Multi-Actor Conflict and Violence in Colombia

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Abstract

Most accounts of civil war are bounded by a dyadic conceptualization of conflict. Unfortunately, such an approach offers limited leverage to understand conflicts characterized by multiple actors. By extending prominent theories of territorial competition and natural resources, the main argument claims that violence depends not only on the number of armed actors, but also on their kind. By focusing on Colombia, the study disaggregates the violent behavior of 30 different armed actors between 1988 and 2014 including government authorities, guerrilla organizations, paramilitary groups, and criminal syndicates. The identification strategy relies on the presumably exogenous price shocks of coca, oil and coffee to explain the violent presence of different armed actors, and their subsequent effect on the number of homicides. Results show that different commodities have distinct effects on the behavior of rent-seeking and support-seeking armed actors, and the resulting multi-polar configurations of conflict increase the levels of violence in different magnitudes.

Keywords: Multi-polar conflict, civil war, natural resources, Colombia

1 Introduction

Despite the substantial progress in understanding the micro-dynamics of violence, most theoretical and empirical accounts are bounded by a dyadic conceptualization of conflict usually involving the incumbent and a unified rebel front (Gurr 1970, Tilly 1978, Kalyvas, Shapiro and Masoud 2008, Davenport 2007, Harbom, Melander and Wallensteen 2008). This bipolar approach offers limited analytical leverage to understand a large number of conflicts characterized by the violent interactions between multiple armed actors. Lacking the theoretical and empirical instruments to analyze the dynamics of violence in multi-polar settings generates a considerable problem of omitted variable bias and prevents our understanding of prominent conflicts such as Somalia, Yemen, Democratic Republic of Congo, Afghanistan, Burma, Indonesia, and Syria, to name a few.

To address these limitations, this study analyzes the complexities of the Colombian civil war, one of the world's oldest and most intractable conflicts. Theoretically, the study builds on and extends prominent theories of territorial competition (Kalyvas 2006) and natural resources (Collier and Hoeffler 2004, Fearon 2005) to understand violence in multi-polar conflict settings. The central argument claims that violence depends not only on the number of actors, but also on the support-seeking or rent-seeking motivations of different types of actors. The study thus contributes to deepen our understanding about the rationale of different armed actors and their consequences on the levels of violence. Empirically, the study relies on a new database comprising 30 different Colombian armed groups between 1988 and 2014. The data unfolds actors, space and time in order to geo-reference the violent presence of government forces (7 subgroups), guerrilla organizations (8 subgroups), paramilitaries (7 subgroups), and criminal syndicates (8 subgroups).

To disentangle the relationship between multiple armed actors and the levels of violence, the identification strategy follows other studies relying on the exogenous variations in price commodity shocks (Dube and Vargas 2013, Angrist and Kugler 2008). In line with the theoretical expectations, results show that price shocks of coca, oil and coffee have distinct effects on the violent presence of different actors, and the resulting multi-polar conflict scenarios increase the levels of violence in different magnitudes. These findings contribute to expand the menu of causal mechanisms linking natural resources and the motivations of violence beyond traditional approaches (Collier and Hoeffler 2004, Fearon 2005). In addition, disaggregating actors contributes to refining inferences drawn from quantitative studies of conflict interactions (Shellman, Hatfield and Mills 2010).

This study contributes to understanding the Colombian civil war in different ways. First, it moves beyond the attributes of the state (Oquist 1980, Kline 2003) and structural conditions (Thomson 2011, Daly 2012) to explain the micro-dynamics of violence. Second, it explicitly adopts an actor-centered perspective from both theoretical and empirical points of view. Third, it uses a multi-polar approach to integrate previous studies that focus on the state (Oquist 1980, Acemoglu, Robinson and Santos 2013), insurgent organizations (Holmes, Gutiérrez de Piñeres and Curtin 2009), paramilitary groups (López 2010, Acemoglu, Robinson and Santos 2013), and criminals (Grajales 2011), considered separately. Finally, it integrates other studies examining economic determinants of conflict such as the illicit drug economy (Angrist and Kugler 2008, Suárez 2000, Thoumi 2002, Holmes, Gutiérrez de Piñeres and Curtin 2009), the booming oil sector (Guáqueta 2003, Pearce 2007; 2004, Richani 2005), and fluctuations in coffee prices (Dube and Vargas 2006; 2013).

The paper is structured in five parts. The first section extends dominant theories of territorial competition and natural resources into a multi-polar conflict setting, and derives a set of observable implications. The second disaggregates the violent presence of different armed actors across time and space. The data section presents the evidence and the methodology used for analyzing it. The results section reports the main statistical findings. Finally, the last section presents the conclusions.

2 Theory

By considering a variety of actors, we necessarily dis-aggregate theorizing the motivations of violence and the dynamics of conflict. To do so, the theoretical construct builds on and extends two prominent explanations of conflict: territorial contestation and natural resources. A long tradition of research characterizes conflict as the armed interaction between two-parties, usually the incumbent authority and a rebel front (e.g. Gurr 1970, Eckstein 1980, McAdam, Tarrow and Tilly 2001, Skocpol 1979). Within this dyadic approach, Kalyvas (2006) advances a two-actor model to explain selective violence against non-combatants. In this explanation, contested territories endure more selective violence than areas where one armed actor exercises hegemony.

Despite its contributions, a bipolar model has limited leverage to explain conflicts characterized by multiple groups, and run the risk of suffering omitted variable bias. To address this limitation, we extend the classic bipolar model of territorial competition to analyze the dynamics of multi-actor conflicts. The immediate extension implies that territories comprising multiple actors tend to experience higher levels of violence than areas disputed by fewer actors. In highly contested areas, casualties accumulate as combatants from different sides fight, and non-combatants die as armed actors undermine their rival's support basis or coerce their loyalty. Although we agree with this basic premise, we consider that violence in multi-polar settings is not only a function of the number of actors, but also their kind.

Armed actors can be distinguished by the extent to which they need local support to conduct their activities. The quest for loyalty is a core assumption in Kalyvas' (2006) explanation as both the incumbent and insurgents depend on the support of local populations to effectively control an area. The need for people's loyalty motivates armed actors to exercise a certain degree of self-control towards the population. After all, both authorities and rebels are in the business of winning people's hearts and minds in the long run. However, not all armed actors seek popular support. Instead, the primary objective of some groups might be maximizing economic predation, rather than securing loyalties (Collier 2000). We expect this to be the case with paramilitary groups and criminal syndicates. This does not mean that paramilitaries lack political motivations, but their political goals are often instrumental to the ultimate objective of appropriating rents (López 2010, Garay Salamanca et al. 2008). Removing the need for popular support also removes incentives for self-restraint. Consequently, it is plausible to expect higher levels of violence in areas affected by primarily rent-seeking groups than in territories containing support-seeking actors. The logic of self-restraint of support-seeking actors is similar to Olson's (2000) "stationary bandit"

Eliminating the quest for popular support has further implications. If controlling the population is no longer a zero-sum game between contenders, then multiple armed actors can coexist within the same area as long as their interests do not collide. Removing the need of popular loyalty thus removes the motivation for conflict, and favors the possibility of coexistence or coalition. Eliminating the incentive for fighting might reduce the casualties caused by armed confrontations between actors. However, this might not necessarily reduce the overall levels of violence as multiple groups could engage in joint predation against civilians. Moreover, territories comprising multiple rent-seeking actors operating in predatory coalition might experience substantial levels of violence since none of the actors has incentives for self-restraint. These considerations lead to the following hypotheses:

H_1: *Increasing the number of armed actors in a territory increases the levels of violence.*

H_2: *Territories affected by the presence of primarily rent-seeking armed groups tend to experience higher levels of violence than areas containing support-seeking armed actors.*

H_3: *Coalitions of armed actors in a given territory are associated with higher levels of violence than in areas where such coalitions are absent.*

There is a broad literature linking natural resources and conflict (Collier and Hoeffler 2004). Yet, there is no agreement about the mechanisms through which natural resources operate (Fearon 2005, Kalyvas and Sambanis 2005, Ross 2005; 2006, Humphreys 2005, Lujala 2009; 2010). Recent developments by Dube and Vargas (2013) suggest that different commodities have distinct effects on violence. In particular, booms in labor intensive commodities such as coffee reduce violence as fighters give up arms and engage in the more profitable and safer activities. In contrast, an increase in contestable income from oil is likely to increase violence as it augments the gains from appropriating fuel rents. Angrist and Kugler (2008) show a similar rapacity effect when rural violence spikes after booms in international cocaine prices. We rely on these innovative ideas about the divergent effects of distinct commodities and extend their implications about their influence on different armed actors. By doing so, our theory uncovers an array of motivations and mechanisms linking coca, oil and coffee to the violent behavior of government forces, insurgents, paramilitaries, and criminals.

