

The Effects of a Less Repressive Counternarcotics Policy on Post-conflict Violence

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Abstract

This paper examines the connection between post-conflict violence and crime incentives. The argument is that violence should increase after the peace signature due to the regulatory role of illegal actors in a war economy. Colombia made history by signing a peace agreement with the FARC guerrillas, which was hailed as one of the most inclusive and progressive ever but also marked a significant shift towards a less repressive counternarcotics policy. Contrary to expectations, the peace agreements led to a rise in homicide rates in areas previously controlled by FARC. By integrating multiple datasets and using comparative interrupted time series, this paper reveals a significant change in homicide rates in municipalities with previous FARC presence after the peace accords. The rise in post-conflict violence in these municipalities is ascribed to the combination of FARC withdrawal and unanticipated crime incentives, which does not necessarily imply the failure of the counternarcotics policy.

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1. Introduction

The key question to analyze in this paper is what is the effect of the peace accords in post-conflict violence in the context of crime incentives? To answer this question, This paper will delve into the impact of the drastic shift in counternarcotics policy introduced by the peace accords between the Colombian Government and the Fuerzas Armadas Revolucionarias de Colombia – FARC guerrilla (The Revolutionary Armed Forces of Colombia, acronym in Spanish) on municipal homicide rates in areas.

The expected outcome after a peace accord is a reduction in homicide rates right immediately after the peace signature by rebels and the government. However, Colombia has had a long history of internal conflict with thousands of victims and several illegal actors involved in the rents of drug trafficking. Therefore, it is relevant to explore the effects of the withdrawal of

an armed actor as was the FARC guerrilla in zones with coca production. This study anticipates that contrary to expectations, the peace accords raised municipal homicide rates since the very first month after the peace signature in most of the municipalities with previous FARC presence, particularly those with coca production. Colombia has been suffering human rights concerns after the peace accords, in particular the homicide of social leaders, the increase in the number of massacres, and the risk of violence outbreaks (Defensoria del Pueblo 2018; INDEPAZ and CACEP 2019; The United Nations 2020; Human Rights Watch 2023; El Espectador 2021; Reuters 2023). The increase in homicides in a country after a civil war is not a recent issue. Why violence and homicide rates persist and even spike during post-conflict periods has been one of the most concerning issues over the last 30 years because of its impacts on development and sustainable peace (Collier et al. 2003; Duffield 2014; Walter 2011; World Bank Group 2022; Steenkamp 2011; Bara, Deglow, and van Baalen 2021; Gartner and Kennedy 2018). The answer to this question has created a permanent debate among scholars, particularly whether the post-conflict homicide phenomenon is related to the causes of violence during the civil war or is a different phenomenon corresponding to failures in peace implementation.

The paper is structured into four sections. The first section presents a discussion on post-conflict violence and introduces the evolution and ramifications of counternarcotics policy in the Colombian conflict. The second section describes the material and methodological strategy along with the datasets used in this study. The third section exposes the theory and calculations, the fourth section presents the theory and calculation, and the final section shows the results and concludes with policy implications based on the findings.

1.1. Literature in post-conflict violence

One of the most intriguing questions in post-conflict violence is, why does homicide rate and crime increase after a peace agreement ends a civil conflict? Three initial explanations in the literature can summarize the debate. The first explanation posits a mechanism of “legitimation of violence”. The pioneering work by Archer and Gartner (1976, 1984) examines the relationship between the post-war period and homicide rates under seven alternative explanations. They conclude that wars provide conditions to perceive homicide as a legitimate act, and this perception affects the likelihood of using homicide to settle the conflict in everyday life, even during times of peace. Steenkamp (2005) continues Archer and Garner’s perspective and states that a culture of violence is created through violent ethnonational clashes and encourages further acts of violence, which explains outbreaks of violence in post-conflict societies, a culture of violence. However, Stamatel and Romans (2018) examined the validity of Archer and Gartner's theory introducing additional variables according to modern societies. Nonetheless, they found no evidence supporting the argument for the legitimization of violence due to constraints in sample selection and the inclusion of variables such as demographics, globalization, modernization, securitization, and democratization, which play a more significant role in influencing interpersonal violence than participation in war in modern societies. (Stamatel and Romans, 2018, p. 306).

Despite the legitimization of the violence argument's lack of empirical evidence, several studies show that civil wars increase the risk of various forms of postwar violence (Boyle 2014; Deglow 2016; Mason and Greig 2016). In reality, there exist numerous means by which the violence of war can translate into higher or, in uncommon situations, lower rates of postwar violence (Gartner & Kennedy, 2018, p.48). However, one concern is the difficulty in establishing

definitive causality or pinpointing exact mechanisms linking war and post-conflict violence due to the complexity of factors involved (Gartner and Kennedy 2018).

The literature from the institutional approach laid their grassroots on the persistence of economic incentives for criminal activities and lack of solid institutions as causal variables of post-conflict violence (Collier et al. 2003; DeRouen et al. 2010; World Bank Group 2022; Carnegie Endowment for International Peace 2023). A couple of pioneering studies led by the economist Paul Collier observed that once violence is initiated, it may follow a path-dependent process (Collier and Sambanis 2002; Collier and Hoeffler 1998). Academics often cite the "greed versus grievance" conundrum when analyzing the reasons behind ongoing conflicts to refer to this approach. Collier and Hoeffler (2000) find in their study that the reason for conflicts after the Cold War is primarily the presence of opportunities for predation, such as control over primary commodity exports, that fuels conflict, while resulting grievances prompt diasporas to provide funding for further discord. This approach suggests that violence is likely more associated with greed explanations such as natural resources or illegal economies (Collier and Hoeffler 2004). While this approach explains why violent conflict persists and creates a sort of conflict trap due to illegal economies, it does not offer explanations as to why an illegal actor signs a peace accord and prefers the political benefits of laying down their arms and stopping fighting despite the revenues of illegal economies or natural resources. It nonetheless suggests that violence in the post-conflict period could also be motivated by greed, particularly in contexts with important revenues from illegal activities that require the provision of security services and this approach is one of the most applicable in current studies (Fearon and Laitin 2003; Nwosu 2023; Idler 2020; Felbab-Brown 2017; Walker and Botero 2022; World Bank Group 2022).

This approach views post-conflict violence as including the persistence of conflict (Walter 2015) or the "conflict trap" (Paul Collier et al. 2003). One of the arguments from this perspective for violence after a war is the existence of war economies. In contemporary civil wars, war economies often revolve around the relevance of alternative sources of self-financing for armed actors in the post-Cold War era. These sources of revenue may include extortion, oil, diamond, or drug trafficking (Collier and Hoeffler 1998; Collins and Alarcón 2021; Nwosu 2023). The concept of a 'war economy' refers to an intricate system of economic structures that involve combat, shadow, and coping economies. This system is designed to generate profit for both state and non-state actors through the use of coercion and violence. Thus, the persistence of illegal war economies may result "in a homicidal peace in which post-war killings equal or exceed those in war" (Cooper 2006, p. 20).

Alternative explanations consider that the cause of new waves of internal violence depends on the improvements in governance (Fearon 2011) because countries with their weak institutions fail to achieve a high level of welfare (Acemoglu and Robinson 2012) and weak political and legal institutions fail constraining elites in post-civil war states as well (Walter 2015). The bad governance and the lack of checks on executive power or credible commitment to political reform could create a situation where rebels need to maintain militias as a supplementary mechanism to hold political elites in line (Walter 2015). Complementarily, a study by (Hegre and Nygård 2015) argues that the improvement of both formal democratic institutions and informal aspects of governance is essential in reducing the occurrence of post-conflict violence. Although this approach highlights the importance of political institutions and the enhancement of governance in reducing the risk of conflict in the entire country, it is worth

noting that certain countries may exhibit variations in local governance across their territories, which can result in varying levels of violence outbreaks.

