armed organizations attempt to consolidate territorial control in areas affected by aerial eradication missions.

Figure 2.8: Second stage estimates of the causal effect of aerial eradication on attacks against civilians.



Notes: the figure presents the point 2SLS estimates from the main specification of Equation 2.2 with the corresponding confidence intervals at the 95% level. The dependent variable is the amount of violent attacks against the civilian population. The mean of the dependent variable is 0.177, and the point estimates were computed with 84.523 observations. The error term controls for clustered correlation at the year-municipal level.

Figure 3.7 depicts 2SLS estimates of Equation 2.2 based on the total number of aerial eradication operations (quadratic model in Table 3.2), and reports both contemporaneous ($t = 0$) effect and leads up to five months. Figure 3.7 shows that civilian victimization by the FARC and paramilitary groups increases after operations, with the impact primarily reflected four months after operations took place. For instance, a one standard deviation increase in the area share affected by aerial spraying rises violence against civilians in 0.165 attacks, on average (0.282×0.585 the standard deviation of the number of operations). Such effect is economically important since it represents 93% the average amount of attacks during the sample period (see Table 2.1). Results in Table 3.2 underestimate the real effect of eradication operations on violent conflict locally.

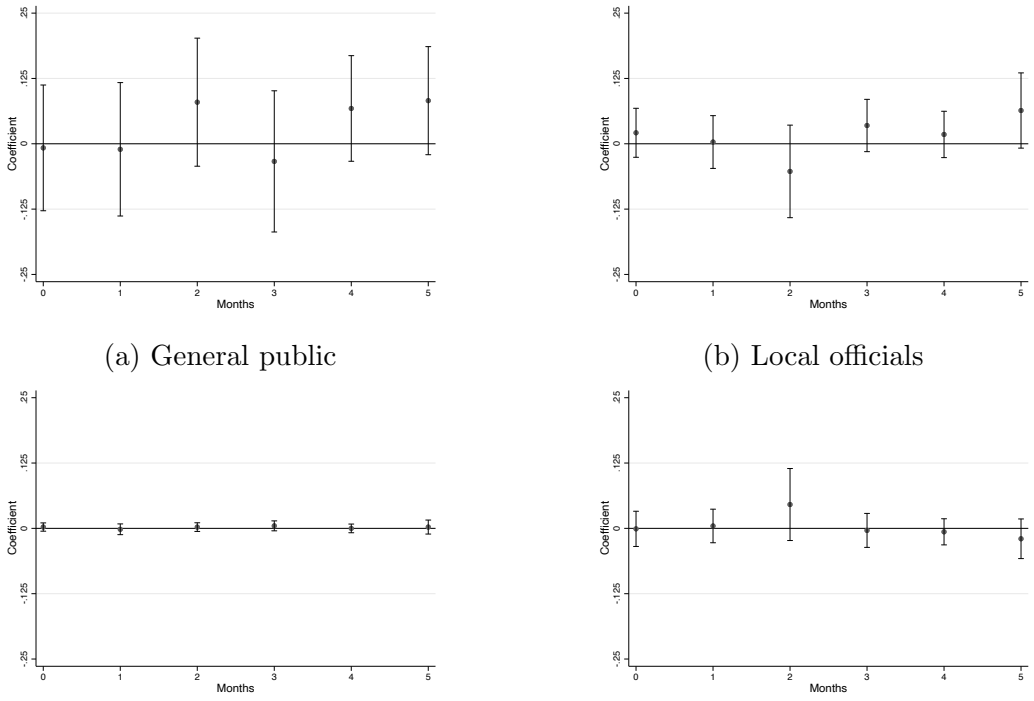
2.5.4 2SLS estimates: selective versus indiscriminate violence

Non-state armed organizations are frequently committed to specific economic and political discourses that dictate how these organizations must engage with civilians, and often such discourses limit the power to enforce control over a local community; non-state armed organizations face a set of constraints when committing conventional violence against the civilian population. In this scenario, my theoretical argument highlights that the rising violence seen in Figure 3.7 is a result of victimization perpetrated

by paramilitary groups, who rely less on civilian collaboration. In contrast to what happened with the AUC, the cultivation of coca crops relied more on civilian assistance due to the way the FARC established its own illegal cocaine enterprise. The setting in which both the FARC and paramilitary groups were operating permitted the latter to establish territorial control through more violent means, entailing that paramilitary groups exercised their authority by targeting indiscriminately the civilian population in a more lethal manner.

Hypotheses 2 in Section 2.3.2 underscores who the most likely targets of violent attacks are. It predicts that FARC will only resort to selective violence against local communities while avoiding causing pain more generally; it would be costly and inefficient to the FARC to attack indiscriminately the civilian population. Similarly, paramilitary groups, since they rely less on popular support, no longer need to use violence effectively in order to obtain collaboration from the civilian population. What this means is that paramiliary groups will target indiscriminately its attacks against civilians. Selective violent attacks by FARC are thus more likely, as indiscriminate violent attacks by paramilitary groups become more apparent after territorial control disputes (see Section 2.3.2).

Figure 2.9: Second stage estimates of the causal effect of aerial spraying on attacks against civilians committed by FARC by type of target.



(a) General public

(b) Local officials

(c) Social leaders

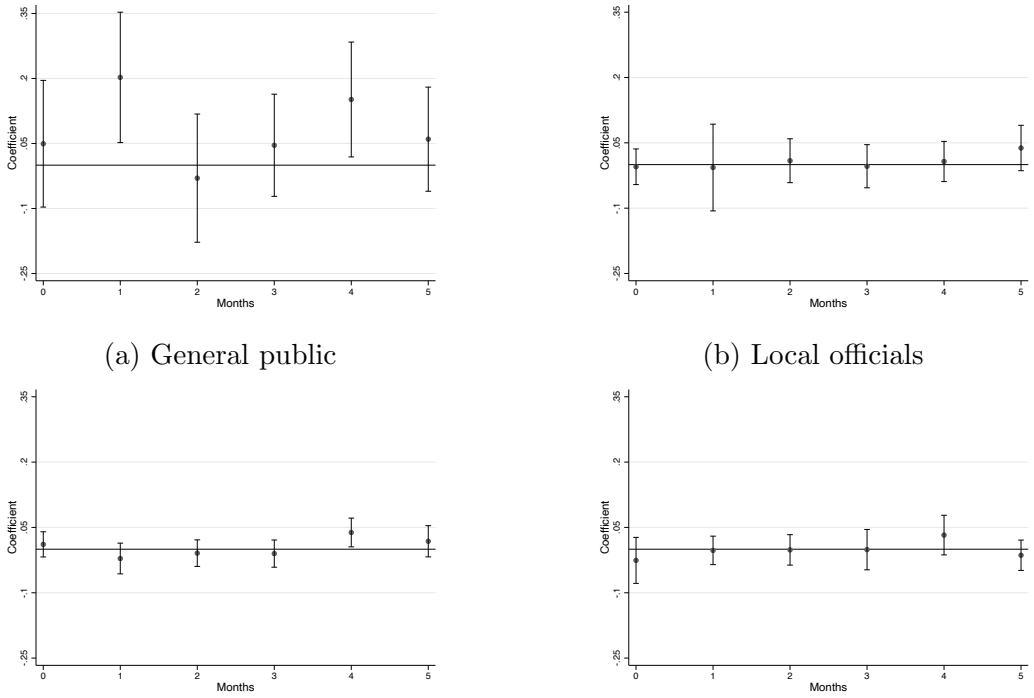
(d) Informants

Notes: these figures present the point 2SLS estimates from the main specification of Equation 2.2 with the corresponding confidence intervals at the 95% level. The dependent variable in panel (a) is the amount of violent attacks carried out by FARC against the general public. The dependent variable in panel (b) is the amount of violent attacks carried out by FARC against local officials. The dependent variable in panel (c) is the amount of violent attacks carried out by FARC against social leaders. The dependent variable in panel (d) is the amount of violent attacks carried out by FARC against informants. The mean of the dependent variable is respectively 0.053, 0.010, 0.03, and 0.06. The point estimates were computed with 84.523 observations. The error term controls for clustered correlation at the year-municipal level.

Figure 2.9 illustrates the effect of aerial eradication operations on who the FARC attacks. It confirms the pattern that FARC focuses its attacks against a specific segment of the local population, local officials, but not on other targets such as the general public, social leaders, or informants. The increase of attacks against local officials is statistically significant at a 10% level. Overall, a one standard deviation increase in the number of aerial spraying operations rises violence against local officials in 0.04 attacks during the fifth month since eradication take place, on average (0.063 $\times$ 0.585 the standard deviation of the number of operations). Figure 2.10 depicts how paramilitary groups target a variety of objectives. On average, a one standard

deviation increase in the area share increases the amount of attacks against the general population in 0.118 attacks (0.202×0.585), and social leaders in 0.013 attacks (0.022×0.585). There are no statistical significant effects on other type of targets. Both Figure 2.9 and 2.10 confirm my theoretical argument: the FARC followed a selective approach to target its attacks against the civilian population, whilst paramilitary groups attacked the civilian population in a more indiscriminate way.

Figure 2.10: Second stage estimates of the causal effect of aerial spraying on attacks against civilians committed by paramilitary groups by type of target.



(a) General public

(b) Local officials

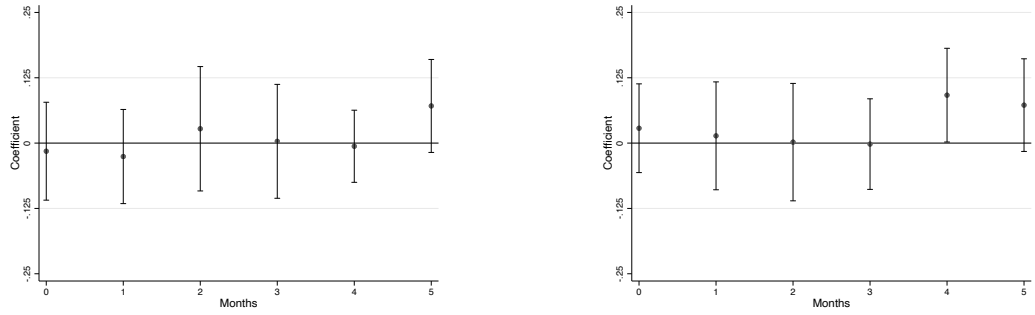
(c) Social leaders

(d) Informants

Notes: these figures present the point 2SLS estimates from the main specification of Equation 2.2 with the corresponding confidence intervals at the 95% level. The dependent variable in panel (a) is the amount of violent attacks carried out by paramilitary groups against the general public. The dependent variable in panel (b) is the amount of violent attacks carried out by paramilitary groups against local officials. The dependent variable in panel (c) is the amount of violent attacks carried out by paramilitary groups against social leaders. The dependent variable in panel (d) is the amount of violent attacks carried out by paramilitary groups against informants. The mean of the dependent variable is respectively 0.096, 0.04, 0.013, and 0.09. The point estimates were computed with 84.523 observations. The error term controls for clustered correlation at the year-municipal level.

2.5.5 2SLS estimates: non-lethal versus lethal violence

Figure 2.11: Second stage estimates of the causal effect of aerial spraying on attacks against civilians by type of violence by FARC.



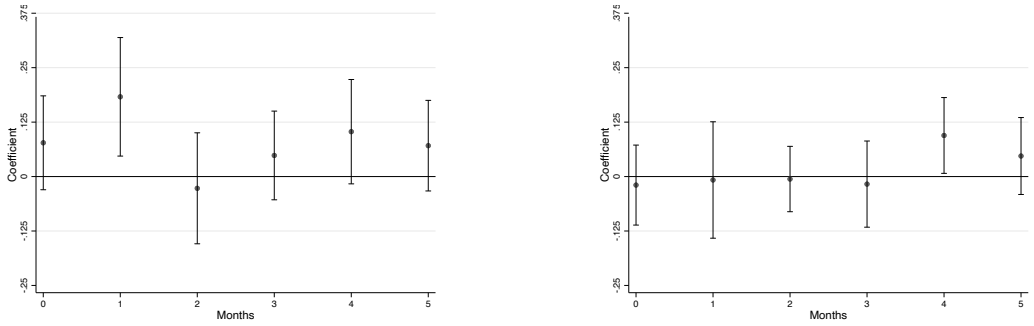
(a) Lethal violence (b) Non-lethal violence

Notes: these figures present the point 2SLS estimates from the main specification of Equation 2.2 with the corresponding confidence intervals at the 95% level. The dependent variable in panel (a) is the amount of lethal attacks carried out by FARC against the civilian population. The dependent variable in panel (b) is the number of civilian casualties carried out by the FARC. The mean of the dependent variable is respectively 0.030, and 0.035. The point estimates were computed with 84.523 observations. The error term control for clustered correlation at the year-municipal level.

Figure 2.11 illustrates the trend of violent attacks perpetrated by FARC on civilians based on 2SLS estimates of Equation 2.2. Lethal violence seems to not respond to aerial spraying systematically. However, non-lethal violence perpetrated by the FARC appears to rise four months after operations took place. A one standard deviation increase in the number of operations increases the amount of non-lethal attacks by 0.054, on average (0.054$\times$ 0.585).

The effect of aerial eradication on civilian victimization perpetrated by paramilitary groups is depicted in Figure 2.12. The findings indicate that paramilitary groups reacted more aggressively than the FARC because they are willing to resort to both lethal and non-lethal violence following aerial eradication operations. For instance, a one standard deviation increase in the number of operations results in 0.107 more lethal attacks (0.183 $\times$ 0.585, two months after), and 0.055 more non-lethal attacks (0.094 $\times$ 0.585, four months after).

Figure 2.12: Second stage estimates of the causal effect of aerial spraying on attacks against civilians by type of violence by paramilitary groups.



(a) Lethal violence (b) Non-lethal violence

Notes: these figures present the point 2SLS estimates from the main specification of Equation 2.2 with the corresponding confidence intervals at the 95% level. The dependent variable in panel (a) is the amount of lethal attacks carried out by paramilitary groups against the civilian population. The dependent variable in panel (b) is the number of civilian casualties carried out by paramilitary groups. The mean of the dependent variable is respectively 0.076, and 0.036. The point estimates were computed with 84.523 observations. The error term control for clustered correlation at the year-municipal level.

Overall, the findings in this section indicate that both the FARC and paramilitary groups are equally threaten by aerial eradication operations and they respond accordingly. This anti-narcotics policy jeopardizes non-state armed organizations' territorial domination, forcing them to utilize violence strategically. Because FARC relies largely on popular support to carry out illegal drug-trafficking activities, it can not go unchecked when employing lethal victimization practices in order to preserve support from the local population. Because paramilitary groups are less constrained, they resort to lethal victimization methods.

2.5.6 Discussion

According to the findings, violence follows a strategic path. The direction of this path satisfies several sets of constraints. In the case of Colombia, paramilitary groups and the FARC sponsored their military actions through the illegal drug economy. Further, both non-state armed organizations place a high value on gaining control of local territory. Coca production, like any other economic activity, is exposed to an arrange of unexpected shocks that could undermine the profitability of the business. Often, government presence put in risk such profitability. A non-state armed organization, acting as an economic agent, will undertake choices in order to minimize the negative

long term impact of government presence on the profit of economic illegal activities in territories under their control. Increasing civilian support could be one way to mitigate the adverse effect of the negative shock. In this regard, threatening to use violence is an effective tactic for eliciting support from the civilian population (Kalyvas, 2006a).

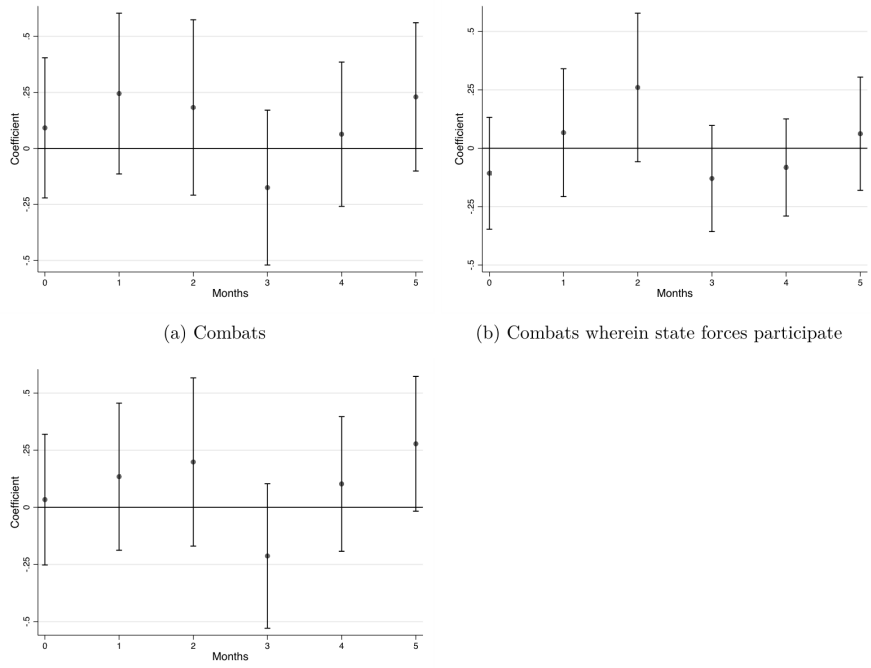
The results underline that non-state armed organizations are constrained in their ability to deliver violence promptly. Instead, they must meet certain conditions in order to do so. In the Colombian case, the results show that non-state armed organizations' use of violence was constrained by the strategic value of a territory, and the strength of the relationship between non-state armed organizations and the civilian population. Finally, the findings also imply that predictors of the onset of violence and factors determining who would be the target of that violence are inexorably linked.

