Let the Rebels Rule? Evidence on the Economic Effects of Rebel Governance in Colombia*

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Abstract

I study the impact of rebel governance on economic development in rural Colombia. In 1998 the Colombian government created a 42,000 square km demilitarized zone (DMZ) to negotiate with FARC, Colombia's largest and oldest rebel group. Using a spatial regression discontinuity design, I exploit the DMZ's border defined by municipalities' pre-existing administrative boundaries to examine the causal effects of rebel-based social order on education, living conditions, and agricultural production. I show that rebel governance increased the years of education by 0.1 standard deviations, access to aqueduct systems by 11 percentage points, and agricultural yield by 16 percent. These findings appear driven by public goods provision and less exposure to violence during rebels' rule.

Keywords: Rebel Rule, Violence, Civil War, Development.
JEL Classification: O15, N46, D74.

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1 Introduction

Internal civil wars have been the most common type of war since the 1950s (Kalyvas and Balcells, 2010); by 1990, nearly one of every four countries in the world had an active civil conflict (Blattman and Miguel, 2010). However, far beyond the direct implications of violent conflict, armed groups have shaped the development path of local communities under their territorial control, especially in developing countries. Furthermore, when imposing social order, armed groups typically permeate economic activities, public goods provision, collective action, and institutions (Arjona, 2016). Yet, little is known about how armed actors' governance affects economic development at the micro-level.

The effect of rebel governance on local development has been largely overlooked. The literature on the economic consequences of civil conflict mainly concentrates on the negative impacts of violent shocks (Blattman and Miguel, 2010). While armed actors deploy various violent and non-violent strategies during civil conflicts, destructive events (e.g., murders, kidnapping, terrorist attacks) are easier to measure and, thus, disproportionately account for most empirical evidence. However, the emerging literature on rebel governance, especially in political science, has documented how armed actors often provide social order in various settings, from Latin America to Africa or the Middle East (Arjona, 2016).

Yet, whether rebel-based social order fosters economic development is still an open question. On the one hand, enforcing property rights and providing security are challenging tasks for governments in the developing world. Thus, armed actors could increase welfare by providing basic social order (i.e., safety and taxation) (Sanchez de la Sierra, 2020). Furthermore, armed actors frequently permeate social life beyond security and taxation. For example, ethnographic evidence suggests that The Eritrean People's Liberation Front (EPLF) promoted health care, education, and land reforms (Pool, 2001), and the Shining Path in Peru provided policing and organized recreational events (La Serna, 2012). Altogether, these interventionist social orders might also affect local development.

On the other hand, there are multiple channels by which rebel governance could neglect economic development. First, rebel governance often implies violent disputes over territorial control, which has proven adverse effects on economic growth (Abadie and Gardeazabal, 2003). Second, armed actors' permanent control of areas might prevent communities from receiving public investment. Third, evidence from gang territorial control in El Salvador suggests the armed groups' rule of law decreases welfare because of substantial limitations to labor mobility (Melnikov et al., 2020). Furthermore, unlike the relationship between civilians and the government under modern democratic regimes, armed groups' social order is typically imposed on civilians. Therefore, the absence of a political accountability mechanism could promote rent-seeking institutions and worsen economic development (Acemoglu et al., 2001).

In this paper, I leverage a historical event where rebels governed within a well-defined area in rural Colombia to study its persistent effects on local development. Three features of this study are noteworthy. First, I can study a clear and explicit setting of rebel governance. This contrast with the existing literature that concentrates primarily on the direct impact of violence, considering that armed actors' provision of social order is often hard to identify and measure. Second, granular data allows me to provide micro-level evidence on how rebel governance affects rural households, as most available evidence concentrates on aggregated data at the district or country level. Finally, by measuring outcomes twelve years after the exposure to rebel governance, I'm able to shed light on persistent mechanisms, which are particularly relevant for local development in the long run.

The historical events at the center of my study are the 1998 peace negotiations between the Central Government of Colombia and the Revolutionary Armed Forces of Colombia (*Fuerzas Armadas Revolucionarias de Colombia* - FARC). As part of the peace talks, the government demilitarized nearly 42,000 km of Colombia's territory - an area close to the size of Switzerland (see Figure 1). Without any presence of police and military personnel, FARC entered the demilitarized zone (from now on, the DMZ or *El Caguan*) in early 1999 and imposed their own social order until 2002, when peace talks ended without an agreement and conflict was resumed. I argue that FARC actively governed inside the DMZ since they were the only actor allowed to remain armed. During the DMZ, they restricted mobility, imposed taxes, and provided public safety, infrastructure, and justice (Espinosa and Ruiz, 2001; Espinosa, 2010; Reyes, 2012; CNMH, 2017b).

I use granular data from Colombia's 2014 Rural Census (CNA) to study the causal effect of FARC's rule on local development. The CNA provides detailed information on living conditions and agricultural production for Colombia's entire rural population, about 5 million people. I can combine nearly 1.5 million household records with restricted information about their geographic location using the CNA. Since I can determine each household's exact distance to the boundary of the FARC rule, I can identify the effect of exposure to rebel rule using a Spatial Regression Discontinuity Design. To define the DMZ, the government used the pre-existing administrative division of Colombia's territory; the DMZ border perfectly matched the boundaries of the existing municipalities. Therefore, I argue that, when delimiting *El Caguan*, the government arbitrarily allocated some peasants to live inside the DMZ -where FARC ruled- and others to live just outside. Furthermore, I show that areas designated as part of *El Caguan* are similar to sites just outside the boundary on geographic and essential demographic characteristics.

I study the DMZ's effect on three dimensions of local development. First, I examine human capital by computing the impact on literacy, years of schooling, and access to public health. Second, I use dwelling quality and access to public conveniences to study households' material welfare. Third, I consider variables related to agricultural production, such as yield, revenues, and crop specialization.

Contrary to the overall adverse effects of violent conflict on development, my results do not suggest that FARC governance negatively affected development in any of the dimensions I study. Instead, I find that rebel rule had positive effects on education, access to public services, and agricultural production. In particular, my results suggest that the DMZ increased the years of schooling by 0.4, which is about 0.1 standard deviation (SD). Furthermore, dwelling characteristics indicate that the DMZ did not impact the quality of the household's walls and floor materials. Yet, when studying access to public conveniences, I find that the DMZ increased access to sewerage and aqueduct systems by 2 percentage points (p.p.) and 11 p.p., respectively. Finally, results on agricultural production show that the DMZ increased farmers' revenue per hectare by 16%, total revenue by 35%, and made farmers more likely to specialize in perennial crops rather than transitory crops. I then verify that these results are robust to an extensive battery of RD specifications, measurement error, inference assumptions, and the presence of selective migration.

I use ethnographic evidence and additional empirical exercises to better understand these results and assess theoretical mechanisms. First, I follow Arjona (2016)'s typology on *rebelocracy* and historical records from the DMZ to understand why FARC decided to permeate social order with an interventionist strategy, i.e., providing public goods, regulating day-to-day activities, handling civilian complaints and misdemeanors. I suggest that FARC used this strategy to control the territory better and as a learning environment to share alternative forms of rebel governance within military fronts. Hence, by adopting the functions of an interventionist state, FARC was able to construct roads, bridges (El Tiempo, 2003), water tanks, and schools (CNMH, 2017a). I hypothesize that these infrastructure improvements might explain the positive results on access to public services and agricultural yields.

Second, I consider violence reduction as an alternative mechanism to explain my results. Extensive evidence shows how violence negatively affects welfare (Arias et al., 2014; Abadie and Gardeazabal, 2003). Since FARC had total control of the territory (i.e., *de facto* and *de jure*), I argue that the lack of armed competition made violence unnecessary. Thus, lower levels of violence might explain the positive effects on education and agricultural production. These results are consistent with empirical evidence on the positive effects of violence decrease on education (Prem et al., 2021) and agricultural investment (de Roux and Martínez, 2021). Accordingly, I show that the positive impact on schooling is only driven by age cohorts exposed to the DMZ during their schooling age, which is consistent with seminal work on the high returns of human capital investments during childhood. (Heckman, 2006; Heckman and Kautz, 2012).

Third, I use variables on property rights, agricultural practices, and collective action to study FARC's agrarian agenda as a complementary mechanism to explain the effect on agricultural production. I don't find evidence that FARC significantly affected property rights or agricultural practices. Yet, additional results show modest positive effects on capital investment (i.e., machinery and infrastructure), which might explain positive yields. Furthermore, exposed farms are less likely to be vertically integrated within producer associations while more likely to use collective work. These results are consistent with historical evidence suggesting that FARC promoted collective action at the local level between peasants and shed light on the persistent effects of informal institutions from rebel governance.

Finally, I use fiscal outcomes at the municipal-year level to test for a disproportional increase of government investment in the former DMZ's municipalities as an alternative explanation. I also study educational inputs, such as pupil-teacher ratio and school construction, to study differential educational policies as an alternative explanation. However, I do not find evidence supporting the differential public investment of educational policy hypothesis after the DMZ ended.

Overall, it is worth noting that a modern democratic social order is not the relevant counterfactual to understand the results. Instead, I hypothesize that in the absence of the DMZ, households would have been exposed to higher levels of violence in the context of limited State presence. For instance, while I find positive effects on education and agricultural revenues, they do not translate into better living standards (i.e., dwelling characteristics). Thus, far from suggesting that rebel governance fosters economic development, my results indicate that it can mitigate the adverse effects of violent conflict.

This paper contributes to the existing literature on civil conflict for several reasons. First, while many studies have developed theoretical frameworks to understand insurgent governance (Berman et al., 2011; Bueno de Mesquita, 2013; Arjona et al., 2015; Arjona, 2016; Peñaranda Currie et al., 2021), causal evidence on their impacts have been difficult to obtain. I add to this literature by casually examining the consequences of rebel rule on local development and empirically testing the existing theoretical and ethnographic evidence.

Furthermore, this paper also contributes to the growing empirical evidence on criminal governance's effect on development, where consensus remains absent. For example, Melnikov et al. (2020) finds that El Salvador's gang rule negatively affects education, material well-being, and income by restricting mobility. In contrast, Sanchez de la Sierra (2020) shows how armed actors create social order with low uncertainty and violence and, therefore, foster positive effects on the welfare in Eastern Congo. I expand this literature by presenting additional evidence to support the claim that criminal governance could positively affect development. Moreover, whereas the existing literature has focused on the short-term effects of criminal governance, this paper sheds light on its persistent effect over the long run.

My results also speak to broader literature studying civil conflict and its effects on development. There is extensive evidence that shows how civil wars cause persistent adverse impacts on relevant factors for development: education (Fergusson et al., 2018; León, 2012), health (Bundervoet et al., 2009), agricultural production (Arias et al., 2019; de Roux and Martínez, 2021), collective action (Orbegozo, 2021), and growth (Abadie and Gardeazabal, 2003). Yet, most available work studies conflict where armed actors actively engage in a violent confrontation over political, economic, and social control. I complement this literature by assessing the impact on education, material welfare, and agricultural yields of non-violent settings within a civil conflict.

Finally, I also take the first steps towards empirically studying the developmental effect of a historical event of significant magnitude. This itself is an important contribution. *El Caguan* was the longest-lasting DMZ in Colombian history and significantly impacted how the civil conflict unfolded during the 2000s. Moreover, while a vast literature of qualitative and ethnographic evidence has documented *El Caguan*'s DMZ (e.g. Espinosa and Ruiz, 2001; Cadena, 2004; Espinosa, 2010; Gonzalez, 2012; Reyes, 2012; CNMH, 2017a), this is the first paper to study the effect of the DMZ on economic development empirically.

This paper is organized as follows. Section 2 describes the historical background of Colombia's civil war and *El Caguan*'s demilitarized zone. Section 3 presents the data sources, the empirical strategy, and the identification assumptions. Section 4 outlines the main findings on developmental outcomes. I then test the robustness of my results to a set of complementary empirical exercises in section 6. In section 5 I discuss potential mechanisms behind my results. Finally, section 7 presents the concluding remarks.

2 Historical Background

Colombia's armed conflict dates back to the bipartisan violence between liberals and conservatives during the mid-20th century (Bushnell, 1993). While national parties resolved their political differences in the late '50s, peasants in remote areas remained armed due to agrarian disputes and political participation restrictions. By the early '60s, the central government's feeble State capacity allowed communist peasant guerrillas to control significantly large rural areas, called *independent republics* (Lopez-Uribe and Sanchez, 2018).

In 1964, the central government launched a military operation against the *Marquetalia Republic*, an enclave of communist peasant guerrillas in the southwest of Colombia. A group of survivors of around 350 men, led by Manuel Marulanda and inspired by the Cuban Revolution, founded the Revolutionary Armed Forces of Colombia (FARC) in May 1966. Their tactics went from communist civil disobedience to active mobile guerrilla attacks on the government. By 1978, FARC had expanded to nearly 1,000 men and deployed ten different battlefronts throughout Colombia. According to Rangel (1999), by providing social order, justice, and security, FARC earned the public's support in most regions where they were present. Moreover, in the absence of the State's rule of law, FARC was a suitable substitute (Medina, 1990).

Although the government had demobilized most guerrilla groups by the early '90s, FARC kept extending their military and political power. They took advantage of coca leaf growing production by taxing cocaine's supply chain. Additionally, the government had held peace talks on various occasions, allowing the guerrilla to get national and international political recognition (Velez, 2001).

2.1 ***El Caguan*'s DMZ**

By 1998, every attempt to demobilize FARC had failed, and its rapid power growth made military defeat unfeasible. Naturally, the public broadly favored negotiation over military defeat. Presidential candidate Andrés Pastrana exploited peace as his central political platform and was elected into office in June 1998. As president-elect, he met with FARC's leadership and agreed to start official negotiations after signing in (see Figure B1).

In October 1998, Pastrana issued Resolution No. 85, which: i) officially started peace talks with FARC, ii) recognized FARC's political origins, and iii) demilitarized five municipalities[1]: La Uribe, Mesetas, Vistahermosa, La Macarena, and San Vicente del Caguan. Nearly 87,500 civilians lived under FARC's rule for more than three years, from November 1998 through February 2002.