Given the centrality of coca in the Colombian conflict, we analyze this commodity first. Drug contraband has long been associated with conflict (Fearon 2004, Lujala 2009), and Colombia is no exception (Richani 2012, Felbab-Brown 2010). Drugs are often regarded as a highly lucrative commodity that motivates rent seeking violence (Collier 2000). However, this approach neglects the political economy of drug cultivation. Coca might increase violence, but it might do so in territories outside the production zone, not in cultivation areas controlled by insurgents. This expectation is grounded in the observations that coca farmers are an important source of political support for the insurgents (Gutiérrez Sanín 2004, Vargas 2011). Coca farmers (*cocaleros*) often benefit from insurgent protection against the state and predatory drug traffickers, and in exchange they offer their political support (Felbab-Brown 2010, Díaz and Sánchez 2004). Instead of praying on *cocaleros*, the FARC exploits the drug trade mostly by regulating and taxing coca farmers (Saab and Taylor 2009, Tickner, García and Arreaza 2011). Insurgents thus behave as support-seekers and refrain from conducting violence against *cocaleros* in an effort to protect their funding sources and gain local loyalty.

In principle, the state is also expected to behave as support-seeker and refrain from using violence. However, given the marked militaristic character of counter-narcotic activities, coca production is likely to increase the violent presence of government forces. Finally, we expect criminals and paramilitaries to display high levels of violence in coca producing areas given their direct engagement in drug trafficking activities (Saab and Taylor 2009, Tickner, García and Arreaza 2011). Based on these expectations, we derived the following implications:

H_4 *Increasing profitability of coca cultivation is related to:*

H_4a*: increasing violent presence of government forces as they enforce the law.*

H_4b*: not increasing violent presence of insurgents as they rely on peasants as a social and economic base of support.*

H_4c*: increasing violent presence of paramilitaries as they engage in drug trafficking.*

H_4d*: increasing violent presence of criminals as they engage in drug trafficking.*

Oil is often linked to conflict as a motivation for rent seeking rebels or as a sign of state weakness (Collier and Hoeffler 2004, Fearon 2005). In contrast to these accounts, we follow those who argue that fuel rents increase the violent presence of the state in it tries to secure strategic infrastructure (Ross 2005, Dube and Vargas 2006). The substantial rents derived from oil motivate the state to deploy a forcible presence around oil production facilities in order to protect the generation of such rents. Due to the sophistication of oil extraction, rebel organizations are not expected to directly exploiting fuel rents (Ross 2006). However, insurgents are likely to increase their violent presence in oil producing areas as oil infrastructure becomes a military target, aiming either to disrupt the state or to extort the personnel and contractors that operate oil facilities (Dunning and Wirpsa 2004, Richani 2005, Pearce 2004; 2007). Finally, we expect paramilitary groups and criminal organizations to use violence in oil producing areas as they often develop protection rackets to extort oil contractors, or are employed by international oil companies as mercenaries to protect them from insurgents (Dunning and Wirpsa 2004, Richani 2005, Pearce 2004; 2007). These theoretical expectations lead to the following observable implications:

H_5 *Increasing profitability of oil production is related to:*

H_5a*: increasing violent presence of government forces as they try to protect oil infrastructure.*

H_5b: increasing violent presence of insurgents as they try to disrupt oil infrastructure.

H_5c: increasing violent presence of paramilitaries as they engage in predatory or mercenary activities.

H_5d: increasing violent presence of criminals as they engage in predatory or mercenary activities.

According to Dube and Vargas (2013), booming coffee markets are likely to have a labor substitution effect and reduce the levels of violence. The intuition is that periods of profitable coffee production attract workers to the coffee fields, thus preventing them from enlisting as combatants. We expect profitable coffee markets to reduce the violent presence of insurgent groups and paramilitary organizations. We also expect coffee to reduce the violent presence of government forces, although the incentives to deter desertion in the military and police forces make labor substitution an unlikely mechanism (Presidencia De La República 2010, Lara Guerrero and Molano Niño 2006). Instead, the state might refrain from engaging in violence in an effort to avoid disrupting the economic prosperity of coffee regions. Finally, due to the high profitability of drug markets, we do not expect coffee production to affect criminal syndicates.[1] These considerations inform the following empirical implications:

H_6 Increasing profitability of coffee cultivation is related to:

H_6a: decrease the violent presence of government forces as labor substitution.

H_6b: decrease the violent presence of insurgents as labor substitution.

H_6c: decrease the violent presence of paramilitaries as labor substitution.

H_6d: not decrease the violent presence of criminal organizations as drug trafficking remains more profitable.

3 Disaggregating armed actors

The empirical analysis for this study relies on a set of variables indicating the violent presence of a variety of armed actors. The data comes from a collection of reports of human rights violations issued by *Centro de Investigación y Educación Popular* (CINEP) (2016), a prominent Colombian non-government organization that has been systematizing information about the conflict for more than four decades. CINEP compiles civilian testimonies of conflict-related violence in all Colombian regions, and publishes the reports in the quarterly journal, *Noche y Niebla*. The collection contains 42,052 detailed narratives of violence between 1988 and 2014, indicating the date of the event, a description of the incident–usually indicating the victim and the known or presumed perpetrator–and the location.

To analyze the narratives we rely on Eventus ID, a software for supervised annotation of unstructured text written in Spanish (Osorio and Reyes 2016). Eventus ID reads the corpus and uses dictionaries of nouns and locations to geo-reference the names of actors mentioned in the text. The outcome is a geo-referenced database of the violent presence of armed groups. The actors dictionary used in this study contains 1,746 names of actors grouped in four main categories: the government, insurgent organizations, paramilitary groups, and criminal organizations. These main groups are then divided into 30 subcategories.

Figure 1 shows the temporal dynamics of the violent presence of different actors involved in the Colombian conflict. The vertical axis denotes the number of municipalities that registered the violent presence of each actor in any given year. The right panel in Figure 1 shows the violent expansion of government forces. The government comprises seven actors including generic mentions of the government, the Army, the Air Force, the Navy, the Police, the Prosecutor, and intelligence agents. The Police began extending their activities in 1998 and were involved in violent episodes in a maximum of 381 municipalities in 2000. That same year, the armed forces spread to 330 municipalities. The surge in government violence after 1998 reflects a change in counterinsurgency strategy. In 1998, President Andrés Pastrana (1998-2002) initiated peace talks with insurgents that included a general ceasefire and the creation of a FARC demilitarized zone, or "*zona de distensión*" (Chernick 1999). However, the insurgents broke with negotiations, causing President Pastrana and his predecessor, Alvaro Uribe (2002-2010), to increase military spending up to 5% of the GDP in 2003 (Richani 2005; 127).

That same year, the United States sent an additional $98 million dollars in military aid to Colombia, an increase of 22.3% from previous years (Dunning and Wirpsa 2004; 25-26).[2]

[Enter Figure 1 here]

Figure 2 shows the violent presence of government forces in different regions of Colombia (panels p-t). The coercive activities of the state were primarily concentrated in a handful of municipalities during the early and mid 1990s. The dramatic expansion of the state's violent presence in 2000 occurred in parallel to the surge of insurgent, paramilitary and criminal activity after the collapse of the peace talks. Although the extent of the violent presence of government forces showed a slight geographic contraction during the mid and late 2000s, there still is considerable violent activity conducted by the state in large part of the country.

[Enter Figure 2 here]

Figure 1 also shows a surge in the violent presence of insurgents between 1995 and 2000. The insurgent category is divided into eight subgroups including the generic group insurgents, the Revolutionary Armed Forces of Colombia (*Fuerzas Armadas Revolucionarias de Colombia - Ejéjercito del Pueblo*, FARC), the National Liberation Army (*Ejército de Liberación Nacional*, ELN), the Popular Liberation Army (*Ejército Popular de Liberación*, EPL), the People's Revolutionary Army (*Ejército Revolucionario del Pueblo*, ERP), the 19th of April Movement (*Movimiento 19 de Abril*, M-19), the Ernesto Rojas Commandos (*Comandos Ernesto Rojas* CER), and the Simon Bolivar Guerrilla Coordinating Board *Coordinadora Guerrillera Simón Bolívar*, CGSB).

Most of the insurgent groups included in our analysis are extint. The EPL was a Maoist guerrilla organization founded in 1967 as the armed wing of the Colombian Communist Party (PCC). Although some dissident factions remain active, the EPL signed a truce with the government in 1991 and formed a political party. The M-19 was mostly an urban guerrilla force formed in 1970 after the government committed fraud in the presidential election. In 1991, the M-19 demobilized and formed the political party, the M-19 Democratic Alliance.