Robustness checks are reported in the Appendix. Figure A.3.1 shows the robustness of the estimates using all the instruments in Table 3.2. Tables A.3.2 and A.3.3 provides evidence of the robustness of the exclusion restriction associated with the instrument, first by exploring the impact of the eradication suitability index on coca cultivation at the municipal level, and then on the amount of attacks perpetrated by non-state armed organizations against the civilian population. In a recent paper, Lee et al. (2021) propose a new critical value function for correcting inference based on the rule-of-thumb of a F-statistic value of 10, because t-ratio-based inference could lead to a large-sample distortion. Figure 2.12a shows that the results remain unchanged after correcting confidence intervals as proposed by Lee et al. (2021). Finally, Figure 2.12 confirms that the results are qualitative the same when I consider a subset of observations only composed by municipalities that cultivate coca during the same sample period.

2.5.7 Mechanisms

Aerial eradication operations drive non-state armed organizations to consolidate territorial control, thus fueling confrontations among all armed actors. As the findings indicate, such disputes escalate the level of violence perpetrated by FARC and paramilitary groups against the civilian population. Non-state armed organizations struggle to hold territorial control after aerial eradication operations, and thus these operations entail a reconfiguration of local leaderships by non-state armed organizations.

Figure 2.13: Second stage estimates of the causal effect of aerial eradication on government combats.



(a) Combats

(b) Combats wherein state forces participate

(c) Combats wherein non-state armed organizations participate

Notes: These figures present the point 2SLS estimates from the main specification of Equation 2.2 with the corresponding confidence intervals at the 95% level. The dependent variable in panel (a) is the total amount of combats carried out by armed actors in municipalities where aerial eradication operations ocurred. The dependent variable in panel (b) is the number of attacks carried out by the government military. The dependent variable in panel (c) is the number of attacks carried out by non-state armed organizations. The mean of the dependent variable is respectively 0.412, 0.229, and 0.331. The point estimates were computed with 84.523 observations. The error term control for clustered correlation at the year-municipal level.

Figure 2.13 illustrates the effect of aerial eradication operations on combats involving security forces and non-state armed organizations. Figure 2.13 demonstrates that an increase in the the number of operations rises the amount of combats although the effect is not statistically significant. Once you divide combats by who initiated them, the early positive estimates are driven by combats in which only non-state armed organizations participate. Security forces are present during ongoing aerial eradication operations. Such military pressure forces non-state armed organizations to keep control of their territories. The struggle for control of these municipalities then incites violence against civilians.

Non-state armed organizations may experience a local negative economic shock as a result of aerial eradication efforts. The FARC and other paramilitary groups relied on illegal sources of income to operate. Aerial eradication may have simply reduced the amount of hectares of coca crops, lowering the expected profit of coca cultivation and cocaine production. One might expect that violence against civilians is just a collateral effect of non-state armed organizations losing valuable economic resources. If that is the case, then aerial eradication operations should have a negative effect on coca cultivation. It is worth mentioning that main effects in Figure 3.7 remain after using yearly data. See Table A.3.4 in the Appendix.

Table 2.4: Second stage estimates of the causal effect of aerial eradication on coca cultivation.

	t		t+1		t+2	
	(1)	(2)	(3)	(4)	(5)	(6)
	Share	Hectares	Share	Hectares	Share	Hectares
Number of eradication operations	0.021***	19.727***	-0.006	6.270	0.002	3.296
	(0.006)	(4.660)	(0.004)	(7.235)	(0.007)	(10.474)
Municipality FE	✓	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓	✓
Municipalities	1,067	1,067	1,067	1,067	1,067	1,067
Kleibergen-Paap F statistic	49.920	49.920	49.920	49.920	49.920	49.920
Mean. Dep. Var.	0.039	75.646	0.039	78.604	0.038	82.133
Std. Dev. Dep. Var.	0.167	394.287	0.171	418.453	0.174	474.577
Observations	6,401	6,401	6,401	6,401	6,401	6,401

Notes: Table 2.4 presents estimates of Equation 2.2 using yearly data. The dependent variable is the yearly number of hectares of coca crops and a dummy indicator of coca crops presence. Both variables are measured at t, $t+1$, $t+2$, and $t+3$. All columns include coca production trends, and municipality and time fixed effects. Clustered standard errors at the municipal level in parentheses. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

The impact of aerial eradication operations on coca cultivation is reported in Table 2.4. It does this by estimating Equations 3.1 and 2.2 using yearly data and replacing the dependent variable with measures of coca cultivation locally. Aerial eradication, in general, does not achieve the intended aim. If anything, aerial eradication had the opposite effect. At year t, one additional operation boosts the area dedicated to cultivate coca in 2.1%, on average. In addition, I investigate the effect of cumulative eradication on coca production. It might be the case that coca production does not

respond to sporadic aerial spraying operations but rather react to persistent eradication efforts. The impact of the area share eradicated between $t-1$ and t on coca cultivation at t and $t+1$ is shown in Table 2.5. According to the findings, aerial eradication continues to have a null impact on coca cultivation. In general, the results reveal that territorial control disputes appear to be influenced by the presence of government security forces rather than the potential negative economic impact of aerial eradication operations.

Table 2.5: Second stage estimates of the causal effect of cumulative aerial eradication on coca cultivation.

	t		t+1	
	(1)	(2)	(3)	(4)
	Share	Hectares	Share	Hectares
Number of eradication operations	-0.009*	-5.079	-0.004	0.615
	(0.005)	(5.035)	(0.016)	(9.155)
Municipality FE	✓	✓	✓	✓
Time FE	✓	✓	✓	✓
Controls	✓	✓	✓	✓
Municipalities	1,067	1,067	1,067	1,067
Kleibergen-Paap F statistic	21.076	21.076	21.077	21.077
Mean. Dep. Var.	0.036	80.281	0.041	91.445
Std. Dev. Dep. Var.	0.162	478.778	0.278	573.361
Observations	5,335	5,335	5,333	5,333

Notes: Table 2.5 presents estimates of Equation 2.2 using yearly data. The dependent variable is the yearly cummulative number of hectares of coca crops between $t-1$ and t, and a dummy indicator of coca crops presence during the same period. All columns include coca production trends, and municipality and time fixed effects, as well as distance to dispatching airports and time trends in coca production. Clustered standard errors at the municipal level in parentheses. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

2.5.8 Heterogeneous effects

Police reinforcements

Seguridad Democrática, an iconic national security policy of Álvaro Uribe's presidency, was one of Colombia's most known national security policies (2002-2010). One of its goals was to place police reinforcements in municipalities that lacked them before to August 2002. Such deployments were frequently performed alongside aerial eradication operations in order to initially boost the amount of government presence by military

capabilities. Police reinforcements in Colombia either could increased or decreased civilian victimization by non-state armed organizations. First, police presence could have reduced civilian victimization because both the FARC and paramilitary groups lacked the military power of government personnel. The FARC or paramilitary organizations might then simply escape the municipality or hide, losing territorial control. There is evidence that police reinforcements reduced insurgent attacks during the period (Cortés et al., 2012). On the other hand, police presence may have increased violence towards civilians. State intervention in the form of police reinforcements raises the amount of violence, making civilian victimization more of a tactical requirement for non-state armed organizations engaging in territory control. In addition to the impact of aerial eradication operations per se, I want to see if government presence in poorly governed areas caused changes in the trajectories of civilian victimization perpetrated by non-state armed organizations.

Table 2.6: Second stage estimates of the causal effect of aerial eradication on attacks against civilians in $t + 5$.

	(1) Not deployed	(2) Deployed
Number of eradication operations	0.316**	0.292*
	(0.137)	(0.154)
Municipality FE	✓	✓
Time FE	✓	✓
Controls	✓	✓
Municipalities	6,775	714
Mean. Dep. Var.	0.153	0.203
Std. Dev. Dep. Var.	1.351	1.927
Observations	76,465	8,058

Notes: Table 2.6 presents estimates of Equation 2.2. The dependent variable is the amount of attacks against civilians per 100.000 population. The share of eradicated area is instrumented with the suitability index at Table 3.2. All columns include coca production trends, and municipality and time fixed effects. Clustered standard errors at the year-municipal level in parentheses. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Police deployments are recorded using a dummy indicator that denotes whether or not a municipality benefited from police reinforcements. Then I compare the impact of aerial spraying operations in municipalities where police reinforcements were deployed against municipalities where they were not. According to Table 2.6, aerial spraying activities had an effect on violence against civilians on both type of municipalities. Five

months after operations, a one standard deviation increase in the number of eradication operations increases the average amount of attacks against civilians in 0.185 attacks (0.316×0.585) in municipalities where there were no deployments. In municipalities targeted by police deployments, there was an increase of 0.171 (0.292×0.585).

AUC disarmament process

Colombia's government and the AUC reached an agreement on disarmament in 2006. It marked the demobilization of more than 30.000 troops across the country. The peace deal altered the trajectory of Colombia's civil war, as well as the levels of violence, particularly violence against civilians.

Table 2.7: Second stage estimates of the causal effect of aerial eradication on attacks against civilians in $t + 5$.

	(1) Pre-disarmament	(2) Post-disarmament
Number of eradication operations	0.300	-0.012
	(0.198)	(0.121)
Municipality FE	✓	✓
Time FE	✓	✓
Controls	✓	✓
Municipalities	3,212	5,347
Mean. Dep. Var.	0.190	0.136
Std. Dev. Dep. Var.	1.591	1.284
Observations	34,264	50,254

Notes: Table 2.7 presents estimates of Equation 2.2. The dependent variable is the amount of attacks against civilians per 100.000 population. The share of eradicated area is instrumented with the suitability index at Table 3.2. All columns include coca production trends, and municipality and time fixed effects. Clustered standard errors at the year-municipal level in parentheses. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table 2.7 indicates that the disarming deal reached between the Colombian government and the AUC had a marginal effect on the patterns of civilian victimization in Colombia. Before and after the demobilization process, there seems to be a small reduction on violent attacks, but point estimates are not statistically significant. The impact, however, differs according to the non-state armed organization (see Table A.3.5 and Table A.3.6 in the Appendix).

Combatants demobilization

Colombia's government has consistently persuaded combatants from various non-state armed groups to disarm unilaterally. When a combatant or a group of combatants demobilizes from a rebel unit, the invitation to disarm usually comes with legal and financial rewards. There were over 13.000 demobilization cases of militants from various non-state armed organizations between 2004 and 2010. Reduced rank-and-file membership of such organizations is likely to decimate their ability to mobilize troops and intimidate civilians at the local level. Table 2.8 shows that, when there is no demobilization of combatants, five months after operations, a one standard deviation increase in the total number of operations rises attacks against civilians in 0.198 attacks (0.338×0.585). However, if at least one case of demobilization exists, there is a reduction in violence, although the effect is no longer statistically significant. Both the FARC and paramilitary groups are affected by such pacification policy (see Table A.3.7 and Table A.3.8 in the Appendix)

Table 2.8: Second stage estimates of the causal effect of aerial eradication on attacks against civilians in $t + 5$.

	(1) Without demobilization	(2) With demobilization
Number of eradication operations	0.338***	-0.188
	(0.116)	(0.197)
Municipality FE	✓	✓
Time FE	✓	✓
Controls	✓	✓
Municipalities	7,467	898
Mean. Dep. Var.	0.139	0.548
Std. Dev. Dep. Var.	1.336	2.307
Observations	80,208	2,878

Notes: Table 2.8 presents estimates of Equation 2.2. The dependent variable is the amount of attacks against civilians per 100.000 population. The share of eradicated area is instrumented with the suitability index at Table 3.2. All columns include coca production trends, and municipality and time fixed effects. Clustered standard errors at the year-municipal level in parentheses. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

2.6 Conclusion

The outbreak of violence is the element that captures the attention of civil war specialists the most. The strategic use of violence is a neglected aspect of internal warfare analyses. Many factors could influence the type of violence a non-state armed organization

choose to inflict on the civilian population in this regard. Some of these are military endowments, capabilities, political identities, personal feuds, popular support, economic and social resources, internal organization, governance structures, and ideology. Finding reliable theories to interpret the strategic use of violence is difficult due to the myriad of plausible explanations. Under what conditions would a non-state armed organization decide to attack the civilian population?

Territorial disputes fuel the increase of violence against civilians. I contend that non-state armed organizations' victimization decisions are influenced by two factors: the strategic value of territory and the extend to which civilians collaborate with combatants. Using data from conflict events in Colombia, I investigate how the FARC insurgency and paramilitary groups used various repertoires of violence to target civilians during the Colombian civil war. Using weather-dependent aerial eradication operations, this paper shows the causal effects of such missions on the sort of violence inflicted on civilians by the FARC and paramilitary groups. First, aerial eradication operations trigger armed clashes between security forces and non-state armed organizations. Because both the FARC and paramilitary groups are threaten by the military presence of the government, they are compelled to consolidate territorial control. This fact sparks territorial disputes in municipalities where coca plantations are grown. This type of confrontation exacerbates violence towards civilians. The findings reveal that, despite the fact that both the FARC and paramilitary groups resort to violence in order to obtain territorial control, these two organizations are able to leverage themselves through diverse civilian victimization strategies. The FARC used non-lethal forms of violence, whereas paramilitary groups used lethal and non-lethal violence. In the same way, the target of violence of both non-state armed organizations differs. While the FARC targeted local officials, paramilitary groups targeted the general population and social leaders. The mechanism explaining these results is the role played by government's military presence.

The paper's contribution is to provide a set of causal mechanisms for drawing the path of violence against civilians during ongoing armed conflicts, based on rich data that allow for the identification of diverse repertoires of violence utilized by non-state armed organizations. In this way, the study extends beyond the binary dichotomy of all-forms-of-violence versus the absence of violence, and explores how non-state armed

organizations strategically substitute different sorts of violence. There are some flaws in the analysis as well. It focuses primarily on the causal effects of aerial eradication operations on civilian victimization. It does not rule out the fact that other types of shocks would provide a different set of results. Furthermore, there are critical questions that remain unresolved here. For example, does civilian victimization achieve its objectives? Answering such a question is the road that future academic work should take.

Chapter 3

The Economic Roots of Violence: The Unintended Consequences of Colombia's Close Peace Referendum

3.1 Introduction

Policies aimed at noble purposes can have unintended negative consequences. Policies encouraging people to vote and participate in the political process, in particular, may backfire, mostly in situations where civil wars are still ongoing. This could be because the election results reveal people's political beliefs, and this information captures the attention of the fighting factions. Particularly crucial to address is the fact that political beliefs can contradict the interests of armed actors, motivating them to use violence against civilians (Acemoglu et al., 2013b; Fergusson and Vargas, 2013; Condra et al., 2018; Fergusson et al., 2021). The intertwined relationship between electoral results and violence is not only shown throughout regular elections such as those for local offices, congressional seats, and presidential elections, but may also be present when people resolve on the final outcome of a peace agreement.

According to the PA-X Peace Agreement Database[1], there are 1,915 agreement

[1]Peace agreements database: `https://www.peaceagreements.org/about`

documents from 140 peace initiatives that span 1990 to 2021. This database includes well-known conflicts such as those in Angola, Bosnia, and Afghanistan, as well as border conflicts between Nigeria and Cameroon and the Falkland Islands conflict between Argentina and the United Kingdom. 399 (28%) of these 1,915 agreements are related to ceasefire declarations and agreements to deescalate violence. A question that then arises is: how effective are negotiated settlements as pacification policies to be adopted in armed conflict settings?

As different non-state armed organizations remained active in Colombia, the government decided to hold a national peace referendum so that citizens could vote on whether or not to accept the final agreement reached between the government and the FARC insurgency. What happens when citizens reveal their preferences in this regard? More generally, what are the implications of exposing political opinions about war and peace amid a long-running armed conflict? One possible scenario is that, subject to people's approval of a final deal, ex-combatants' demobilization and subsequent political engagement will promote political stability. Rotation of political parties in office reduces the incentives to resort to violence (Przeworski, 1991; Regan and Henderson, 2002; Acemoglu and Robinson, 2006; Davenport, 2007). On the other hand, if people reject the possibility of a violent organization transitioning to politics, the conflict will be prolonged.

When we consider the role that other violent groups that are not participating in a peace process could play, how much peace negotiations benefit such groups' economic and political ambitions influences the risk of violence outbreak. The strategic use of violence by these actors is determined by how lucrative the demobilization of one of its former competitors is for them. Furthermore, if all of these groups are fighting for the rents of power, the potential exit of one violent actor increases the expected benefit of the fighting. However, such an increase in expected gains is contingent on the ability of not-yet disarmed organizations to occupy vacant territories left by the departing of the settled side. The reconfiguration of territorial control will eventually result in violence on those contested territories, at least in the short term.

This study examines the response of non-state armed organizations that did not participate in the negotiations between the Colombian government and the FARC

insurgency to the results of the October 2016 Colombian peace referendum. We argue that the negotiated settlement between the Colombian government and the FARC insurgency was viewed as an economic opportunity for non-state armed organizations that have not yet been disarmed because, following the FARC's demobilization from its strongholds, economic rents previously dominated by the FARC can potentially be contested if such armed actors have the capacity to gain control of those territories. We suggest that the outcome of the peace referendum indicates the cost of maintaining territorial control over former FARC-controlled areas. All else being equal, a higher vote against the peace deal reveals places where the FARC insurgency has historically had a weak social base that supports its ideals. These areas are easier to conquer. Conversely, higher vote in support of the accord indicates areas that are sympathetic with the FARC insurgency's aims. As a result, active groups target former FARC strongholds; however, areas that opposed the peace referendum are easier to dominate. Nonetheless, territorial control demands the use of coercion against the local population.