The DMZ municipalities are part of a region where FARC has always had a strong presence. In the mid-20th century, peasants from the Andean mountains colonized the area to own land. The late colonization implied the State's absence and the active presence of FARC. By the time the DMZ started, the State and FARC were disputing territorial control over the region (CNMH, 2017a).

By demilitarizing *El Caguan*, the central government dictated the retreat of all military and police personnel. As a result, FARC settled in the DMZ on the 7th of January, 1999[2].

[1]Municipalities are Colombia's public administration smaller unit.

[2]Before arriving at the DMZ, FARC demanded in December 1998 the withdrawal of the last 92 administrative soldiers present in San Vicente's battalion. The government accepted the 23rd of December 1998, leaving the five municipalities of *El Caguan* without public force (Semana, 1999).

According to a San Vicente resident: "Overnight we saw how the public forces left and how the guerrilla entered the town [...] We had no choice but to accept what was happening" (Reyes, 2012). While civilian staff from the mayor's office were the only public officials left in the area, the government did not restrict whether FARC could carry military equipment, allowing them to have full *de facto* control.

Qualitative and ethnographic evidence related to *El Caguan* suggest FARC completely governed inside the DMZ (e.g. Cadena, 2004; Espinosa and Ruiz, 2001; Reyes, 2012; Espinosa, 2010; El Tiempo, 1999; Gonzalez, 2012). So much so that Colombia's highest administrative court has ruled on various occasions that the State's absence violated the population's rights by failing to protect inhabitants of the area from FARC (El Universal, 2013). By permanently settling inside the DMZ and highly restricting mobility from the inside, FARC secured its position in *El Caguan*. FARC's top-ranking officials and nearly 4,000 militiamen lived and patrolled the DMZ between 1999 and 2002 (Semana, 2002).

During the first year of the DMZ, FARC moved to remove further State officials and social leaders from the area. To replace the judiciary system, FARC expelled the Attorney General's Office prosecutor in early 1999 (Caracol, 1999). FARC also campaigned against social leaders that questioned their actions. In mid-1999, they asked San Vicente's parish priest to leave the region (El Tiempo, 2002a). This strategy allowed FARC to replace State's presence inside the DMZ actively. They installed multiple complaints and claims offices, called "Oficinas", where the public could report civil disputes and requests to the FARC's high-ranking officials (Arjona, 2016; Espinosa and Ruiz, 2001).

FARC also provided public safety. As the replacement of police and military personnel, the government had designed a *civic* police force conformed by the civil population from each municipality in the DMZ and led by the mayor (see Figure B2). Nonetheless, FARC designated half of the *civic* police force, and ultimately they had the final say. Moreover, the *civic* police were mainly in charge of handling misdemeanors, for which the accused usually had to pay a fine at the complaints and claims offices (Reyes, 2012). As a result, the community often recognized FARC as a compelling source of justice and conflict resolution [3] (Espinosa, 2010).

Initially, the lack of infrastructure was an obstacle to governing *El Caguan*. Hence, FARC promoted and financed roads between the five demilitarized municipalities to improve their access to the whole DMZ. In addition, they provided public goods by hiring and organizing local communities (Gonzalez, 2012). As noted by Peñaranda Currie et al. (2021), road

[3] For instance, according to Espinosa and Ruiz (2001), when the community couldn't resolve a dispute between two peasants in La Macarena, a woman affected stated: "How so? Is there no guerrilla? Where are the authorities (referring to FARC)?".

construction is typical where armed actors, especially FARC, provide social order.

2.2 The Aftermath

On February 20th, 2002, the government unilaterally decided to end the peace talks with FARC and retake the DMZ. While active conflict had declined dramatically during the DMZ, the government deployed nearly 4,000 troops, and combat intensified during 2002 (El Tiempo, 2002b). Even though official forces could control the municipalities' capitals, FARC's presence in the region remained constant until 2016 (see Figure B3).

Although the DMZ had legal validation, public officials often stigmatized communities for their close relations with FARC during the peace talks. Military personnel in the area imposed additional restrictions on the civil population to limit FARC's ability to access market goods. For instance, police and military personnel restrained the trade of goods (i.e., food, fuel, personal care items) between municipalities' capitals and rural areas (CNMH, 2017b). The public force's inability to correctly differentiate between community members and under-covered FARC militia negatively affected communities' relation with the State (Semana, 2012).

3 Empirical Strategy

3.1 Data

Sample Selection and Outcomes

I use Colombia's 2014 National Agricultural Census (*Censo Nacional Agropecuario* - CNA). The CNA provides detailed information on living conditions and agricultural production of Colombia's entire rural population. I combine restricted data on households' precise GPS location from the CNA and historical maps of municipalities' boundaries in 1998 to assign whether the household lived in an area exposed to *El Caguan*.

The CNA has multiple levels of information. The central unit of observation is the Unit of Agricultural Production (*Unidad Productiva Agricola* - from now on, UPA or farm). The farm is defined as a plot of land with agricultural production and with a unique decision-making entity. If it has residents, they are organized into dwellings, and each dwelling can have one or more households. The available geographic coordinates vary at a farm level, as they correspond to where the interview took place, which is most likely the farm's decision-maker dwelling.

Table 1 summarizes the main variables in the CNA; columns 1-5 present basic summary statistics for the complete sample on the CNA. Column 1 shows that the CNA surveyed about 5 million people in rural Colombia in 2014, representing nearly 1.5 million households. Broadly, Colombia's rural population is relatively young, with an average age of 32 years. Almost three out of every four households self-identify as poor, and access to public conveniences is scarce. For example, only 6% and 40% of dwellings report having access to sewerage and aqueduct systems, respectively.

Columns 6-5 show the number of observations, the mean, and the standard deviation for the primary analysis sample, respectively. To construct this analysis sample, I first restrict the sample to households within a 100 km buffer from *El Caguan*'s border. [4]Because *El Caguan* Next, because El Caguan is located in Colombia's southeast plains, I drop observations placed in the highlands of Colombia's Andean region. The red zone in Figure 2 illustrates the highlands areas that are not considered in the analysis. Column 6 shows that these restrictions leave me with about 43,000 households and 133,000 people.

I then divide *El Caguan*'s border into five different boundary segments, corresponding to each municipality that made part of the DMZ (see Figure 2). Then, I assign the distance and information of the closest boundary segment to each household in my sample. In my analysis, I consider all boundary segments except for La Uribe, mainly located at the Eastern Ranges. If included, the Eastern Ranges would create a discontinuous jump in geographic, socioeconomic, and cultural characteristics, affecting the similarity of observations at each side of the boundary.

I study the DMZ's effect on three groups of outcomes. First, I examine the impact on human capital formation with a dummy variable indicating whether individuals can read and write, a variable of years of education, and a dummy variable indicating whether individuals have access to health insurance. Second, I assess whether the DMZ affected material welfare based on the dwelling's quality and access to public conveniences. Third, I consider variables related to agricultural yield, revenues, and crop specialization.[5]

Table 2 compares the primary outcome variables of individuals living in the DMZ's municipalities with neighboring municipalities. Overall, differences in column 5 suggest that individuals inside the DMZ have worse education, living conditions, and access to public services. For instance, Panel B indicates that households from DMZ municipalities are 7 p.p. more likely to self-identify as poor and have a higher probability of reporting exposure to land-related violence. Panel D suggests that farms inside the DMZ have higher revenues and are more specialized in cash crops, requiring higher investment levels.

[4]I do this mainly for computational reasons. Overall, my RDD specification optimal bandwidth ranges between 6 km and 26 km.

[5]To account for multiple hypothesis testing concerns, I present Romano and Wolf (2005)'s step-down adjusted p-values for the main results.

Additional Data Sources

I use additional data sources to measure geographic characteristics, exposure to armed conflict, and migration patterns across exposed and non-exposed municipalities. I use data on elevation and rainfall between 1980 and 1989 from the World Clim Organization, and data on land suitability for agriculture and average cropland in 1992 from the UW - Madison's Atlas of the Biosphere. Data on the geographic location of rivers comes from official information of Colombia's National Mapping Institute - IGAC and information on conflict events by armed actors come from Violent Presence of Armed Actors in Colombia (ViPAA). To study migration patterns between 2000 and 2005, I use Colombia's 2005 General Census. I also use data on fiscal outcomes from Colombia's National Planning Department (DNP) at the municipality-year level, to study differential investment by government post-DMZ as an alternative explanation for my results. Data on communities' perceptions towards armed actors come from the ELCA 2010, which I employ to study mechanisms. Finally, I use data on educational inputs, such as teachers and schools, to study a differential educational policy after the DMZ. This data is provided by the Colombian Minister of Education and varies at the municipal-year level.

3.2 Research Design

Because exposed and non-exposed municipalities to the DMZ most likely differ on observable and unobservable characteristics, a simple regression of developmental outcomes on exposure would yield a biased estimation of the causal effect of interest. For instance, even before the DMZ started, exposed municipalities had had a more substantial FARC presence than their neighboring municipalities. Thus, I exploit the discontinuous change in exposure to *El Caguan* by comparing households located near the arbitrarily defined border of the DMZ.

The boundary forms a multi-dimensional discontinuity in a longitude-latitude space. Thus, my baseline specification approximates the location of each farm with a local linear polynomial of the geodesic distance to the DMZ border estimated separately on each side of the boundary.[6] Therefore, I can estimate the effect of exposure to the DMZ on the outcomes of interest with the following spatial regression discontinuity design (RDD) specification:

[6] Although a wide variety of empirical work has used the spacial RDD approach, there is no consensus on the best way to approximate the location in the regression analysis. While some researchers use latitude and longitude as running variables in a multi-score RDD setting (e.g. Dell, 2010; Grosfeld et al., 2013; Dell et al., 2018), others have favored a *normalizing-and-pooling approach* using the Euclidean distance to reduce the multi-dimensional space to a single running variable (e.g. Miguel and Roland, 2011; Michalopoulos and Papaioannou, 2013; Melnikov et al., 2020; Lowes and Montero, 2020).

$$y_{i,u,v,s} = \alpha + \tau Caguan_u + \gamma Dist_u + \theta Dist_u \times Caguan_u + \phi_s + \psi X_{i,u,v,s} + \varepsilon_{i,u,v,s} \qquad (1)$$

$y_{i,u,v,s}$ denotes the outcome for individual i from farm u in rural district (*vereda*) v assigned to boundary segment s. $Caguan_u$ is a variable indicating whether the farm u is located inside the DMZ. $Dist_u$ is the geodesic distance to the DMZ border, which controls for smooth functions of geographic location. ϕ_s are nearest boundary segment fixed effects. And $X_{i,u,v,s}$ is a covariates vector, which includes an indicator for sex, age, age-squared, and the farm's extension.

The coefficient of interest is τ, which captures the local causal effect of being just inside *El Caguan* on the outcome of interest. Because FARC rule was more vital at the municipalities' capitals -often located in the center of each municipality- this local intention-to-treat effect presumably underestimated the average treatment effect. Intuitively, I argue that when delimiting *El Caguan*, the government arbitrarily allocated some peasants to live inside the DMZ -where FARC ruled- and others to live just outside the DMZ. Both groups presumably had similar geographical, cultural, historical, and institutional characteristics before the DMZ started. Therefore, an RDD design in this context allows me to identify the DMZ's effect on recent developmental outcomes.

I cluster standard errors at a rural district level. Accordingly, as a benchmark, I use a linear distance polynomial function, triangular kernel weighting, and calculate the optimal bandwidth for each outcome variable following Calonico et al. (2019)'s one common MSE optimization. For completeness, I document the robustness to alternative approximations to standard error structures, the degree of the distance polynomial function, kernels weighting, and bandwidths (see Appendix D).

3.3 Threats to Identification

The RDD approach presented in equation (1) requires two key identifying assumptions. First, it needs the potential outcomes of all relevant factors to vary smoothly on the boundary before the DMZ[7]. Under this assumption, observations just outside the boundary are a good approximation to those observations' counterfactuals inside the boundary.

The main concern for identification is that the government chose the DMZ location strategically for specific characteristics that could affect the outcomes of interest. For instance,

[7]Let K_0 and K_1 denote the potential outcomes under treatment and control, respectively, d denote the linear distance to the boundary, and ϕ_m the boundary segment fixed effects. Identification requires that $E[K_0|d, \phi_m]$ and $E[K_1|d, \phi_m]$ are continuous at the discontinuity threshold.

the DMZ might have been located in strategic zones for cocaine production. Nonetheless, when defining the DMZ, the government didn't choose a specific area but instead used the already-defined boundaries of existing municipalities. Thus, the government did not select the DMZ boundaries based on particular characteristics but on Colombia's preexisting administrative division. Furthermore, I argue that what mattered when assigning the DMZ was each municipality's capital. Thus, the rest of the municipal area is an extension of the capital, making it presumably a *good as random* assignment for households near the edge.

I assess this assumption's plausibility by checking for the balance of geographic and essential demographic characteristics on both sides of the boundary. Table 3 presents mean differences and RDD estimates using specification (1) on these features. As most of these outcomes come from satellite information, results on geographic variables in Panel A and B are at the 10 km by 10 km grid cell level. Demographic variables in Panel C come from CNA and vary at an individual level.

Consistent with the first identification assumption, I find balance in all the geographical characteristics. While unconditional mean differences in columns (3) and (5) yield statistically significant coefficients, the RDD approach in column (7) shows non of the variables in Panels A-B show significant differences statistically and in magnitude relative to the mean. Because these characteristics are pre-determined by the DMZ, results suggest areas are comparable along the boundary.

Demographic characteristics in Table 4 are also balanced around the border. Differences in these variables would suggest fundamental demographic changes along the border, threatening the sample comparability on each side of the boundary. For instance, significant differences in age or sex composition could be explained by the degree of exposure to civil conflict, as men and younger individuals are more likely to be recruited into armed organizations. Yet, column 7 implies that these demographic characteristics vary smoothly around the border, suggesting demographics are comparable along the boundary.

Second, the RDD approach requires that residents inside the DMZ don't selectively migrate from those areas to neighboring locations outside the boundary. This assumption guarantees that control observations were not directly exposed to the DMZ. During and after the DMZ, some migration likely took place. Still, ethnographic evidence suggests migration was mainly from the DMZ's municipalities to major cities, such as Villavicencio and Bogotá (CNMH, 2017a).