The CER and the ERP were splinter groups of the EPL and the ELN. The CER had no more than 25 combatants when it disbanded in 1992, and the ERP counted roughly 14 members when it demobilized in 2007. Finally, the CGSB was an umbrella group that formed in 1987 to unite the FARC, M-19, ELN, and EPL. However, the CGSB failed to develop a centralized command and political platform, and the different guerrilla organizations continued to act autonomously. By 1997, the organization ceased to exist (Arnson 1999; 197-200).

The temporal trends mostly capture the violent presence of the two insurgent groups that remain active: the FARC and the ELN. The FARC formed in 1964 after the government launched a series of U.S.-supported attacks on armed, autonomous peasant communities or "self defense zones" linked to the PCC (Brittain 2009; 11-14). After the attacks, an estimated 4,000 survivors fled to the southeastern frontier and formed the FARC, a peasant army that reached an estimated 18,000 fighters by 2001 (Richani 2002; 74). The FARC adopted a Marxist-Leninist ideology and a political platform centered on agrarian reform. Similarly, the ELN also formed in 1964 as a Marxist insurgency comprising radical peasant movements, organized university students, oil workers, Catholic radicals, and urban intellectuals. In 2000, the ELN counted on roughly 5,000 armed combatants (Richani 2002; 85, 87).

As Figure 1 shows, at the apex of insurgent expansion, 480 municipalities reported the presence of generic insurgents, that is, without mentioning their specific affiliation. This figure represents 42.3% of the total number of municipalities in the country. The same year, 378 municipalities (33.7% of the total) recorded violent activities of the FARC, and 258 locations (22.3% of the total) reported the ELN. The territorial presence captured by our analysis is consistent with the estimated presence of the FARC in 40% of the national territory, and the ELN in 33% of the territory as reported by Richani, taking into account that Richani's estimates include both their violent and non-violent presence, whereas our analysis only captures insurgent violent presence (Richani 2002; 74, 85). To clarify the point, panels (a) to (e) in Figure 2 show the spatial patterns of insurgent violence. Insurgent organizations concentrated violent activity in the Central Andean and Caribbean region, outside the insurgents' strongholds in the Amazon and Eastern Plains.[3]

Returning to Figure 1, there is a notable increase in the violent presence of insurgents between 1995 and 2000, followed by a marked decline in the number of municipalities with presence of guerrilla groups. The escalation of the insurgents' violent presence corresponds to the increased military capacity the FARC and the ELN derived from coca and oil rents during the 1990s. The spike in violent presence also captures the end of the peace negotiations between President Pastrana and the FARC in 1998, which resulted in a large FARC offensive in 2000. However, the military campaigns launched by Presidents Pastrana and especially Alvaro Uribe were effective in undermining the FARC's territorial control and reducing the organizations numbers to an estimated 7,000 armed combatants (Bustamante, Chaskel and Sweig 2008, DeShazo, Primiani and McLean 2007). The fighting capacity of the ELN also declined dramatically after 2000, but is more attributable to successful paramilitary attacks on ELN strongholds than on government action (Richani 2002; 88, Dunning and Wirpsa 2004; 87). In line with those trends, panels (a)-(e) in Figure 2 show that the scope of violent insurgent presence gradually became more focalized in 2005, and the trend continued in 2010.

The third set of actors, paramilitaries, are divided in seven different organizations including generic mentions of paramilitaries, the United Self-Defense Forces of Colombia (*Autodefensas Unidas de Colombia*, AUC), the Popular Revolutionary Anti-Terrorist Army of Colombia (*Ejército Revolucionario Popular Antiterrorista Colombiano*, ERPAC), Gaitan Self-Defense Forces of Colombia (*Autodefensas Gaitanistas de Colombia*, AGC), the Peasant Self-Defense Forces of Cordoba and Uraba (*Autodefensas Campesinas de Córdoba y Urabá*, ACCU), Social Cleansing (*Limpieza Social*), and other independent groups.

The panel at the center-left of Figure 1 reports the violent presence of paramilitary organizations. In general, the violent presence of paramilitaries follows a similar pattern to insurgent organizations, yet the escalation of paramilitary groups is less abrupt than the insurgents, and its later decline is also less pronounced. The paramilitaries first appeared in

Colombia in the 1980s in response to insurgent attacks targeting agrarian elites. The main instigators of "self defense" groups were cattle ranchers and narcotics traffickers (Tickner, García and Arreaza 2011; 420) and their organizations were sanctioned under Colombian law in 1968 and again in 1994 (Pearce 2004; 49). Until the late 1990s, paramilitarism in Colombia was geographically fragmented as indicated in Figure 2, which shows the geographic dispersion of paramilitary violent presence (panels f-j). Between the early and mid 1990s, the incipient violent activity of paramilitary organizations was concentrated in a few locations.

However, in 1997, the commander of the ACCU, Carlos Castaño, united Colombia's paramilitaries under the national umbrella organization, the AUC. Soon after, paramilitary groups launched an aggressive offensive against insurgent organizations, and extended paramilitary violence to most of the Andean, Caribbean and Pacific regions. In 2000, there were reports of generic paramilitary groups in 292 municipalities (33.7% of the total number of locales), and the AUC extended its violent activities to 200 municipalities (17.8% of the total). The surge of violent paramilitary presence marginally decreased in 2005 and 2010, but remained active in a substantial number of municipalities. The decrease is attributable to the collective demobilization of more than 30,000 paramilitary combatants under President Alvaro Uribe between 2003 and 2007 (DeShazo, Primiani and McLean 2007; 13-14, Porch and Rasmussen 2008; 28). The continuation of violence after 2007 adds to mounting evidence that the paramilitary demobilization was incomplete (Porch and Rasmussen 2008).

Finally, paramilitary involvement in drug trafficking facilitated the emergence of a third non-state armed actor: the emerging criminal bands. The category of criminal organizations is divided into eight subcategories including the generic reference to "criminal groups" (*Bandas Criminales*, BACRIM), *Los Urabeños*, *Los Rastrojos*, Black Eagles (*Águilas Negras*), *Los Paisas*, The Envigado Office (*Oficina de Envigado*), *Los 400*, and other independent criminal groups. The BACRIMs formed as splinter paramilitary organizations that engage in violence in pursuit of primarily criminal goals (Castillo 2014). As indicated in the center-right panel in Figure 1, a multitude of small and independent BACRIMs expanded their operations in

1999 and reached a maximum of 260 municipalities in 2000. *Los Urabeños*, a larger and more organized criminal group that emerged from the ranks of the AUC, appeared on the scene in 2000 and expanded to 103 municipalities that year. After the demobilization of paramilitaries, some former AUC combatants created the *Águilas Negras*, which reached a maximum of violent presence in 79 municipalities in 2007, and later on in 2009.

The third row in Figure 2 shows the late emergence and expansion of criminal organizations across panels (k)-(o). In the midst of the surge of insurgent and paramilitary violence in 2000, a large number of small and independent criminal organizations burgeoned throughout the country. During the mid and late 2000s, the spatial contraction and concentration of violent criminal presence is indicative of the consolidation of *Los Urabeños* and the emergence of the *Águilas Negras*, two of the largest and more violent BACRIM groups in Colombia.

The unprecedented disaggregation of armed actors in the data that we outline here allows use to analyze the multi-polar dynamics of violence in the Colombian conflict. However, the variables derived from this information should be interpreted carefully. As Kalyvas (2008) argues, the presence of armed actors might not correlate with high levels of violence in territories controlled by a single actor. In line with this argument, our geo-referenced data on armed groups only provides information on the location of their *violent presence*, but not about the locales where they conduct non-violent activities. The reason is that CINEP only reports incidents of human rights violations, but does not provide information about areas controlled by armed actors that exercise no violence against their population. Since the source of data does not provide information about areas of non-violent monopolistic control, a more precise interpretation of this data should be circumscribed to an indication of *violent presence* of armed actors. This nuanced interpretation is congruent with other studies on the Colombian conflict (Arjona 2011, Granada, Restrepo and Sánchez Meertens 2009).

4 Data and Identification Strategy

4.1 Data

The empirical assessment aims to understand the dynamics of violence in Colombia at the municipal-year basis covering all 1,122 municipalities between 1988 and 2014. The dependent variable is the total number of homicides by municipality year as reported by the Colombian Police (Moreno 2014). To test the argument, we use the information from CINEP (2016) to build a set of independent variables measuring different aspects of the violent presence of state and non-state armed actors. Variable *main actors* indicates the number of actors overlapping according to four main categories: government, paramilitaries, insurgents and organized criminals. The number of overlapping main actors ranges from 0 to 4. Variable *sub actors* disaggregates those four categories into specific subactors and indicates the number of specific actors that overlap in a given municipality-year. Each main actor category is broken down into the subactors indicated in section 3, which generates a number of overlapping subactors ranging from 0 to 16. In addition to the main overlapping actors and subactors, the empirical analysis also uses a set of dummy variables indicating the violent presence of *paramilitaries*, *insurgents*, *criminals*, and *government*. These variables take the value of 1 when there are reports of the violent presence for each actor category in any municipality-year, and 0 otherwise. Appendix A reports the descriptive statistics.