We use a regression discontinuity design (RDD) to assess whether the level of local support for the final agreement influences the extent of violence one year after the peace referendum took place. We use the difference between the vote share of the No and Yes on the referendum as the score variable. Our findings reveal that a close peace referendum defeat leads to up to 0.012 extra monthly attacks per 10,000 people by non-state armed organizations other than the FARC one year after the referendum date, a significant effect equivalent to nearly 1.3 times the sample mean. . Furthermore, consistent with the economic gains obtained from FARC disarmament for not-yet-disarmed organizations, the increase in violence is concentrated in municipalities where coca is grown and exploit precious metal mining. Importantly, we do not see an increase in violent attacks by the FARC insurgency as a result of the negative outcome of the peace referendum, and we find no differential trends in historic violence that could have explained any outcome during the peace referendum.

Our findings seems to be consistent with the argument presented before. There appears to be little evidence of vote rigging, particularly in key locations such as municipalities with a large electorate. The main results are not driven by the dynamics of conflict right before the peace negotiations secretly started or by the results of the 2014 presidential election in which one candidate was in favor of continuing the peace

negotiation and the other was not. The 2014 presidential election may be remembered as the first time voters expressed their views on the progress of peace talks (Weintraub et al., 2014). Point estimates are consistent across multiple bandwidths, and when different sub-samples of observations near the cut-off are removed (Donut RD). Given that the motivation for RDDs is a comparison of expected outcomes as one approaches the threshold from each side, the estimates should not be sensitive to observations at the threshold (Barreca et al., 2011). Statistically significant effects are detectable only at the 0% cutoff point.

Our study contributes both empirically and theoretically. In general, this study is related to a larger field of study on the impact of democracy on violence. Estimating the causal effect of democracy on conflict is empirically challenging. First, a conflict can prompt the implementation of elections (reverse causality). Similarly, in other contexts, an unobserved variable can determine both democracy and conflict (omitted variable bias). In this study, the close referendum results allow us to estimate the causal effect of voters' preferences regarding war and peace on violence. We study the effect on a subset of municipalities that are supposed to be similar in a wide range of observable and unobserved characteristics, differing only in whether they approve or disapprove the final agreement between the Colombian government and the FARC insurgency. From a theoretical point of view, we assert that unexpected economic shocks caused by events of peace could trigger spirals of violence. We analyze the effect of revealing preferences through voting in the peace referendum on the dynamics of violence in Colombia, rather than assessing the direct influence of the peace agreement or the peace referendum on violence.

3.2 Institutional context and economic framework

Since the 1960s, the Colombian government had been fighting two violent groups: *Revolutionary Armed Forces of Colombia* (FARC by its Spanish acronym) and *National Liberation Army* (ELN). Both non-state armed organizations emerged in response to the demand for the disenfranchisement of political rights expressed by rural peasants who felt ignored by the political elite. After years of intensive violence between 1948 and 1958, a period known as *La Violencia* (The Violence), the Colombian elite managed to overcome a political reform to deal with the still ongoing confrontations

between the long-standing Liberal and Conservative parties. The *National Front* agreement, implemented between 1958 and 1974, allowed both parties to share power while excluding other political voices, particularly liberal and leftist insurgents operating on Colombia's periphery.

The FARC and the ELN intended to overthrow the government and create a socioeconomic order that would be more conducive to their objectives. However, these two organizations were not large enough to pose a threat to the Colombian government and, more broadly, to the institutional arrangement established by the *National Front*. Between the 1970s and 1980s, other non-state armed organizations, such as the *Popular Army of Liberation* (EPL), *April 19 Movement* (M-19), *Quintín Lame Armed Movement* (MAQL), and *Revolutionary Party of the Workers* (PRT), joined both the FARC and the ELN in their fight against the government. Although these groups differed in several aspects, all converged on the same left-leaning rationale of fighting settled local elites who had traditionally held power and refused to allow other groups to participate in politics. Local elites in Colombia also formed their own militias, which eventually merged under the name of *United Self-defenses of Colombia* (AUC), a paramilitary organization.

Towards the end of the 1990s The FARC and AUC were Colombia's two most powerful non-state armed organizations, and both became involved in drug trafficking, receiving a large portion of their funding from that activity. While income from drug trafficking accounted for 48% of FARC's budget, it accounted for 70% of AUC's budget (Saab and Taylor, 2009; Fisher and Meitus, 2017; Abadie et al., 2015). Coca crops expanded rapidly in the second half of the 1990s, coinciding with the outbreak of Colombia's civil war. Colombia became one of the main producers of coca leaves in the world after the planting rate of coca bushes increased from 19% to 74% between 1990 and 2000 (Rozo, 2012; Mejía, 2016). This production was spread over 200 municipalities, and roughly half of all coca crops were concentrated within ten municipalities (Mejía, 2016). Colombia was the leading cocaine exporter in 2009, accounting for 60% to 80% of the global supply (Mejía, 2016; Fisher and Meitus, 2017). This trend persisted even after the AUC was demobilized between 2003 and 2007 (Mejía, 2016).

In 2011, under the administration of Juan Manuel Santos, the Colombian government

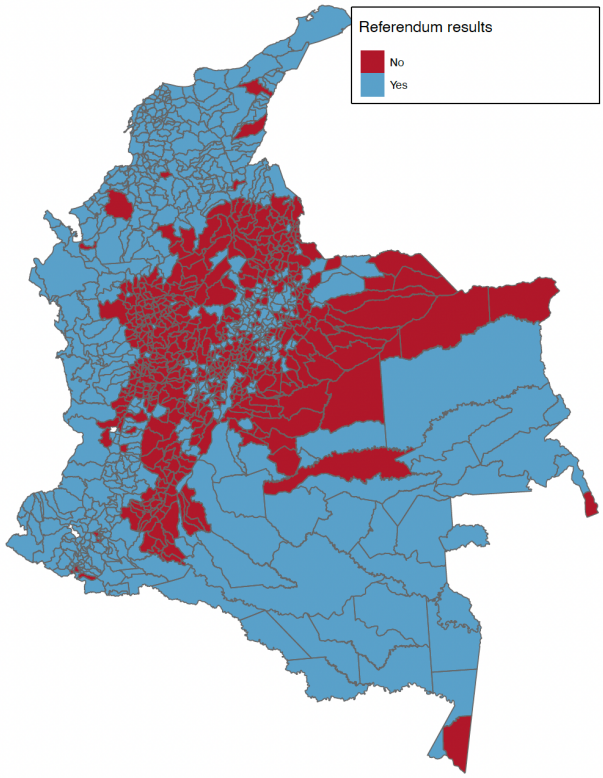
started a series of secret conversations with FARC's delegates looking for an eventual demobilization and disarmament of this insurgency. In 2012, the Colombian government and the FARC announced the beginning of peace talks and the support of the governments of Norway and Cuba as guarantors of the process. Official peace discussions began in October 2012 in Havana, Cuba. The FARC insurgency announced the signing of an official ceasefire with the government in July 2016, and the Colombian government rendered the final document resulting from the settlement to the then UN Secretary-General, Ban Ki Moon.

To ratify and legitimate the final agreement reached with the FARC, the Colombian government chose to hold a national referendum. It was approved by the Constitutional Court and Congress. To be valid, the referendum had to meet two requirements: the share approving the peace deal (votes for the "Yes" in the referendum) i) had to represent at least 13% of the electorate, and ii) had to outweigh the share that rejected the peace deal (votes for the "No" in the referendum). Although opinion polls consistently placed "Yes" as the virtual winner of the peace referendum, the final result on 2 October 2016 showed that 50.22% of the people rejected the peace deal, which represented 6,438,552 votes, a margin of barely 0.44% against "Yes".[2] Therefore, the FARC and the Colombian government were required to amend the agreement and publish a new version of it in December 2016. Finally, the DDR of the FARC insurgency started in January 2017. The geographic distribution of the referendum results is depicted in Figure 3.1.

There is a documented increase in violence in Colombia after the FARC disarmament process (Charles et al., 2020). Experts attribute the increase in violence to attacks perpetrated by other non-state armed organizations that were not involved in the peace negotiations with the FARC (Charles et al., 2020). There is a struggle for territorial control in coca-growing areas. The local disputes are driving the assassination of social leaders and former FARC combatants (**?**). What is causing this surge in violence? What is the main trigger for post-conflict violence in Colombia since the disarmament of the FARC insurgency?

[2]Unlike the US voting system where the number of votes in national elections depends on the Electoral College, elections in Colombia are managed by popular vote.

Figure 3.1: The outcome of the referendum in October 2016.



Notes: The map presents the distribution of the outcome of the referendum across Colombian municipalities in October 2016 and does not include the islands of San Andrés and Santa Catalina.

3.2.1 Economic framework

Civil wars are highly susceptible to the opportunism of violent actors (Collier and Hoeffler, 1998; Sambanis, 2002; Fearon and Laitin, 2003b; Humphreys, 2003; Wood, 2003; Collier and Hoeffler, 2004; Kalyvas, 2007; Justino, 2007; Collier et al., 2009). Their sole motivation for fighting is to seek economic profit, which implies that those involved in the conflict respond exclusively to a set of economic incentives. This perspective suggests that drastic changes in economic income are strong predictors of the onset and duration of civil wars. For example, rivalry over resources such as commodities or natural resources, illegal drug trade, and even legitimate economic activities all result in violence (Le Billon, 2001; Leonard and Straus, 2003; Ross, 2004; Le Billon, 2005; Lujala et al., 2005; Humphreys, 2005; Ross, 2006; Besley and Persson, 2008; Dal Bó and Dal Bó, 2011). However, the direction of the relationship between income and violence is ambiguous. A decrease in income can exacerbate violence, as

potential combatants' opportunity costs of joining an armed group get lower (Dube and Vargas, 2013b). On the contrary, an increase in income can increase violence by rising the amount of the reward for which armed actors are fighting (Miguel et al., 2004b; Bazzi and Blattman, 2014). In either case, economic factors lead to violence outbreak.

We see the peace talks between the Colombian government and the FARC insurgency, and particularly the demobilization of the FARC insurgency following the signing of the final agreement, as an exogenous increase in the rents that other armed groups that did not participate in the talks can potentially appropriate by disputing the valuable territories formerly controlled by FARC. Further, as it has extensively been shown in the literature such territorial contestation is often carried out by violent means (Kalyvas, 2007; Prem et al., 2020a; Rivera-Triviño, 2022). Thus, even if the size of illicit rents remain constant, an armed actor's share of rents may increase if it can gain control of areas previously controlled by the FARC. Such territories have inherent strategic value because they can raise rents for incoming armed actors. This re-accommodation of territorial control by armed actors implies that confrontations and the struggle for territorial control will increase violence at the local level.

Importantly, since information on how contestable former FARC strongholds currently are is nosy, the outcome of the peace referendum may reveal key information on this regard. The cost of territorial control on former FARC strongholds, we argue, is proportional to the level of alignment of preferences among the FARC insurgency and the local population. The outcome of the peace referendum serves as an indicator of this cost. As a result, the cost of regaining territorial control of former FARC strongholds is proportional to the number of votes cast favoring the final peace agreement; the greater the No vote share during the referendum, the lower the cost armed actors bear when deciding to take control of former FARC strongholds. This lower cost translates into a rise in violent coercion by newcomers in areas previously controlled by the FARC. This argument provides a set of empirical hypotheses, as follows:

- Violent events increase in municipalities where people voted mainly against the final agreement between the Colombian government and the FARC insurgency.
- The increase in violence is concentrated in former FARC strongholds as well as

municipalities representing any economic value.

- The increase in violence is only temporary, as territorial control by armed actors reconfigures following the demobilization of the FARC insurgency.

According to our data, the FARC insurgency was present in 109 municipalities between 2007 and 2011, of which 29 reported coca crops, or 30% of municipalities reporting coca crops in Colombia during 2015 (96 municipalities). During 2015, the area of coca crops in these 29 municipalities amounted 37,015 hectares. Since coca cultivation covered a total area of 96,085 hectares in 2015, coca cultivation on FARC strongholds accounted for 38% of Colombia's total production in 2015. This is an important area that can be redistributed among active non-state armed organizations following the demobilization of the FARC insurgency in 2017. According to UNODC (2016), average production of cocaine hydrochloride per hectare was of 6.8 kg during 2015. The average price of cocaine hydrochloride per kilo was of US$1.732 for the same period. Thus, FARC controlled areas produced 251.702 kg of cocaine hydrochloride. The face value of this production went around US$436 million in 2015.

3.3 Empirical strategy

3.3.1 Data

Universidad del Rosario provided the dataset on violent attacks, which includes a detailed description of each conflict event, such as the armed actor involved, civilian casualties, date and location[3]. We aggregate violent incidents per month and armed group (FARC, ELN, paramilitary groups, and other perpetrators) at the municipality level and normalize the number of violent attacks perpetrated per 10,000 inhabitants. The number of violent attacks carried out by non-state armed organizations between October 2016 and October 2017 is our main outcome variable. We also include conflict data from October 2015 to October 2018, as well as historical conflict data from 1997 to 2010 to perform robustness checks.

[3]The dataset was created using reports from *Revista Noche y Niebla*. These statistics are highly reliable since they are based on news reports from 25 major Colombian newspapers, as well as reports filed by Catholic priests documenting any incident involving political violence. These events are then cross-checked against government reports.

We also used data from *Integrated Monitoring System for Illicit Crops* (SIMCI, in Spanish) from *United Nations Office on Drugs and Crime* (UNODC) to examine any heterogeneous effects of coca crop cultivation on violent attacks at the municipal level. Furthermore, since non-state armed organizations fund their military activities not just via drug-trafficking revenues, but also through mining rents, we include statistics of mining in Colombia. The *Ministry of Mines and Energy* in Colombia records mineral production at the municipal level and Prem et al. (2020a) reports the presence of illicit mining at the same level. This enables us to look for heterogeneous effects in areas where there is both legal and illicit mining.

To create our treatment variable, we use the result of the peace referendum of *National Registry for Civil Status in Colombia*.[4] The treatment variable has a value of one if the share of votes in the municipality that disapproves the peace agreement outweighed the share that approved it (the "No" won); otherwise, it has a value of zero (the "Yes" won). Finally, we add the result of the 2014 presidential election to examine how this election influenced the final vote on the peace referendum.

Table 3.1: Summary statistics.

	Mean	Std. Dev.	Min	Max
Peace referendum (October 2, 2016)				
Vote share in favor of peace	0.515	0.500	0.000	1.000
Voting turnout	35.298	8.321	3.386	62.411
Violent attacks (per 10,000 people)				
Total number of attacks	0.013	0.114	0.000	6.122
Attacks perpetrated by FARC	0.001	0.032	0.000	2.630
Attacks perpetrated by ELN	0.002	0.043	0.000	3.061
Attacks perpetrated by paramilitary groups	0.002	0.054	0.000	3.060
Attacks perpetrated by an unknown armed actor	0.008	0.074	0.000	2.461
Attacks perpetrated by security forces	0.002	0.033	0.000	1.558

Notes: Summary statistics are calculated for the sample studied (October 2016 - September 2017) using monthly averages.

[4]This is the official institution in Colombia responsible for holding the elections and scrutinizing votes. For the referendum, it reported the number and percentage of votes cast in favor or against the peace agreement, as well as the null votes and unmarked votes, for every polling station.

We include information on electoral risk measures during the peace referendum reported by *Misión de Observación Electoral*, which include data on non-state armed organizations presence and a host of other local risk data. The final dataset contains a pooled panel of municipal microdata from October 2016 to October 2017.

The summary statistics for our main treatment and the dependent variables are shown in Table 3.1. The peace referendum was approved in 51.5% of the municipalities, despite a low turnout of 35%. Despite the fact that the referendum was supported by 51.5% percent of municipalities, the final vote share in favor of the peace agreement was just 49.78%. Table 3.1 shows the number of non-state armed organizations that were active during the sample period. The fact that violent attacks perpetrated by unknown armed actors were the most common type of attack is an important takeaway from this table. Table 3.2 shows how different the municipalities that supported "Yes" and "No" during the peace referendum were based on a set of observable municipal socioeconomic characteristics. Table 3.2 shows that the municipalities that supported the peace agreement are located in the rural area. These municipalities are located in the Caribbean, Pacific, Orinoquía, and Amazon regions. These municipalities are typically more rural and far from major urban areas. Finally, municipalities where the peace referendum was successful are poorer, report higher infant mortality rates, and grow coca crops to a greater extent.

Table 3.2: Summary statistics: "Yes" versus "No" municipalities.

	YES	NO	Difference
Andean region	0.324	0.818	-0.494
	(0.468)	(0.386)	[0.000]
Caribbean region	0.308	0.027	0.282
	(0.462)	(0.161)	[0.000]
Pacific region	0.255	0.053	0.202
	(0.436)	(0.224)	[0.000]
Orinoquía region	0.032	0.076	-0.044
	(0.176)	(0.265)	[0.000]
Amazon region	0.080	0.027	0.054
	(0.272)	(0.161)	[0.000]
Total population	20,628.642	20,250.466	378.176
	(24,726.291)	(24,052.305)	[0.079]
Rurality index	0.620	0.549	0.071
	(0.238)	(0.221)	[0.000]
Municipal area (hec^2)	135,807.843	64,772.348	71,035.495
	(418,250.746)	(166,411.805)	[0.000]
Altitude (km)	920.094	1,387.794	-467.699
	(1,379.018)	(810.294)	[0.000]
Distance to departmental capital (km)	89.657	76.644	13.013
	(66.505)	(51.411)	[0.000]
Distance to Bogotá (km)	405.974	226.189	179.785
	(196.919)	(127.602)	[0.000]
Unsatisfied basic needs index	55.429	36.260	19.169
	(21.197)	(15.330)	[0.000]
Total municipal income	14,758.270	14,765.387	-7.117
	(24,909.421)	(21,088.913)	[0.973]
Total municipal expenditure	17,347.887	16,664.036	683.852
	(28,470.011)	(23,077.724)	[0.003]
Dummy indicator of violence between 1948-1953	0.114	0.159	-0.046
	(0.317)	(0.366)	[0.000]
Land conflicts between 1901-1917	0.090	0.078	0.012
	(0.286)	(0.268)	[0.000]
Land conflicts between 1901-1931	0.119	0.104	0.015
	(0.324)	(0.306)	[0.000]
Potential students in primary school	2,246.950	2,006.138	240.812
	(2,668.919)	(2,351.161)	[0.000]
Potential students in secondary school	2,646.116	2,439.341	206.775
	(3,117.347)	(2,837.554)	[0.000]
Total number of schools	42.743	40.735	2.008
	(38.640)	(30.724)	[0.000]
Dummy indicator of coca crops presence	0.244	0.134	0.110
	(0.430)	(0.341)	[0.000]
Infant mortality rate	24.758	18.548	6.210
	(10.849)	(6.127)	[0.000]

Notes: Summary statistics are calculated for the sample studied (October 2016 - September 2017) using monthly averages.