Unfortunately, no data is available to directly measure migration during *El Caguan*. Nonetheless, I provide three complementary exercises that suggest migration hardly explains my results. First, Figure 4 tests for a discontinuous change in population density at the boundary. If households inside the DMZ were more likely to migrate to neighboring municipalities, I would expect a decrease in household density at the boundary. Yet, results in Figure 4 do not support such a claim. Second, I use Colombia's 2005 General Census to suggest that migration patterns between the DMZ and neighboring municipalities are similar. Figure 3 shows the migration flow from DMZ municipalities to neighboring municipalities in my analysis. Descriptive results suggest migration to neighboring municipalities represented less than 10% of all migration between 2000 and 2005. Third, Section 6 presents a trimming to estimate what percentage of the sample I would have to drop for selective migration to explain my results fully.

4 Impacts on Economic Development

4.1 Human Capital

Table 5 presents the results of estimating equation (1) on human capital formation, using data from the 2014 rural census. For each outcome, I show both the RDD coefficient when using the optimal bandwidth suggested by (Cattaneo et al., 2020a) and the RDD coefficient for a fixed bandwidth of 10 km, which allows me to have a stable sub-sample to compare results across outcomes. I control for boundary segment fixed effects, age, age square, and sex to improve precision. Columns (1) and (2) show a null impact on literacy; the coefficient is imprecise and very close to zero, with a point estimate of -0.01 for an average literacy rate of 84%. Nonetheless, columns (3) and (4) show that the DMZ positively impacted the years of education. Twelve years after the *El Caguan*, I estimate the DMZ increased the years of schooling by 0.4; this accounts for an increase of 0.1 SD and 5% of the mean. Finally, columns (5) and (6) study the effect of health insurance, showing a small (1% of the mean) and non-significant effect. I present the respective RD plots for these outcomes in Figure 6.

4.2 Material Welfare

I now investigate whether rebel governance affected households' material welfare. I proxy welfare with available dwelling characteristics in the 2014 rural census to do so. I show the RDD coefficient for each outcome using the optimal bandwidth and a fixed bandwidth of 10 km and control for boundary segment fixed effects. Table 6 shows results on dwelling characteristics and access to public services. While columns (1) and (2) show results on the likelihood of having adequate wall materials (concrete or better), columns (3) and (4) show results on the probability of having adequate floor materials (concrete or better). I show the DMZ had no significant impact on either of these outcomes. Although columns (5) and (6) document no effect on the probability of having electricity, columns (7) and (9) show a positive and statistically significant impact on the likelihood of having a sewerage and aqueduct system, respectively. I estimate that exposed areas are 2 percentage points more likely to have a sewerage system and 11 percentage points more likely to have an aqueduct system; both effects account for at least 100% of the sample mean. I present the respective RD plots for these outcomes in Figure 7.

4.3 Agricultural Production

Next, I look at agricultural production outcomes. Since I use Colombia's rural census, my population of interest is farmers, for which agricultural production is their primary source of income. For each outcome, I show the RDD coefficient using the optimal bandwidth and a fixed bandwidth of 10 km and control for boundary segment fixed effects and the farms' total area.[8] I first study whether rebel governance had a persistent impact on agricultural yields and revenue. To do so, I proxy yield with a crop-specific measure of revenue per hectare, which I discuss in detail in Appendix A. I then examine whether the production is for the household's subsistence (self-consumption) or market sale.

Table 7 shows results on agricultural yields, revenue, and final production use. The dependent variables in columns (1)-(2) and (3)-(4) are the inverse hyperbolic sine of total revenue and revenue per hectare, respectively. The coefficient of interest can be interpreted as a semi-elasticity.[9] Column (1) shows that the DMZ led to an average increase of approximately 16% in the revenues per hectare, a proxy for yield,. This effect is precisely estimated (statistically significant at the 1% level) and hardly changes when using the fixed bandwidth of 10km in column (2). Similarly, results in columns (3) and (4) illustrate that the DMZ increased total revenue by at least 35% (statistically significant at the 1% level). Conversely, column (5) suggests that the DMZ increased the likelihood of using agricultural production only for self-consumption (i.e., subsistence) by nearly 12 percentage points. This result is significant at a 5% confidence level and is equivalent to 28% of the sample mean. While results in columns (7) and (8) on the likelihood of using agricultural production only for market sale are not statistically significant, they suggest a negative association with the DMZ. I present the respective RD plots for these outcomes in Figure 8.

Finally, I compare differences in crop choices by looking at how likely farmers are to specialize in cash crops, perennial crops, and transitory crops. Crop choices can reflect farmers' attitudes toward uncertainty or investment constraints. For example, cash crops require high

[8]When studying the effect on agricultural yield and revenue, I run the regression at the farm-crop level and include crop fixed effects.

[9]I use arcsinh transformation on monetary variables because it approximates the natural logarithm while retaining zero-valued observations. For further details see Bellemare and Wichman (2020).

levels of investment and vertical integration within the production chain. Similarly, Figure 5 shows that perennial crops have higher agricultural yields. Studying the effect on crop specialization is essential for two reasons. First, empirical evidence suggests that civil conflict distorts agricultural decisions such that producers prefer less profitable crops (Arias et al., 2019). Thus, resulting in a potential mechanism of poverty traps. Second, these distortions can persist over time and affect local long-run development (Brück and Schindler, 2009).

Table 8 presents the results on crop choices. I classify crops into cash crops, perennial crops, and transitory crops. Following Montero (2021), I define a crop as a cash crop when it requires centralized processing to be valuable, and an individual worker cannot directly consume it. For perennial and transitory crops, I use the official classification provided by DANE. Appendix A offers detailed information on crops classification. For example, column (1) to (4) shows that the DMZ led to a significant decrease in cash crop specialization. Column (1) illustrates that 12 years after rebel governance, exposed farms had 7% less area dedicated to cash crops, relative to an average share of cash crop area of 33%. Likewise, column (3) results show that the DMZ led to an 11% decrease in the participation of cash crops in total revenue. I present the respective RD plots for these outcomes in Figure 9.

Columns (5) to (12) illustrate an accordant pattern across results: exposed farms are more likely to specialize in perennial crops and less likely to specialize in transitory crops. Columns (5) and (7) show that the DMZ led to a 7% increase in the share of the area dedicated to perennial crops and a 13% decrease in the participation of perennial crops in total revenue, respectively. Both results account for at least 10% of the sample mean. Moreover, columns (9) to (12) show that the DMZ had the opposite effect on transitory crops. Column (11) shows that the DMZ led to a 10% decrease in the participation of transitory crops in total revenue.

5 Mechanisms and Discussion

The results in Section 4 raise the intriguing question of how the DMZ, and more specifically, FARC governance, positively affected economic development at the local level. This section draws from the historical background reviewed in Section 2 and presents additional empirical exercises to explore the theoretical mechanisms that could explain my main findings. Overall, I find two central mechanisms that explain my results. First, FARC invested in infrastructure (i.e., roads, bridges, water tanks), which explains the positive effects on public services and agricultural yields. Second, the DMZ significantly reduced violence, positively affecting education and promoting specialization in more profitable crops.

5.1 An Interventionist Rebel Rule

As noted in Section 2, FARC broadly intervened in the social order during the DMZ by providing security, infrastructure, dispute resolution, taxation, and regulating day-to-day life. Thus, the first question worth answering is why they decided to permeate social order. To answer this question, it is worth noting that the first implication of the DMZ was that FARC didn't have to fight for territorial control. The presidential decree that formalized *El Caguan* provided both *de facto* (i.e., public forces retreated) and *de jure* military control over the DMZ. Furthermore, the pooling of FARC personnel and high-ranking commanders towards the DMZ facilitated high levels of internal discipline. These two conditions likely made FARC "more likely to operate under long time horizons, establishing a social contract with the local population" (Arjona, 2016, p. 10).

Under this long time horizon, it follows from the theory of state formation that FARC had incentives to provide a minimal condition on government: monopoly of violence (Hobbes, 1948; Weber, 1922). Moreover, empirical evidence on state formation and armed conflict suggests that armed groups take over the essential functions of the state -monopoly of violence, taxation, and protection of property rights- to better appropriate local revenues (Sanchez de la Sierra, 2020). Ethnographic evidence suggests that FARC co-opted the civil police, restricted individuals' freedom of movement, and patrolled roads and rivers to maintain territorial control (CNMH, 2014).

Yet, security provisions for territorial control within the DMZ can't fully explain why FARC decided to adopt the functions of an interventionist state (e.g., infrastructure, a justice system, rules of conduct) rather than resembling a minimalist one. Therefore, I provide three complementary reasons that explain this decision in the context of *El Caguan*.

First, an interventionist strategy facilitated territorial control. For instance, FARC's military control over the DMZ resulted from a voluntary retreat from the public force; this increased the likelihood of a government military offensive, which was especially threatening as most high-ranking officials were permanently living in the DMZ (Espinosa and Ruiz, 2001). Thus, by intervening in most aspects of social order, FARC could directly monitor most activities inside the DMZ and fortify their control over the area.

Second, it allowed FARC to further modify social, political, and economic institutions in a territory where they had been present historically. As noted in Section 2, the DMZ was located where FARC had been present since the late 60s. Thus, to some extent, they recognized this territory as their own and expected to continue making a presence on it if the peace talks failed (CNMH, 2014). Consequently, the DMZ provided the opportunity to shape life in this territory without resistance from the central government. Moreover, by becoming a reliable source of social order in the region during the DMZ, they would secure the public's support in the future.

Third, the DMZ was an experimental setting to introduce various forms of rebel governance that FARC had used for decades in the territories under their control. As noted by Rangel (1999), FARC had been imposing local social order across Colombia since the 80s. Nonetheless, they did so in various ways across military fronts (CNMH, 2014). Thus, the DMZ became a suitable setting to share learned lessons on rebel governance strategies across commanders (Espinosa, 2016). In fact, in 2000 -a year after the DMZ started- FARC produced two formal documents -FARC's Law 002 and 003- which included guidelines on taxation and administrative corruption (CNMH, 2014). Accordingly, after the DMZ, FARC fronts started using *Community Handbooks* to handle civilian affairs. Thus, these elements suggest that FARC leveraged the DMZ to formalize and unify rebel governance practices across fronts.

All together, FARC operating under a long time horizon and adopting an interventionist state could explain my findings to some extent. First, the construction of communal water tanks, documented in Section 2, could explain the positive effects on access to sewerage and aqueduct systems. Second, the construction of roads across the DMZ municipalities reasonably explains why the DMZ led to higher revenues per hectare in agricultural production. For instance, El Tiempo (2003) suggests that FARC build nearly 140 km roads within the DMZ, significantly improving transport times across local rural markets. Finally, (CNMH, 2017b) also documents that FARC also promoted the construction of schools, which could explain the positive effects on years of education.

I use data on communities' perceptions towards armed conflict from the ELCA 2010 to provide suggestive evidence on the relationship between civilian populations exposed to the DMZ and FARC.[10] I compare attitudes towards the armed conflict in Vistahermosa with available communities in the same sub-region (i.e., Eastern Region). Tables B1-B4 present the results of this analysis. Due to the small number of observations and exposed communities, I use randomization inference to estimate statistical significance from my comparisons. While Table B1 suggests that communities in Vistahermosa have historically been more exposed to armed actors' presence, Table B2 shows that this presence is more likely to be monopolized by just one actor, especially at the end of the DMZ. These results are consistent with ethnographic on the monopolistic control of FARC within the DMZ.

Nonetheless, column (4) in Table B1 shows that the higher presence of armed actors doesn't translate to higher perceptions of insecurity. This result might indicate that communities get used to the company of armed actors and don't perceive them as drivers of insecurity, especially in the context of monopolistic presence. Furthermore, column (3) in

[10]ELCA surveyed four communities from Vistahermosa, a municipality exposed to the DMZ.

Table B1 shows that communities in Vistahermosa have a higher probability of submitting to the will of armed groups, implying that armed actors do permeate social order. Finally, results in Table B4 do not show differential victimization patterns related to violent attacks, forced displacement, or taxation.

5.2 Violence

Another potential explanation mechanism that could explain my results is that the DMZ led to a substantial violence reduction. Figure 10 shows an appreciable reduction of armed conflict events between 1999 and 2000 within the DMZ municipalities. This conflict de-escalation is likely to result from the DMZ, as it entailed less competition over territorial control (Arjona et al., 2015). Moreover, anecdotal evidence discussed in Section 2 suggests FARC could control the DMZ without major adversaries; thus, the lack of armed competition made violence unnecessary.

To empirically assess whether the DMZ led to less violence related to conflict, in Table 9, I estimate equation (1) on the likelihood of being exposed to forced displacement, land dispossession, and land abandonment. Column (1) shows that the DMZ decreases the probability of land displacement by 10 p.p., representing a reduction of nearly 60% relative to the mean at the 99% confidence level. Accordingly, columns (2) and (3) show that the DMZ led to a decrease of 4 p.p. on the likelihood of being exposed to forced land dispossession and 3 p.p on reporting land abandonment. These estimates are highly precise and consistent with ethnographic evidence on violence reduction during *El Caguan*. Moreover, Figure 11 plots the year of victimization of forced displacement and land dispossession across the DMZ and neighboring municipalities. Note that DMZ municipalities' victimization rates are consistently lower for both variables. I find this evidence convincing that the DMZ led to a reduction in violence.

Less violence could explain the positive effect on the years of schooling, and it would be consistent with empirical evidence on the positive impact of violence decrease on education (Prem et al., 2021). If this is the case, one would expect that cohorts exposed to the DMZ during their schooling age would be the ones driving the effect. In Figure 12, I empirically test this hypothesis by separately estimating the RDD coefficient on three different subsamples: age cohorts that had their schooling age before the DMZ started, age cohorts that had their schooling age during the DMZ, and age cohorts that had their schooling age after the DMZ ended. Overall, results are consistent with this hypothesis and suggest that only exposed cohorts drive the effect. Moreover, null effects on cohorts with schooling age after the DMZ suggest positive results were not persistent after the DMZ ended.