The study also analyzes the overlapping presence of a selected set of subactors that have been highly relevant throughout the Colombian conflict. Variable *selected G* refers to the government and includes the following subactors: the Army, Navy, or Police. *Selected I* relates to the insurgents category and includes mentions of generic insurgents, FARC, ELN or EPL. *Selected P* refers to paramilitary groups and indicates the violent presence of generic paramilitaries, the AUC, or ACCU. Finally, *selected C* relates to the category of organized criminals and includes *Los Urabeños*, *Los Rastrojos*, or independent criminal groups. These variables take the value of 1 when the violent presence of any subactor by each category is reported in a municipality-year, and no other actor from any other category is reported in the area. In this sense, these variables represent repressive violence conducted by any subactor without the presence of other type of actors in that location-year.

To capture the multipolar nature of the Colombian conflict, we analyze the overlapping violent presence of these selected subactors in combinations of dyads, triads and a tetrad. Variables *selected GC*, *GI*, *GP*, *IC*, *IP*, and *PC* take respectively the value of 1 when any subactors of each pair of categories conduct violent activities in a given municipality-year, while no other types of actors are present. For example, variable *selected GI* indicates the bilateral conflict between any combination of government forces represented by the Army, Navy, or the Police, and the presence of rebels such as generic insurgents, the FARC, ELN or EPL. In a similar logic, triads represent conflict scenarios characterized by the overlapping violent presence of three types of groups. In this sense, variables *selected GIC*, *GIP*, *GPC*, *IPC* represent the possible combinations of tripartite conflict between selected subactors in each corresponding category, while the actors of the omitted category are not present. Finally, the tetrad variable, *selected GICP*, indicates the scenario of the most arduous conflict involving any combination of subactors of each of the four main actor categories in a given location-year. In this sense, these variables are indicative of different gradations of conflict starting from the violent presence of monopolistic actors, then moving up to bipolar confrontations, followed by tripartite conflict, and culminating in scenarios of quadripartite violent interactions.

There is substantial differentiation between the dependent variable and data on violent presence of armed actors since CINEP reports go beyond homicides and provide information about non-lethal human rights violations such as kidnapping, displacement, arson, etc.

The analysis includes a set of controls. To address the temporal inertia of violence (Fajnzylber, Lederman and Loayza 2002), the assessment considers *lagged homicides* (logged). Including this variable represents a highly astringent test for the argument. To control for the effect of poverty on conflict (Collier and Hoeffler 2004, Fearon and Laitin 2003), variable *GDP* measures the annual Gross Domestic Product per capita by department as reported by DANE (2016). GDP is deflated to express real prices in 2005 (The World Bank 2016*b*). *GDP squared* is also included to control for non-linear effects. To address the propensity of conflict in rural areas (Scott 2009, Wood 2003), *density* measures the number of inhabitants per square kilometer at the municipal-year level. *Density squared* is also included to control for non-linear effects. *Population* accounts for the logged number of people by municipality-year. The logged variables *Plan Colombia Military* and *Plan Colombia Economic* control for U.S. aid. Variables *Barco Negotiations* and *Pastrana Negotiations* represent peace talks held under the Barco (1990-91) and Pastrana (1998-1999) administrations. Finally, *Plan Patriota* captures the military offensive under Alvaro Uribe (2002-2006), and *Medellin Offensive* accounts for the effects of the war between the state and the Medellin cartel (1989-1993).

4.2 Identification Strategy

The endogeneity between the number of armed actors active in a location and the levels of homicides represents a challenge of causal inference. To disentangle the etiology of violence, we follow similar identification strategies implemented by Dube and Vargas (2013) and Angrist and Kugler (2008). We use international variations of commodity prices to assess how economic incentives shape multi-polar conflict. In particular, the identification strategy uses plausible exogenous booms of coca, oil and coffee as instruments motivating the incursion or withdrawal of armed actors from specific territories, regardless of the levels of violence. In line with the theoretical expectations, fluctuating commodity prices shape the behavior of different armed actors in distinct manners.

The methodological strategy uses an instrumental variable (IV) approach to assess the impact of multiple armed actors on the number of homicides at the municipal-year level (Angrist and Pischke 2009, Khandker, Koolwal and Samad 2010, Sovey and Green 2011). We evaluate first the effect of exogenous commodity price shocks of coca, oil, and coffee on different indicators of violent presence of armed actors, and then assess the impact of their predicted violent presence on the levels of homicides. The panel data covers all 1,123 Colombian municipalities between 1988 to 2014.

Coca price shocks are the interaction of two components. First, we use the retail price per pure gram of cocaine in the U.S. for purchases of less than 10 grams with data from Office of National Drug Control Policy (2014). Second, we interact cocaine prices with the total area of coca cultivation at the municipality-year level in Colombia from the satellite monitoring system of the United Nations Office on Drugs and Crime (2016). The interaction is logged to improve the fit of the model, and standardized to facilitate interpretation. Coca price shocks represent the variation in the value of coca cultivation territories caused by the exogenous fluctuations of the U.S. cocaine market.

Oil price shocks combine three component. The first is the annual average price per oil barrel in the international market using 2000 as year of reference (The World Bank 2016*a*). The second is the annual oil production at the department level measured in barrels (Ministerio de Minas y Energía 2016). The third is a dummy variable taking the value of 1 for the municipality-years that have active oil extraction contracts. The variable of oil contracts was built by geo-referencing information of oil extraction contracts in sedimentary basins with data from Agencia Nacional de Hidrocarburos (2016).[4] The interaction of these three factors is logged, and then standardized. Oil shocks depict variations in the territorial value of oil producing areas caused by oil extraction and fluctuations in international oil prices.

Coffee price shocks are measured by interacting three components. First, we use the annual average of the international coffee price (Federacion Nacional de Cafeteros de Colombia 2016). The second is the annual production of coffee for export in Colombia measured in thousand sacks of 60 kg. International Coffee Organization (2016*a*). To localize the effect of international coffee prices and levels of production, we interact these two components with a dummy variable taking the value of 1 for municipalities located in an elevation range favorable for coffee production, which is between 1,000 and 1,800 meters above the average sea level (Instituto Geográfico Agustín Codazzi 2016). The interaction of these three variables is logged and standardized. Coffee price shocks reflect changes in the territorial value of coffee producing areas resulting from fluctuations of local coffee production and changes in the international coffee prices.

Finally, the model considers a triple interaction of coca, oil, and coffee price shocks to account for concurrent market fluctuations. In general, these instruments provide information about the local variations of territorial value caused by exogenous shocks of international commodity prices. These externally-induced fluctuations shape the behavioral micro-foundations of armed actors to increase or decrease their violent presence in specific areas.

Formally, the model rests on a time-series cross-section in which Y_{it} represents the number of homicides (logged) in municipality i in year t, A_{it} indicates the violent presence of armed actors, X_{it} is a vector of observables, α_1 represents the intercept, and ϵ_1 the disturbances:

$$Y_{it} = \alpha_{1m} + \beta_1 A_{it} + \delta_1 X_{it} + \epsilon_{1it} \tag{1}$$

To circumvent the endogeneity between the violent presence of armed actors and the levels of homicides, we rely on plausibly exogenous shocks of coca, oil and coffee prices as instruments to identify the extrinsic effect of A_i on Y_{it}. The first stage represents the impact of the instruments on the violent presence of armed actors as:

$$A_{it} = \alpha_{2m} + \mu_1 C_{it} + \mu_2 \Theta_{it} + \mu_3 \kappa_{it} + \mu_4 C\Theta\kappa_{it} + \delta_2 X_{it} + \epsilon_{2it} \tag{2}$$

where A_i represents a set of indicators of the violent presence of armed actors, C_{it} denotes coca price shocks, Θ_{it} indicates oil price shocks, κ_{it} represents coffee price shocks, X_{it} corresponds to other covariates, α_2 is the intercept, and ϵ_2 are the error terms.

Finally, the second stage is obtained by replacing the endogenous variable of equation (1) with the fitted values of the first stage from equation (2), which leads to:

$$Y_{it} = \alpha_{3m} + \beta_2 \hat{A_i}t + \delta_3 X_{it} + \epsilon_{3it}. \tag{3}$$

Y_{it} indicates logged levels of homicides in any given municipality-year *it*, and $\hat{A}_{it}$ represents the predicted value of the violent presence of armed actors derived from the exogenous variation of commodity prices. All models use municipal fixed effects, year fixed effects, region-year fixed effects, and robust standard errors to account for unobserved factors.