3.3.2 Methodology and identification

The outcome of the peace referendum is likely to be correlated with a range of observed and unobserved municipal characteristics. Furthermore, there is evidence that electoral results are influenced by violence (Kibris, 2011; Berrebi and Klor, 2008; Getmansky and Zeitzoff, 2014). Thus, comparing municipalities that did not approve the peace agreement with municipalities that did may result in a biased estimation of the true causal effect of the results of the peace referendum on the dynamics of violence at the local level in Colombia.

We rely on the fact that the majority of either side during the peace referendum changes discontinuously at the centered threshold of 0%. Even if the final decision was based solely on the aggregate number of votes cast at the national level, we can identify municipalities in which most voters rejected or approved the final peace agreement reached between the Colombian government and the FARC insurgency. We contend that other non-state armed organizations utilize this information to exert violence strategically. Our empirical model is based on a regression of the following form:

$$y_{it} = \beta_1 + \beta_2 \times D_{it} + \beta_3 \times f\left(X_{it}\right) + \beta_4 \times D_{it} \times f\left(X_{it}\right) + \epsilon_{it} \tag{3.1}$$

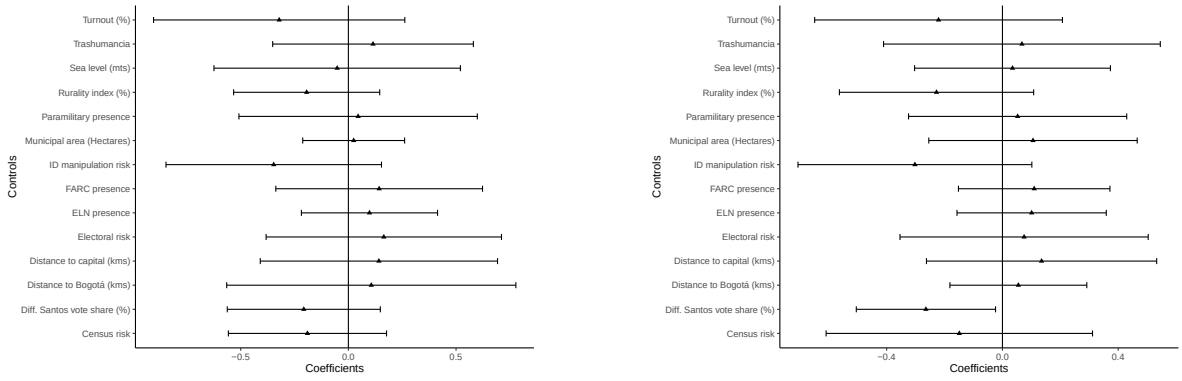
where y_{it} is the outcome variable for municipality i in month t, D_{it} represents a dummy treatment indicator of whether a municipality did not approve the peace deal during the referendum, the term $f\left(X_{it}\right)$ is a polynomial function of our score variable (the vote share that disapproves of the peace deal with 50% centered at 0), and ϵ_{it} is an idiosyncratic error term. The term X_{it} is the vote share rejecting the peace agreement minus the vote share supporting the peace agreement, where a vote share represents a fraction of the total number of votes. Thus, our treatment variable equals one if $X_{it} > 0$ and 0 otherwise.

The coefficient of interest is β_2, which accounts for a discontinuous jump in our outcome variable around the score variable at 0. We estimate β_2 parametrically and non-parametrically in a narrow bandwidth following Calonico et al. (2014). We also evaluate our results using different bandwidths and local linear and local quadratic polynomials (Lee and Lemieux, 2010; Gelman and Imbens, 2019). The causal interpretation of β_2 is based on two main assumptions: i) covariates other than our outcome variable

vary smoothly at the threshold, meaning that any discontinuous jump in violence perpetrated by non-state armed organizations is only attributable to the disapproval of the final peace deal between the Colombian government and the FARC insurgency, and ii) there is no systematic manipulation of the results of the peace referendum around the threshold of the score variable.

Figure 3.2 shows the distribution of a set of municipal characteristics along different values of the score variable before the peace referendum taking place following Calonico et al. (2014). Overall, this figure suggests that the first identification assumption is a plausible assumption; there is no evidence of statistically significant differences at the threshold between treatment and control municipalities for this set of observable variables. Figure A.3.1 in the Appendix provides graphical evidence in this regard.

Figure 3.2: Continuity assumption.



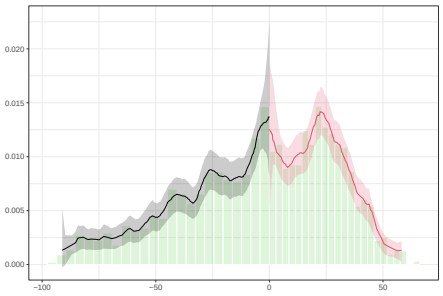
(a) Linear polynomials (nonparametric) (b) Linear polynomials (parametric)

Notes: Point estimates accompanied by confidence intervals at the 95% level following Calonico et al. (2014).

To assess the second identification assumption, we implement a manipulation test proposed by Cattaneo et al. (2020), which is a modification of the McCrary test (McCrary, 2008). Figure 3.3 shows the distribution of the score variable. A discontinuous jump in either direction of the threshold would indicate that it is more or less likely to see a narrow win of the peace agreement disapproval during the October 2016 referendum. However, Figure 3.3 shows that there is no significant increase in density at the threshold (p-value = 0.452). Furthermore, when we run a McCrary (2008) test, we find no apparent sorting on the score variable (p-value = 0.022). We test the manipulation in the score variable along different quartiles of the empirical distribution of the number of potential voters (electorate) in Figure A.3.2 since the final outcome

depends on the total number of votes casted. Again, there is no evidence of manipulation in our score variable.

Figure 3.3: Score density.



Note: Manipulation test based on Cattaneo et al. (2020), where p-value is 0.452.

3.4 Results

3.4.1 Main results

Table 3.3 presents our main findings that rejecting the peace agreement causes a sizable and statistically significant increase in violent attacks carried out by non-state armed organizations equal to 0.012 attacks, on average. Panel A shows the nonparametric estimates of the effect of treatment after Calonico et al. (2014), and panel B shows the parametric estimates[5]. Columns 1, 2, 7, and 8 present the baseline results without additional controls; columns 2-6 and 8-12 report clustered standard errors at the department-month level; columns 3 and 9 include predetermined municipal characteristics (rurality index, municipal area in hectares, sea level, distance to Bogotá in kilometers, central government budget transfers, and population); columns 4 and 10 include political controls such as the 2014 presidential election vote share, the number of potential voters and turnout during the peace referendum, and a set of election risk measures including risk of unusual migration, risk of unusual census, risk of unusual ID inscriptions, and a global measure of electoral risk during the peace referendum; columns 5 and 11 include conflict controls (number of violent attacks

[5]In Panel A we report uniform kernels of local polynomials of order one implementing bias corrected and robust standard errors as well as optimal bandwidths. In Panel B, we fit a linear polynomial and restrict the sample according to the optimal bandwidths of nonparametric estimates with standard errors clustered at the department-month level and no controls following Calonico et al. (2014).

between 1997-2010, FARC attacks between 2011-2014, ELN attacks between 2011-2014, and paramilitary attacks between 2011-2014. All measures are normalized by 10,000 inhabitants); columns 6 and 12 include all controls. Almost all nonparametric estimates across all empirical models indicate a positive and statistically significant effect that varies between 0.009 and 0.012 attacks, on average, depending on the specification. Parametric estimates have a magnitude similar to that of nonparametric estimates and almost all are statistically significant.

Table 3.3: Effect of the referendum results on the average monthly violent events involving non-state armed groups using linear polynomials, October 2016 – September 2017

Dependent variable	Average monthly violent events involving non-state armed groups (per 10,000 inhabitants)											
	Equal bandwidths						Unequal bandwidths					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Nonparametric estimates and bias-corrected standard errors of Calonico, Cattaneo, and Titiunik (2014) - Kernel: Uniform												
Referendum's vote share (No)	0.012**	0.012**	0.011**	0.009*	0.011**	0.009**	0.012**	0.012**	0.011**	0.009*	0.009*	0.008*
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Mean dependent variable	0.009	0.009	0.008	0.008	0.009	0.009	0.008	0.008	0.009	0.008	0.009	0.008
Bandwidths	13.893	14.968	16.897	16.684	15.126	18.721	(11.422, 12.772)	(11.352, 12.934)	(11.371, 14.371)	(12.341, 15.935)	(10.616, 12.855)	(10.702, 16.594)
Observations	3,804	3,996	4,524	4,476	4,044	4,956	3,360	3,384	3,552	4,020	3,264	3,804
Municipal controls			✓			✓			✓			✓
Political controls				✓		✓				✓		✓
Conflict controls					✓	✓					✓	✓
Cluster		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Panel B: Parametric estimates												
Referendum's vote share	0.011**	0.011*	0.012*	0.009*	0.009	0.009	0.011**	0.011*	0.012**	0.006**	0.008	0.009
	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)	(0.003)	(0.006)	(0.006)
Mean dependent variable	0.009	0.009	0.009	0.009	0.009	0.009	0.008	0.008	0.008	0.008	0.008	0.008
Bandwidths	13.893	13.893	13.893	13.893	13.893	13.893	(11.422, 12.772)	(11.422, 12.772)	(11.422, 12.772)	(11.422, 12.772)	(11.422, 12.772)	(11.422, 12.772)
Observations	3,804	3,804	3,804	3,804	3,804	3,804	3,360	3,360	3,360	3,360	3,360	3,360
Municipal controls			✓			✓			✓			✓
Political controls				✓		✓				✓		✓
Conflict controls					✓	✓					✓	✓
Cluster		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

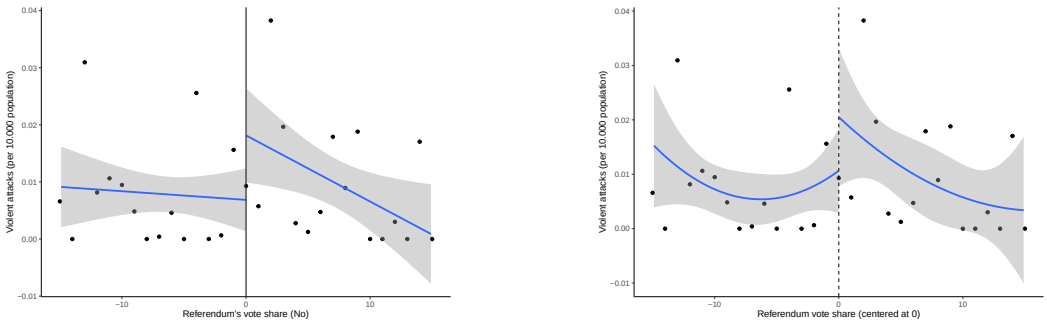
Note: Standard errors in parentheses clustered at the department-month level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The nonparametric estimates in Table 3.3 show that a year after the peace referendum, voting against the peace agreement between the Colombian government and the FARC insurgency increases the number of violent attacks carried out by non-state armed organizations by about 0.012 attacks per 10,000 inhabitants (see column 2). This increase is significant, since it is 1.3 times the sample mean of violent attacks. Furthermore, our results are robust to the choice of bandwidth. Our estimates remain statistically

significant when we use a quadratic polynomial (Table A.3.1), and triangular or epanechnikov kernels (Table A.3.2). As expected, estimates are not statistically significant when considering the following year, that is, data between October 2017 and September 2018 (Table A.3.3).

Figure 3.4 depicts our main estimates based on the parametric approach in column 2 of Table 3.3 using linear and quadratic polynomials and a uniform kernel. Each point represents the average number of violent attacks for a specific bin within the optimal bandwidth range according to Calonico et al. (2014). Both figures suggest a statistically significant jump near the threshold.

Figure 3.4: Effect of referendum results on the average monthly violent events involving non-state armed groups, October 2016 – September 2017.



(a) Linear polynomials (b) Quadratic polynomials

Note: Bins within Calonico et al. (2014) optimal bandwidths are displayed for linear and quadratic polynomials without additional controls. Standard errors are clustered at the department-month level.

3.4.2 Mechanisms

In this section, we examine who carried out the violent acts, determine the hot spots of violence, and study how the peace referendum is related to the 2014 presidential election, which was considered an unofficial peace referendum at the time (Weintraub et al., 2014). Heterogeneous effects are tested using the raw results in column 2 of Table 3.3. The increase in violence presented in the main findings could be attributed to violent acts carried out by FARC dissidents as a form of retaliation. Table 3.4 shows, however, that the increase in violence documented a year after the peace referendum is mainly committed by non-state armed organizations that were not involved in the negotiation process.

Table 3.4: Effect of the referendum results on the average monthly violent events involving non-state armed groups using linear polynomials by perpetrator, October 2016 – September 2017

Dependent variable	Average monthly violent events involving non-state armed groups (per 10,000 inhabitants)	
	FARC	Other non-state groups
	(1)	(2)
Referendum's vote share (No)	0.000	0.011*
	(0.000)	(0.006)
Dependent variable mean	0.0001	0.009
Adjusted R^2	-0.0002	0.001
Observations	3,996	3,996
Cluster	✓	✓

Note: Standard errors in parentheses clustered at the department-month level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

We investigate whether violence spreads differentially along former FARC's strongholds since these areas are of major importance for non-state armed organization's economic interests. Thus, we interact a dummy indicator of rejecting the peace agreement with a measure of the magnitude a municipality is exposed to the potential control of other non-state armed groups. In this case we only consider the presence of the ELN and paramilitary groups. Also, we test the impact of such exposition in FARC's strongholds and uncontrolled areas to verify the plausibility of the differential impact on FARC's strongholds. We define presence of an armed group as a dummy indicator of whether the total number of attacks committed by an armed group within a municipality exceeds the median value of the same measure across Colombian municipalities. Thus, uncontrolled municipalities are defined as areas where presence of any armed group is not reported. The degree of exposure of FARC's strongholds to the presence of other armed groups is defined as:

$$Z = \alpha_i \times FARC_i$$

where α_i stands for the proportion of neighboring municipalities of municipality i

reporting the presence of armed actors other than FARC, and $FARC_i$ is a dummy indicator for FARC presence in municipality i. The degree of exposure of uncontrolled municipalities goes the same:

$$Z = \alpha_i \times Uncontrolled_i$$

where $Uncontrolled_i$ is a dummy indicator for uncontrolled municipalities. The heterogeneous effects are reported in Table 3.5 and Table 3.6. Column 1 and Table 3.5 shows that municipalities under FARC control and more vulnerable to the influence of other armed groups report a differential increase in violent events. Though this effect is not statistically significant. Then, in columns 2 and 3, I intend to depict the same effect for the influence of the ELN and paramilitary groups separately. For the paramilitary case it shows that the coefficient of the interaction term becomes statiscally significant at 10%. There is a differential increase in violent events in municipalities where people mostly voted against the final peace agreeement, are FARC's strongholds, and where paramilitary groups could have a greater influence.

Table 3.6 replicates the empirical exercise of Table 3.5, though leveraging on uncontrolled municipalities. This time, the results show a differential reduction in violent events in uncontrolled municipalities exposed to the influence of other armed groups, particularly paramilitary groups. Overall, Table 3.5 and Table 3.6 provide evidence that non-state armed organizations other than the FARC are attempting to expand their territorial control towards former FARC strongholds rather than doing so indiscriminately to all sort of territories.

Table 3.5: Effect of the referendum results on the average monthly violent events involving non-state armed groups using linear polynomials in areas dominated by FARC, October 2016 – September 2017

Dependent variable	Average monthly violent events involving non-state armed groups (per 10,000 inhabitants)		
	Any other group	ELN	Paramilitary groups
	(1)	(2)	(3)
Referendum's vote share (No)	0.007	0.011*	0.006
	(0.005)	(0.005)	(0.005)
Referendum's vote share (No) × Z	0.036	-1.120*	0.077*
	(0.046)	(0.662)	(0.039)
Dependent variable mean	0.006	0.006	0.006
Adjusted R^2	0.019	0.049	0.019
Observations	3,996	3,996	3,996
Cluster	✓	✓	✓

Note: Standard errors in parentheses are clustered at the department-month level. *Z* represents a dummy indicator taking the value of one if the condition in the title of each column holds, and takes the value of zero otherwise. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3.6: Effect of the referendum results on the average monthly violent events involving non-state armed groups using linear polynomials in areas not dominated by non-state armed groups, October 2016 – September 2017

Dependent variable	Average monthly violent events involving non-state armed groups (per 10,000 inhabitants)		
	Any other group	ELN	Paramilitary groups
	(1)	(2)	(3)
Referendum's vote share (No)	0.014**	0.011**	0.014**
	(0.006)	(0.005)	(0.006)
Referendum's vote share (No) × Z	-0.045**	-0.056	-0.060**
	(0.022)	(0.091)	(0.025)
Dependent variable mean	0.006	0.006	0.006
Adjusted R^2	0.002	0.017	0.004
Observations	3,996	3,996	3,996
Cluster	✓	✓	✓

Note: Standard errors in parentheses clustered at the department-month level. *Z* represents a dummy indicator taking the value of one if the condition in the title of each column holds, and takes the value of zero otherwise. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

We argue that non-state armed organizations that did not take part in the peace process are tilted to support the demobilization of the FARC insurgency. When the FARC leaves its strongholds, other violent groups can seize control of these areas. This control may entitle them to economic rents previously under the domain of the FARC. If this is the case, we should observe a larger increase in violent attacks around the cut-off of our score variable in municipalities where coca crops are cultivated and mining occurs than in municipalities where these economic activities are not present. Table 3.7 and Table 3.8 show that the increase in violent attacks around the cut-off is larger in municipalities where coca crops are grown and where government titles are provided for the legal extraction of precious metals, a proxy for the presence of mining rents. Such effect is only observable for FARC's strongholds (see able 3.7). Both tables further show that the presence of state forces have no impact on dynamics of violence locally.