According to this literature review, if illicit economies are a significant incentive for illegal actors, we should expect high homicide rates in municipalities with coca production, especially where the government fails to provide security and protect communities, and no other actor, legal or illegal, exercises territorial control. This is often the case in rural communities with previous presence of FARC and illegal coca production, where this guerrilla provided security conditions for coca production and controlled the local coca market. Therefore, it is important to explore the impacts of an illegal actor's absence in communities with illegal revenues in a post-conflict scenario.

1.2. Conflict and counternarcotics policy in Colombia

According to Fearon and Latin (2003), rugged and mountainous terrain is associated with a higher probability of civil war. This geographical dimension is a second element to consider together with the rural perspective as an explanation of violence and crime in Colombia. Colombia boasts a striking geographical variety. The Andean cordillera flares out into three distinct parallel ranges, determining its rugged topography alongside the country. The steep and broken Andean Mountain masses descend into plains across the eastern interior toward the Amazon. This geographic landscape partially explains why the Colombian State has been weak in providing public goods and employing law and order in the whole territory.

The failure of the State to provide public goods and secure conditions for development is the third element why FARC persisted for over five decades. FARC was able to seize legitimacy from a Colombian state that largely failed to maintain its authority in the countryside right up to

the early twenty-first century. The State's weakness invited conflict because the Colombian government was unable to maintain its monopoly on the use of force, and the Colombian government lacked the ability to extend its authority to the countryside (McDougall 2009). Given this social reality, the FARC ruled over the political, economic, and social life of the population. Eventually, the FARC regulated some aspects of civilian conduct. Arjona (2016) also argues that armed actors do not only kill, but also, they create a “rebelocracy” of institutions, creating local alliances, providing public goods, and even social regulation. In fact, the relevance of the FARC in regulating several aspects of rural life becomes a key component along with the provision of security conditions for coca crop production.

Colombia has a long and complex history of internal war and conflict. This history has involved the Government of Colombia, guerrillas (FARC, ELN, EPL, and M-19), paramilitaries (AUC, AGC), and drug cartels, staggered across the decades from the 1950s to today. The set of overlapping and interrelated conflicts has been tied to the unequal distribution of land and wealth and the illicit trade in drugs. One root cause of the war has been the peasant's lack of access to rural property; this is why the FARC emerged as a guerrilla force in 1964. Since its origins, the FARC had a strong relationship with rural populations and gained territorial and social control in remote rural areas of the country. The FARC was the oldest and largest irregular army in Colombia from 1964 to 2016. The FARC operated in several regions of the country and preserved its historical presence in the southern part of Colombia, close to the Amazon jungle. For many years they financed their political and military battle against the Colombian government through kidnapping, extortion, illegal gold mining, and drug trafficking, keeping a dominant presence in many municipalities with coca crops (Leech 2011; Gerardo Barbosa Castillo 2017; Leongómez 2004).

The counternarcotics policies began in the early Nixonian war on drugs. The following decades were characterized by the government's 'kingpin strategy', targeting key members of drug cartels (Collins and Alarcón 2021). With the capture and death of Pablo Escobar in 1993 the power vacuum left in the illegal drug business was sought to be filled by FARC and right-far forces Autodefensas Unidas de Colombia (United Self-Defense Forces of Colombia, AUC in Spanish)(Franz 2016). Throughout the 1990s, Colombia witnessed a significant ascent as the leading supplier of coca leaf and the primary distributor of refined cocaine and heroin, thereby meeting an expanding demand in the U.S. market. The alarm regarding the quantities of heroin and cocaine being exported to the United States was a motivating factor behind U.S. initiatives to aid Colombia in tackling the drug issue (Beittel and Rosen, 2017, p.1).

The FARC like other illegal groups in Colombia found an essential source of funding via drug cultivation and trafficking during the 1990s. This nexus of FARC-Coca and the revenues this provided changed the dynamics of the conflict in Colombia, since then, the counternarcotics strategy has been a combination of counter-insurgency, coca crop eradication, and interdiction efforts. The most relevant strategy supported by the US government in Colombia during the XXI century has been Plan Colombia (Author). The goals of Plan Colombia were to reduce the production of illicit drugs by 50% in a period of 6 years and improve security in Colombia by re-claiming control of areas held by illegal armed groups, providing over \$6 billion between 2000 and 2006 (U.S. GAO 2008), and almost 70% of the budget was allocated to eradicate coca plants (Franz 2016). However, Plan Colombia failed to reach both goals. By the time of the beginning of the peace negotiations in 2012, FARC became the most significant armed actor in municipalities with coca crops. McDermott (2017) performed a study for Insight Crime with administrative data, showing the spatial correlation between FARC and coca production in

Colombia by 2015 (Map 1). Indeed, according to the data used in this study by 2016 FARC was present in 135 of 183 municipalities with coca crops and all municipalities with more than 700 hectares of coca cultivated (46 municipalities).

The government of Colombia was aware of the relevance of coca production in the sustainability of the peace accords. Indeed, coca production was one of the first points negotiated in the peace accords signed between the Colombian government and the FARC guerrilla in December 2016. The peace accords defined a paradigmatic shift in the counternarcotics policy to eradicate coca production including a radical change in the counternarcotics policy from the repressive approach to the voluntary substitution through monetary compensation conditional on the eradication of their crops. The traditional strategy to eradicate coca crops in Colombia was forced eradication; concentrated in areas where coca cultivation was high. This strategy was implemented using manual eradication and aerial fumigation. Manual eradication is still active in Colombia using a labor-intensive activity to uproot coca bushes. In contrast, aerial eradication was implemented by using airplanes to spray herbicide over coca plantations (Dávalos and Morales 2022). However, aerial eradication with glyphosate was suspended by the Colombian government in May 2015 because of the health and environmental risks associated with the herbicide (BBC News 2015), leaving manual eradication as the unique strategy to combat coca crops until peace accords implementation.

The paradigmatic shift introduced by the peace accords meant that the government would pay farmers to stop coca cultivation and create alternatives for rural production. This program named as the National Program for the Integral Substitution of Illicit Crops (PNIS) was designed as a comprehensive program to benefit coca-growing, non-growing, and coca-leaf-gathering families. The program included payments of 36 million pesos (approximately USD \$ 12.000 in

2016) for each family registered. The payments would be delivered through five components: immediate food assistance; technical assistance support; delivery of inputs and materials for food security projects and home gardens; short-cycle productive projects; and long-cycle projects (Verdad Abierta 2021b).

This policy was announced two years before its implementation in May 2014, one year before the aerial fumigation suspension, and it was one of the first issues agreed upon in the peace negotiation. The policy generated incentives for individuals to grow coca to increase the chances of receiving the subsidies because the largest crops should receive more monetary subsidies. The suspension of aerial fumigation and the early announcement of the coca accords could create a negative for incentive in the coca production behavior. In fact, the total of squared hectares of coca crops (SHC) in Colombia since the coca accord in May 2014 increased from 69,132 in 2014 to 146,140 squared hectares of coca crops in 2016, while the total of municipalities with coca crops has been decreasing, which means that the production was concentrated in some municipalities (see Figure 1).

According to the dataset used in this study by December 2016, 135 municipalities with coca production reported the presence of FARC, the same number of municipalities in 2014, yet the total production of coca crops skyrocketed from 67,422 SHC in 2014 to 143,803 SHC, which means an almost 2.14 fold increased. In contrast, municipalities with coca production and no FARC presence reported a decrease from 69 in 2014 to 48 by December 2016, and coca cultivation increased from 1,710 SHC in 2014 to 2,336 SHC in 2016. This means that this phenomenon occurred in zones controlled by FARC. A study found similar findings, an increase of 604 hectares on average per FARC-municipality for 2016, and 1032 for 2017, but no significant differences for years 2013, 2014, and 2015 (Lopez et al. 2019). A couple of additional

studies show that the stimulus created by the change in the counternarcotics policy modified farmers' behaviors for increasing coca production in FARC municipalities in order to receive better subsidies with the implementation of the peace accords (Ladino, Saavedra, and Wiesner 2021; Prem, Vargas, and Mejía 2023). Two years after the peace accords the SHC increased in most of the 170 municipalities focalized with the strategy established in the peace accords for reducing coca production. The initial explanation for this situation during the post-conflict phase is that this strategy was not implemented properly and experienced defunding, and a lack of political will (Sandinski and Campos 2019). While these studies provide empirical evidence on the effect of the coca policy modification on coca production, the implication of this increase in coca production on homicide rates it is still unsolved, particularly after the FARC withdrawal.