Furthermore, results on agricultural production could also be explained by lower levels of violence. Both theoretical and empirical evidence suggests that civil conflict has a strong negative effect on agricultural production, especially as it leads to lower levels of investment (Arias et al., 2014). As noted before, I argue that the DMZ reduced conflict victimization relative to neighboring territories. Then, I would expect farmers outside the DMZ to be more likely to have experienced active civil conflict. Thus, these farmers would prefer activities with short-term yields and lower profitability from activities that require high investments, as pointed out by Arias et al. (2019) and de Roux and Martínez (2021). Therefore, the positive effects on agricultural yield and revenue suggest that in the absence of the DMZ, farmers inside would have been exposed to high levels of violence, thus, experiencing a lower-income trajectory. Moreover, this might also explain why farmers inside the DMZ are less likely to specialize in transitory crops and more likely to specialize in perennial crops.

5.3 Property Rights, Agricultural Practices and Collective Action

An alternative explanation to why the DMZ led to higher agricultural yields might be that FARC intervened in farmers' agricultural practices. For now, I have argued that better infrastructure (i.e., roads, bridges, river ports) and less violence could explain these positive effects. Nonetheless, FARC also had a solid agrarian agenda that they pushed forward during the DMZ. For instance, FARC's Law 001 (called "*The Revolutionary Agrarian Reform*") banned farmers from having estates of over 1,500 hectares, recognized property rights to small peasants under a lease, and promoted *de facto* occupations of private property and local agrarian collective action under the figure of local *Committees for Agrarian Reform* (CNMH, 2014).

Results on crop specialization are consistent with FARC's agrarian agenda. For example, FARC's agricultural practices favor local small farmers over corporate production. If so, this could explain the adverse effects on cash crops, which require high levels of investment, large estates, and vertical integration within the production chain. To further understand the role of FARC's agrarian policy on development outcomes, I estimate equation (1) on intermediate outcomes related to property rights, agricultural practices, capital investment, and partnership structure. In Table 10, while column (1) shows a small (relative to the sample mean) and imprecise effect on the probability of the farm being privately owned, column (2) suggests that the DMZ decreases the likelihood of having land of collective property.[11] In columns (3) to (5), I find no evidence that producers inside the DMZ were more likely to use irrigation systems, fertilizers, and professional pest control techniques. Next, in

[11] Note that this variable has a very low frequency, with a sample average of 0.01. Thus, one must interpret this result with caution, as the RD estimate might be sensitive to rare events near the boundary.

columns (6) and (7), I study whether exposed producers are more likely to have agricultural machinery and buildings. Results suggest a somewhat noisy increase of 7 percentage points in the likelihood of having machinery (e.g., harvester, power plant) and no effect on having buildings for agricultural use (e.g., greenhouse, barn). Finally, columns (8) to (10) show producers' partnership structure estimates. Whereas column (8) suggests that the DMZ decreased the likelihood of joining a formal producers association by 6 percentage points, results in column (10) show a statistically significant increase of 5 percentage points on using collective work.[12]

How should one think about my main results in light of these findings? First, notice that the negative effect on collective property suggests that institutional mechanisms might persist over time. At first, this result might seem counter-intuitively, as FARC follows a Marxism–Leninism doctrine. Yet, their rural agenda moved towards privately owned property for small farmers. Second, the null results on agricultural practices reflect that FARC's agrarian policy didn't include elements that would improve agricultural operations. Third, positive effects on capital investment could respond to indirect incentives. Since FARC was primarily concerned with large unproductive estates, they promoted capital investments to enhance agricultural production. For instance, the *Revolutionary Agrarian Reform* stated that estates with more than 1,500 hectares would not be expropriated if they would "introduce modern agricultural technologies" (CNMH, 2014). Finally, partnership structure results provide evidence of informal institutions' persistent effect. These results suggest that the DMZ promoted informal collective action between peasants while counteracting formal vertical integration in agricultural production.

5.4 Alternative Explanation: Differential Public Investment

Differential public investment after the DMZ ended in early 2002 could be a potential alternative explanation to the positive results on public services, years of education, and agricultural revenues. However, this would imply that the central and municipal governments significantly increased expenditure in the DMZ municipalities. Therefore, I use fiscal outcomes at the municipal-year level to test for a disproportional increase of government investment in the former DMZ's municipalities. To do so, I follow Abadie (2021) and estimate a synthetic control analysis that provides an alternative counterfactual for the evolution of fiscal investment across the DMZ municipalities. I study transfers from the national government to the municipalities and municipal investment (i.e., capital expenditure).

Panel (a) in Figure C1 shows the total transfers from the national government to the

[12] Collective work is defined as an informal labor relation where neighboring peasants collaborate during agricultural production.

municipalities. The solid line corresponds to the actual total transfer per 10,000 inhabitants, while the dashed line shows the prediction from the synthetic control. I observe that the synthetic control follows the realized time series up to 2000 and exceeds it afterward. While the synthetic control keeps growing, the actual series drops and stagnates. Placebo inference in panel (b) suggests this difference is not statistically significant (Abadie, 2021). Figure C5 shows a similar pattern for municipal investment, meaning there is no significant difference between the synthetic control and the actual value observed. Moreover, figures C2-C4 show similar patterns on transfers from the central government for educational expenses, health expenses and free disposable revenues for the municipal government. I find this compelling evidence that a differential investment does not explain my results after the DMZ.

Yet, fiscal data on revenues and expenses show the funds flow toward specific categories. However, they might be misleading as they do not show how the municipal government specifically spent money. Alternatively, I study educational inputs such as teachers and school infrastructure. While Figure C6 shows synthetic control results for pupil-teacher ratio, Figure C7 shows similar results for the number of schools per 1,000 students. Altogether these results do not suggest that the DMZ municipalities provided more educational inputs than nearby non-DMZ municipalities.

6 Robustness

In this section, I provide an extensive battery of additional robustness tests in Appendix D. First, I present robustness to alternative RDD bandwidths, polynomial functions, and kernel weightings. Second, I reproduce my results using a donut regression discontinuity design for accounting for measurement error in the distance to the DMZ. Third, I estimate my results using alternative assumptions when computing standard errors. Fourth, I use a sample trimming exercise to account for possible selective migration within the DMZ boundary. Overall, results discussed in Section 4 are robust to these robustness checks.

Alternative RDD Specifications

It could be the case that my main results only exist for a particular regression discontinuity specification. To examine the robustness of the results to alternative RDD specification choices, in Appendix D.1, I present the main results using additional bandwidths (i.e., 50%, 75%, 125%, and 150% of the optimal bandwidth), alternative RDD polynomials (i.e., quadratic and cubic) and varying the kernel choice for the estimation weighting (i.e., epanechnikov and uniform). Although some results (e.g., years of education, sewerage, and cash crops specialization) are sensitive to bandwidth selection as they lack the proper sample power, the point estimate is generally relatively constant across specifications. Overall, the results are highly robust to the degree of the RDD polynomial and the kernel choice.

Donut RDD

Given that I only observed the geographic coordinate within each estate where the interview took place and not the exact extent of the property, it might be the case that the farms very close to the border cross the DMZ's boundary. To alleviate further concerns over this possible measurement error in the independent variable, I use a Donut Regression Discontinuity Design. These modified RDD regressions involve dropping all data points within a specific distance to the threshold.[13] By construction, Donut RDD induces bias into my estimates because it compares less similar observations across the distance to the DMZ. Nonetheless, since it drops observations that are more likely to cross the DMZ's boundary, it helps me determine to what extent measurement error affects my results.

In Appendix D.2, I present the main results using Donut RDD. Overall, point estimates become more prominent as the Donut RDD hole increases. For instance, Column (6) in Table D5 suggests that the DMZ increased by 1.4 years of education relative to an estimated increase of 0.4 years using the standard RDD approach. Altogether, Donut RDD results indicate that the main results in Section 4 are conservative due to classical measurement error on the independent variable, which biases my result towards zero.

Alternative Variance-covariance Matrix Assumptions

Considering that anecdotal evidence suggests that the rural district (*vereda*) groups similar individuals and that most of the day-to-day life in rural Colombia takes place at this level, my baseline specification uses Nearest Neighbor clustered (NN-cluster) standard errors at the rural district level. Yet, I can't be sure if the error term correlates at this exact level. Therefore, in Appendix D.3, I present the main results using alternative structures for the error term.[14] In Tables D9 to D12, column (1) presents baseline results, column (2) uses NN-clustered standard errors at the municipality level, column (3) uses clustered standard errors at the rural district level, column (4) uses clustered standard errors at the municipality level, column (5) uses clustered standard errors within 250 meters bins of the distance to the boundary, and column (6) uses clustered standard errors within 500 meters bins of the distance to the boundary. Both significant levels and point estimates are robust to alternative variance-covariance matrix assumptions.

[13]See Dahl et al. (2014); Canaan and Mouganie (2018); Zimmerman (2014); Melnikov et al. (2020) for similar applications of Donut RDDs.

[14]When using an alternative error term structure, I allow the bandwidth to vary across regressions.

Trimming for Selective Migration

As noted in Section 3.3, one possible alternative explanation for my results is that the DMZ led to selective migration across the boundary. Under this setting, the most capable individuals left neighboring places outside the DMZ by migrating to the former DMZ area. Thus, the area inside the DMZ appears more developed. In Appendix D.4, I follow Lowes and Montero (2020) in conducting a trimming exercise to empirically assess the magnitude of the selective migration to explain my results fully. I first estimate a simple factor model to produce a wellness score for human capital, dwelling characteristics, and access to public services.[15] Based on this score, I then drop the $x\%$ of the most well-off individuals and reproduce my main results. By trimming the $x\%$ of the sample, I tried to determine what percentage of the most well-off individuals who reside inside the DMZ I would need to omit so that I don't observe statistically significant differences between former DMZ non-DMZ areas. I reproduce this process for yield, revenue, and crop specialization outcomes, but I use each continuous variable distribution instead of a factor model score.

Tables D13 to D16 show the main results if I trim the top 2.5, 5, 10, 15, and 20% of the most well-off individuals and farms. Mostly, my results suggest that after trimming for the top 5% of the sample inside the DMZ, the results remain of similar magnitude and statistical significance. However, for a higher trimming rate of 10%, coefficients become non-statistical significance while having similar magnitude; I hypothesize this reflects a loss of power induced by the smaller sample. Furthermore, the coefficient's magnitude and statistical significance become increasingly noisy when trimming at least 15% of the sample inside the DMZ. Overall, these results suggest that at least 10% of the sample inside the DMZ had to reflect selective migration to explain the differences I observed fully. As a point of reference, using Colombia's 2005 General Census, I estimate that between 2000 and 2005, the likelihood of migrating from a DMZ neighbor municipality to the DMZ was 14%. Thus, selective migration had to account for 2/3 of this migration pattern for my results to be only explained by selective sorting across the boundary. Therefore, these estimates demonstrate that my results remain consistent even under a strong assumption of high levels of selective migration.

Spatial Placebo Analysis

I now perform a placebo analysis using arbitrary alternative cutoffs for the RDD estimates. If the impacts reflect the effects of the DMZ on developmental outcomes, I wouldn't expect to find a discontinuous jump in the outcomes if I arbitrarily move the cutoff to a point inside or

[15] I use a factor model to create a continuous measure of wellness because all of these variables are dummies.

outside the DMZ. I present the results of this placebo exercise in section D.5. Overall, some results are sensitive to alternative placebo cutoffs, while others are robust. For instance, Panel (b) in Figure D1 shows that I find null results for years of education in 3 out of 4 alternative cutoffs, while I find significant impacts in the actual cutoff. Nevertheless, Panel (a) in Figure D3 shows that 2 out of 4 placeboes yield statistically significant results when studying total revenues, which raises concerns about the validity of the original estimates. Further analysis is required to understand the sensitivity of some outcomes to this placebo test.

7 Conclusion

This paper examines the persistent effect of rebel governance in rural Colombia. By exploiting geographic discontinuities on the exposure to rebel rule, I empirically assess the impacts of rebels' social order on local economic development. My results provide evidence that rebel governance didn't negatively affect development in any of the dimensions I studied. Instead, I find modest positive effects on education, access to public services, and agricultural production.

I draw from historical and ethnographic evidence on the DMZ to explore potential mechanisms. First, I find that FARC took an interventionist approach to social order by providing public goods, security, and justice during the DMZ. Thus, this approach might explain the positive effect on access to public services and agricultural yield. Second, I show compelling evidence that lower levels of violence during rebel governance mediate my education results. Finally, I don't find persuasive evidence that the rebels' agrarian policy had a persistent effect over time. Overall, most of the positive effects I see seem to be explained by cohorts directly exposed to the DMZ or initial investments in infrastructure. Thus, it doesn't appear to be a persistent effect of rebel rule over time, as I don't have evidence of any significant impact on historical institutions.

Although my results are relevant to understand better the persistent effects of civil conflict and, more specifically, rebel-based social order, my results reflect on a particular form of rebel governance and might not generalize to another context. FARC governance over El Caguan resulted from the specific circumstances that the peace negotiations allowed; thus, one must be careful because of the limited external validity.

Finally, my result on the positive gains from rebel governance not translating into better living standards suggests that these households face structural constraints that may restrict local development. Thus, this paper draws attention to a relevant aspect of development policy, especially in a post-conflict scenario. Nevertheless, further research is required to understand these restrictions better and address them from a public policy perspective.