Table 3.7: Effect of referendum results on the average monthly violent events involving non-state armed groups using linear polynomials by economic activity within FARC's strongholds, October 2016 – September 2017

Dependent variable	Average monthly violent events involving non-state armed groups (per 10,000 inhabitants)			
	Coca cultivation	Legal mining	Illegal mining	Military state presence
	(1)	(2)	(3)	(4)
Referendum's vote share	0.040	0.006	0.077**	0.070**
	(0.027)	(0.026)	(0.035)	(0.033)
Referendum's vote share × Z	0.092**	0.384***	0.070	0.010
	(0.041)	(0.099)	(0.047)	(0.039)
Dependent variable mean	0.006	0.006	0.006	0.006
Adjusted R^2	0.032	0.157	0.013	0.023
Observations	384	384	384	384
Cluster	✓	✓	✓	✓

Note: Standard errors in parentheses clustered at the department-month level. *Z* represents a dummy indicator taking the value of one if the condition in the title of each column holds, and takes the value of zero otherwise. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 3.8: Effect of referendum results on the average monthly violent events involving non-state armed groups using linear polynomials by economic activity outside FARC's strongholds, October 2016 – September 2017

Dependent variable	Average monthly violent events involving non-state armed groups (per 10,000 inhabitants)			
	Coca cultivation	Legal mining	Illegal mining	Military state presence
	(1)	(2)	(3)	(4)
Referendum's vote share	0.008*	0.004	0.004	0.001
	(0.005)	(0.005)	(0.005)	(0.005)
Referendum's vote share × Z	-0.041*	0.003	0.001	0.007*
	(0.022)	(0.005)	(0.005)	(0.004)
Dependent variable mean	0.006	0.006	0.006	0.006
Adjusted R^2	0.009	-0.0003	-0.0002	0.0008
Observations	3,612	3,612	3,540	3,612
Cluster	✓	✓	✓	✓

Note: Standard errors in parentheses clustered at the department-month level. Z represents a dummy indicator taking the value of one if the condition in the title of each column holds, and takes the value of zero otherwise. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Following the ending of the talks between the Colombian government and the FARC insurgency, 170 municipalities most devastated by armed conflict were prioritized for structural transformation through development initiatives. This is referred to as Territorial Focus Development Programs (PDET, its acronym Spanish). A similar strategy, known as the Program to Substitute Crops Used for Illegal Purposes, was designed to replace coca crops with alternative types of sustainable livelihood (PNIS). Consequently, Table 3.9 shows higher increases in violent attacks in municipalities targeted by these government programs. For PNIS, the effects are statistically significant. The areas where the Colombian government is making significant efforts to alleviate the conditions that sparked violent conflict in the first place through a nonmilitary approach have seen a rise in violent attacks. This impact is evident in strategic territories for non-state armed organizations, that is, places where coca is cultivated.

Table 3.9: Effect of the referendum results on the average monthly violent events involving non-state armed groups using linear polynomials by municipal characteristic, October 2016 – September 2017

Dependent variable	Average monthly violent events involving non-state armed groups (per 10,000 inhabitants)			
	ETCR	PDET	PNIS	ZOMAC
	(1)	(2)	(3)	(4)
Referendum's vote share (No)	0.011*	0.008	0.009	0.010*
	(0.006)	(0.005)	(0.005)	(0.006)
Referendum's vote share (No) × Z	0.015	0.004	0.051**	-0.001
	(0.015)	(0.013)	(0.023)	(0.007)
Dependent variable mean	0.009	0.009	0.009	0.009
Adjusted R^2	0.0007	0.015	0.010	0.005
Observations	3,996	3,996	3,996	3,996
Cluster	✓	✓	✓	✓

Note: Standard errors in parentheses clustered at the department-month level. *Z* represents a dummy indicator taking the value of one if the condition in the title of each column holds, and takes the value of zero otherwise. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Two years before the referendum was held, there were presidential elections. One of the two candidates in the second round was Juan Manuel Santos, who was running for reelection, and the other one was Óscar Iván Zuluaga. While Santos advocated for the extension of negotiations, Zuluaga advocated for the termination of the peace agreement with the FARC insurgency. According to Weintraub et al. (2014), because both candidates had opposite views on peace discussions, the second round of the 2014 presidential election could be viewed as an unofficial peace referendum. In Table 3.10 we examine the impact of the 2014 presidential election outcome on violent attacks carried out by non-state armed organizations. This table illustrates that the increase in violent attacks around the threshold of the score variable is not related with the outcome of the 2014 presidential election. We rule out the possibility that an unexpected shift in voting behavior between the two elections prompted violent groups to resort to violence.

Table 3.10: Effect of the referendum results on the average monthly violent events involving non-state armed groups using linear polynomials by 2014 election results, October 2016 – October 2017

Dependent variable	Average monthly violent events involving non-state armed groups (per 10,000 inhabitants)
	Violent events
	(1)
Referendum's vote share (No)	0.010*
	(0.006)
Referendum's vote share (No) × Santos' vote share	0.005
	(0.006)
Dependent variable mean	0.009
Adjusted R^2	0.005
Observations	3,996

Note: Standard errors in parentheses clustered at the department-month level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

3.4.3 Robustness checks

Do political preferences explain the rise in violent attacks?

An important robustness test is to show that political preferences in general are not correlated with violent attacks locally. We try to rule out the possibility that the 2014 presidential election shaped the outcome of the peace referendum. We evaluate whether the vote share of the 2014 presidential election had an impact on violent attacks perpetrated by non-state armed organizations after the peace referendum. Table 3.11 finds no statistically significant effect around the threshold in the 2014 elections. Violent attacks after the peace referendum are not statistically associated with the share of presidential election votes in 2014. Overall, empirical evidence suggests that the main findings are not influenced by recent elections.

Table 3.11: Effect of the 2014 presidential election on the average monthly violent events involving non-state armed groups using linear polynomials, October 2016 – September 2017

Dependent variable	Average monthly violent events involving non-state armed groups (per 10,000 inhabitants)	
	Equal bandwidths	Unequal bandwidths
	(1)	(2)
Panel A: Nonparametric estimates and bias-corrected standard errors of Calonico, Cattaneo, and Titiunik (2014) - Kernel: Uniform		
2014 vote share (Santos)	-0.003	0.008
	(0.005)	(0.007)
Mean dependent variable	0.008	0.008
Bandwidths	22.868	22.659
Observations	4,872	4,776
Panel B: Parametric estimates		
2014 vote share (Santos)	-0.002	0.006
	(0.005)	(0.007)
Mean dependent variable	0.008	0.011
Bandwidths	22.868	22.659
Observations	4,872	4,776

Note: Standard errors in parentheses clustered at the department-month level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Does historic conflict influence the outcome of the peace referendum?

So far, we have focused on the effect of the outcome of the referendum on future violence. Electoral preferences and election outcomes are determined by conflict in the past (Kibris, 2011; Berrebi and Klor, 2008; Getmansky and Zeitzoff, 2014). In this case, there is evidence showing that the referendum result responded to the intensity of Colombia's armed conflict, particularly at the local level. According to Branton et al. (2019), the level of support for the peace agreement was proportional to the level of exposure to violence. To evaluate whether this is the case in the sample we use around the threshold, we check if there is any jump in the number of attacks perpetrated by non-state armed organizations between 2002-2006 around the threshold of our score variable. Finding a jump would imply that armed conflict in the past influenced the outcome of the peace referendum. Table 3.12 finds no statistical significant effects, allowing us to discard the possibility that any increase in violent attacks after the peace referendum is triggered by historical conflict in Colombia. This result applies to the historic conflict involving the FARC (Table A.3.4) and other non-state armed

organizations (Table A.3.5) separately.

Table 3.12: Effect of the referendum results on the average monthly violent events involving non-state armed groups using linear polynomials, January 2002 – December 2006

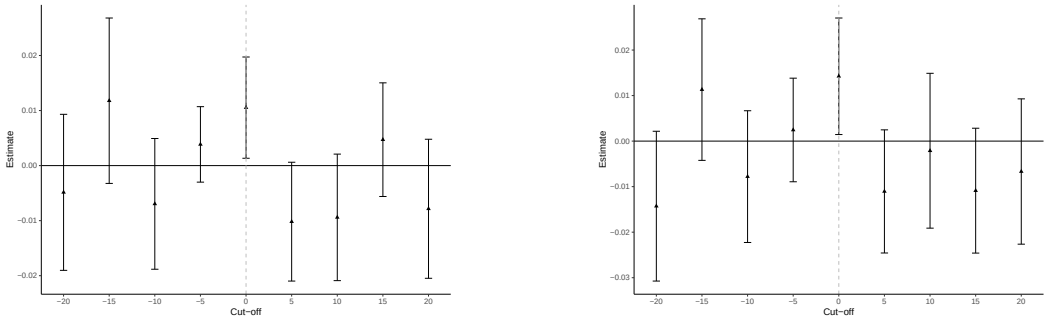
Dependent variable	Average monthly violent events involving non-state armed groups (per 10,000 inhabitants)	
	Equal bandwidths	Unequal bandwidths
	(1)	(2)
Panel A: Nonparametric estimates and bias-corrected standard errors of Calonico, Cattaneo, and Titiunik (2014) - Kernel: Uniform		
Referendum's vote share (No)	1.481	1.399
	(1.879)	(2.631)
Mean dependent variable	5.070	5.500
Bandwidths	17.246	22.903
Observations	389	518
Panel B: Parametric estimates		
Referendum's vote share (No)	1.399	1.991
	(1.322)	(1.322)
Mean dependent variable	5.070	5.500
Bandwidths	17.246	22.903
Observations	389	518

Note: Standard errors in parentheses clustered at the department-month level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Other robustness checks

We evaluate the sensitivity of our results when we run the same discontinuous design at different cut-offs (Figure 3.5). We also drop out a subset of observations near the cutoff point of 0 (Barreca et al., 2011) in Figures 3.6. Finally, we test the sensitivity of our results when we use a different set of bandwidths (Figure 3.5). Overall, these figures demonstrate that the point estimates do not change, particularly in the linear polynomial case. Results are statistically significant at 10% for quadratic polynomials.

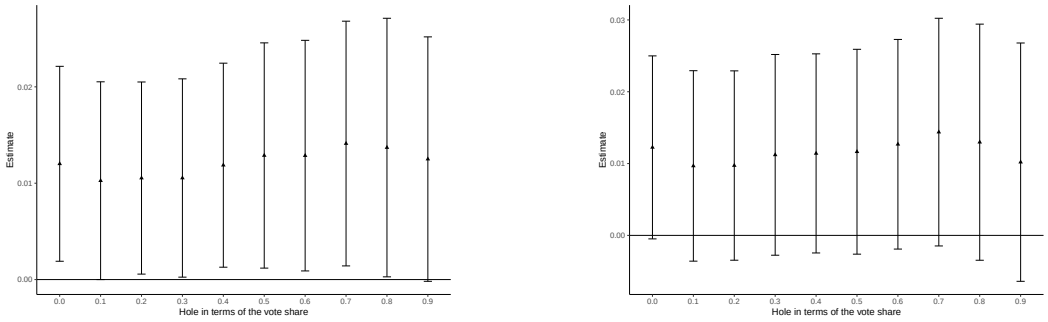
Figure 3.5: Sensitivity analysis to different cut-offs.



(a) Linear polynomials (b) Quadratic polynomials

Note: Point estimates for the common support of the score variable with confidence intervals at the 95% level. Parametric estimates using optimal bandwidths of Calonico et al. (2014) based on linear and quadratic polynomials, no controls, and clustered standard errors at the department-month level case.

Figure 3.6: Sensitivity analysis to observations near the cut-off

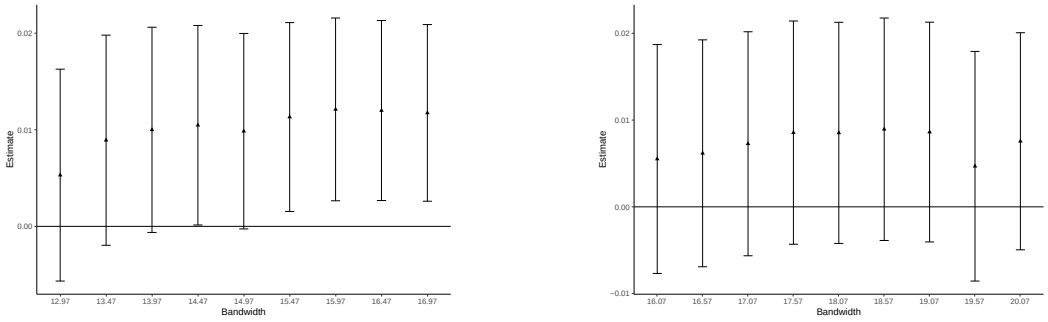


(a) Linear polynomials (b) Quadratic polynomials

Note: Point estimates for the common support of the score variable with confidence intervals at the 95% level. Parametric estimates using optimal bandwidths of Calonico et al. (2014) based on linear and quadratic polynomials, no controls, and clustered standard errors at the department-month level case.

Figure 3.7 confirms the robustness of our results when we consider different sets of optimal bandwidths following Calonico et al. (2014).

Figure 3.7: Sensitivity analysis to bandwidth choice.



(a) Linear polynomials (b) Quadratic polynomials

Note: Point estimates accompanied by confidence intervals at the 95% level.

3.5 Conclusion

This paper contributes to the academic debate on what factors lead to the outbreak of violence, particularly after unexpected economic shocks. We estimate the effect of revealing political preferences amid a long-running armed conflict by evaluating the unanticipated negative consequences of Colombia's peace referendum results. We exploit local close referendum outcomes regarding the peace agreement to uncover a significant increase in violent attacks in municipalities where the vote share disapproving the negotiated settlement is higher than the vote share approving it. This impact has been driven by the strategic value of specific areas, mostly places previously controlled by the FARC insurgency, and areas where violent actors that did not participate in the peace negotiations can potentially extract economic rents. Importantly, we rule out other potential explanations for our findings, such as historic conflict or political preferences in general. Overall, the recent increase in violence in Colombia appears to be linked to economic causes. Non-state armed organizations that remained active after the peace talks with the FARC insurgency are attempting to keep control of former FARC's strongholds. Furthermore, these organizations are trying to hold control of FARC's former economic rents.

We contend that the reasons that led to the outbreak of violence in the first place can likewise lead to violence in a post-conflict stage. This is especially true in civil wars involving multiple factions. Partial peace settlements in which just a subset of armed actors lay down their weapons while others continue to participate in violent

confrontations create the conditions for violence to escalate. Peace talks with the FARC insurgency represented an economic opportunity for armed actors who refused to accept a peaceful settlement. Because of the FARC's demobilization, economic rents previously controlled by the FARC were contested by other armed actors. Fighting for territorial control and economic rents fueled the increase in violence one year after the peace referendum.

Our findings show how well-intended measures used to legitimize a negotiated settlement, such as one that leveraged the agreement between the FARC insurgency and the Colombian government, turned out to be an ineffective approach to promote a pacification policy. Policies aimed at reinforcing the state's monopoly of violence and disarming non-state armed organizations operating locally must include conditions to avoid violence against the local population and be more focused on establishing the right conditions to allow a constant presence of the government.

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Appendices

Appendix A

Chapter 1

A.0.1 Ceasefire or implementation?

The signature of the final peace agreement at the end of 2016 was followed by a mobilization of FARC fronts away from their areas of operation and into specific zones where, under the monitoring of a UN Peace Mission, FARC disarmed and started their reincorporation process. Thus, one could argue that, while the permanent ceasefire opened a window of opportunity for other armed groups to dispute the control of FARC-dominated territories, the mobilization of FARC personnel during the agreement implementation stage further facilitated the occupation of former FARC areas by other armed groups. If this is the case, then there should be a differential effect on the killing of social leaders starting in 2017:1, relative to that observed during the post ceasefire, pre-implementation period (2015:1 to 2016:2).

However, as mentioned in the introduction, the quest for territorial control by armed groups entails the selective killing of civilians to induce fear and encourage allegiance and support, and this strategy is independent of whether a ceasefire-compliant FARC is present or not. This, on the other hand, argues against any differential effect in the killing of social leaders after the implementation of the agreement relative to the ceasefire period. We take a skeptical view and estimate this potential differential effect

across the post cease-fire period through the following model:

$$
\begin{aligned}
y_{mdt} = \alpha_m + \delta_{dt} + \beta_1 \times \text{FARC}_m \times \text{ExposureOthers}_m \times \text{Implementation}_t \qquad \text{(A.2.3.1)} \\
+ \beta_2 \times \text{FARC}_m \times \text{Implementation}_t + \beta_3 \times \text{ExposureOthers}_m \times \text{Implementation}_t \\
+ \beta_4 \times \text{FARC}_m \times \text{ExposureOthers}_m \times \text{Cease}_t + \beta_5 \times \text{FARC}_m \times \text{Cease}_t \\
+ \beta_6 \times \text{ExposureOthers}_m \times \text{Cease}_t + \sum_{c \in \mathbf{X_m}} \gamma'(c \times \delta_t) + \epsilon_{mdt}
\end{aligned}
$$

where Implementation_t is a dummy that takes the value of one after beginning of the peace agreement implementation phase, in first semester of 2017. Relative to β_4, β_1 captures the differential change in the killing of social leaders during the implementation stage in comparison with the ceasefire period for the interaction of interest.