There are solid reasons to consider the instruments as exogenous to the conflict, or at least conditionally independent of unmeasured determinants of violence (Sovey and Green 2011). Coca shocks are primarily determined by U.S. street level prices. According to the United Nations Office on Drugs and Crime (2008; 19), the average price of *one kilogram* of sun-dried coca leaf in Colombia in 2007 was only $2.5 dollars. That same year, *one gram* of pure cocaine was sold in the U.S. retail market at an average of $115.98 dollars (U.S. Department of Justice 2010). The price differential between one kilogram of US cocaine and Colombian coca leaf is 46,326% larger, thus making both markets largely independent. Coffee shocks are also primarily determined by international coffee prices, and therefore exogenous to the conflict. Between 1962 and 2007, the International Coffee Organization (ICO) issued a series of intermittent agreements to govern global coffee prices based on the international supply and demand (International Coffee Organization 2016*b*). Although Colombia is an important ICO member, the volatility of coffee prices is explained by global trends of technological and marketing innovations, as well as oversupply and changes in the demand (The World Bank 2004). Oil shocks are also primarily driven by international prices governed by the Organization of the Petroleum Exporting Countries (OPCE). Moreover, Colombia is such a small oil producing country that it is not even a member of OPEC. Another requirement of a valid instrument is the exclusion restriction, which is met if commodity shocks have no effect on the levels of homicides other than through the presence of armed actors. We consider that this condition is closely met as homicides are directly explained by their perpetrators, and this research places a strong emphasis on disaggregating and geolocating such actors. Therefore, if commodity shocks have an effect on violence, it should be primarily through the behavior of the variety of state and non-state armed actors considered in this study.

5 Results

To understand the multi-polar dynamics of conflict in Colombia between 1988 and 2014, the empirical strategy analyzes the influence of exogenous commodity shocks on different indicators of the violent presence of armed actors, and their extrinsic effect on local levels of violence. The results section is divided in three parts. It first identifies the effect of the number of main overlapping actors and subactors on the levels of violence. Then, it analyzes the effect of each type of armed actor–paramilitaries, insurgents, criminals, and government–on the number of homicides. Finally, it focuses on a selection of relevant subactors to assess the effect of different overlapping scenarios on the levels of violence.

All model specifications include price shocks of coca, oil, coffee, and their interaction as joint instruments. Using multiple instruments helps to illustrate the argument about the heterogeneous effect of different commodities on the behavior of diverse armed actors. Following Hall's (2003) advice to aligning the ontology and the methodology, we opt for keeping these multiple instruments at the expenses of purity in the identification of some models in order to show how armed actors react differently toward distinct commodity shocks.

Table 1 evaluates the effect of the number of overlapping armed actors on the levels of homicides. The variables of interest in this specification are the number of main overlapping actors–referring to the four main actor categories: government, paramilitaries, insurgents, and criminals–and the number of overlapping subactors–which corresponds to the detailed list of 30 armed actors discussed in section 3. Panel (a) in Table 1 shows the results of the first stage. As expected, coca price shocks increase the overlapping violent presence of main actors (Model 1) and subactors (Model 2). In a similar manner, oil price shocks increase the number of main actors and subactors. These results suggest that exogenous increments in the territorial value of specific locations tend to attract the violent presence of multiple actors. In line with the theoretical expectations, coffee price shocks reduce the number of main overlapping actors and specific subgroups. This result suggest a substitution effect in which coffee booms attract individuals that could otherwise engage in violent activities.

[Enter Table 1 here]

The first stage diagnostic suggests that the instruments are jointly strong. Since the model includes multiple instrument, the Cragg-Donald (CD) F-statistic should be used to evaluate their strength (Stock and Yogo 2005). Instead of using the standard threshold of an F-statistic larger than 10 for single instruments, their joint strength should be judged based on the critical values indicated by Stock and Yogo (2005). The CD F-statistic of Models 1 and 2 in Table 1 is larger in both cases than the 16.85 threshold of bias at 5%. This suggests that the instruments are jointly strong.

Panel (b) in Table 1 reports the effect of the predicted number of actors on violence. Results indicate that the convergence of multiple armed actors attracted by the exogenous variations of territorial value is associated with higher levels of violence. According to Model 1, each additional main actor increases the average number of homicides by 39%. Similarly, Model 2 indicates that one additional overlapping subactor increases the expected levels of violence by 25%. The J statistic suggests that there is no overidentification in the models.

The variables of interest in Table 2 correspond to a set of dichotomous measures taking the value of 1 whenever each of the main actor categories are present in a municipality year.[5] These measures help to identify how shocks of different commodity prices affect distinctively each specific type of armed actor. Panel (a) in Table 2 shows the results of the first stage. Model 1 indicates that profitable coca markets increase the violent presence of paramilitaries while a boom in coffee prices reduces their violent presence. However, oil prices do not seem to affect paramilitary behavior. Model 2 shows that the violent presence of insurgents increases as oil producing areas become more valuable, and decreases as coffee prices go up. As expected form the theory, booms of coca do not seem to increase insurgent violent activity in drug producing areas. Model 3 provides evidence of criminal predatory behavior as they increase their violent presence in prosperous coca territories. Yet, coffee or oil price shocks do not seem to affect criminal violent presence. Finally, the three commodity shocks seem to have an effect on government behavior. As expected, booms of coca increase government violent presence as authorities enforce the law. Thriving oil regions also attract the violent presence of the state in an effort to prevent strategic infrastructure. In contrast, coffee price shocks reduce government violent presence, presumably as labor substitution might motivate enrollment in less dangerous activities than law enforcement. The first stage diagnostics show that the joint instruments are moderately strong for explaining broad actor categories. The Stock and Yogo (2005) critical values of the CD F-statistics of Models 2 and 3 suggest a moderate bias of less than 8%. In contrast, the CD F-statistics in Models 1 and 4 indicate a bias less than 11% respectively.

[Enter Table 2 here]

Panel (b) in Table 2 reports the predicted violent presence of paramilitaries, insurgents, criminals and government forces derived from commodity price shocks on the levels of violence in Colombia. Results provide evidence about the distinct levels of escalation of violence associated with the incursion of each type of armed actor. Model 1 shows that the predicted violent presence of paramilitary groups in a given municipality year is associated with an increase in the average levels of violence by 144%. Model 2 indicates that the violent presence of insurgent organizations increases the average levels of violence up to 125%. Model 3 shows that criminals are the most lethal type of actor, as their incursion is associated with an escalation of 162% in the levels of violence. Finally, Model 4 also presents evidence about the disrupting effect of government forces, as their presence is associated with an increase of 140% in the average levels of violence. The second stage diagnostic indicates that Models 2-4 have no problem of overidentification. This is not the case for Models 1. However, due to the heterogeneous effects of some instruments on specific actors, the slight redundancy of some instruments is not surprising.

Table 3 focuses on a selected set of relevant subactors from the government, paramilitary, insurgent and criminal categories, and evaluates their violent presence on the levels of violence in the absence of competitors. Due to the absence of other actors in a given municipality-year, this type of behavior corresponds to repressive violence conducted by monopolistic armed actors. Panel (a) in Table 3 reports the results of the first stage. Model 1 shows that coca and oil shocks increase the violent presence of selected government forces, while thriving coffee seasons reduce their activities. Model 2 indicates that booming oil regions attract the violent presence of selected insurgent groups, whereas coffee shocks have the opposite effect. As expected from the theory, there is not evidence of coca production increasing insurgent violence. Model 3 shows that the violent presence of selected paramilitary organizations is positively associated to the profitability of the coca market, and negatively related to coffee production. Finally, Model 4 suggests that oil shocks motivate the violent presence of selected criminal organizations, while coffee booms hinder their violent behavior. The first stage diagnostics suggest that the joint instruments have limited strength to explain monopolistic violence of selected subactors. The Stock and Yogo (2005) critical values of the CD F-statistic suggest a bias of less than 10% in Model 1, less than 8% in Model 2, and less than 6% in Model 4, which are still tolerable. However, the bias in Model 3 raises up to 16%.

[Enter Table 3 here]

Panel (b) in Table 3 reports the effects of the predicted presence of selected subactors on the levels of violence in Colombia. In general, the analysis shows that violence increases as a consequence of monopolistic repression, yet there is variation in magnitude of the effect depending on the perpetrator. Model 1 indicates that predicted state repression raises the expected levels of violence by 142%. Model 2 shows that the violent presence of selected guerrilla groups is associated with an increase of 114% in the levels of violence. Results from Model 3 indicate that paramilitary repression boosts the expected levels of violence by 166%. Finally, Model 4 shows that the monopolistic repression from criminal groups increases the expected proportion of homicides by 154%. These results reveal a sharp difference between the violent behavior of insurgents and paramilitary groups under monopolistic conditions. The repressive violence conducted by generic guerrilla fighters, FARC combatants or ELN fighters has a positive, yet relatively moderate, effect in the levels of violence. In contrast, the brutality of repression perpetrated by generic paramilitaries, AUC combatants or ACCU militants generates the largest increase in the number of homicides. Probably, the need of social support motivates a certain degree of self-restraint from insurgents in controlled territories, while the lack of territorial contestation imposes no limits to the predatory behavior of paramilitary groups. The J statistics in Table 3 indicates that Models 1, 3 and 4 are not overidentified. However, that is not the case for Model 2. As indicated before, this is plausible as different instruments are not expected to affect subactors in the same way.