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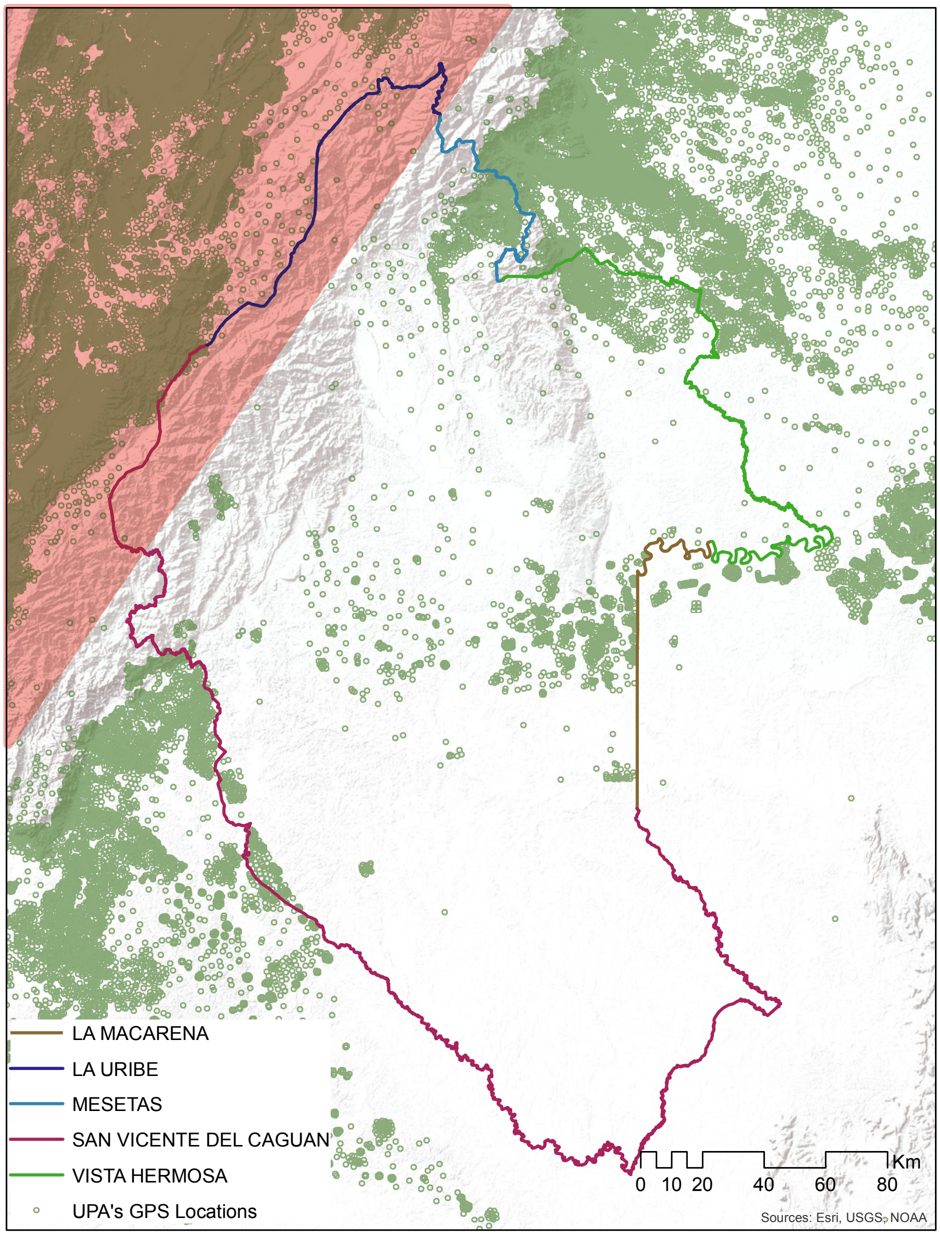
Figures

Figure 1: *El Caguan*'s DMZ in Colombia

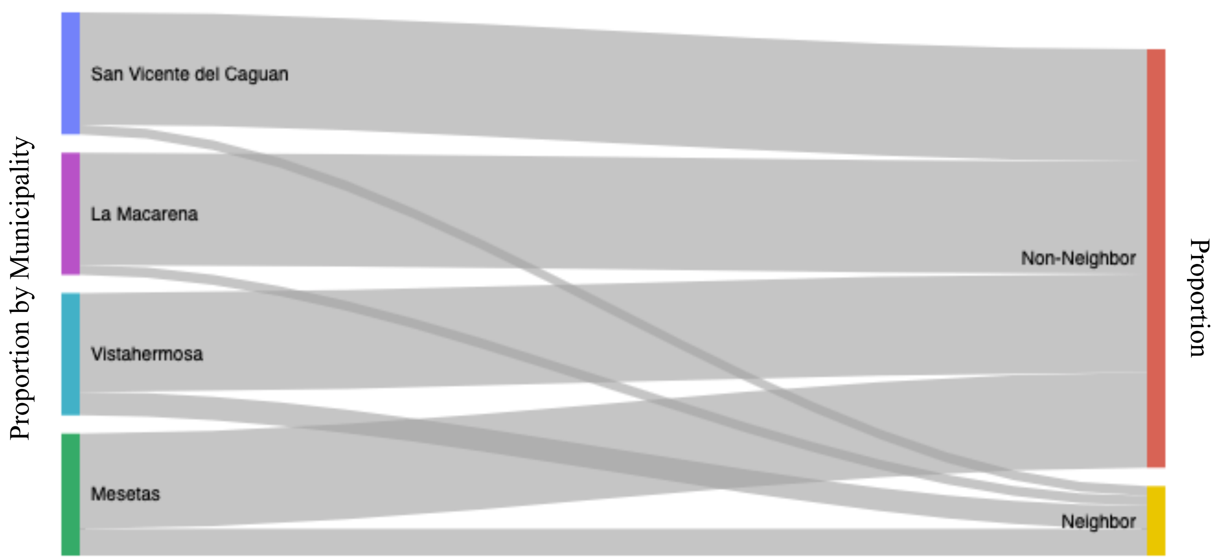
Notes: This figure plots the DMZ within Colombia's territory. The DMZ was located at Colombia's southeast region, between the Andes mountains and the Amazon.

Figure 2: Boundary Segments and farms Locations



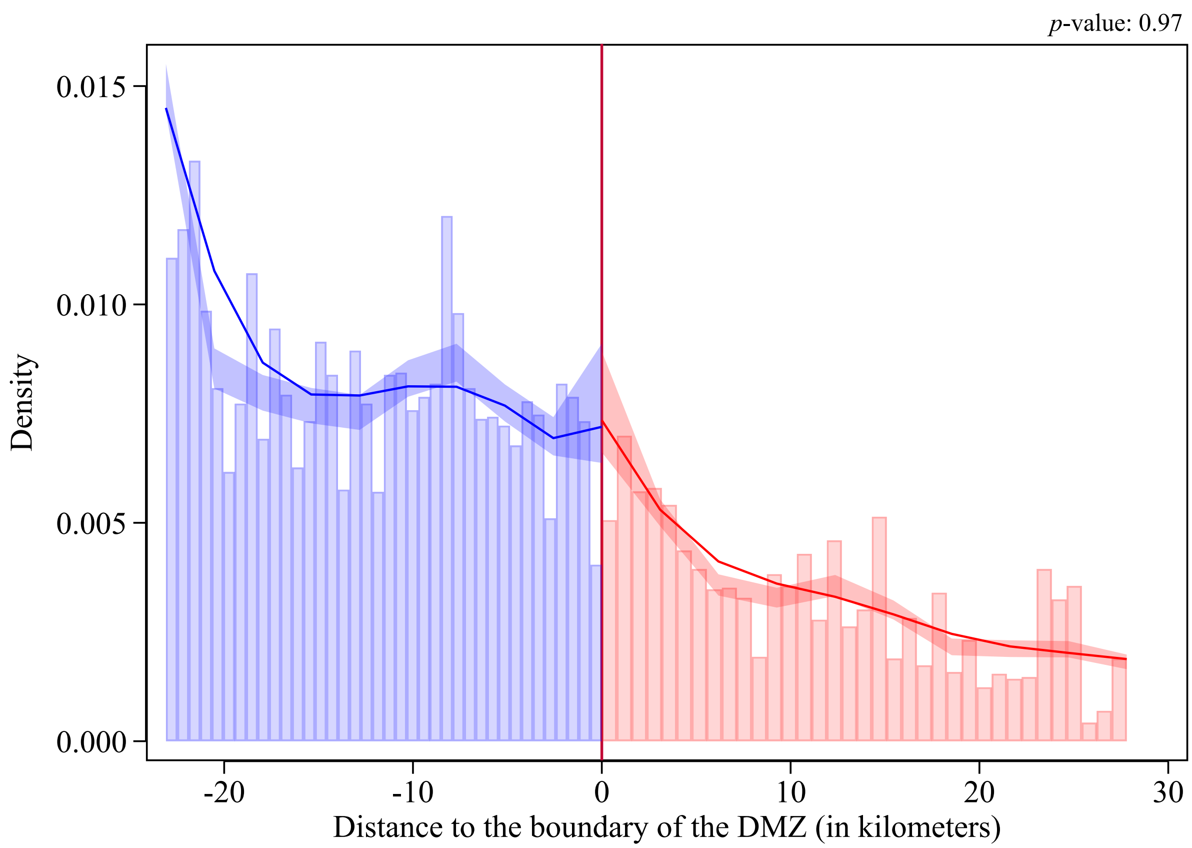
Notes: This figures plot farms located near *El Caguan*'s border. The red area corresponds to the areas located in the Andean highlands, I don't consider neighboring in the highlands, as they are most likely not comparable with those in the plains.

Figure 3: Migration from DMZ Municipalities (left) to Other Municipalities (right)



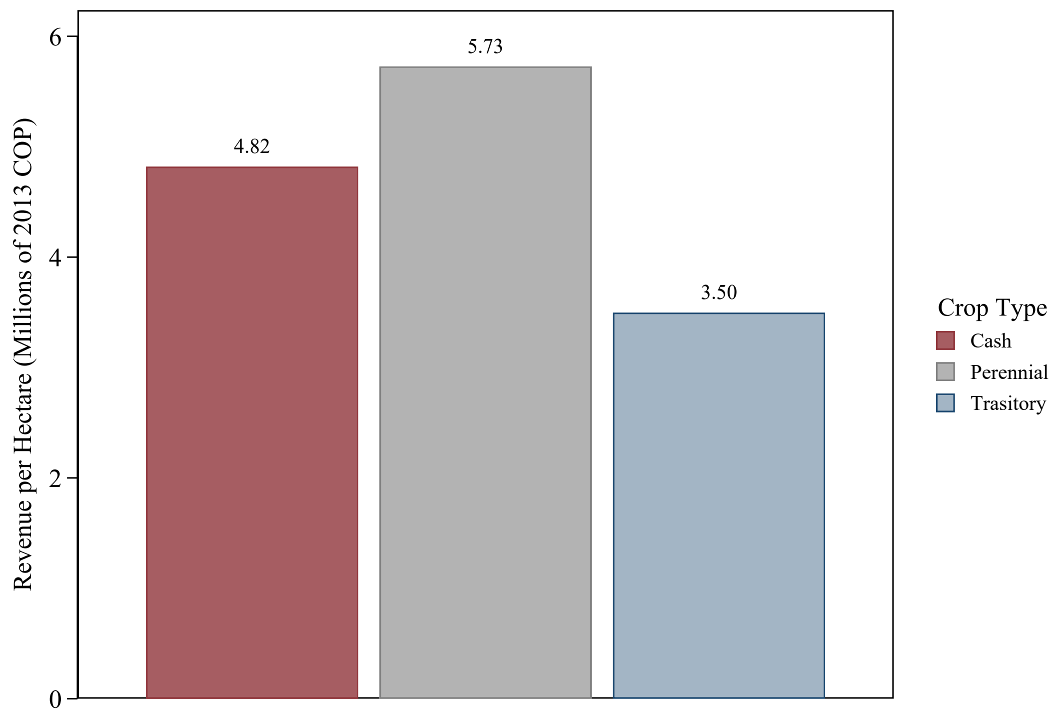
Notes: This figures plots the migration flow from DMZ municipalities (left) to neighboring municipalities (right) as a proportion of each DMZ municipality initial population. It is based on the 2005 General Census and studies migration flow between 2000 and 2005.

Figure 4: Households Density Test



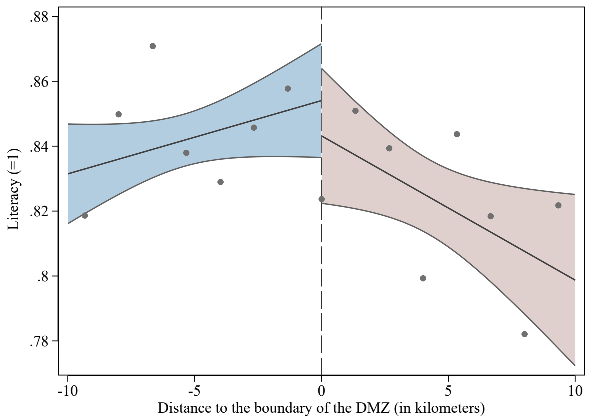
Notes: The figure shows the distribution of distance to the DMZ's boundary in kilometers. The red vertical line denotes the DMZ's border. I formally test for a discontinuity at the threshold using the Local Polynomial Density Estimators proposed by Cattaneo et al. (2020b).

Figure 5: Average Agricultural Yield by Crop Type

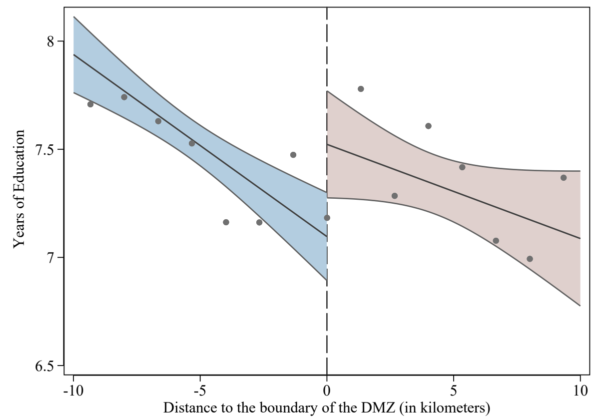


Notes: The figure shows the average revenue per hectare in the CNA. As noted in the text, perennial crops have higher yields that transitory crops.