Table A.2.3.1 shows the estimated coefficients from specification. The coefficient of interest is not statistically significant which suggests no differential effect on the rate of leader killed in this sub-period.[1] We interpret this as suggesting that the ceasefire, which was by and large respected by FARC (to credibly signal their willingness of reaching a peace agreement) was a high enough incentive for other armed groups to dispute the control of this group's territorial strongholds, and there was no differential such incentive when the implementation stage of the peace agreement started.

Killing of social leaders: data sources and main patterns

Since 2006, *Somos Defensores* created an information system that records all the killings of social leaders, with the objective of producing permanent statistics about this type of violence in order to lobby national authorities and generate awareness on what they call a systematic (and intentional) practice.The registry is filled with the input of a large network of Human Rights organizations (over 500) with presence throughout the Colombian territory (especially in conflict-affected areas) and supplemented with fieldwork carried out by *Somos Defensores* to verify that assassinations of alleged leaders are indeed so. Efforts are made to avoid double counting.

For each murder case the dataset includes: the date and place of the event, the victim's name, the organization represented by the leader, and the presumed perpetrator. There

[1]The Table also shows that the level effect for this sub-period is positive and statistically significant when the pre-determined controls are added.

Table A.2.3.1: Killing of social leaders during the cease fire and the implementation of the peace agreement

	Killing rate	
	(1)	(2)
Implementation × FARC × ExposureOthers	0.070	0.100
	(0.291)	(0.294)
Cease × FARC × ExposureOthers	0.395**	0.419**
	(0.190)	(0.194)
Implementation × FARC	−0.074	−0.098
	(0.211)	(0.226)
Cease × FARC	−0.112	−0.099
	(0.110)	(0.113)
Implementation × ExposureOthers	0.027	−0.016
	(0.085)	(0.095)
Cease × ExposureOthers	−0.264***	−0.273***
	(0.101)	(0.106)
Implementation + Cease × FARC × ExposureOthers	0.465	0.519*
	(0.290)	(0.296)
Observations	14966	14966
Municipalities	1069	1069
Municipality FE	✓	✓
Department-Period FE	✓	✓
Controls		✓
Avg Dep Var	0.101	0.101
SD Dep Var	1.083	1.083

Notes: This table presents the results from the main specification in equation (A.2.3.1). The dependent variable is the number of homicides of social leaders over total population. *Implementation* is a dummy that takes the value one for the period after 2017:1. See Table 1.3 for more details on variables definition, predetermined controls, and standard errors. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

are a total of 563 killings up to the first semester of 2018, 91% of which remain unresolved by the judicial system.[2] Most of the murdered leaders were part of local community councils (33%), indigenous communities (22%), or peasant organizations (12%) – see Table A.3.1. For the purpose of our statistical analysis, we aggregate this information at the municipality-bi-annual level.

[2]See "La mayoría de asesinatos de líderes sociales quedan impunes: ONG Somos Defensores", *El Espectador*, 11/13/2018. Available from: `https://www.elespectador.com/noticias/judicial/la-mayoria-de-asesinatos-de-lideres-sociales-quedan-impunes-ong-somos-defensores-articulo-823451` (last accesses November 30, 2018).

Table A.1.1: Leaders killed by activity

Activity	N	%
	(1)	(2)
Local council	165	33.3
Indigenous	109	22.0
Peasant	59	11.9
Conflict victims	47	9.5
Union member	32	6.5
Afro	23	4.7
Human rights	19	3.8
LGBT	18	3.6
Student-teacher	20	4.0
Women	3	0.6

Notes: This table shows the distribution of homicides by type of social leader during our period of analysis, 2011:1 to 2017:2.

A.0.2 Testing potential mechanisms

We can use municipal-level variation across specific characteristics to estimate heterogenous effects that can shed some light regarding the underlying mechanisms of the main effect of interest. In particular, the killing of leaders may be exacerbated in municipalities that are more economically attractive for the controlling armed group. Moreover, municipalities with better state capacity and a more effective judiciary are likely to attenuate the unintended violent incentive provided by the ceasefire in formerly FARC strongholds. We thus divide a set of potential mechanisms into these two categories (attractiveness and state capacity) and test whether the estimated average effects entail some variation across these dimensions.

To that end, we augment the main specification in equation (1.1) by adding a fourth interaction term. Specifically, let the municipality characteristic Z_m (measured before the ceasefire) be a measure of the relative attractiveness or else the relative cost of disputing a FARC stronghold. We estimate:

$$\begin{aligned} y_{mdt} = {} & \alpha_m + \delta_{dt} + \beta_1 \times \text{FARC}_m \times \text{ExposureOthers}_m \times Z_m \times \text{Cease}_t \\ & + \beta_2 \times \text{ExposureOthers}_m \times Z_m \times \text{Cease}_t + \beta_3 \times \text{FARC}_m \times Z_m \times \text{Cease}_t \\ & + \beta_4 \times \text{FARC}_m \times \text{ExposureOthers}_m \times \text{Cease}_t + \beta_5 \times \text{FARC}_m \times \text{Cease}_t \\ & + \beta_6 \times \text{ExposureOthers}_m \times \text{Cease}_t + \beta_7 \times Z_m \times \text{Cease}_t + \sum_{c \in \mathbf{X_m}} \gamma'(c \times \alpha_t) + \epsilon_{mdt} \end{aligned} \tag{A.2.2.1}$$

Our coefficient of interest, β_1, captures the differential killing of social leaders in places with FARC presence and exposed to other armed groups in municipalities with

characteristic Z_m. Note that the results coming from this test are suggestive about potential mechanisms, but not necessarily causal. They have to be interpreted with caution.

Using the above specifications we estimate the impact of the December 2014 permanent ceasefire on the killing of social leaders in areas previously dominated by FARC and exposed to other armed groups (equation 1.1), the dynamic persistence of this effect (equation 1.2), and heterogeneous effects given by the relative attractiveness of disputed municipalities as well as their institutional capacity (equation A.2.2.1). The next section reports the estimated results.

Table A.1.2: Municipality characteristics before the ceasefire by FARC presence

	(1) Avg without FARC	(2) FARC presence
Land restitution	0.403	0.223***
	(0.033)	(0.071)
Judicial inefficiency	0.068	0.020*
	(0.003)	(0.011)
Electoral Risk	0.141	0.010
	(0.013)	(0.049)
Municipal income	85.861	−16.211***
	(3.844)	(5.920)
Municipal expenditure	101.917	−23.189***
	(4.788)	(7.586)
Total transfers	9.622	−3.409***
	(0.588)	(0.804)
Transfers from central government	46.070	−3.245
	(1.551)	(3.464)
National transfers	8.839	−3.096***
	(0.517)	(0.708)
Municipalities	1069	

Notes: This table presents univariate regressions based on municipality characteristics before the ceasefire. Column 1 presents the average of each variable before the ceasefire (during 2011) for municipalities wihtout FARC presence. Column 2 presents the estimated coefficient and the standard errors from univariate regressions for FARC presnece. *Land restitution* is a dummy for those municipalities with the number of request for land restitution over the size of the municipality being above the median. *Judicial inefficiency* is the share of justice employees under disciplinary investigations. *Electoral Risk* is a dummy that takes the value of one if the municipality had abnormal behaviour during the previous three congressional elections. *Municipal income* is the sum of current income and capital income measured in thousands of current pesos per inhabitant. *Municipal expenditure* is the sum of current expenses and capital expenses measured in thousands of current pesos per inhabitant. *Total transfers* is the sum of the resources transferred to the municipality by another level of government measured in thousands of current pesos per inhabitant. *Transfers from central goverment* is transfers corresponds to resources from national entities transferred to the territorial entity measured in thousands of current pesos per inhabitant. *National transfers* is transfers from the Central Govern- ment by General Participation System (SGP) measured in thousands of current pesos per inhabitant.

Table A.1.3: Differential effect on municipal finance by FARC presence after cease

	Municipal Income	Municipal Expenditure	Total Transfers	Transfers from central goverment	National Transfers
	(1)	(2)	(3)	(4)	(5)
Cease × FARC	29.152	37.872	−2.140	10.880	−0.318
	(29.176)	(36.776)	(2.985)	(9.329)	(2.310)
Observations	7468	7468	7468	7483	7468
Municipalities	1069	1069	1069	1069	1069
Municipality FE	✓	✓	✓	✓	✓
Period FE	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓
Avg Dep Var	1114.769	1134.640	107.486	497.139	97.047
SD Dep Var	911.294	919.664	118.829	304.267	107.631

Notes: This table presents the results from the main specification in difference. We exploit municipal-level variation by year, over the period 2011 to 2017. The dependent variable is the measure per capita. *Cease* is a dummy that takes the value one for the period after 2015, *FARC* is a dummy for those municipalities with FARC presence. Predetermined municipal controls includes logarithm of the population in 2010, municipality area, average elevation, distance to the closest major city, share of population under poverty, literacy rate, math and language test scores, index of rurality, log of tax income and index of good fiscal policy. Errors in parentheses control for spatial and first-order time correlation (see Conley, 1999, Conley, 2016). We allow spatial correlation to extend to up to 279 km from each municipality's centroid to ensure that each municipality has at least one neighbor. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table A.3.1: Leaders killed by activity

Activity	N	%
	(1)	(2)
Local council	165	33.3
Indigenous	109	22.0
Peasant	59	11.9
Conflict victims	47	9.5
Union member	32	6.5
Afro	23	4.7
Human rights	19	3.8
LGBT	18	3.6
Student-teacher	20	4.0
Women	3	0.6

Notes: This table shows the distribution of homicides by type of social leader during our period of analysis, 2011:1 to 2017:2.

A.0.3 Additional Figures and Tables

Table A.3.2: Killing of social leaders, FARC presence, and exposure to other armed groups

	Killing rate		Number of killings		Any killing	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: FARC Presence						
Cease × FARC	−0.043	−0.020	0.011	0.009	0.011	0.008
	(0.084)	(0.093)	(0.017)	(0.018)	(0.014)	(0.014)
Panel B: Other Groups Presence						
Cease × Exposure Others	−0.156**	−0.170**	−0.009	−0.013	−0.008	−0.013
	(0.076)	(0.080)	(0.015)	(0.016)	(0.011)	(0.012)
Observations	14966	14966	14966	14966	14966	14966
Municipalities	1069	1069	1069	1069	1069	1069
Municipality FE	✓	✓	✓	✓	✓	✓
Department-Period FE	✓	✓	✓	✓	✓	✓
Controls		✓		✓		✓
Avg Dep Var	0.101	0.101	0.028	0.028	0.021	0.021
SD Dep Var	1.083	1.083	0.219	0.219	0.144	0.144

Notes: This table presents the results from the main specification in equation (1.1). We exploit municipal-level variation by semester, over the period 2011:1 to 2017:2. Columns (1) and (2) use the number of homicides of social leaders over total population, columns (3) and (4) use as dependent variable the total number of homicides of social leaders, while columns (5) and (6) use a dummy that takes the value one if there was at least one social leader assassinated. *Cease* is a dummy that takes the value one for the period after 2015:1. *FARC* is a dummy for those municipalities with FARC presence. *ExposureOthers* is a continuous variable that measures ELN or paramilitary groups presence in the municipality or their (distance-penalized) vicinity. Predetermined municipal controls includes logarithm of the population in 2010, municipality area, average elevation, distance to the closest major city, share of population under poverty, literacy rate, math and language test scores, index of rurality, log of tax income and index of good fiscal policy. Errors in parentheses control for spatial and first-order time correlation (see Conley, 1999, Conley, 2016). We allow spatial correlation to extend to up to 279 km from each municipality's centroid to ensure that each municipality has at least one neighbor. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table A.3.3: Killing of social leaders, FARC presence and exposure to other armed groups: Using Negative Binomial and Conditional Poisson models

	Negative Binomial		Conditional Poisson	
	(1)	(2)	(3)	(4)
Cease × FARC × ExposureOthers	1.503***	1.428***	2.013***	2.310***
	(0.478)	(0.521)	(0.279)	(0.309)
Cease × FARC	0.020	−0.222	−0.807***	−1.185***
	(0.313)	(0.347)	(0.155)	(0.190)
Cease × ExposureOthers	−0.721**	−0.805**	−1.320***	−1.295***
	(0.332)	(0.372)	(0.199)	(0.212)
Observations	2786	2786	2786	2786
Municipalities	199	199	199	199
Municipality FE	✓	✓	✓	✓
Period FE	✓	✓	✓	✓
Controls		✓		✓
Avg Dep Var	0.101	0.101	0.101	0.101
SD Dep Var	1.083	1.083	1.083	1.083

Notes: This table presents the results from the main specification in equation (1.1). We exploit municipal-level variation by semester, over the period 2011:1 to 2017:2. All the columns use as dependent variable the total number of homicides of social leaders. Columns (1) and (2) estimate a negative binomial model while columns (3) and (4) estimate a conditional poisson model. *Cease* is a dummy that takes the value one for the period after 2015:1. *FARC* is a dummy for those municipalities with FARC presence. *ExposureOthers* is a continuous variable that measures ELN or paramilitary groups presence in the municipality or their (distance-penalized) vicinity. Predetermined municipal controls includes logarithm of the population in 2010, municipality area, average elevation, distance to the closest major city, share of population under poverty, literacy rate, math and language test scores, index of rurality, log of tax income and index of good fiscal policy. Standard errors in parentheses. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table A.3.4: Killing of social leaders, FARC presence, and exposure to other armed groups before the ceasefire

	Killing rate		Number of killings		Any killing	
	(1)	(2)	(3)	(4)	(5)	(6)
Trend × FARC × ExposureOthers	−0.080	−0.072	0.003	0.003	0.003	0.003
	(0.055)	(0.055)	(0.011)	(0.011)	(0.008)	(0.008)
Trend × FARC	0.026	0.034	0.001	0.002	−0.002	−0.002
	(0.029)	(0.031)	(0.005)	(0.005)	(0.003)	(0.004)
Trend × ExposureOthers	0.018	0.024	0.004	0.005	0.002	0.002
	(0.024)	(0.027)	(0.004)	(0.004)	(0.003)	(0.003)
Observations	8552	8552	8552	8552	8552	8552
Municipalities	1069	1069	1069	1069	1069	1069
Municipality FE	✓	✓	✓	✓	✓	✓
Department-Period FE	✓	✓	✓	✓	✓	✓
Controls		✓		✓		✓
Avg Dep Var	0.101	0.101	0.028	0.028	0.021	0.021
SD Dep Var	1.083	1.083	0.219	0.219	0.144	0.144

Notes: This table presents the results from specification that includes linear trends interacted with three different treatments before the ceasefire. We exploit municipal-level variation by semester, over the period 2011:1 to 2014:2. Columns (1) and (2) use the number of homicides of social leaders over total population, columns (3) and (4) use as dependent variable the total number of homicides of social leaders, while columns (5) and (6) use a dummy that takes the value one if there was at least one social leader assassinated. *Trend* is a trend variable, *FARC* is a dummy for those municipalities with FARC presence. *ExposureOthers* is a continuous variable that measures ELN or paramilitary groups presence in the municipality or their (distance-penalized) vicinity. Predetermined municipal controls includes logarithm of the population in 2010, municipality area, average elevation, distance to the closest major city, share of population under poverty, literacy rate, math and language test scores, index of rurality, log of tax income and index of good fiscal policy. Errors in parentheses control for spatial and first-order time correlation (see Conley, 1999, Conley, 2016). We allow spatial correlation to extend to up to 279 km from each municipality's centroid to ensure that each municipality has at least one neighbor. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table A.3.5: Killing of social leaders, FARC presence, and exposure to other armed groups: Placebo Land Agreement in 2013

	Killing rate		Number of killings		Any killing	
	(1)	(2)	(3)	(4)	(5)	(6)
Placebo × FARC × ExposureOthers	−0.068	0.011	0.038	0.042	0.015	0.017
	(0.267)	(0.284)	(0.048)	(0.049)	(0.039)	(0.039)
Placebo × FARC	0.035	0.057	−0.011	−0.011	−0.011	−0.013
	(0.141)	(0.150)	(0.023)	(0.025)	(0.018)	(0.018)
Placebo × ExposureOthers	−0.051	−0.038	0.013	0.017	0.007	0.006
	(0.173)	(0.180)	(0.019)	(0.019)	(0.015)	(0.014)
Observations	8552	8552	8552	8552	8552	8552
Municipalities	1069	1069	1069	1069	1069	1069
Municipality FE	✓	✓	✓	✓	✓	✓
Department-Period FE	✓	✓	✓	✓	✓	✓
Controls		✓		✓		✓
Avg Dep Var	0.101	0.101	0.028	0.028	0.021	0.021
SD Dep Var	1.083	1.083	0.219	0.219	0.144	0.144

Notes: This table presents the results from the main specification in equation (1.1). We exploit municipal-level variation by semester, over the period 2011:1 to 2014:2. Columns (1) and (2) use the number of homicides of social leaders over total population, columns (3) and (4) use as dependent variable the total number of homicides of social leaders, while columns (5) and (6) use a dummy that takes the value one if there was at least one social leader assassinated. *Placebo* is a dummy that takes the value one for the period after 2013:1. *FARC* is a dummy for those municipalities with FARC presence. *ExposureOthers* is a continuous variable that measures ELN or paramilitary groups presence in the municipality or their (distance-penalized) vicinity. Predetermined municipal controls includes logarithm of the population in 2010, municipality area, average elevation, distance to the closest major city, share of population under poverty, literacy rate, math and language test scores, index of rurality, log of tax income and index of good fiscal policy. Errors in parentheses control for spatial and first-order time correlation (see Conley, 1999, Conley, 2016). We allow spatial correlation to extend to up to 279 km from each municipality's centroid to ensure that each municipality has at least one neighbor. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table A.3.6: Measuring exposure to other armed groups using the presence in neighboring municipalities