The analysis moves beyond settings of monopolistic violence by analyzing the dynamics of violence in territories contested by two contenders. Table 4 shows the effect of different dyads of selected subactors on the number of homicides. Panel (a) in Table 4 reports the effect of fluctuating commodity prices on bipolar competition. Booms of coca markets have positive effect across all specifications. It is plausible to expect the operation of distinct mechanisms attracting different actors to coca producing regions. Government authorities are expected to engage in law enforcement activities and eradication policies, while paramilitary groups and criminal organizations extort lucrative drug markets. With the exception of Model 3, thriving oil producing areas also attract dyads of competitors across all other models. However, the reasons for bipolar overlapping in oil rich territories might be different from the motivations related to coca areas. Government agencies are likely to use force to protect strategic oil infrastructure, especially under the expectation of guerrilla attacks to disrupt them, and criminals and paramilitaries are likely to create extortion rackets in oil producing areas. Finally, prosperous coffee regions reduce the number of dyads that include the government as one of the contenders (Models 1-3), as well as dyad of insurgents and criminals (Model 4). However, dyads characterized by paramilitaries fighting insurgents, or coexisting with criminals are not affected by coffee shocks.

The first stage diagnostics of Table 4 reveal different levels of instrument strength for distinct dyads. The Stock and Yogo (2005) critical values for the CD F-statistic indicate that the instruments are strong for dyads GC (Model 1) and IC (Model 4), in which there is less than 6% of bias. The CD F-statistic for dyads GI, and PC (in Models 2, and 6) suggests moderate weakness with less than 10% of bias. However, Models 3 and 5 indicate that the instruments are jointly weak to explain interactions between selected government and paramilitaries, as well as between insurgents and paramilitaries.

[Enter Table 4 here]

The second panel in Table 4 shows the effect of the predicted dyads on the levels of violence. According to Model 1, territories defined by the presence of selected government forces and criminal organizations tend to have 170% more violence than areas of no active armed actors. Model 2 shows that bipolar conflict between the state and prominent guerrilla groups tends to increase the homicide count by 159%. Notice that this dyad generates the least amount of violence among any other pair of contenders. As Model 3 suggests, the coexistence between government forces and specific paramilitary groups triggers a dramatic increase of violence by 202%. Model 4 shows that territories where insurgent and criminal organizations are present, violence increases by 186%. Model 5 shows that confrontations between guerrilla fighters and paramilitary combatants also generate the largest increase of homicides in the order of 253%. Finally, Model 6 reveals that municipalities where both paramilitaries and criminal organizations also generate a substantial wave of violence as homicides increase by 237%. The J statistics in Table 4 indicate no presence of overidentification.

In general, the second stage results in Table 4 indicate that dyads in which selected paramilitaries are actively engaged tend to experience the highest levels of violence (Models 3, 5 and 6). However, the mechanisms operating in these different settings might not be the same. The direct confrontation between insurgents and paramilitaries is plausibly the central mechanism driving the wave of violence in Model 5, which is the most lethal scenario. The second most violent dyad combines paramilitaries and criminals (Model 6). However, the driving mechanism here might be joint predation rather than rivalry. Notice that this conflict setting is only about 10% less violent than the most violent dyad, yet the mechanism for violence might be completely different. Finally, the third most violent dyad comprises government fores and paramilitaries. There are several well documented incidents in which authorities neglect to protect the population from paramilitary incursions, or even encourage paramilitary violence (Acemoglu, Robinson and Santos 2013). Therefore, the mechanism of violence might be collusion. It seems that areas where paramilitaries collude with criminals or government authorities are likely to suffer unrestrained levels of predation.

Table 5 analyzes multi-polar settings involving different combinations of triads (Models 1-4), or a quadripartite conflict scenario (Model 5). Panel (a) in Table 5 shows a consistent positive effect of prosperous coca and oil producing regions across the different triads and the tetrad. With the exception of Model 2, coffee shocks also suggest a negative effect on multi-polar conflict. In line with the theoretical expectations, fluctuations in these commodities are likely to attract the convergence of distinct actors motivated by different reasons. The CD F-statistic suggests that the instruments are strong for explaining the convergence of three or more armed actors around valuable territories. The Stock and Yogo (2005) critical values suggest relatively strong instruments with less than 7% of bias in Model 1, and less than 8% in Models 3-5. However, the bias in Model 2 increases up to 16%.

[Enter Table 5 here]

Panel (b) in Table 5 reports the effect of the predicted triads and tetrad on the levels of violence. Model 1 shows that the least violent triad is a territory comprising selected government forces, insurgent organizations and criminal groups. This convergence generates an eruption of violence 207% larger than areas with no armed actors. Model 2 indicates that violence climbs up to 248% in locations concentrating the violent presence of government forces, guerrilla fighters, and paramilitary combatants. Model 3 reveals that settings combining government forces, paramilitary organizations and criminal groups have an escalation of 229% in the number of homicides. The last triad comprises the violent presence of insurgents, paramilitaries and criminal organizations, and is likely to experience the largest increase of violence by a magnitude of 259%. Finally, the locations concentrating the most ardent conflict combine the active presence of prominent government forces, insurgent organizations, paramilitary groups, and criminal syndicates. According to the results of Model

5, territories combining these four types of actors are likely to experience burst of violence in the magnitude of 254%. Finally, the J statistic indicates no presence of overidentification in any of the models.

In line with the theoretical expectations, the involvement of additional armed actors increases the levels of violence. However, as Panel (b) in Tables 3, 4, and 5 indicate, increasing the number of actors seems to have diminishing returns on the levels of violence. In addition, as the empirical analysis indicates, the escalation of conflict is not a simple geometrical progression of the number of contenders. The dynamics of multi-polar violence are also affected by the type of actors involved in the conflict. Results in Table 5 show that the least violent triad is the one comprising government, insurgents and criminals (Model 1). This low level of violence is expected as both government and insurgents have incentives to practice self-restraint. In contrast, the most violent triad is the one comprising two rent-seeking actors, represented by paramilitaries and criminals, and insurgent groups (Model 4). In this scenario, the levels of violence might be affected by the confrontations between paramilitaries and insurgents, and influenced by the joint predation of paramilitaries and criminals, who have less incentives to self-restrain.

6 Conclusions

This paper moves beyond the dyadic conceptualization of conflict to develop a novel approach that accounts for multi-actor conflicts. We focus on the Colombian conflict where multiple armed actors interact contributing to one of the world's longest internal wars. By disaggregating armed actors, we are able to analyze the violent behavior of 30 different armed actors between 1988 and 2014, including government authorities, guerrilla organizations, paramilitary groups, and criminal syndicates. We examine the impact of external price shocks in coca, oil, and coffee on the violent presence of these different armed groups, and subsequent effects on the number of homicides. Building on existing theories of territorial competition

(Kalyvas 2006) and natural resources (Collier and Hoeffler 2004, Fearon 2004), we develop a theory and model to precisely account for the heterogeneous ways in which distinct natural resources affect the behavior of different actors.

The results show that the multi-polar nature of conflict increases the level of violence as indicated by the number of homicides at the municipal level. A more nuanced analysis of the results reveals that the relationship between the number of actors and violence is not linear, but is characterized by diminishing returns. Violence increases in tandem with moving from a setting containing a single actor to a conflict dyad, and then to a tripartite conflict environment. However, the presence of a fourth actor has a marginal effect on the number of homicides when compared to an already complex triad scenario.

In addition, the findings identify actor type as a critical factor that is largely overlooked in the literature. Results show that violence in multi-polar settings is not only a function of the number of actors, but also their kind. Based on the distinction between support-seeking and rent-seeking actors, results suggest that rent-seeking actors–such as paramilitaries and criminals–are less constrained in their use of violence by incentives to secure political loyalties with the local population. Conversely, support-seeking actors–such as government and insurgents –whose success hinges on civilian support for information and other resources, tend to be less aggressive. The analysis shows that the presence of paramilitaries and criminal groups in conflict dyads and triads generate higher level of violence than the ones experienced in settings comprising insurgent and government forces.

The analysis and findings in this paper reveal that relying on dyadic models to analyze multi-actor conflicts results in a serious problem of omitted variable bias that could lead to erroneous conclusions. Hence, there is a need for more theoretical, empirical and methodological work to develop models that better account for the unique dynamics of multi-polar conflict. In particular, more research is needed in systematically identifying different types of actors and their impact on violence.