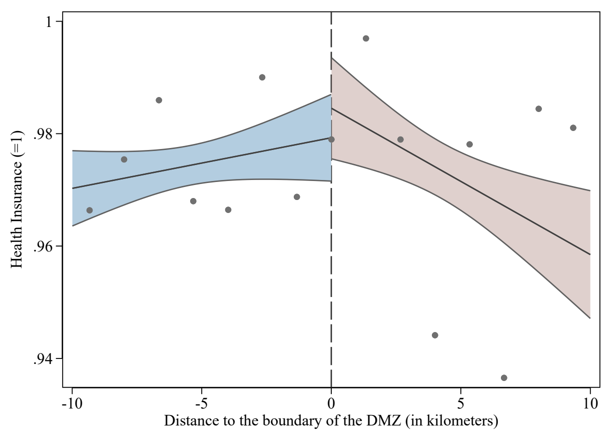
Figure 6: Human Capital: RD Plots



(a) Literacy (=1)



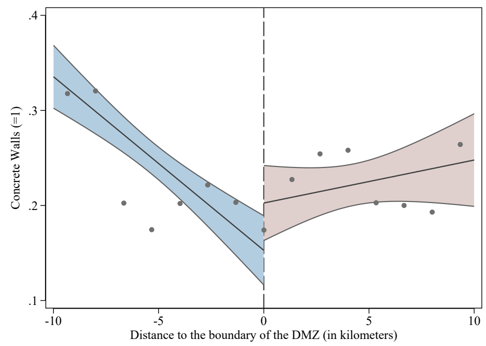
(b) Years of Education



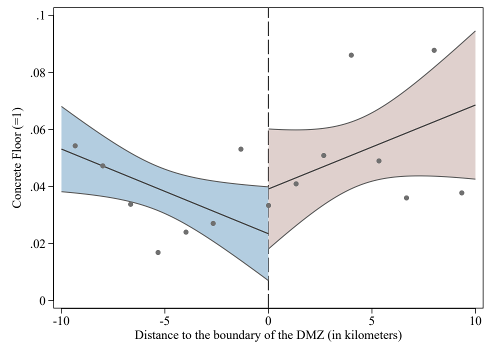
(c) Health Insurance (1)

Notes: This figures plots the discontinuity at the boundary. The dependent variable in panel (a) is an indicator variable that takes the value of one for individuals that know how to read and write, in panel (b) it is the total years of formal education, and panel (c) it is an indicator that takes the value of one for individuals with health insurance. The points represents the average value of the outcome variable in bins of width of 1.4 *km*. The regressions are estimated using local linear polynomials in the outcome of interest estimated separately on each side of the border within a fixed bandwidth of 10 km. Sample is restricted to border segments of San Vicente, La Macarena, Vistahermosa, and Mesetas. I present the corresponding estimate of τ in equation 1 in Table 5.

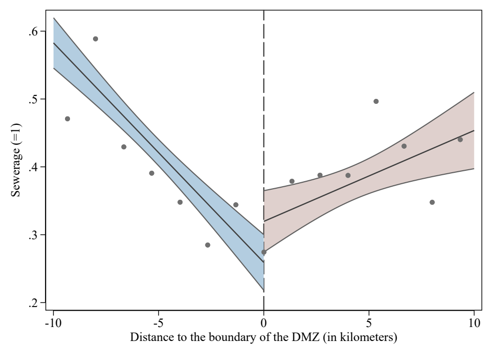
Figure 7: Dwelling Characteristics: RD Plots



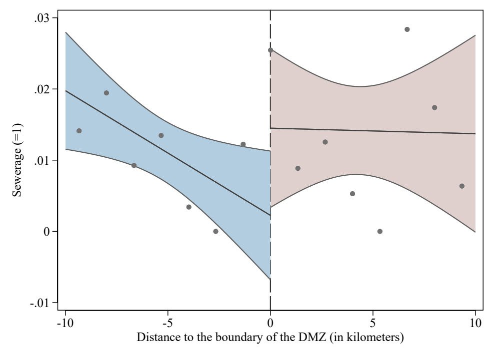
(a) Concrete Walls (=1)



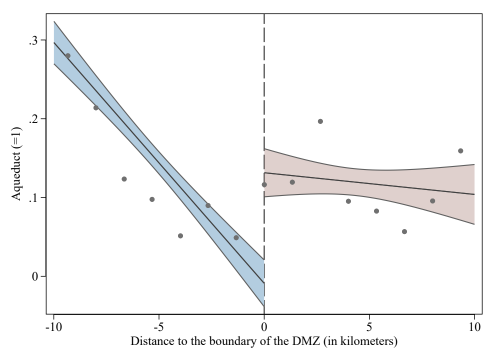
(b) Concrete Floor (=1)



(c) Electricity (=1)



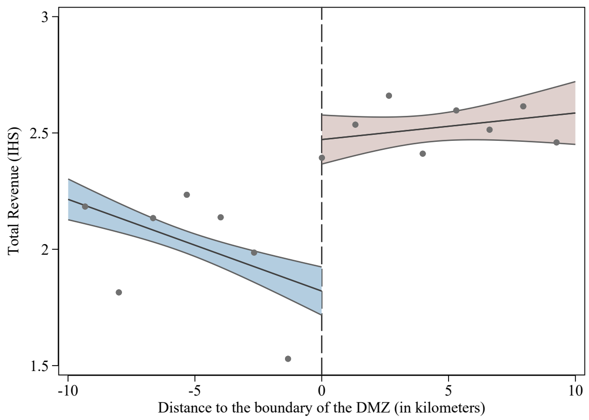
(d) Sewerage (=1)



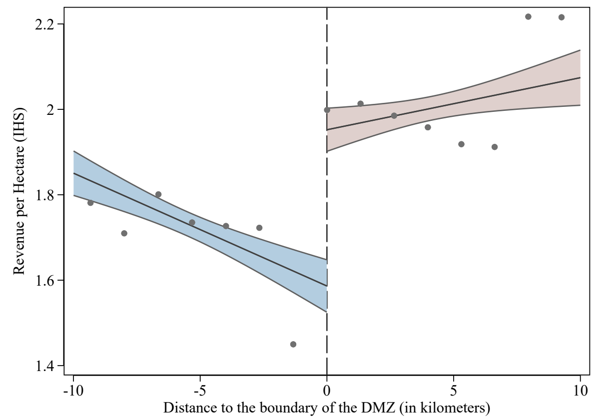
(e) Aqueduct (=1)

Notes: This figures plots the discontinuity at the boundary. The dependent variable in panel (a) is an indicator that equals one if the dwelling's walls materials are in concrete or better, while in panel (b) it is an indicator that equals one if the dwelling's floor materials are in concrete or better. Dependent variable in panel (c) is an indicator that equals one if the dwelling has access to electricity, in panel (d) it is an indicator that equals one if the dwelling has access to sewerage system, and in panel (e) it is an indicator that equals one if the dwelling has access to aqueduct system. The points represents the average value of the outcome variable in bins of width of 1.4 km. The regressions are estimated using local linear polynomials in the outcome of interest estimated separately on each side of the border within a fixed bandwidth of 10 km. Sample is restricted to border segments of San Vicente, La Macarena, Vistahermosa, and Mesetas. I present the corresponding estimate of τ in equation 1 in Table 6.

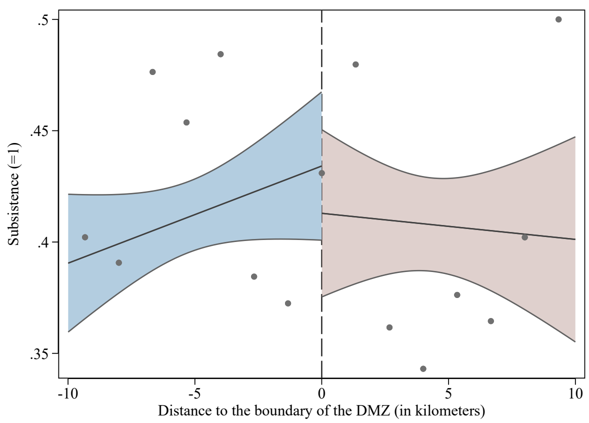
Figure 8: Yield & Agricultural Production: RD Plots



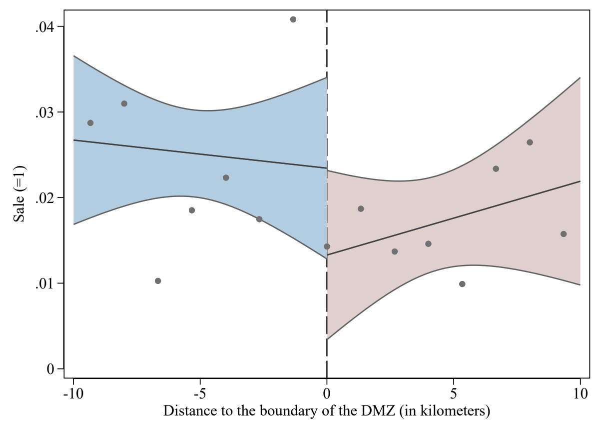
(a) Total Revenue (IHS)



(b) Revenue per Hectare (IHS)



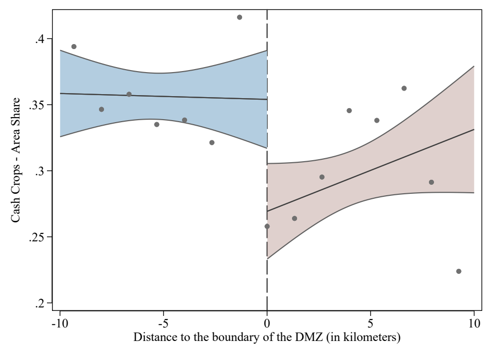
(c) Subsistence (=1)



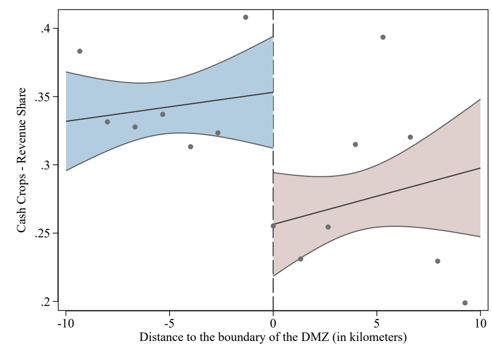
(d) Sale (=1)

Notes: This figures plots the discontinuity at the boundary. The dependent variable in panel (a) is the inverse hyperbolic sine of the total revenue in Colombian 2013 millions of COP, while in panel (b) it is the inverse hyperbolic sine of the revenue per hectare in Colombian 2013 millions of COP. Dependent variable in (c) is an indicator that equals one if the farms agricultural production is used only for self-consumption, and in panel (d) it is an indicator that equals one if the farms agricultural production is used only for market sale. The points represents the average value of the outcome variable in bins of width of 1.4 km. The regressions are estimated using local linear polynomials in the outcome of interest estimated separately on each side of the border within a fixed bandwidth of 10 km. Sample is restricted to border segments of San Vicente, La Macarena, Vistahermosa, and Mesetas.I present the corresponding estimate of τ in equation 1 in Table 7.