Although FARC guerrillas were the largest guerrilla in Colombia, a relevant characteristic in the Colombian conflict is the involvement of several illegal actors. The ELN (The National Liberation Army, acronym in Spanish) is the second largest guerrilla group with left-wing political ideologies in Colombia after FARC. This guerrilla funds its activities through kidnapping, extortion, and drug trafficking and has sought alliances with large drug trafficking organizations. Another group has been the right-wing paramilitary groups as an army against left-wing guerrilla groups. The AUC (United Self Defense Forces of Colombia, acronym in Spanish) was founded in the 1990s by the Castaño brothers, who gathered several drug traffickers. In 2003, the Colombian government began formal negotiations with the AUC with the stated aim of seeking its demobilization; most of them demobilized between 2005 and 2008. However, almost instantly to their demobilization, successor groups have irrupted since then to today, under different denominations, the largest paramilitary group is the Gaitanista Self-

Defense Forces of Colombia or Gulf Clan (AGC, acronym in Spanish), and other factions are The Caparrapos, Aguilas Negras and ERPAC (Colombia Reports 2019).

The peace negotiation between FARC guerrillas and the Colombian government began in September 2012 and concluded on August 24th, 2016. After a failed referendum on October 2nd, the peace accords were ratified by the Congress of Colombia on December 1st, 2016. By December 2016, FARC guerrillas were present in 218 municipalities out of 1122 in Colombia, with 85 of them being disputed among FARC and other groups (see Table 5). For this reason, it should be expected a decrease in homicide rates in the municipalities where FARC presence was reported until the peace accords.

The national homicide rate in Colombia has suffered smaller variations from the beginning of the peace negotiations until the lockdowns due to the COVID-19 pandemic as we can see in the upper graph in Figure 2. In contrast, the lower graph in Figure 2 shows significant variations in homicide rates in municipalities with FARC presence by December 2016. We can see for instance that the average homicide rate spikes in the very first month after the peace accords on municipalities with previous FARC presence from 2.9 to 4.3 homicides per 100.000 inhabitants, while this variation was on average 1.7 to 1.9 homicides per 100.000 inhabitants in municipalities without FARC presence by 2016. This initial observational evidence permits us to infer different effects on homicide rates after the peace accords for municipalities with the previous presence of FARC.

It is alarming to note that social leaders have been victims of homicide. According to the non-governmental organizations Somos Defensores and Verdad Abierta in a report released in October 2021, between November 24, 2016 and September 30, 2021, 682 individuals who were committed to protecting the rights of different communities were killed. According to Maydany

Salcedo, legal representative of the Municipal Association of Workers of Piamonte (Asimtracampic), the Colombian government failed to comply with the peace accords. Salcedo believes that if the government had followed through with the land restitution, things would have been different. However, she claims that the government was not interested in complying with the agreement and the voluntary substitution (Verdad Abierta 2021a). A study conducted by Marin (2022) highlights how the implementation of the coca substitution policy led to a surge in violence against social leaders in Colombia. The policy resulted in a 481% increase in the rate of social leader killings and a 122% rise in the likelihood of such killings occurring in municipalities where leaders opposed the growth of illegal crops. This increase was particularly notable in areas where organized crime did not hold significant power and where illegal armed groups were present (Marín, 2022, p.1). Moreover, armed groups that were not part of the peace process singled out community leaders in former FARC strongholds, seeking to establish their supremacy in those municipalities (Prem et al. 2022).

They claim that the government's excessive security schemes not only take the protected people, many of whom are leaders and ethnic authorities, out of context but also distance them from the community. This puts them in a different status and has political, social, and economic implications. These leaders can become accustomed to the schemes, even if there is a change in context. Therefore, it is necessary to have constant guarantees so that it is not necessary to resort to these schemes (Verdad Abierta 2021a). A reputable organization, such as the Crisis Group, points out that the state's inability to control former FARC territory has created a new universe of risks for social leaders. They find themselves in the crossfire of competing armed groups, which puts their safety at risk (Crisis Group 2020). In fact, one of the critiques is that the Colombian government has historically allocated insufficient resources to rural areas and

exhibited geographical bias as a strategy for security provision, in terms of civilian security policy led by civilians instead of the traditional military approach. The government has primarily focused on large cities and municipal capitals, neglecting vast expanses of the national geography. Instead of responding to coexistence and security challenges that affect citizens, Colombia's leaders have prioritized the fight against illegal armed groups, which is more of a national security concern (Bulla and Guarín 2015).

2. Material and methodological strategy

The context of Colombia by 2017 could be summarized as a scenario where the lack of a security service provided by FARC in areas with coca production captured the attention of illegal groups including FARC dissidents. The rational theory during the civil war (Kalivas 2006) argues that violence is a deliberate action of armed actors to gain territorial and social control, and this violence tends to be indiscriminate in zones disputed among different armed actors. The absence of a hegemonic actor in a post-conflict scenario is relevant to test this theory and identify potential outbreaks of violence. The argument is that coca farmers are key actors in the coca production for illegal actors and that violence is the mean used for social control and provision of security conditions for this illegal activity at the same time that several actors such as FARC dissidents, ELN, far-right groups and even drug-traffickers are interested in gaining former FARC territories. Then, homicide rates during the peace accord implementation phase should be highest in municipalities with previous FARC presence and coca production due to disputes among illegal actors and violence against local farmers, in particular, if local coca farmers are interested in the stimulus established in the peace accords, which would result

contrary to illegal groups interested in the coca production. In fact, the assassinations of social leaders in Colombia during the postaccord have been one of the most concerning signals of a possible violent outbreak in Colombia due to new illegal actors occupying the spaces left by FARC (Defensoria del Pueblo 2018). Local NGOs have denounced 195 social leaders assassinated during the first year of postaccords in 2017 (INDEPAZ and CACEP 2019) and the Colombian Ombudsman reported that 215 social leaders and human rights activists were killed in 2022 (Reuters 2023). Although, the exact number of social leaders assassinated has been controversial due to different interpretations of who is a social leader (Rozo Ángel and Ball 2019) both; the Government of Colombia and local NGOs consider that it is a concerning issue in particular for peace sustainability and even could even be an unintended effect of the counternarcotics policy introduced by the peace accords (Marín Llanes 2022).

The conceptual model of my theory combines two explanatory variables: coca production and illegal actors interested in coca production profits. The theoretical argument is that illegal actors are interested in filling the FARC hegemony control over coca production. Then the scenario becomes a territorial dispute with a fragmented hegemony where replication of FARC strategies for controlling civil society as selective homicide is the strategy applied to gain social control in rural areas with coca production.

This study uses five datasets. The homicide dataset provided by the National Police of Colombia and the administrative demographic information provided by the National Department of Statistics of Colombia for the dependent variable; the *Municipal monthly homicide rate*, which is determined by the number of homicides a month divided by the total population per municipality and calculated the rate for 100.000 inhabitants. Because it is a regression discontinuity design for measuring the impact of the peace accords on municipalities, this study

applies a treatment assignment mechanism based on previous FARC guerrilla presence (No | Yes) and Coca crops reported (No | Yes). To determine the presence of FARC guerrillas, this study used two sources the dataset elaborated by the NGO Mision de Observacion Electoral in 2016 and the Risk Reports elaborated by the Early Warning System of the Ombudsman Office of Colombia responsible for alerting potential violations of Human Rights by illegal actors in Colombia. Regarding coca crop production, this study used the municipal annual dataset provided by the Ministry of Justice of Colombia. For the definition of the discontinuity variables the cut-off was December 1st 2016 (month 83 in the dataset) and the pre-trend variables correspond to the period before the peace accords (months 33 to 83 in the dataset) and the post-trend corresponds to the pos-conflict phase (months 83 to 120 in the dataset).