Notes

[1]For example, in 1997 the price of 1 kg. of cocaine ready for export in Colombia was $1,050 dollars (Reuter and Greenfield 2001). In contrast, the international price per a 60 kgs. sack of coffee in the same year was $201.14 dollars, which corresponds to only $3.4 dollars per kilogram of coffee.

[2]Between 1993 and 2005, per capita justice and security spending in Colombia rose to $900,000 Colombian pesos. Spending was highest in the oil-producing departments of Arauca ($1,700,000 pesos/capita) and Casanare ($1,600,000 pesos/capita) (Holmes and Sheila Amin Gutiérrez de Piñeres 2012; 101,113,118).

[3]Other insurgent groups also expanded their territorial activities between 1995 and 2000, but their areas of activity were concentrated in a handful of municipalities reflecting the total or partial demobilization of these groups during the period under study.

[4]The measure does not include exploration contracts nor oil production off-shore.

[5]As indicated in section 3, each main actor category includes a collection of subgroups: paramilitaries contain 7 subactors, insurgents have 8 subactors, criminals include 8 subactors, and the government group comprises 7 subactors.

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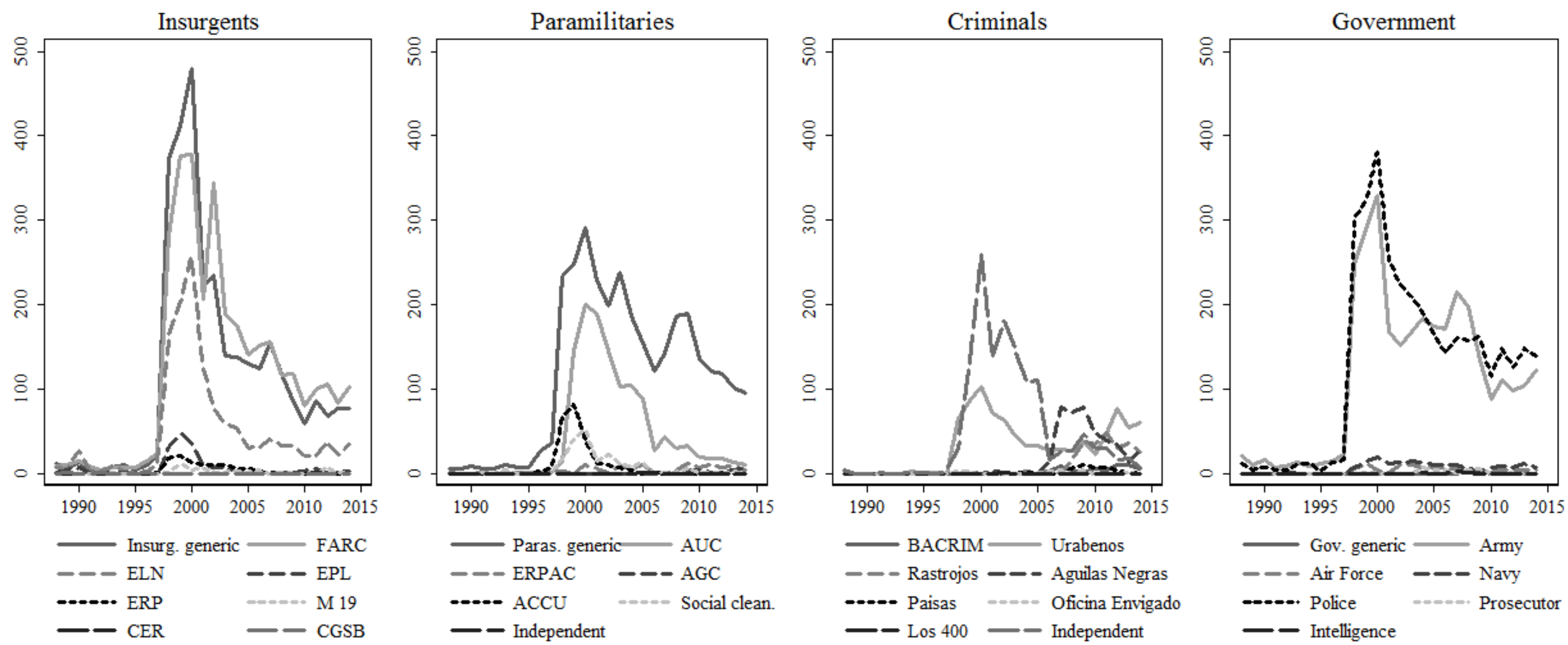
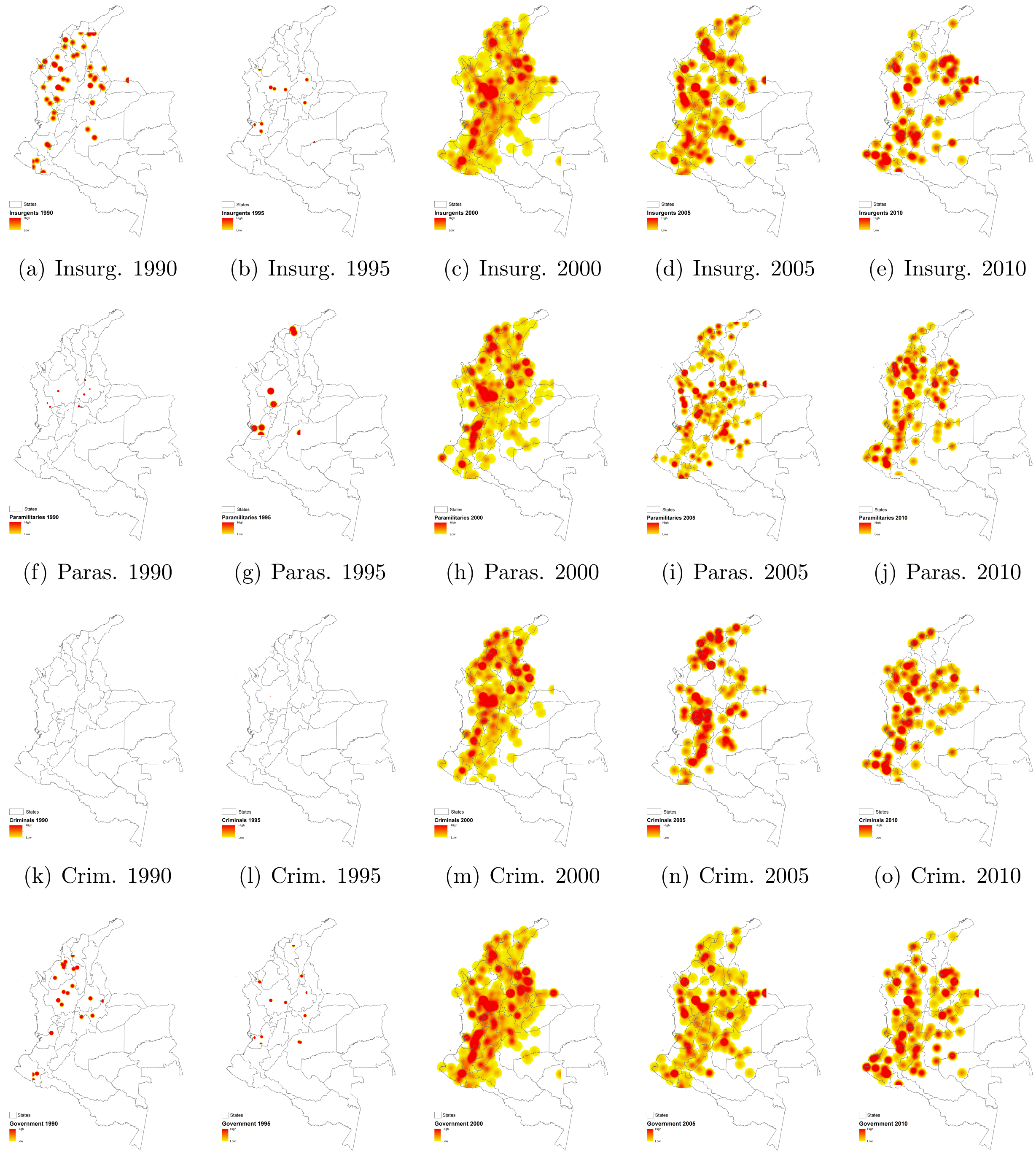


Figure 1: Number of municipalities with violent presence of armed actors in Colombia (1988-2014)



(a) Insurg. 1990 (b) Insurg. 1995 (c) Insurg. 2000 (d) Insurg. 2005 (e) Insurg. 2010

(f) Paras. 1990 (g) Paras. 1995 (h) Paras. 2000 (i) Paras. 2005 (j) Paras. 2010

(k) Crim. 1990 (l) Crim. 1995 (m) Crim. 2000 (n) Crim. 2005 (o) Crim. 2010

(p) Gov. 1990 (q) Gov. 1995 (r) Gov. 2000 (s) Gov. 2005 (t) Gov. 2010

Figure 2: Violent presence of armed actors in Colombia (1990-2010)