	Killing rate		Number of killings		Any killing	
	(1)	(2)	(3)	(4)	(5)	(6)
Cease × FARC × ExposureOthers	0.422**	0.459**	0.104**	0.109**	0.064*	0.068**
ex	(0.178)	(0.182)	(0.043)	(0.043)	(0.035)	(0.034)
Cease × FARC	−0.245*	−0.249*	−0.046*	−0.050**	−0.023	−0.027
	(0.133)	(0.139)	(0.024)	(0.025)	(0.021)	(0.022)
Cease × ExposureOthers	−0.243***	−0.279***	−0.035***	−0.041***	−0.025**	−0.032***
	(0.091)	(0.097)	(0.013)	(0.014)	(0.010)	(0.011)
Observations	14966	14966	14966	14966	14966	14966
Municipalities	1069	1069	1069	1069	1069	1069
Municipality FE	✓	✓	✓	✓	✓	✓
Period FE	✓	✓	✓	✓	✓	✓
Controls		✓		✓		✓
Avg Dep Var	0.101	0.101	0.028	0.028	0.021	0.021
SD Dep Var	1.083	1.083	0.219	0.219	0.144	0.144

Notes: This table presents the results from the main specification in equation (1.1). We exploit municipal-level variation by semester, over the period 2011:1 to 2017:2. Columns (1) and (2) use the number of homicides of social leaders over total population, columns (3) and (4) use as dependent variable the total number of homicides of social leaders, while columns (5) and (6) use a dummy that takes the value one if there was at least one social leader assassinated. *Cease* is a dummy that takes the value one for the period after 2015:1. *FARC* is a dummy for those municipalities with FARC presence. *NeighOthers* is the share of ELN or paramilitary groups presence among the municipality and their neighbors. Predetermined municipal controls includes logarithm of the population in 2010, municipality area, average elevation, distance to the closest major city, share of population under poverty, literacy rate, math and language test scores, index of rurality, log of tax income and index of good fiscal policy. Errors in parentheses control for spatial and first-order time correlation (see Conley, 1999, Conley, 2016). We allow spatial correlation to extend to up to 279 km from each municipality's centroid to ensure that each municipality has at least one neighbor. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table A.3.7: Measuring exposure to other armed groups using all municipalities penalized by distance

	Killing rate		Number of killings		Any killing	
	(1)	(2)	(3)	(4)	(5)	(6)
Cease × FARC × ExposureOthers	0.325**	0.368**	0.072**	0.078**	0.046*	0.050*
	(0.138)	(0.145)	(0.032)	(0.032)	(0.027)	(0.027)
Cease × FARC	−0.164	−0.177	−0.024	−0.030	−0.011	−0.016
	(0.119)	(0.124)	(0.020)	(0.020)	(0.018)	(0.019)
Cease × ExposureOthers	−0.219***	−0.239***	−0.027***	−0.031***	−0.019**	−0.024***
	(0.079)	(0.081)	(0.011)	(0.011)	(0.008)	(0.009)
Observations	14966	14966	14966	14966	14966	14966
Municipalities	1069	1069	1069	1069	1069	1069
Municipality FE	✓	✓	✓	✓	✓	✓
Period FE	✓	✓	✓	✓	✓	✓
Controls		✓		✓		✓
Avg Dep Var	0.101	0.101	0.028	0.028	0.021	0.021
SD Dep Var	1.083	1.083	0.219	0.219	0.144	0.144

Notes: This table presents the results from the main specification in equation (1.1). We exploit municipal-level variation by semester, over the period 2011:1 to 2017:2. Columns (1) and (2) use the number of homicides of social leaders over total population, columns (3) and (4) use as dependent variable the total number of homicides of social leaders, while columns (5) and (6) use a dummy that takes the value one if there was at least one social leader assassinated. *Cease* is a dummy that takes the value one for the period after 2015:1. *FARC* is a dummy for those municipalities with FARC presence. *ExposureOthers* is a continuous variable that measures ELN or paramilitary groups presence in the municipality and (distance-penalized) Colombian whole municipalities. Predetermined municipal controls includes logarithm of the population in 2010, municipality area, average elevation, distance to the closest major city, share of population under poverty, literacy rate, math and language test scores, index of rurality, log of tax income and index of good fiscal policy. Errors in parentheses control for spatial and first-order time correlation (see Conley, 1999, Conley, 2016). We allow spatial correlation to extend to up to 279 km from each municipality's centroid to ensure that each municipality has at least one neighbor. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table A.3.8: Killing of social leaders by exposure to different armed groups

	Killing Rate	
	(1)	(2)
Cease × FARC × Neo-Paramilitary	0.340*	0.374*
	(0.205)	(0.205)
Cease × FARC × ELN	0.351*	0.395**
	(0.196)	(0.196)
Cease × Neo-Paramilitary	−0.235**	−0.256**
	(0.114)	(0.118)
Cease × ELN	−0.211**	−0.234**
	(0.099)	(0.097)
Cease × FARC	−0.123	−0.120
	(0.105)	(0.110)
Observations	14966	14966
Municipalities	1069	1069
Municipality FE	✓	✓
Department-Period FE	✓	✓
Controls		✓
Avg Dep Var	0.101	0.101
SD Dep Var	1.083	1.083

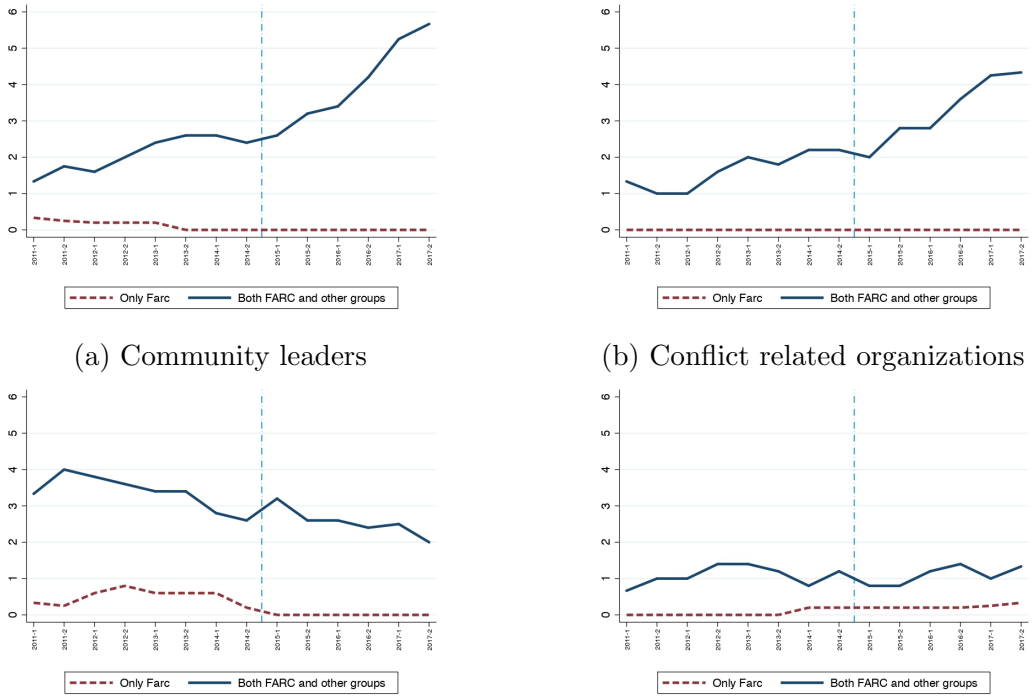
Notes: This table presents the results from the main specification in equation (1.1). We exploit municipal-level variation by semester, over the period 2011:1 to 2017:2. The dependent variable is the number of homicides of social leaders over total population. *Cease* is a dummy that takes the value one for the period after 2015:1. *FARC* is a dummy for those municipalities with FARC presence. *Neo-Paramilitary* is a continuous variable that measures paramilitary groups presence and *ELN* is a continuous variable that measures ELN presence, both measures in the municipality or their (distance-penalized) vicinity. Predetermined municipal controls includes logarithm of the population in 2010, municipality area, average elevation, distance to the closest major city, share of population under poverty, literacy rate, math and language test scores, index of rurality, log of tax income and index of good fiscal policy. Errors in parentheses control for spatial and first-order time correlation (see Conley, 1999, Conley, 2016). We allow spatial correlation to extend to up to 279 km from each municipality's centroid to ensure that each municipality has at least one neighbor. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table A.3.9: Killing of social leaders by type of leader

	Community councils		Conflict related organizations		Afro-Indigenous		Others	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cease × FARC × ExposureOthers	0.261**	0.270**	0.059	0.067	0.049	0.050	0.050	0.066
	(0.107)	(0.116)	(0.115)	(0.111)	(0.086)	(0.087)	(0.043)	(0.043)
Cease × FARC	−0.044	−0.047	0.022	0.022	−0.093*	−0.086	−0.022	−0.022
	(0.057)	(0.058)	(0.078)	(0.079)	(0.052)	(0.058)	(0.024)	(0.025)
Cease × ExposureOthers	−0.106	−0.121	−0.011	−0.016	−0.046	−0.041	−0.092***	−0.100***
	(0.078)	(0.081)	(0.024)	(0.028)	(0.042)	(0.047)	(0.030)	(0.031)
Observations	14966	14966	14966	14966	14966	14966	14966	14966
Municipalities	1069	1069	1069	1069	1069	1069	1069	1069
Municipality FE	✓	✓	✓	✓	✓	✓	✓	✓
Department-Period FE	✓	✓	✓	✓	✓	✓	✓	✓
Controls		✓		✓		✓		✓
Avg Dep Var	0.009	0.009	0.006	0.006	0.008	0.008	0.006	0.006
SD Dep Var	0.109	0.109	0.082	0.082	0.120	0.120	0.104	0.104

Notes: This table presents the results from the main specification in equation (1.1) by splitting the killings into types of leaders. We exploit municipal-level variation by semester, over the period 2011:1 to 2017:2. All columns use as dependent variable the number of killings over population. *Cease* is a dummy that takes the value one for the period after 2015:1. *FARC* is a dummy for those municipalities with FARC presence. *ExposureOthers* is a continuous variable that measures ELN or paramilitary groups presence in the municipality or their (distance-penalized) vicinity. Predetermined municipal controls includes logarithm of the population in 2010, municipality area, average elevation, distance to the closest major city, share of population under poverty, literacy rate, math and language test scores, index of rurality, log of tax income and index of good fiscal policy. Errors in parentheses control for spatial and first-order time correlation (see Conley, 1999, Conley, 2016). We allow spatial correlation to extend to up to 279 km from each municipality's centroid to ensure that each municipality has at least one neighbor. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Figure A.3.1: Evolution of killings by leader type.



(a) Community leaders

(b) Conflict related organizations

(c) Afro-Indigenous

(d) Others

Notes: This figure presents the evolution of killings of social leaders from 2010 to 2017 by type of leader. We split the sample by type of municipality into those with FARC and other groups exposure, and only FARC. We define those municipalities with exposure as those that have any positive exposure. Panel A presents the evolution for community leaders (30%), panel B for leaders of peace related organizations (20%), panel C for afro and indigenous leaders (27%), while panel D present the rest (23%). In all the panels we show one-year moving averages to smooth the data.

Appendix B

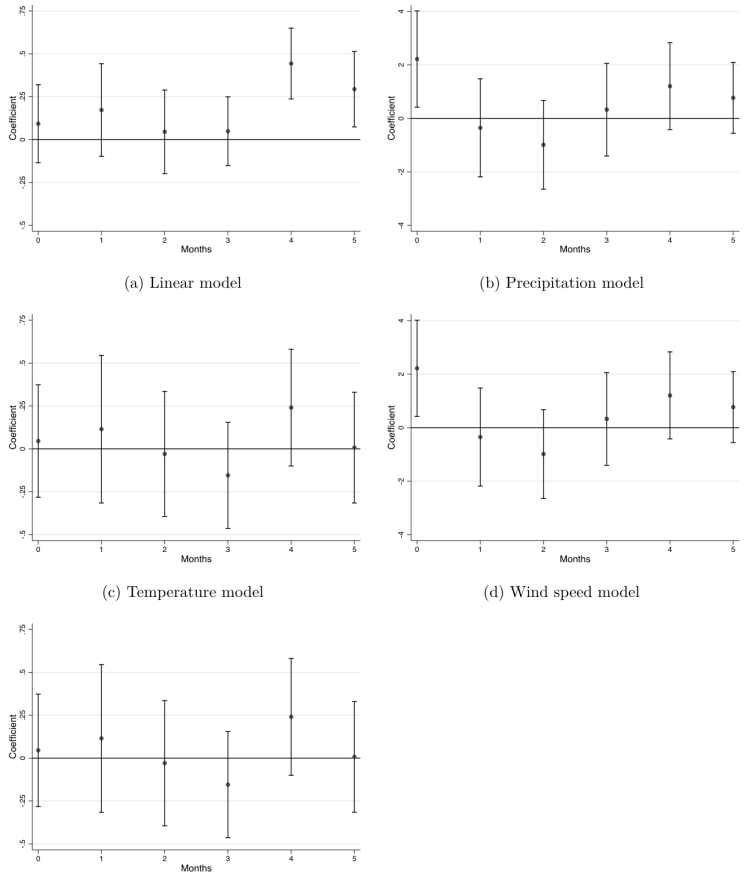
Chapter 2

Table A.3.1: Summary statistics: differences between eradicated versus not eradicated areas in municipalities that produce coca.

	Eradicated	Not eradicated	Difference
Andean region	0.150	0.230	-0.080
	(0.357)	(0.421)	[0.000]
Caribbean region	0.090	0.153	-0.063
	(0.286)	(0.360)	[0.000]
Pacific region	0.260	0.217	0.044
	(0.439)	(0.412)	[0.000]
Orinoquía region	0.149	0.112	0.037
	(0.356)	(0.315)	[0.000]
Amazon region	0.352	0.288	0.063
	(0.478)	(0.453)	[0.000]
Total population	30832.858	31688.123	-855.265
	(34198.029)	(55824.278)	[0.436]
Rurality index	0.660	0.669	-0.009
	(0.165)	(0.199)	[0.072]
Municipal area (km^2)	5113.048	4618.839	494.209
	(8437.231)	(8571.774)	[0.037]
Altitude (km)	425.977	515.583	-89.607
	(607.624)	(685.199)	[0.000]
Distance to departmental capital (km)	134.076	138.272	-4.195
	(72.929)	(89.825)	[0.050]
Distance to Bogotá (km)	402.395	415.105	-12.710
	(106.701)	(130.247)	[0.000]
Per capita GDP	2939067.054	3637381.615	-698314.561
	(2299958.443)	(2560422.378)	[0.000]
Total municipal income	8730.345	9194.708	-464.363
	(10493.304)	(14943.728)	[0.152]
Total municipal expenditure	7275.652	8962.387	-1686.735
	(6010.089)	(13698.692)	[0.000]
Municipal development index	24.519	26.616	-2.097
	(6.032)	(7.162)	[0.000]
Municipal investment	5971456.180	7581251.624	-1609795.443
	(4929841.881)	(11262605.318)	[0.000]
Lenguage test	44.937	45.274	-0.337
	(3.208)	(3.271)	[0.000]
Math test	48.215	48.371	-0.155
	(1.659)	(1.588)	[0.001]
Low birth weight	24.347	27.694	-3.347
	(41.756)	(71.990)	[0.015]
Homicides per 100.000 population	74.960	70.528	4.433
	(83.388)	(97.354)	[0.066]
Forced migration cases per 100.000 population	5220.027	4407.720	812.307
	(5025.667)	(6502.026)	[0.000]
Kidnapping cases per 100.000 population	41.581	39.907	1.673
	(52.134)	(65.768)	[0.310]
Abandoned land cases per 100.000 population	13.835	17.561	-3.726
	(7.274)	(13.261)	[0.017]

Notes: summary statistics are calculated for the sample studied (2004-2010).

Figure A.3.1: Second stage estimates of the causal effect of aerial eradication on attacks against civilians.



(a) Linear model

(b) Precipitation model

(c) Temperature model

(d) Wind speed model

(e) Cloud coverage model

Notes: The figure presents the point 2SLS estimates from the main specification of Equation 2.2 with the corresponding confidence intervals at the 95% level. The dependent variable is the amount of violent attacks against the civilian population. The mean of the dependent variable is 0.177, and the point estimates were computed with 84.523 observations. The error term controls for clustered correlation at the year-municipal level.