3. Theory and calculations

As aforementioned the argument is that coca farmers are key actors in the coca production for illegal actors and that violence is the means used for social control and provision of security conditions for this illegal activity due to the lack of security conditions combating criminal structures or negative incentives to the coca production.

This theoretical argument is shown in Figure 3. Illegal actors are interested in filling the FARC hegemony control over coca production (H). However, several illegal actors and some FARC dissidents were interested in the coca business, and then the scenario became a territorial dispute with a fragmented hegemony (1-H). Violence (V) refers to terror actions such as the selective homicide of coca farmers or even social leaders depending on coca crop production (P) or No coca crop production (P-1). Therefore, it is expected that in previous FARC areas where

farmers were eradicating voluntarily, they faced the highest risk of violence and eventually the highest homicide rates.

The theory expects that homicide rates should be the highest in a postaccord scenario where the illegal hegemony is fragmented due to the absence of FARC and coca crop production. In order to test this argument, this paper evaluates the effect of peace accords on homicide rates in municipalities with previous FARC guerrillas and with coca crops separately, and jointly. The control groups for both categories are municipalities without previous FARC presence and no coca crops cultivated. Because it is a quasi-experimental research setting the peace accords' effects on monthly municipal homicide rates, a comparative time series approach is adequate to conduct the study.

This paper will test whether the municipalities with FARC guerrilla presence reported in 2016 suffered a significant variation in homicide rates with the peace accords. It is expected that homicide rates in municipalities with previous FARC guerrilla should increase during the postaccords phase due to the absence of the armed actor. Because this study is interested in the punctuated discontinuity and the post-trend after the peace accords in order to identify the homicide effects in former FARC municipalities, the Comparative Interrupted Time Series is an appropriate approach to answer this question.

The question to explore is: what is the effect of the absence of FARC guerrillas on municipal homicide rates during the postaccords phase in Colombia? The initial hypothesis tests the effect as follows:

H1: Peace accords increased the homicide rates in municipalities with previous FARC presence.

Because coca production has been a relevant predictor of violence in Colombia the second hypothesis to test is the effect of peace accords on coca crop production. Then the second hypothesis tests the effect of coca production on homicide rates after the peace accords as follows:

H2: Peace accords increased the homicide rates in municipalities with coca crop production.

While **H1** and **H2** test the effect of the peace accords on homicide rates in municipalities with previous FARC presence and coca production separately a third hypothesis will test the combined effect of FARC and coca crop on homicide rates as follows:

H3: Peace accords increased the homicide rates in municipalities with previous FARC presence and with coca crop production.

H1 determines the homicide rates as the outcome variable to explain the effect of the peace accords and the municipalities with previous FARC presence as the treatment group and municipalities without FARC presence as the control group. Model 1 illustrates the measurement of these effects. The model uses the monthly homicide rates per 100.000 inhabitants (y) of the municipality (m) as the outcome. The model re-centers the homicide rate trends at the moment of ratification of the peace accords by the Congress of Colombia on December 1st, 2016 (Peace). The coefficient β_1 captures treatment (t) *Discontinuity*, which is for the indicator variable equal to one when the homicide rate is after the peace, estimates the difference in the *Pre-trend* and *Post-trend* intercepts at the moment of the peace accords, β_4 captures control (c) *Discontinuity*. This estimated difference is interpreted as the treatment effect of the peace accords, which is the key coefficient of interest in this model. The coefficient β_2 captures the monthly homicide rate time trend prior to the peace accords (*Pre-trend*) in the treatment group and β_5 in the control group. The coefficient β_3 represents the change in the *Post-trend* monthly homicide rate time

trend for the treatment group, which can be used to determine if any homicide rate change following the peace accords dissipates or grows over the post-peace accords period, it also includes this same re-centered trend interacted with an indicator variable equal to one when the monthly homicide rate was at or past the peace accords month cutoff, and β_6 is the equivalent coefficient for the control group. The model will measure the effects of peace accords on monthly homicide rates in municipalities with previous FARC presence as treatment group (t) and without FARC presence in 2016 as a control group (c) from the beginning of the peace negotiation in September 2012 to December 2019 before the beginning of the COVID-19 restrictions. Since **H2** tests the effect of coca crop production in municipalities with coca crops annually reported between 2012 and 2020 as treatment (t) and municipalities without coca crops as control (c), Model 1 is applicable for testing **H2** replacing municipalities with FARC by municipalities with coca crop production.

Model 1 (CITS)

$$\begin{aligned}
 y_m = & \alpha + \beta_1 \mathbf{1}(Time_{mt} \geq Peace) + \beta_2 (Time_{mt} - Peace) \\
 & + \beta_3 \mathbf{1}((Time_{mt} \geq Peace) * (Time_{mt} - Peace) * Treat_{mt}) \\
 & + \beta_4 \mathbf{1}(Time_{mc} \geq Peace) + \beta_5 (Time_{mc} - Peace) \\
 & + \beta_6 \mathbf{1}((Time_{mc} \geq Peace) * (Time_{mc} - Peace) * Control_{mc}) \\
 & + \varepsilon_t
 \end{aligned}$$

Because **H3** tests the effect of the interaction between FARC and coca production, the combination of both categories creates four interactions; municipalities with FARC presence in December 2016 and with coca crops annually reported between 2012 and 2020 as the treatment group (t). The control group corresponds to each of the other three interactions. Control 1 (c1) corresponds to municipalities with FARC in 2016 but no coca crops reported in the year measured; Control 2 (c2) corresponds to municipalities with no FARC in 2016 but with coca

crops reported in the year measured; Control 3 (c3) corresponds to municipalities with no FARC in 2016 and no coca crops reported in the year. Model 2 illustrates the measurement of these effects. The model uses the monthly homicide rates per 100.000 inhabitants (y) of the municipality (m) as the outcome. As in Model 1, the model re-centers the homicide rate trends at the moment of ratification of the peace accords by the Congress of Colombia on December 1st, 2016 (Peace). The coefficient β_1 captures treatment (t) *Discontinuity*, coefficient β_2 captures the monthly homicide rate time trend prior to the peace accords (*Pre-trend*) in the treatment group, and the coefficient β_3 represents the change in the *Post-trend*. β_4 captures control (c1) *Discontinuity*, monthly homicide rate time trend for the treatment group that is for the indicator variable equal to one when the homicide rate is after the peace, estimates the difference in the *Pre-trend* and *Post-trend* intercepts at the moment of the peace accords, β_4 captures *c1 Discontinuity*, β_5 captures *c1 Pre-trend* and β_6 captures *c1 Post-trend*; β_7 captures *c2 Discontinuity*, β_8 captures *c2 Pre-trend* and β_9 captures *c2 Post-trend*; β_{10} captures *c3 Discontinuity*, β_{11} captures *c3 Pre-trend* and β_{12} captures *c3 Post-trend*.