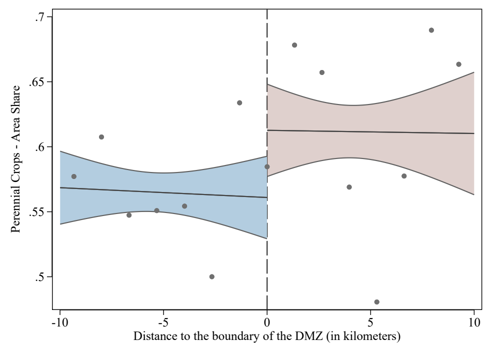
Figure 9: Crop Specialization: RD Plots



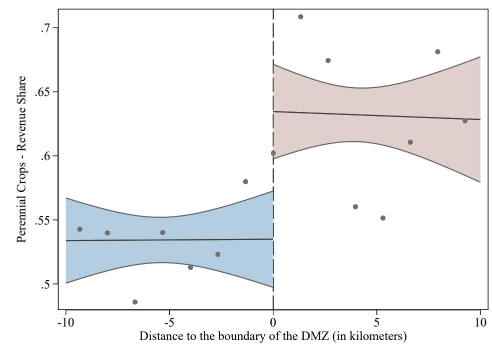
(a) Cash Crops - Area Share



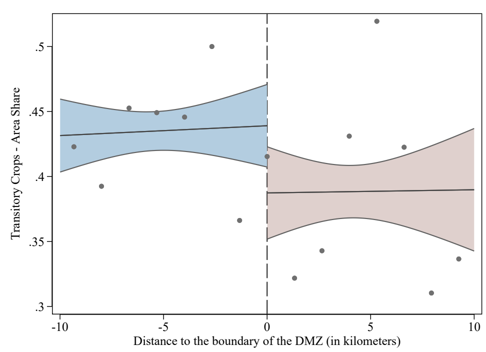
(b) Cash Crops - Revenue Share



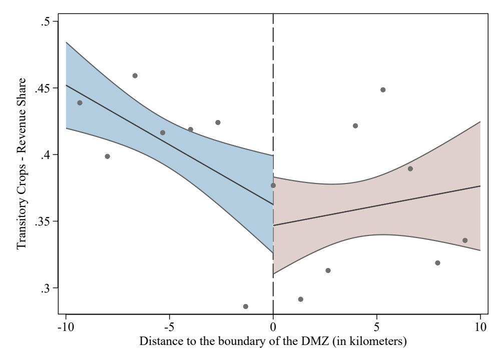
(c) Perennial Crops - Area Share



(d) Perennial Crops - Revenue Share



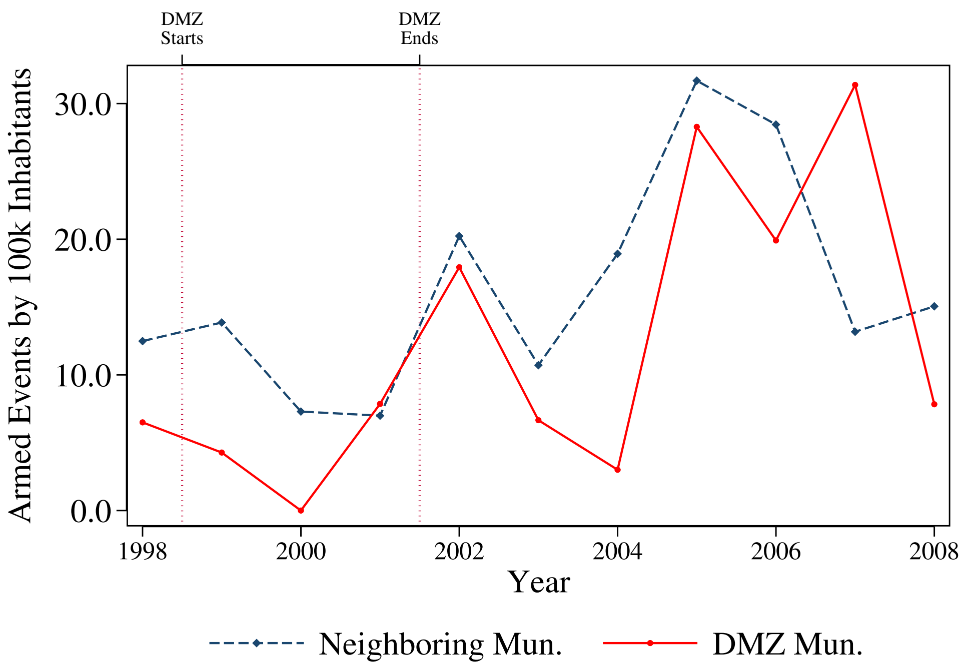
(e) Transitory Crops - Area Share



(f) Transitory Crops - Revenue Share

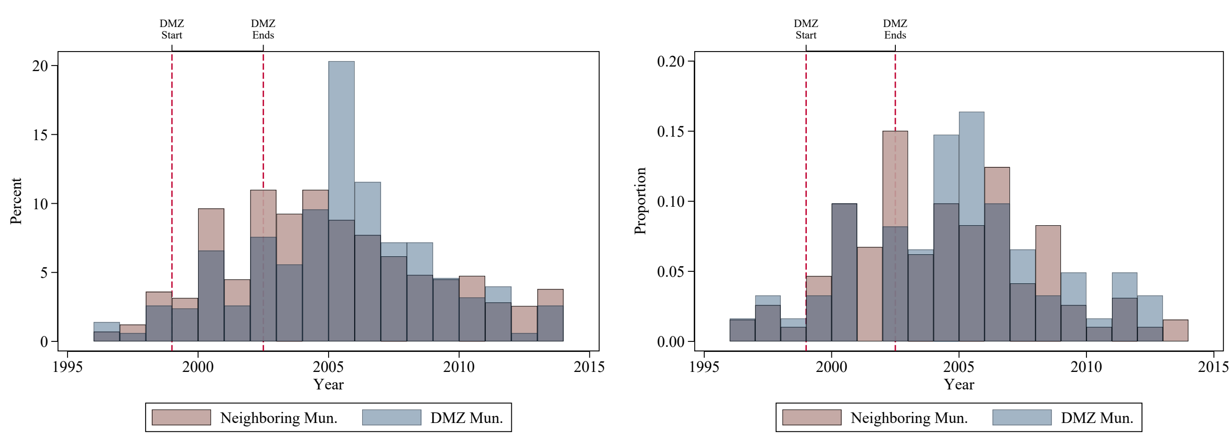
Notes: This figures plots the discontinuity at the boundary. The dependent variable in panel (a) is the share of area with cash crops, while in panel (b) it is the share of revenue from cash crops. The dependent variable in (c) is the share of area with perennial crops, while in panel (d) it is the share of revenue from perennial crops.The dependent variable in panel (e) is the share of area with transitory crops, while in columns panel (f) it is the share of revenue from transitory crops. The points represents the average value of the outcome variable in bins of width of 1.4 km. The regressions are estimated using local linear polynomials in the outcome of interest estimated separately on each side of the border within a fixed bandwidth of 10 km. Sample is restricted to border segments of San Vicente, La Macarena, Vistahermosa, and Mesetas. I present the corresponding estimate of τ in equation 1 in Table 8.

Figure 10: Mechanism - Total Armed Events Over Time



Notes: This figure plots the average armed events by 100 thousand inhabitants over time. To compute the averages I only consider armed actors different from FARC.

Figure 11: Mechanism - Land-Related Violence Victimization Years

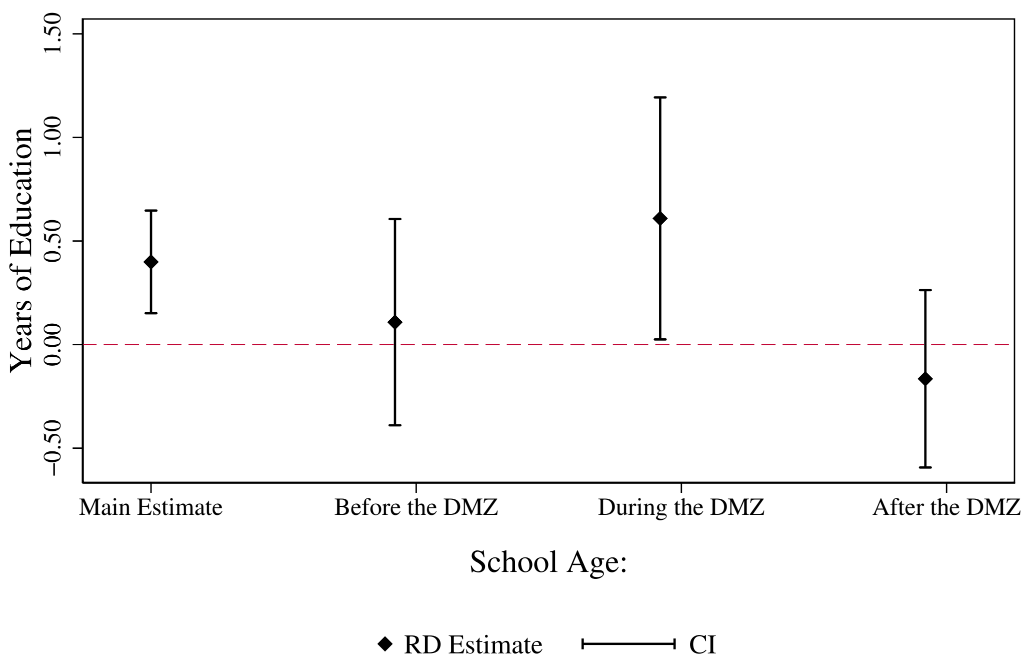


(a) Year of Forced Displacement

(b) Year of Land Dispossession

Notes: Each figure plots the year of victimization of the violent event by municipality's exposure to the DMZ.

Figure 12: Mechanism - Age Cohorts



Notes: This figure plots the RDD estimate for each age-specific cohorts. Estimates are obtain by running the RDD in equation 1 in a sub-sample for each cohort separately. Cohorts grouped in *Before the DMZ* correspond to individuals 21 years or older when the DMZ started in 1999. Cohorts grouped in *During the DMZ* correspond to individuals that were at most 20 years old in 1999 and at list 2 year old in 2002, when the DMZ ended. Cohorts grouped in *Before the DMZ* correspond to individuals 1 years or younger when the DMZ ended in 2002.

Tables

Table 1: Summary Statistics - Rural Census 2014

	Rural Census					Sample: 100 km Buffer			Inside *El Caguan*		
	Obs (1)	Mean (2)	SD (3)	Min (4)	Max (5)	Obs (6)	Mean (7)	SD (8)	Obs (9)	Mean (10)	SD (11)
Panel A: Individual-level Variables											
Men (=1)	5,126,734	0.517	0.500	0	1	133,716	0.542	0.498	13,668	0.559	0.496
Age in years	5,126,734	32.398	21.825	0	115	133,716	31.930	20.583	13,668	30.593	20.655
Natives (=1)	5,126,734	0.164	0.370	0	1	133,716	0.053	0.224	13,668	0.113	0.317
No Ethnicity (=1)	5,126,734	0.759	0.428	0	1	133,716	0.935	0.247	13,668	0.850	0.357
Knows how to read (=1)	5,126,734	0.798	0.401	0	1	133,716	0.841	0.365	13,668	0.797	0.402
Years of Education	4,649,993	7.624	4.637	0	23	121,261	8.225	4.447	12,162	7.044	4.088
Has health insurance (=1)	5,019,313	0.958	0.200	0	1	130,362	0.968	0.176	13,015	0.959	0.199
Panel B: Household-level Variables											
Self-identified as poor (=1)	1,457,519	0.679	0.467	0	1	42,415	0.598	0.490	4,409	0.657	0.475
Better now than 5 years ago (=1)	1,454,528	0.294	0.456	0	1	42,265	0.365	0.481	4,354	0.416	0.493
Internal displacement (=1)	1,543,134	0.132	0.338	0	1	43,345	0.171	0.376	4,550	0.128	0.334
Land dispossession (=1)	1,543,134	0.012	0.107	0	1	43,345	0.023	0.149	4,550	0.017	0.131
Land abandonment (=1)	1,543,134	0.014	0.117	0	1	43,345	0.026	0.159	4,550	0.021	0.143
Panel C: Dwelling-level Variables											
Concrete Walls (=1)	1,476,962	0.491	0.500	0	1	41,964	0.457	0.498	4,392	0.159	0.366
Concrete Floor (=1)	1,475,146	0.163	0.369	0	1	41,898	0.192	0.394	4,382	0.032	0.176
Electricity (=1)	1,488,807	0.833	0.373	0	1	42,578	0.590	0.492	4,519	0.336	0.472
Sewerage system (=1)	1,478,354	0.061	0.239	0	1	42,177	0.070	0.255	4,481	0.035	0.183
Aqueduct system (=1)	1,478,354	0.430	0.495	0	1	42,177	0.237	0.425	4,481	0.127	0.333
Panel D: UPA-level Variables											
Total Revenue (Millions of 2013 COP)	906,186	44.436	742.848	0	159,257	115,986	55.614	956.092	3,166	119.103	453.498
Perennial Crop (=1)	885,473	0.861	0.346	0	1	114,909	0.917	0.275	3,166	0.973	0.164
Transitory Crop (=1)	885,473	0.451	0.498	0	1	114,909	0.398	0.489	3,166	0.751	0.432
Cash Crops (=1)	906,186	0.743	0.437	0	1	115,986	0.818	0.386	3,166	0.642	0.480
Cattle per Hectare	1,340,788	0.018	0.421	0	306	163,412	0.014	0.156	5,308	0.001	0.016
Sells Crops (=1)	2,913,163	0.389	0.488	0	1	378,333	0.399	0.490	6,790	0.412	0.492
Sells Livestock (=1)	2,913,163	0.411	0.492	0	1	378,333	0.349	0.477	6,790	0.733	0.442

Notes: Columns (1) through (5) present basic summary statistics for the complete sample in Colombia's 2014 Rural Census, columns (6) through (8) present basic summary statistics for observations within a 100 km buffer around *El Caguan*'s border; and columns (9) through (11) present basic summary statistics for observations inside *El Caguan* . The number observations might differ within panels due to each question's response rate.

Table 2: Mean Differences with Neighboring Municipalities

	El Caguan		Neighbors		Difference	
	Mean	SD	Mean	SD	(1)-(3)	SE
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Individual-level Variables						
Knows how to read (=1)	0.79	0.41	0.83	0.38	-0.04	0.00***
Years of Education	6.91	4.08	7.55	3.98	-0.64	0.04***
Has health insurance (=1)	0.96	0.21	0.97	0.17	-0.02	0.00***
Obs.	11,744		38,369			
Panel B: Household-level Variables						
Self-identified as poor (=1)	0.68	0.47	0.62	0.49	0.07	0.01***
Better now than 5 years ago (=1)	0.40	0.49	0.36	0.48	0.04	0.01***
Internal displacement (=1)	0.14	0.34	0.14	0.34	0.00	0.01***
Land dispossession (=1)	0.02	0.13	0.02	0.13	0.00	0.00***
Land abandonment (=1)	0.02	0.15	0.02	0.13	0.00	0.00*
Obs.	4,157		12,621			
Panel C: Dwelling-level Variables						
Concrete Walls (=1)	0.17	0.37	0.21	0.41	-0.04	0.01***
Concrete Floor (=1)	0.03	0.18	0.05	0.22	-0.02	0.00***
Electricity (=1)	0.35	0.48	0.36	0.48	-0.01	0.01***
Sewerage system (=1)	0.04	0.19	0.04	0.20	-0.00	0.00***
Aqueduct system (=1)	0.14	0.35	0.14	0.35	-0.00	0.01***
Obs.	4,089		12,358			
Panel D: UPA-level Variables						
Total Revenue (Thousands of 2013 COP)	119.93	455.77	68.71	1,305.36	51.22	23.85***
Perennial Crop (=1)	0.97	0.16	0.94	0.24	0.04	0.00***
Transitory Crop (=1)	0.75	0.43	0.84	0.37	-0.08	0.01***
Cash Crops (=1)	0.64	0.48	0.61	0.49	0.04	0.01***
Sells Crops (=1)	0.41	0.49	0.47	0.50	-0.06	0.01
Sells Livestock (=1)	0.74	0.44	0.71	0.46	0.03	0.01
Obs.	6,708		16,452			
Observations						
Municipalities	5		10			
Rural Districts	337		553			

Notes: This tables show simple mean differences between exposed municipalities and neighboring municipalities. Sample is restricted to *El Caguan*'s DMZ and neighboring municipalities. I don't consider neighboring in the highlands, as they are most likely not comparable with those in the plains. * p < 0.10, ** p < 0.05, *** p < 0.01.