Table A.3.2: OLS estimates of the causal effect of eradication operations on attacks against civilians

	(1) Attacks
Share of coca cultivated	0.825
	(1.815)
Number of eradication operations	0.214**
	(0.092)
Number of eradication operations (fitted value)	-0.178
	(0.265)
Municipality FE	✓
Time FE	✓
Controls	✓
Municipalities	1,067
Mean. Dep. Var.	2.240
Std. Dev. Dep. Var.	8.495
Observations	6,401

Notes: Table A.3.2 presents estimates of Equation 3.1 with yearly data. The dependent variable is the amount of attacks against civilians per 100.000 population four months after eradication operations took place. All columns include coca production trends, and municipality and time fixed effects. Clustered standard errors at the municipal level in parentheses. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table A.3.3: OLS estimates of the causal effect of eradication operations on coca production

	(1) Coca production (share)
Number of eradication operations	0.004**
	(0.002)
Number of eradication operations (fitted value)	0.005
	(0.003)
Municipality FE	✓
Time FE	✓
Controls	✓
Municipalities	1,067
Mean. Dep. Var.	0.039
Std. Dev. Dep. Var.	0.171
Observations	6,401

Notes: Table A.3.3 presents estimates of Equation 3.1 with yearly data. The dependent variable is the amount of attacks against civilians per 100.000 population four months after eradication operations took place. All columns include coca production trends, and municipality and time fixed effects. Clustered standard errors at the municipal level in parentheses. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table A.3.4: 2SLS estimates of the causal effect of yearly eradication operations on attacks against civilians

	(1) t	(2) t+1	(3) t+2	(4) t+3
Number of eradication operations	0.594***	19.727***	-0.006	6.270
	(0.202)	(4.660)	(0.004)	(7.235)
Municipality FE	✓	✓	✓	✓
Time FE	✓	✓	✓	✓
Controls	✓	✓	✓	✓
Municipalities	1,067	1,067	1,067	1,067
Kleibergen-Paap F statistic	49.920	49.920	49.920	49.920
Mean. Dep. Var.	2.240	75.646	0.039	78.604
Std. Dev. Dep. Var.	8.495	394.287	0.171	418.453
Observations	6,401	6,401	6,401	6,401

Notes: Table A.3.4 presents estimates of Equation 3.1. The dependent variable is the amount of aerial eradication operations. All columns include municipality and time fixed effects. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table A.3.5: Second stage estimates of the causal effect of aerial eradication on attacks against civilians by FARC.

	(1) Pre-disarmament	(2) Post-disarmament
Number of eradication operations	0.420**	-0.084
	(0.165)	(0.070)
Municipality FE	✓	✓
Time FE	✓	✓
Controls	✓	✓
Municipalities	3,212	5,347
Mean. Dep. Var.	0.083	0.041
Std. Dev. Dep. Var.	1.054	0.739
Observations	34,264	50,254

Notes: Table A.3.5 presents estimates of Equation 2.2. The dependent variable is the number of attacks against civilians per 100,000 people. The share of the eradicated area is instrumented with the suitability index in Table 3.2. All columns include coca production trends, and municipality and time fixed effects. Clustered standard errors at the municipal level are in parentheses. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table A.3.6: Second stage estimates of the causal effect of aerial eradication on attacks against civilians by paramilitary groups.

	(1) Pre-disarmament	(2) Post-disarmament
Number of eradication operations	-0.120	0.069
	(0.134)	(0.097)
Municipality FE	✓	✓
Time FE	✓	✓
Controls	✓	✓
Municipalities	3,212	5,347
Mean. Dep. Var.	0.107	0.096
Std. Dev. Dep. Var.	1.164	1.012
Observations	34,264	50,254

Notes: Table A.3.6 presents estimates of Equation 2.2. The dependent variable is the number of attacks against civilians per 100,000 people. The share of the eradicated area is indexed with the suitability index in Table 3.2. All columns include coca production trends, and municipality and time fixed effects. Clustered standard errors at the municipal level are in parentheses. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table A.3.7: Second stage estimates of the causal effect of aerial eradication on attacks against civilians by FARC.

	(1) Without demobilization	(2) With demobilization
Number of eradication operations	0.177**	-0.011
	(0.071)	(0.094)
Municipality FE	✓	✓
Time FE	✓	✓
Controls	✓	✓
Municipalities	7,467	898
Mean. Dep. Var.	0.050	0.230
Std. Dev. Dep. Var.	0.811	1.533
Observations	80,208	2,878

Notes: Table A.3.7 presents estimates of Equation 2.2. The dependent variable is the number of attacks on civilians per 100,000 people. The share of the eradicated area is indexed with the suitability index in Table 3.2. All columns include coca production trends, and municipality and time fixed effects. Clustered standard errors at the municipal level are in parentheses. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Table A.3.8: Second stage estimates of the causal effect of aerial eradication on attacks against civilians by paramilitary groups.

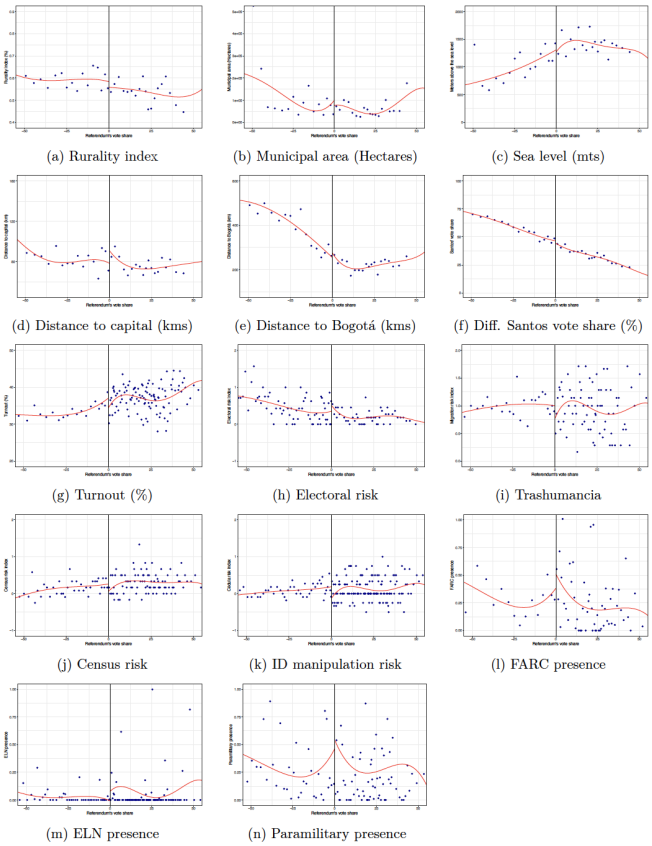
	(1) Without demobilization	(2) With demobilization
Number of eradication operations	0.160*	-0.178
	(0.085)	(0.185)
Municipality FE	✓	✓
Time FE	✓	✓
Controls	✓	✓
Municipalities	7,467	898
Mean. Dep. Var.	0.090	0.318
Std. Dev. Dep. Var.	1.034	1.588
Observations	80,208	2,878

Notes: Table A.3.8 presents estimates of Equation 2.2. The dependent variable is the number of attacks on civilians per 100,000 people. The share of the eradicated area is indexed with the suitability index in Table 3.2. All columns include coca production trends, and municipality and time fixed effects. Clustered standard errors at the municipal level are in parentheses. * is significant at the 10% level, ** is significant at the 5% level, *** is significant at the 1% level.

Appendix C

Chapter 3

Figure A.3.1: The outcome of the referendum in October 2016.



(a) Rurality index (b) Municipal area (Hectares) (c) Sea level (mts)

(d) Distance to capital (kms) (e) Distance to Bogotá (kms) (f) Diff. Santos vote share (%)

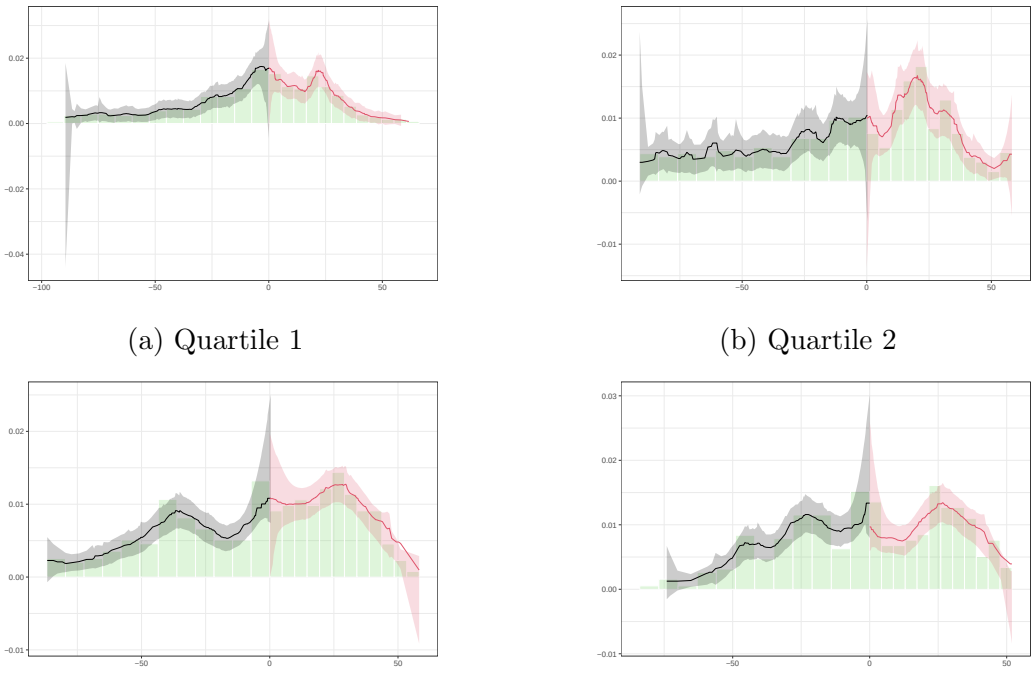
(g) Turnout (%) (h) Electoral risk (i) Trashumancia

(j) Census risk (k) ID manipulation risk (l) FARC presence

(m) ELN presence (n) Paramilitary presence

Notes: The map presents the distribution of the outcome of the referendum across Colombian municipalities in October 2016 and does not include the islands of San Andrés and Santa Catalina.

Figure A.3.2: Score density by electorate quartile.



(a) Quartile 1

(b) Quartile 2

(c) Quartile 3

(d) Quartile 4

Notes: Manipulation test based on Cattaneo et al. (2020). p-values are 0.997 in (a), 0.900 in (b), 0.579 in (c), and 0.803 in (d).

Table A.3.1: Effect of the referendum results on the average monthly violent events involving non-state armed groups using quadratic polynomials, October 2016 – October 2017

Dependent variable	Average monthly violent events involving non-state armed groups (per 10,000 inhabitants)											
	Equal bandwidths						Unequal bandwidths					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Nonparametric estimates and bias-corrected standard errors of Calonico, Cattaneo, and Titiunik (2014) - Kernel: Uniform												
Referendum's vote share (No)	0.013**	0.012*	0.014**	0.014**	0.012*	0.011*	0.013**	0.013**	0.014**	0.013**	0.007	0.007
	(0.006)	(0.007)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)
Mean dependent variable	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Bandwidths	18.067	18.073	18.336	19.970	20.723	20.595	(17.071, 18.718)	(17.367, 19.037)	(17.288, 20.419)	(16.242, 20.481)	(15.303, 23.616)	(17.338, 27.063)
Observations	4,848	4,848	4,860	5,292	5,532	5,496	4,788	4,836	5,136	5,028	5,532	6,348
Municipal controls			✓			✓			✓			✓
Political controls				✓		✓				✓		✓
Conflict controls					✓	✓					✓	✓
Cluster		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Panel B: Parametric estimates												
Referendum's vote share (No)	0.011*	0.011	0.012*	0.012*	0.011	0.012*	0.012*	0.012	0.012*	0.012*	0.011	0.012*
	(0.006)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Mean dependent variable	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Bandwidths	18.073	18.073	18.073	18.073	18.073	18.073	(17.367, 19.037)	(17.367, 19.037)	(17.367, 19.037)	(17.367, 19.037)	(17.367, 19.037)	(17.367, 19.037)
Observations	4,848	4,848	4,848	4,848	4,848	4,848	4,836	4,836	4,836	4,836	4,836	4,836
Municipal controls			✓			✓			✓			✓
Political controls				✓		✓				✓		✓
Conflict controls					✓	✓					✓	✓
Cluster		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

Note: Standard errors in parentheses clustered at the department-month level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A.3.2: Effect of the referendum results on the average monthly violent events involving non-state armed groups using linear polynomials with triangular and epanechnikov kernels, October 2016 – October 2017

Dependent variable	Average monthly violent events involving non-state armed groups (per 10,000 inhabitants)											
	Equal bandwidths						Unequal bandwidths					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Nonparametric estimates and bias-corrected standard errors of Calonico, Cattaneo, and Titiunik (2014) - Kernel: Uniform												
Referendum's vote share (No)	0.011**	0.011**	0.011**	0.009*	0.010*	0.008	0.011**	0.011**	0.012**	0.010**	0.008	0.007
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Mean dependent variable	0.009	0.008	0.008	0.008	0.008	0.009	0.008	0.008	0.008	0.009	0.009	0.008
Bandwidths	19.778	20.116	20.696	21.204	17.911	19.722	(14.419, 17.214)	(14.724, 17.574)	(14.684, 18.148)	(15.507, 19.508)	(13.464, 15.879)	(13.653, 18.117)
Observations	5,220	5,376	5,532	5,628	4,788	5,172	4,344	4,404	4,464	4,728	4,104	4,392
Municipal controls			✓			✓			✓			✓
Political controls				✓		✓				✓		✓
Conflict controls					✓	✓					✓	✓
Cluster		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Panel B: Parametric estimates												
Referendum's vote share (No)	0.012**	0.012**	0.012**	0.008*	0.010**	0.008*	0.011**	0.011**	0.012**	0.010**	0.009*	0.008
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Mean dependent variable	0.008	0.008	0.008	0.008	0.008	0.008	0.009	0.009	0.008	0.008	0.009	0.008
Bandwidths	18.379	18.753	19.057	20.359	17.197	20.620	(13.491, 16.042)	(13.786, 16.426)	(13.718, 17.151)	(14.173, 18.370)	(12.918, 15.643)	(13.079, 18.044)
Observations	4,872	4,968	5,016	5,448	4,620	5,508	4,104	4,152	4,260	4,452	3,996	4,368
Municipal controls			✓			✓			✓			✓
Political controls				✓		✓				✓		✓
Conflict controls					✓	✓					✓	✓
Cluster		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

Note: Standard errors in parentheses clustered at the department-month level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A.3.3: Effect of the referendum results on the average monthly violent events involving non-state armed groups using linear polynomials, October 2017 – September 2018

Dependent variable	Average monthly violent events involving non-state armed groups (per 10,000 inhabitants)											
	Equal bandwidths						Unequal bandwidths					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Nonparametric estimates and bias-corrected standard errors of Calonico, Cattaneo, and Titiunik (2014) - Kernel: Uniform												
Referendum's vote share (No)	0.016*	0.015*	0.021**	0.007	0.014*	0.019**	0.020***	0.019**	0.019**	0.009	0.020**	0.021**
	(0.008)	(0.008)	(0.010)	(0.008)	(0.008)	(0.008)	(0.007)	(0.008)	(0.009)	(0.008)	(0.008)	(0.009)
Mean dependent variable	0.017	0.017	0.018	0.018	0.017	0.015	0.014	0.016	0.016	0.015	0.017	0.017
Bandwidths	7.781	7.864	6.886	8.186	7.989	6.006	(10.528, 6.464)	(8.010, 6.556)	(9.402, 6.808)	(10.056, 8.059)	(8.608, 7.596)	(8.487, 6.860)
Observations	4,068	4,104	3,756	4,248	4,176	3,348	4,632	3,936	4,404	4,812	4,332	4,188
Municipal controls			✓			✓			✓			✓
Political controls				✓		✓				✓		✓
Conflict controls					✓	✓					✓	✓
Cluster		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Panel B: Parametric estimates												
Referendum's vote share (No)	0.011	0.011	0.009	0.007	0.014*	0.008	0.014	0.014*	0.013*	0.010	0.016**	0.013*
	(0.010)	(0.008)	(0.007)	(0.008)	(0.008)	(0.007)	(0.009)	(0.008)	(0.007)	(0.008)	(0.007)	(0.007)
Mean dependent variable	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.016	0.016	0.016	0.016
Bandwidths	7.864	7.864	7.864	7.864	7.864	7.864	(8.010, 6.556)	(8.010, 6.556)	(8.010, 6.556)	(8.010, 6.556)	(8.010, 6.556)	(8.010, 6.556)
Observations	4,104	4,104	4,104	4,104	4,104	4,104	3,936	3,936	3,936	3,936	3,936	3,936
Municipal controls			✓			✓			✓			✓
Political controls				✓		✓				✓		✓
Conflict controls					✓	✓					✓	✓
Cluster		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

Note: Standard errors in parentheses clustered at the department-month level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A.3.4: Effect of the referendum results on the average monthly violent events involving FARC using linear polynomials, January 2002 – December 2006

Dependent variable	Average monthly violent events involving non-state armed groups (per 10,000 inhabitants)	
	Equal bandwidths	Unequal bandwidths
	(1)	(2)
Panel A: Nonparametric estimates and bias-corrected standard errors of Calonico, Cattaneo, and Titiunik (2014) - Kernel: Uniform		
Referendum's vote share (No)	0.963	9.923**
	(1.096)	(4.508)
Mean dependent variable	2.480	4.190
Bandwidths	16.184	3.302
Observations	367	98
Panel B: Parametric estimates		
Referendum's vote share (No)	1.134	8.598**
	(0.933)	(4.128)
Mean dependent variable	2.480	3.302
Bandwidths	16.184	2.636
Observations	367	98

Note: Standard errors in parentheses clustered at the department-month level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.3.5: Effect of the referendum results on the average monthly violent events involving non-state armed groups other than FARC using linear polynomials, January 2002 – December 2006

Dependent variable	Average monthly violent events involving non-state armed groups (per 10,000 inhabitants)	
	Equal bandwidths	Unequal bandwidths
	(1)	(2)
Panel A: Nonparametric estimates and bias-corrected standard errors of Calonico, Cattaneo, and Titiunik (2014) - Kernel: Uniform		
Referendum's vote share (No)	1.001	3.179
	(1.026)	(2.815)
Mean dependent variable	2.500	2.170
Bandwidths	12.382	3.077
Observations	293	132
Panel B: Parametric estimates		
Referendum's vote share (No)	1.282	2.675
	(0.806)	(2.643)
Mean dependent variable	2.500	2.170
Bandwidths	12.382	3.077
Observations	293	132

Note: Standard errors in parentheses clustered at the department-month level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.