Model 2 (CITS-Interaction FARC-Coca crops)

$$\begin{aligned}
 y_m = & \alpha + \beta_1 \mathbf{1}(Time_{mt} \geq Peace) + \beta_2 (Time_{mt} - Peace) \\
 & + \beta_3 \mathbf{1}((Time_{mt} \geq Peace) * (Time_{mt} - Peace) * Treat_{mt}) \\
 & + \beta_4 \mathbf{1}(Time_{mc1} \geq Peace) + \beta_5 (Time_{mc1} - Peace) \\
 & + \beta_6 \mathbf{1}((Time_{mc1} \geq Peace) * (Time_{mc1} - Peace) \\
 & * Control1_{mc1}) + \beta_7 \mathbf{1}(Time_{mc2} \geq Peace) \\
 & + \beta_8 (Time_{mc2} - Peace) + \beta_9 \mathbf{1}((Time_{mc2} \geq Peace) \\
 & * (Time_{mc2} - Peace) * Control2_{mc2}) \\
 & + \beta_{10} \mathbf{1}(Time_{mc3} \geq Peace) + \beta_{11} (Time_{mc3} - Peace) \\
 & + \beta_{12} \mathbf{1}((Time_{mc3} \geq Peace) * (Time_{mc3} - Peace) \\
 & * Control3_{mc3}) + \varepsilon_t
 \end{aligned}$$

4. Results

Figure 4 illustrates the regression discontinuity for the treatment and control group in Model 1 and provides evidence supporting **H1**. The results show a punctuated discontinuity and a change in the sense of the post-trend homicide rates in municipalities with previous FARC guerrillas' presence, while municipalities in the control group without FARC presence were not affected by the peace accords. Table 2 reports the coefficients from Model 1 for municipalities with FARC guerrillas' presence by December 1st, 2016. These results indicate that the peace accords significantly affected the homicide rates per 100.000 inhabitants in municipalities with the previous presence of FARC. The *Discontinuity* in homicide rates in municipalities with previous FARC presence increased overall by 1.8 homicides per 100.000 inhabitants a month at the moment of the signature of the peace accords and these results are statistically significant at conventional levels ($p < 0.001$). The *Post-trend* in municipalities with the previous presence of FARC, it changed direction with respect to the *Pre-trend*. The homicide rates per 100.000 inhabitants in the post-accords period increased overall by 0.09 ($p < 0.001$) homicides a month, while in the *pre-trend*, the homicide rates decreased by 0.06 ($p < 0.001$) homicides a month per 100.000 inhabitants. In contrast, municipalities without previous FARC presence did not experience significant variations in homicide rates after the peace accords. These results permit us to anticipate a conclusion that the peace negotiation meant an important reduction in homicide rates, which may be explained by the cease-fire determined by FARC guerrillas in November 2012 (Reuters 2012), but the post-accords phase experienced a rise in homicide rates, which may be unexpected by the peace negotiators. Therefore, identifying the mechanism that explains why the signature of the peace accords triggers this rapid variation in homicide rates is a key point for the next section.

Figure 5 and Table 3 show the results and statistical evidence for **H2**. These results prove the relevance of coca production as a predictor of homicide rates. These results indicate that the peace accords significantly affected the homicide rates per 100.000 inhabitants in municipalities with coca crops. The *Discontinuity* in homicide rates in municipalities with coca crop production increased overall by 2 homicides per 100.000 inhabitants a month at the moment of the signature of the peace accords and these results are statistically significant at conventional levels ($p < 0.001$). Regarding the *Post-trend* and *Pre-trend* the results are similar to the municipalities with FARC presence, and peace negotiations meant a significant variation in homicide rate trends before and after the peace accords. While the analysis for FARC set the presence of FARC for determining the treatment group, the coca analysis set the annual coca crop production > 1 as the treatment group and control otherwise. These results are complementary to one another since FARC is a category fixed on time, and coca crops vary according to annual production. However, as mentioned in the Colombian context, by 2016 FARC was present in 135 of 183 municipalities with coca crops and it is relevant to explore the interaction between FARC presence and coca crops established in **H3**.

Figure 6 and Table 4 show the results for supporting **H3**. The regression results indicate that the peace accords significantly affected the homicide rates per 100.000 inhabitants in municipalities with previous FARC presence and coca crops. The *Discontinuity* in homicide rates increased overall by 2.7 homicides per 100.000 inhabitants a month at the moment of the signature of the peace accords and these results are statistically significant at conventional levels ($p < 0.001$). The *Post-trend* in municipalities with the previous presence of FARC and coca crop production, changed direction with respect to the *Pre-trend*. The homicide rates per 100.000 inhabitants in the post-accords period increased overall by 0.125 ($p < 0.001$) homicides a month

while in the *pre-trend*, the homicide rates decreased by 0.09 ($p < 0.001$) homicides a month per 100.000 inhabitants. In contrast, the peace accords did not affect the homicide rates in municipalities with coca crop production, and no previous FARC presence. Indeed, the average homicide rates in these municipalities were often under the homicide rate mean, which provides evidence for the argument that mere coca production did not trigger the homicide rates. It could be explained because these territories were occupied by other illegal actors as in the case of ELN or AGC where FARC presence is irrelevant. Alternative control groups as municipalities without coca crop production and previous FARC presence did not experience a significant *Discontinuity* but experienced a slight variation in trends before and after the peace accords. Figure 5 shows that the average homicide rates have been over the mean rate for most of the months, which permits us to infer that homicide rates in these municipalities could be associated with other patterns to explore in further research. Finally, the municipalities without coca crop production and without previous FARC presence corresponding to 81% of the municipalities of Colombia, did not experience variation or discontinuity associated with the peace accords and were under the mean homicide rate for almost all months.

5. Discussion and Conclusions

The primary issue addressed in this paper concerned the repercussions of peace accords on post-conflict violence in the context of crime incentives. To address this inquiry, this paper examined the impact of peace agreements between the Government of Colombia and the FARC insurgents on municipal homicide rates in areas where the FARC previously operated as the experimental group and areas with no prior presence as the control group. This variable interacted with the crime incentives variable corresponding to municipalities with and without

coca crops. This paper hypothesizes that contrary to the expected result, peace accords increased homicide rates in municipalities with previous FARC presence, which is explained by the persistence of coca profits in previous FARC zones and a lack of a hegemonic armed actor. This study develops a theory of violent outbreaks in the post-conflict scenario following the postulates of rationality during the war, based on the rationality of violence by illegal actors for maintaining social control and maintaining the revenues provided by the coca crop production. This study tested this theory by applying a comparative interrupted time-series approach consistently in three regression discontinuities to test the effects of peace accords in homicide rates for municipalities with previous FARC presence, coca crop production, and the interaction among FARC and Coca crops.

According to this study, the change in counternarcotics policy is not the primary factor for the increase in homicides in previous FARC municipalities. This is because the homicide rate also rose in municipalities with previous FARC presence but no coca crops. Simultaneously, there was no notable rise in homicides in regions where coca production and prior FARC influence were absent post-peace agreements. The findings indicate a conspicuous and abrupt shift in the rate trends immediately following the implementation of peace accords in regions with coca crops and prior FARC presence. The lack of security conditions in rural areas could explain the occurrence of negative and unintended effects from the counternarcotics policy, as the absence of law enforcement in former FARC areas contributed to a violent escalation in homicide rates.

The peace negotiation positively affected the declining homicide rates in FARC-affected municipalities, attributed to the cease-fire and FARC's relative dominance as an unlawful armed

actor. Nevertheless, the mere removal of the armed actor did not ensure a satisfactory guarantee for enduring peace, particularly given the ongoing motivations for illicit economies. In contrast, the nonexistence of FARC appears to have caused violent outbreaks associated with the implementation of the voluntary eradication policy in previous FARC-controlled regions.

A policy concern is the lack of security adaptation to the post-conflict challenges. The recent shift in counternarcotic policy, which fails to provide a comprehensive security strategy focused on filling the lack of. Law enforcement in municipalities with previous FARC presence exposes citizens and social leaders to significant risks. This includes the threat of engaging with "new armed actors" who are drawn by the profits associated with the coca production, highlighting the vulnerability of coca farmers involved in implementing the new policy. This scenario prompts a discussion on the minimal prerequisites for addressing the security gap that arises when armed actors are absent during the post-conflict phase, alongside the persistence of crime incentives.

This study finds empirical evidence that the peace accords created a punctuated discontinuity and a change in trend in municipal homicide rates in municipalities with previous FARC guerrillas' presence and with coca crop production. The stipulations in the peace accords regarding counternarcotics policy appear inadequate when it comes to addressing the vast scale of coca crops, drug trafficking, and especially the risk faced by local farmers. This is particularly concerning given the absence of FARC guerrillas. Notably, the accords included stipulations for protecting demobilized guerrilla members and mentioned the necessity of improving the Early Warning System but lacked provisions for law enforcement and the reinforcement of judicial and security policies at the local level. Moreover, there are no specific minimum security requirements outlined for the successful implementation of the counternarcotics policy. This situation vividly illustrates the surprising effect of the peace accords on homicide rates in

municipalities previously affected by FARC guerrillas, starting immediately after the signing of the peace agreement.