Table 3: Balance on Geographic and Pre-Demilitarization Characteristics

	Within 50 km			*Within 25 km*			*RD Estimates*	
	Inside	Outside	SE	Inside	Outside	SE	RD Coefficient	SE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Geographic Characteristics								
Elevation	450.80	376.12	33.40	494.43	411.20	47.89	109.82	134.71
Rainfall (Avg.)	203.28	218.09	1.78***	204.45	213.69	2.43***	-4.57	5.87
Rainfall (St. Dev.)	3.15	3.09	0.28	3.37	3.12	0.34	0.74	0.66
Land Suitability	0.22	0.16	0.02***	0.24	0.19	0.02**	0.03	0.06
Cropland (1992)	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.01
River (=1)	0.51	0.41	0.04**	0.48	0.40	0.05*	0.09	0.10
Panel B: Location Characteristics								
Distance: Bogota	288.69	327.71	4.09***	291.22	314.46	5.15***	-1.78	12.95
Distance: Department's Capital	149.42	147.92	4.16	151.33	148.65	5.40	3.36	13.56
Observations - Grid cells	319	445		202	232		429	

Notes: Columns (1), (2), (4), and (5) present the mean of the corresponding variable. Columns (3) and (6) present clustered standard errors for the difference in means clustered at the municipality level. Inside and Outside indicate whether a grid cell's centroid is inside or outside the former DMZ area, respectively. Columns (7) and (8) show estimates of τ in equation 1 and it's standard error, respectively. The unit of observation is at the $10km$ by $10km$ grid level. All regressions use a triangular kernel, local linear polynomial at each side of the boundary, include boundary segment fixed effects. The RDD MSE optimal bandwidths are determined using the procedure suggested by Cattaneo et al. (2020a). Sample is restricted to border segments of San Vicente, La Macarena, Vistahermosa, and Mesetas. The unit of observation is at the individual level. I present robust standard errors. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Balance on Basic Demopraphic Characteristics

	Within 50 km			*Within 25 km*			*RD Estimates*	
	Inside	Outside	SE	Inside	Outside	SE	RD Coefficient	SE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Demographic Characteristics								
Age	30.84	32.03	0.25***	31.75	31.94	0.29	0.44	0.77
Men (=1)	0.56	0.55	0.01*	0.56	0.55	0.01	-0.01	0.01
Natives (=1)	0.10	0.02	0.00***	0.08	0.03	0.00***	0.00	0.00
No Ethnicity (=1)	0.87	0.97	0.00***	0.90	0.95	0.00***	-0.00	0.00
Observations - People	11,565	49,471		8,265	21,601		9,152	

Notes: Columns (1), (2), (4), and (5) present the mean of the corresponding variable. Columns (3) and (6) present clustered standard errors for the difference in means clustered at the municipality level. Inside and Outside indicate whether a grid cell's centroid is inside or outside the former DMZ area, respectively. Columns (7) and (8) show estimates of τ in equation 1 and it's standard error, respectively. The unit of observation is an individual in the CNA. All regressions use a triangular kernel, local linear polynomial at each side of the boundary, include boundary segment fixed effects. The RDD MSE optimal bandwidths are determined using the procedure suggested by Cattaneo et al. (2020a). Sample is restricted to border segments of San Vicente, La Macarena, Vistahermosa, and Mesetas. The unit of observation is at the individual level. I present robust standard errors. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Human Capital

	Literacy (=1)		Years of Education		Health Insurance (=1)	
	(1)	(2)	(3)	(4)	(5)	(6)
RD Estimate	-0.01	0.00	0.40***	0.35***	0.01	0.01*
	(0.009)	(0.010)	(0.126)	(0.133)	(0.008)	(0.007)
	[0.520]		[0.107]		[0.520]	
BW Selection	Optimal	Fixed	Optimal	Fixed	Optimal	Fixed
BW	15.3	10.0	11.3	10.0	7.58	10.0
Obs.	18250	12070	12338	10754	8750	11723
Dep. Var. Mean	0.84	0.84	7.53	7.48	0.98	0.97
Dep. Var. Std.	0.37	0.37	4.06	4.06	0.16	0.16

Notes: This table shows estimates of τ in equation 1. The dependent variable in columns (1) and (2) is an indicator variable that takes the value of one for individuals that know how to read and write, in columns (3) and (4) it is the total years of formal education, and in (5) and (6) it is an indicator that takes the value of one for individuals with health insurance. The unit of observation is at the individual level in all columns. All regressions use a triangular kernel, local linear polynomial at each side of the boundary, include boundary segment fixed effects, and control for age, age squared and sex. The RDD MSE optimal bandwidths are determined using the procedure suggested by Cattaneo et al. (2020a). Sample is restricted to border segments of San Vicente, La Macarena, Vistahermosa, and Mesetas. The unit of observation is at the individual level. Standard errors clustered at the rural districts level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. I present the corresponding RD plot in Figure 6.

Table 6: Dwelling Characteristics and Public Conveniences

	Concrete Walls (=1)		Concrete Floor (=1)		Electricity (=1)		Sewerage (=1)		Aqueduct (=1)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
RD Estimate	-0.02	-0.01	-0.02	-0.01	-0.01	-0.01	0.02**	0.01	0.11**	0.13***
	(0.040)	(0.038)	(0.025)	(0.021)	(0.066)	(0.068)	(0.010)	(0.008)	(0.046)	(0.044)
	[0.733]		[0.584]		[0.740]		[0.109]		[0.090]	
BW Selection	Optimal	Fixed	Optimal	Fixed	Optimal	Fixed	Optimal	Fixed	Optimal	Fixed
BW	8.84	10.0	7.82	10.0	10.8	10.0	6.78	10.0	7.98	10.0
Obs.	3392	3822	2976	3815	4224	3901	2614	3836	3054	3836
Dep. Var. Mean	0.23	0.24	0.04	0.04	0.43	0.41	0.01	0.01	0.11	0.14
Dep. Var. Std.	0.42	0.43	0.19	0.20	0.49	0.49	0.10	0.11	0.31	0.35

Notes: This table shows estimates of τ in equation 1. The dependent variable in columns (1) and (2) is an indicator that equals one if the dwelling's walls materials are in concrete or better, while in columns (3) and (4) it is an indicator that equals one if the dwelling's floor materials are in concrete or better. Dependent variable in columns (5) and (6) is an indicator that equals one if the dwelling has access to electricity, in columns (7) and (8) it is an indicator that equals one if the dwelling has access to sewerage system, and in columns (9) and (10) it is an indicator that equals one if the dwelling has access to aqueduct system. The unit of observation is at the dwelling level in all columns. All regressions use a triangular kernel, local linear polynomial at each side of the boundary, and include boundary segment fixed effects. The RDD MSE optimal bandwidths are determined using the procedure suggested by Cattaneo et al. (2020a). Sample is restricted to border segments of San Vicente, La Macarena, Vistahermosa, and Mesetas. Standard errors clustered at the rural districts level in parentheses and Romano and Wolf (2005)'s step-down adjusted p-values robust to multiple hypothesis testing in square brackets with 1,000 replications. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. I present the corresponding RD plot in Figure 7.

Table 7: Agricultural Yield

	Revenue Per Hectare		Total Revenue		Subsistence (=1)		Sale (=1)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
RD Estimate	0.16***	0.17***	0.35***	0.38***	0.12**	0.08	-0.02	-0.02
	(0.020)	(0.022)	(0.084)	(0.080)	(0.060)	(0.053)	(0.013)	(0.013)
	[0.001]		[0.001]		[0.037]		[0.113]	
BW Selection	Optimal	Fixed	Optimal	Fixed	Optimal	Fixed	Optimal	Fixed
BW	12.1	10.0	9.17	10.0	7.47	10.0	9.74	10.0
Obs.	8466	6994	6364	6994	4287	5773	5627	5773
Dep. Var. Mean	4.40	4.28	15.29	15.47	0.42	0.41	0.02	0.02
Dep. Var. Std.	4.20	4.13	37.81	37.56	0.49	0.49	0.15	0.15

Notes: This table shows estimates of τ in equation 1. The dependent variable in columns (1) and (2) is the inverse hyperbolic sine of the revenue per hectare in Colombian 2013 millions of COP, while in columns (3) and (4) it is the inverse hyperbolic sine of the total revenue in Colombian 2013 millions of COP. Dependent variable in columns (5) and (6) is an indicator that equals one if the farms agricultural production is used only for self-consumption, and in columns (7) and (8) it is an indicator that equals one if the farms agricultural production is used only for market sale. The unit of observation is at the farm-crop level in columns (1) to (4), while it is at the farm level in columns (5) to (8). All regressions use a triangular kernel, local linear polynomial at each side of the boundary, and include boundary segment fixed effects, and control for farm extension. In columns (1) to (4) I also include crop fixed effects. The RDD MSE optimal bandwidths are determined using the procedure suggested by Cattaneo et al. (2020a). Sample is restricted to border segments of San Vicente, La Macarena, Vistahermosa, and Mesetas. Standard errors clustered at the rural districts level in parentheses and Romano and Wolf (2005)'s step-down adjusted p-values robust to multiple hypothesis testing in square brackets with 1,000 replications. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. I present the corresponding RD plot in Figure 8 .

Table 8: Agricultural Choices

	Cash Crops - Share				Perennial Crops - Share				Transitory Crops - Share			
	Area		Revenue		Area		Revenue		Area		Revenue	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
RD Estimate	-0.07*	-0.09**	-0.11**	-0.12**	0.07**	0.07	0.13***	0.07*	-0.07**	-0.07	-0.10***	-0.00
	(0.041)	(0.045)	(0.046)	(0.048)	(0.035)	(0.048)	(0.033)	(0.037)	(0.035)	(0.048)	(0.032)	(0.047)
	[0.026]		[0.012]		[0.012]		[0.001]		[0.012]		[0.001]	
BW Selection	Optimal	Fixed	Optimal	Fixed	Optimal	Fixed	Optimal	Fixed	Optimal	Fixed	Optimal	Fixed
BW	14.3	10.0	11.6	10.0	21.8	10.0	18.2	10.0	21.8	10.0	25.6	10.0
Obs.	3476	2482	2907	2482	5391	2482	4437	2482	5391	2482	7271	2482
Dep. Var. Mean	0.33	0.33	0.31	0.32	0.63	0.58	0.63	0.57	0.37	0.42	0.34	0.39
Dep. Var. Std.	0.34	0.34	0.37	0.37	0.32	0.31	0.35	0.35	0.32	0.31	0.34	0.34

Notes: This table shows estimates of τ in equation 1. The dependent variable in columns (1) and (2) is the share of area with cash crops, while in columns (3) and (4) it is the share of revenue from cash crops. The dependent variable in columns (1) and (2) is the share of area with perennial crops, while in columns (3) and (4) it is the share of revenue from perennial crops.The dependent variable in columns (1) and (2) is the share of area with transitory crops, while in columns (3) and (4) it is the share of revenue from transitory crops. The unit of observation is at the farm level in all columns. All regressions use a triangular kernel, local linear polynomial at each side of the boundary, and include boundary segment fixed effects, and control for farm extension. The RDD MSE optimal bandwidths are determined using the procedure suggested by Cattaneo et al. (2020a). Sample is restricted to border segments of San Vicente, La Macarena, Vistahermosa, and Mesetas. Standard errors clustered at the rural districts level in parentheses and Romano and Wolf (2005)'s step-down adjusted p-values robust to multiple hypothesis testing in square brackets with 1,000 replications. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. I present the corresponding RD plot in Figure 9 .

Table 9: Mechanism - Violence

	Forced Displacement (=1)	Land Dispossession (=1)	Land Abandonment (=1)
	(1)	(2)	(3)
RD Estimate	-0.10**	-0.04***	-0.03***
	(0.039)	(0.011)	(0.007)
BW Selection	Optimal	Optimal	Optimal
BW	16.6	14.0	15.9
Obs.	6353	5386	6107
Dep. Var. Mean	0.17	0.02	0.02
Dep. Var. Std.	0.37	0.14	0.14

Notes: This table shows estimates of τ in equation 1. The dependent variable in columns (1) is an indicator that equals one if the household head reports that at least one individual within the family was a victim of forced displacement, in columns (2) it is an indicator that equals one if the household head reports that at least one individual within the family was a victim of land dispossession, and in columns (3) it is an indicator that equals one if the household head reports that at least one individual within the family was a victim of land abandonment. The unit of observation is at the household level in all columns. All regressions use a triangular kernel, local linear polynomial at each side of the boundary, and include boundary segment fixed effects, and control for farm extension. The RDD MSE optimal bandwidths are determined using the procedure suggested by Cattaneo et al. (2020a). Sample is restricted to border segments of San Vicente, La Macarena, Vistahermosa, and Mesetas. Standard errors clustered at the rural districts level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: Mechanism - Agricultural Practices

	Panel A: Property Rights		**Panel B: Agricultural Practices**		
	Private Property (=1)	Collective Property (=1)	Irrigation System (=1)	Fertilizer Use (=1)	Pest Control (=1)
	(1)	(2)	(3)	(4)	(5)
RD Estimate	-0.01	-0.03***	0.00	-0.00	-0.00
	(0.028)	(0.010)	(0.036)	(0.046)	(0.045)
BW Selection	Optimal	Optimal	Optimal	Optimal	Optimal
BW	9.00	6.01	13.0	12.3	13.8
Obs.	4589	3108	7351	6966	7766
Dep. Var. Mean	0.86	0.01	0.82	0.45	0.67
Dep. Var. Std.	0.35	0.11	0.38	0.50	0.47
	Panel C: Capital Investment		**Panel D: Partnership Structure**		
	Machinery (=1)	Buildings (=1)	Producers Association (=1)	*Cooperativa* (=1)	Colective Work (=1)
	(6)	(7)	(8)	(9)	(10)
RD Estimate	0.07*	0.01	-0.06**	0.01	0.05***
	(0.043)	(0.039)	(0.028)	(0.008)	(0.015)
BW Selection	Optimal	Optimal	Optimal	Optimal	Optimal
BW	11.8	13.4	13.4	21.2	16.2
Obs.	6083	6707	5555	8303	8074
Dep. Var. Mean	0.53	0.43	0.11	0.02	0.05
Dep. Var. Std.	0.50	0.50	0.31	0.12	0.22

Notes: This table shows estimates of τ in equation 1. The dependent variable in columns (1) is an indicator that equals that equals one if the farm is privately own, while in columns (2) it is an indicator that equals that equals one if the farm is collectively own. The dependent variable in column (3) is an indicator that equals that equals one if the farm has an irrigation system, in column (4) it is an indicator that equals that equals one if the farm use fertilizers, and in column (3) it is an indicator that equals that equals one if the farm uses modern pest control practices. The dependent variable in columns (6) is an indicator that equals that equals one if the farm has machinery equipment, while in columns (2) it is an indicator that equals that equals one if the farm has buildings for agricultural production. The dependent variable in column (3) is an indicator that equals that equals one if the farmers participate in a producers association, in column (4) it is an indicator that equals that equals one if the farmers participate in a *cooperativa*, and in column (3) it is an indicator that equals that equals one if the farm uses collective work for agricultural production. The unit of observation is at the household level in all columns. All regressions use a triangular kernel, local linear polynomial at each side of the boundary, and include boundary segment fixed effects, and control for farm extension. The RDD MSE optimal bandwidths are determined using the procedure suggested by Cattaneo et al. (2020a). Sample is restricted to border segments of San Vicente, La Macarena, Vistahermosa, and Mesetas. Standard errors clustered at the rural districts level in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.