The implications of this study suggest that a peace negotiation strategy that solely focuses on the withdrawal of an illegal actor, without simultaneously addressing the persistence of incentives in illegal markets and incorporating security stipulations for citizens in war-affected municipalities, particularly in the case of drug trafficking, may undermine the sustainability of peace by failing to establish regulatory roles and effectively reduce illegal market incentives.

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Datasets used in this study:

- Homicide: National Police of Colombia
- Population: DANE
- FARC: MOE and EWS
- Coca crops: Ministry of Justice

Software used for statistics calculation:

StataCorp. 2023. *Stata Statistical Software: Release 18*. College Station, TX: StataCorp LLC.

Appendix

Map 1 FARC AND COCA CULTIVATION BY 2015

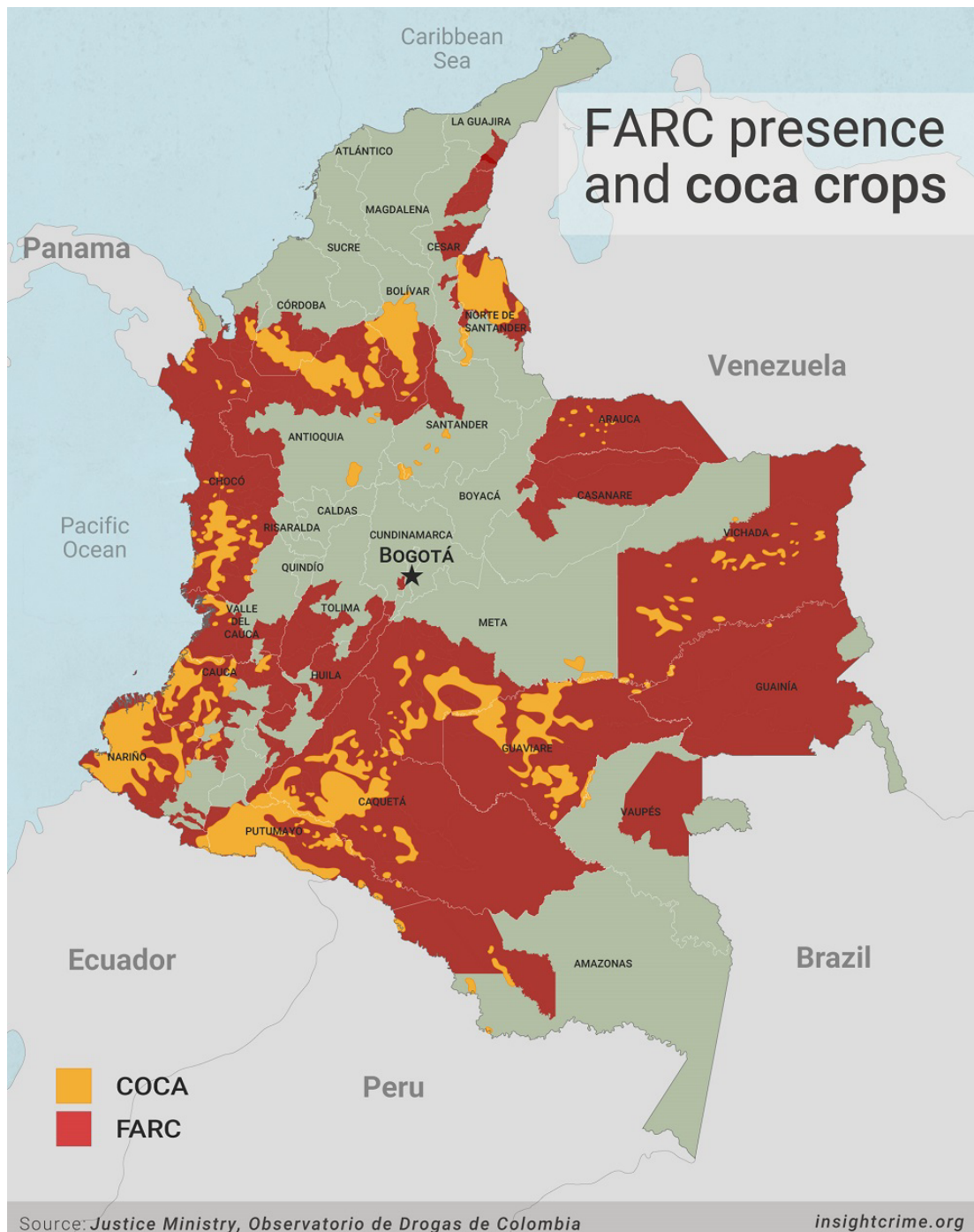


Figure 1

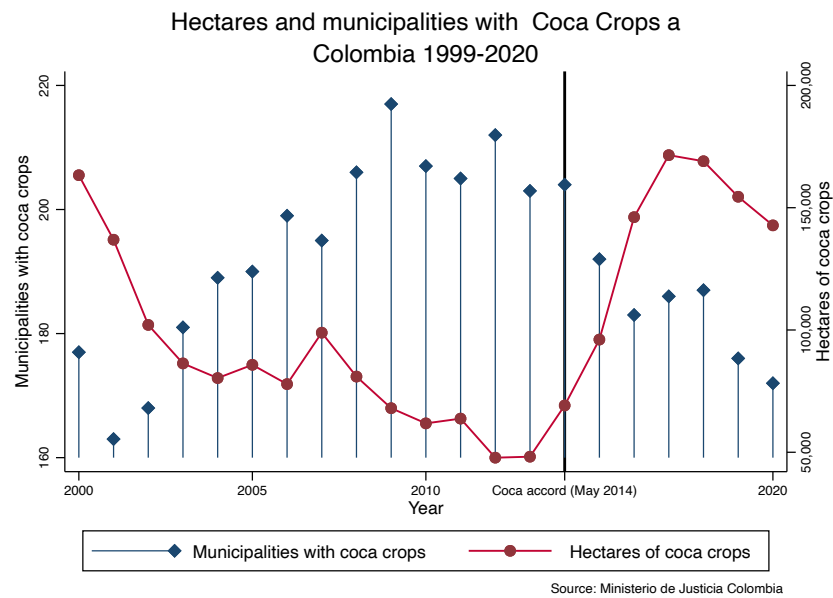


Figure 2

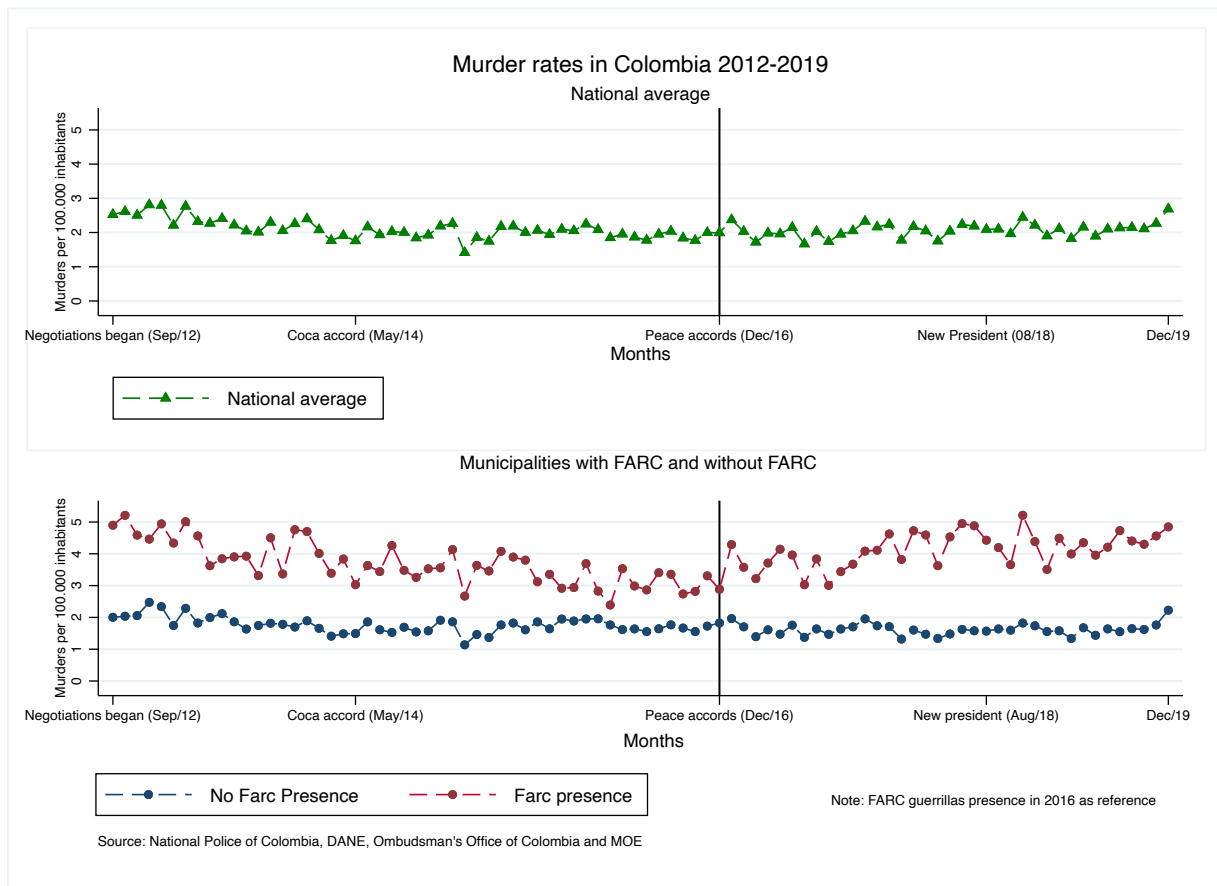


Figure 3
The rationality of the war in the post-conflict

	Hegemonic illegal actor (H)	Hegemony fragmented (1-H)
Coca crop production (P)	Moderate murder rates	Highest murder rates
No coca crop production (P-1)	Lowest murder rates	Lower murder rates
	Peace negotiation	Peace implementation

Table 1. Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Municipal monthly homicide rate per 100,000 inhabitants	98736	2.1	5.35	0	277.4
Municipalities with coca crops					
No	98736	.83	.376	0	1
Yes	98736	.17	.376	0	1
Squared Hectares of Coca crops	98736	105.79	730.202	0	23147.95
Farc guerrillas in 2016					
No	98736	.81	.4	0	1
Yes	98736	.19	.4	0	1
Disputed municipalities					
No disputed and no FARC	98736	.872	.334	0	1
Disputed (FARC and another groups)	98736	.01	.099	0	1
FARC and no other groups	98736	.119	.323	0	1

Figure 4. Regression discontinuity for homicide rates in municipalities with and without FARC

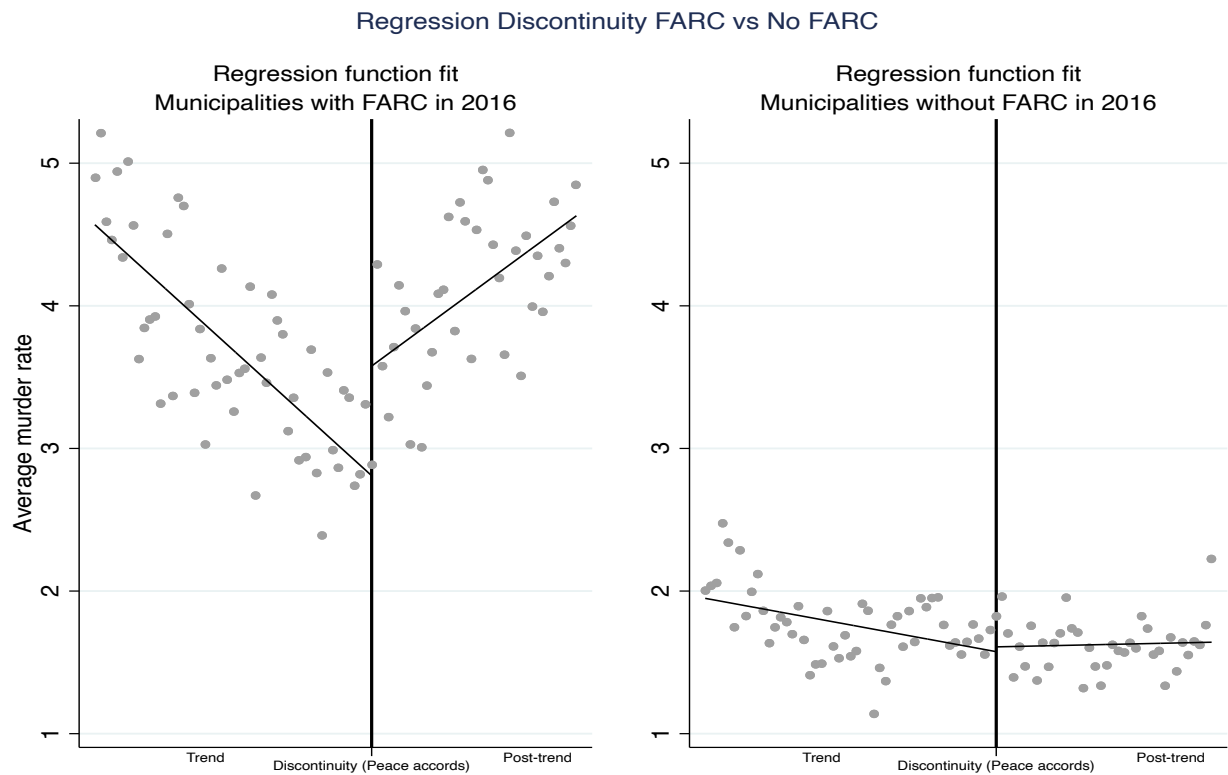


Table 2. Regression discontinuity for homicide rate in municipalities with and without FARC

	<i>Municipal monthly homicide rate</i>
Discontinuity with FARC	1.795*** (0.152)
Pre-trend with FARC	-0.066*** (0.003)
Post-trend with FARC	0.094*** (0.007)
Discontinuity without FARC	-0.215** (0.065)
Pre-trend without FARC	0.00007 (0.001)
Post-trend without FARC	0.0008 (0.003)
Constant	1.783*** (0.043)
Observations	
Standard errors in parentheses calculated with bootstrapping and 1000 repetitions	
* p<0.05, ** p<0.01, *** p<0.001	

Figure 5. Regression discontinuity for homicide rates in municipalities with and without coca crops

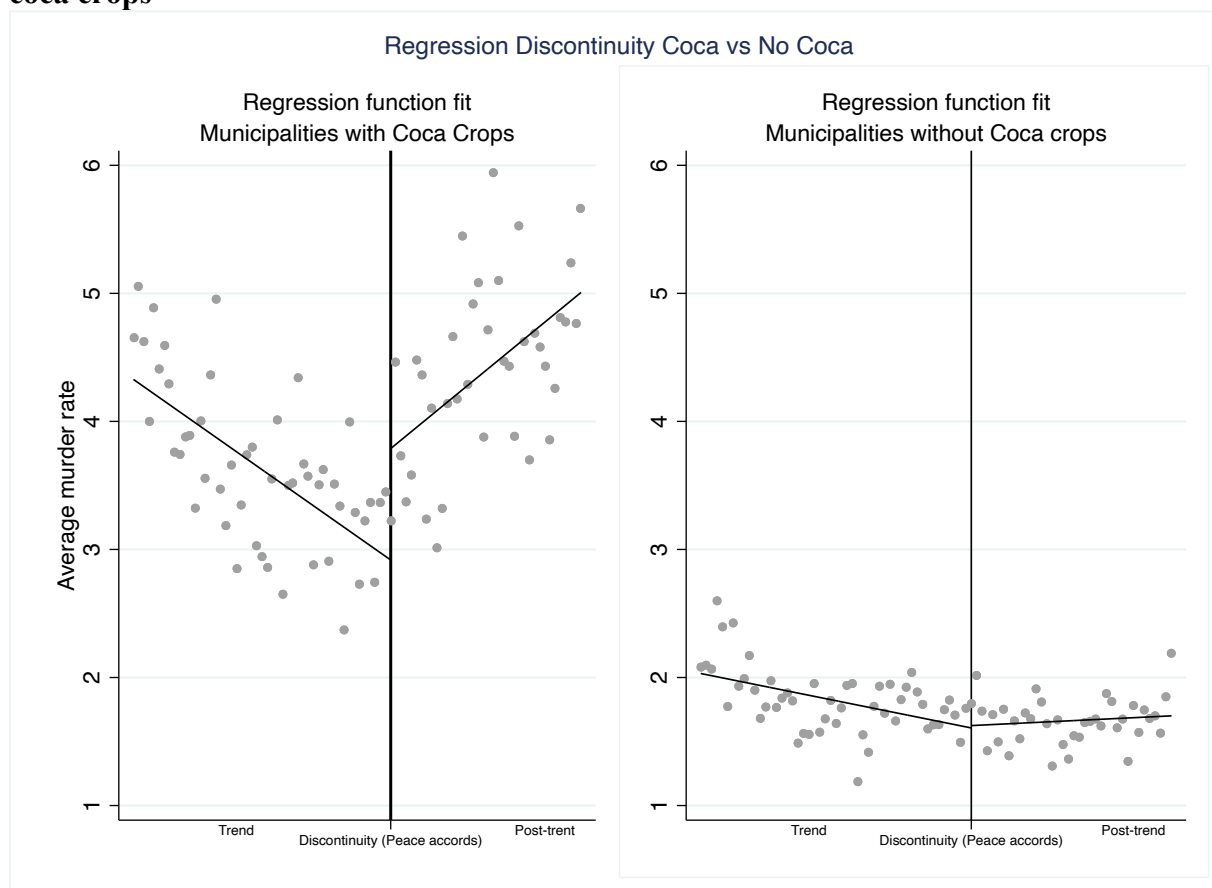


Table 3. Regression discontinuity for homicide rate in municipalities with and without FARC

	<i>Municipal monthly homicide rate</i>
Discontinuity with Coca crops	1.993*** (0.170)
Pre-trend with Coca crops	-0.061*** (0.003)
Post-trend with Coca crops	0.094*** (0.008)
Discontinuity without Coca crops	-0.210** (0.0658)
Pre-trend without Coca crops	-0.001 (0.001)
Post-trend without Coca crops	0.003 (0.002)
Constant	1.794*** (0.044)
Observations	98736

Standard errors in parentheses calculated with bootstrapping and 1000 repetitions

* p<0.05, ** p<0.01, *** p<0.001

Figure 5. Regression discontinuity for homicide rates in municipalities with and without FARC and coca crops

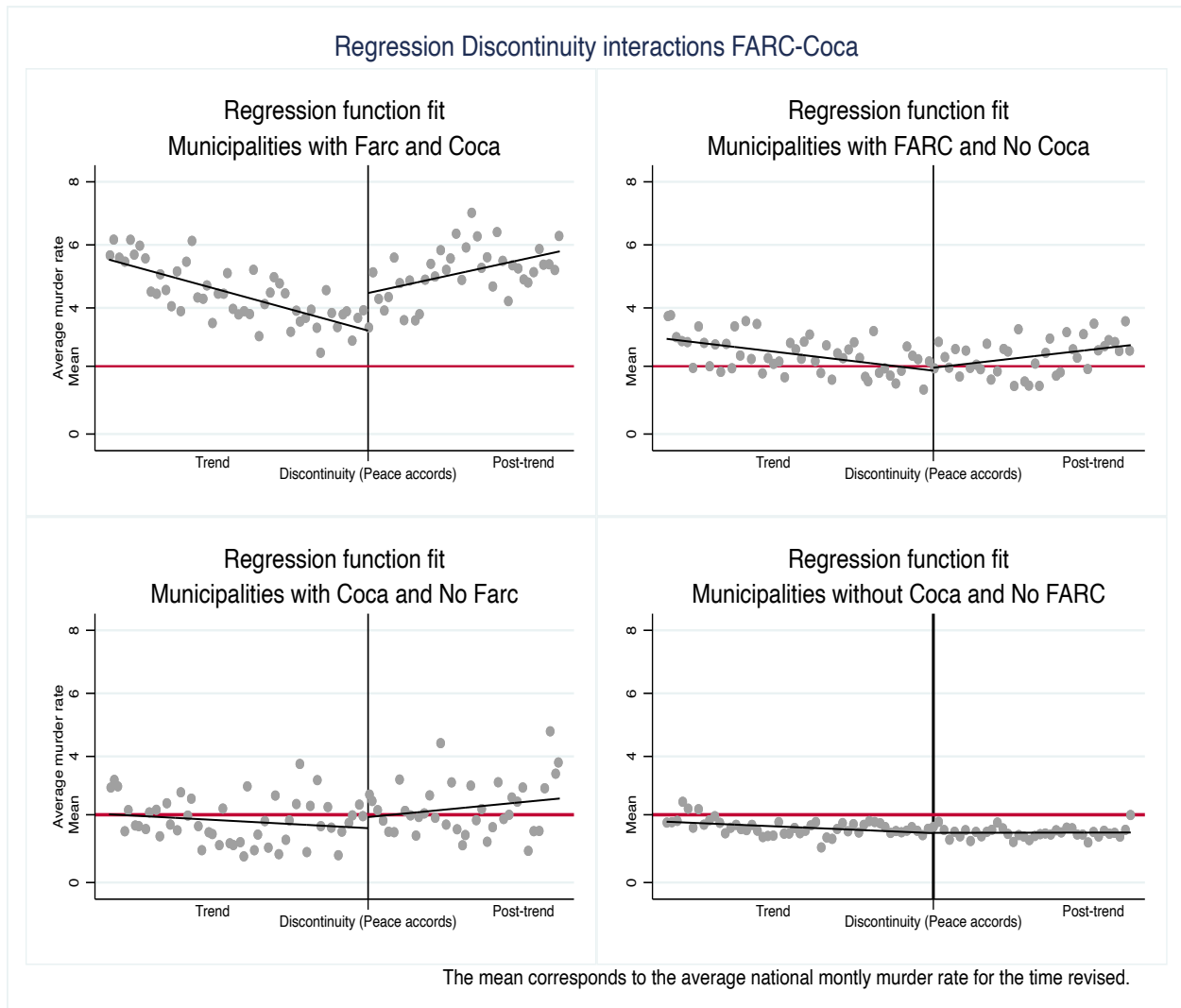


Table 4. Regression discontinuity for homicide rate in municipalities with and without FARC

	<i>Municipal monthly homicide rate</i>
Discontinuity FARC and Coca crops	2.70*** (0.201)
Pre-trend FARC and Coca crops	-0.09*** (0.003)
Post-trend FARC and Coca crops	0.125*** (0.01)
Discontinuity FARC and NO Coca crops	0.322 (0.167)
Pre-trend FARC and NO Coca crops	-0.027*** (0.003)
Post-trend FARC and NO Coca crops	0.046*** (0.008)
Discontinuity NO FARC and Coca crops	0.294 (0.247)
Pre-trend NO FARC and Coca crops	-0.007* (0.003)
Post-trend NO FARC and Coca crops	0.023 (0.013)
Discontinuity NO FARC and NO Coca crops	-0.248*** (0.068)
Pre-trend NO FARC and NO Coca crops	0.0006 (0.002)
Post-trend NO FARC and NO Coca crops	-0.0004 (0.003)
Constant	1.782*** (0.047)
Observations	98736

Standard errors in parentheses calculated with bootstrapping and 1000 repetitions

* p<0.05, ** p<0.01, *** p<0.001

Table 5. Municipalities with other illegal actor in municipalities with FARC presence in December 2016

	ELN	AGC	ELN and AGC
Yes	56	40	11
No	1	5	1
Total	57	45	12

Note: FARC were present in 133 municipalities without another illegal group