Table 1: Number of main actors and subactors

Panel (a): First stage		
	(1)	(2)
Endogenous variable	Main actors	Subactors
Coca price shock	0.038***	0.059**
	(0.012)	(0.020)
Oil price shock	0.020**	0.034**
	(0.007)	(0.011)
Coffee price shock	-0.619**	-1.186**
	(0.225)	(0.375)
Coca×Oil×Coffee	-0.049***	-0.068***
	(0.008)	(0.013)
Controls	Yes	Yes
Panel (b): Second stage		
	(1)	(2)
Dependent variable	Homicides	Homicides
Main actors	0.39***	
	(0.09)	
Subactors		0.25***
		(0.06)
Controls	Yes	Yes
CD-F-statistic	20.96	17.52
J-statistic	5.04	6.12
J-p-value	0.16857	0.10601
Observations	30,294	30,294

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001.
Robust standard errors in parentheses. The table omits the following controls: lagged homicides, density, density sqr., Plan Colombia military and economic spending, Pastrana and Barco peace negotiations, Plan Patriota, Medellin offensive, GDP, GDP sqr., population, year fixed effects, and region-year fixed effects.

Table 2: Main actor types

Panel (a): First stage				
	(1)	(2)	(3)	(4)
Endogenous variable	Paramilitaries	Insurgents	Criminals	Government
Coca price shock	0.015***	0.004	0.009*	0.010*
	(0.004)	(0.004)	(0.003)	(0.004)
Oil price shock	0.001	0.009***	0.003	0.006*
	(0.002)	(0.002)	(0.002)	(0.003)
Coffee price shock	-0.169*	-0.155+	-0.078	-0.217**
	(0.082)	(0.082)	(0.072)	(0.083)
Coca×Oil×Coffee	-0.009**	-0.015***	-0.014***	-0.011***
	(0.003)	(0.003)	(0.002)	(0.003)
Controls	Yes	Yes	Yes	Yes
Panel (b): Second stage				
	(1)	(2)	(3)	(4)
Dependent variable	Homicides	Homicides	Homicides	Homicides
Paramilitaries	1.44***			
	(0.42)			
Insurgents		1.25***		
		(0.33)		
Criminals			1.62***	
			(0.41)	
Government				1.40***
				(0.38)
Controls	Yes	Yes	Yes	Yes
CD-F-statistic	10.51	13.92	13.49	10.55
J-statistic	7.18	5.96	3.87	5.48
J-p-value	0.06643	0.11369	0.27553	0.14005
Observations	30,294	30,294	30,294	30,294

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001. Robust standard errors in parentheses. The table omits the same controls as indicated in Table 1.

Table 3: Selected subactors with no overlap

Panel (a): First stage				
	(1)	(2)	(3)	(4)
Endogenous variable	Selected G	Selected I	Selected P	Selected C
Coca price shock	0.009*	0.002	0.011**	0.005
	(0.004)	(0.004)	(0.004)	(0.003)
Oil price shock	0.006*	0.010***	0.002	0.006**
	(0.003)	(0.002)	(0.002)	(0.002)
Coffee price shock	-0.201*	-0.169*	-0.172*	-0.122+
	(0.084)	(0.082)	(0.082)	(0.070)
Coca×Oil×Coffee	-0.012***	-0.015***	-0.009**	-0.013***
	(0.003)	(0.003)	(0.003)	(0.002)
Controls	Yes	Yes	Yes	Yes
Panel (b): Second stage				
	(1)	(2)	(3)	(4)
Dependent variable	Homicides	Homicides	Homicides	Homicides
Selected G	1.42***			
	(0.39)			
Selected I		1.14***		
		(0.32)		
Selected P			1.66**	
			(0.51)	
Selected C				1.54***
				(0.40)
Controls	Yes	Yes	Yes	Yes
CD-F-statistic	10.32	14.13	8.18	15.75
J-statistic	5.07	8.26	6.21	5.18
J-p-value	0.16652	0.04095	0.10204	0.15896
Observations	30,294	30,294	30,294	30,294

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001. Robust standard errors in parentheses. The table omits the same controls as indicated in Table 1.
Selected subactors G, I, P and C refer to:
G: Selected government subactors: Army, Navy, or Police.
I: Selected insurgent subactors: Generic insurgents, FARC, ELN or EPL.
P: Selected paramilitary subactors: Generic paramilitaries, AUC, or ACCU.
C: Selected criminal subactors: Urabeños, Rastrojos, or independent.

Table 4: Overlapping selected subactors: dyads

Panel (a): First stage						
	(1)	(2)	(3)	(4)	(5)	(6)
Endogenous variable	Sel. GC	Sel. GI	Sel. GP	Sel. IC	Sel. IP	Sel. PC
Coca price shock	0.010***	0.006+	0.010**	0.006*	0.008*	0.005*
	(0.003)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
Oil price shock	0.004*	0.007**	0.003	0.006***	0.006**	0.004**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Coffee price shock	-0.182**	-0.166*	-0.142*	-0.123*	-0.070	-0.088
	(0.061)	(0.074)	(0.070)	(0.058)	(0.064)	(0.056)
Coca×Oil×Coffee	-0.009***	-0.011***	-0.007*	-0.010***	-0.006*	-0.008***
	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Panel (b): Second stage						
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	Homicides	Homicides	Homicides	Homicides	Homicides	Homicides
Selected GC	1.70***					
	(0.45)					
Selected GI		1.59***				
		(0.43)				
Selected GP			2.02**			
			(0.62)			
Selected IC				1.86***		
				(0.49)		
Selected IP					2.53***	
					(0.75)	
Selected PC						2.37***
						(0.66)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
CD-F-statistic	16.65	10.66	8.26	16.73	7.41	11.41
J-statistic	6.04	5.01	4.40	4.52	1.63	3.19
J-p-value	0.10960	0.17116	0.22116	0.21030	0.65311	0.36260
Observations	30,294	30,294	30,294	30,294	30,294	30,294

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001. Robust standard errors in parentheses. The table omits the same controls as indicated in Table 1. Selected actors are indicated in Table 3.

Table 5: Overlapping selected subactors: triads and tetrad

Panel (a): First stage					
	Triads				Tetrad
	(1)	(2)	(3)	(4)	(5)
Endogenous variable	GIC	GIP	GPC	IPC	GIPC
Coca price shock	0.010***	0.009**	0.009***	0.006*	0.008***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
Oil price shock	0.004*	0.005**	0.003*	0.004**	0.003**
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Coffee price shock	-0.138*	-0.091	-0.115*	-0.098*	-0.103*
	(0.054)	(0.059)	(0.051)	(0.049)	(0.047)
Coca×Oil×Coffee	-0.007***	-0.005*	-0.007***	-0.007***	-0.006***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Controls	Yes	Yes	Yes	Yes	Yes
Panel (b): Second stage					
	Triads				Tetrad
	(1)	(2)	(3)	(4)	(5)
Dependent variable	Homicides	Homicides	Homicides	Homicides	Homicides
Selected GIC	2.07***				
	(0.56)				
Selected GIP		2.48***			
		(0.73)			
Selected GPC			2.29***		
			(0.63)		
Selected IPC				2.59***	
				(0.73)	
Selected GIPC					2.54***
					(0.71)
Controls	Yes	Yes	Yes	Yes	Yes
CD-F-statistic	15.12	8.38	14.15	12.69	13.94
J-statistic	4.81	2.52	4.11	3.49	3.81
J-p-value	0.18644	0.47144	0.24971	0.32211	0.28305
Observations	30,294	30,294	30,294	30,294	30,294

+ $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$. Robust standard errors in parentheses. The table omits the same controls as indicated in Table 1. Selected actors are indicated in Table 3.

7 Appendix A: Descriptive statistics

Table 6: Descriptive statistics

Variable	Obs.	Mean	S.D.	Min	Max
Municipality - year variables					
Homicides	30294	19.711	125.973	0	4585
Main actors	30294	0.487	1.04	0	4
Subactors	30294	0.752	1.784	0	16
Insurgents	30294	0.144	0.351	0	1
Criminals	30294	0.079	0.269	0	1
Paramilitaries	30294	0.115	0.319	0	1
Government	30294	0.15	0.357	0	1
Selected G	30304	0.145	0.352	0	1
Selected I	30304	0.136	0.343	0	1
Selected P	30304	0.106	0.308	0	1
Selected C	30304	0.063	0.243	0	1
Selected GC	30304	0.046	0.209	0	1
Selected GI	30304	0.105	0.306	0	1
Selected GP	30304	0.076	0.264	0	1
Selected IC	30304	0.042	0.199	0	1
Selected IP	30304	0.064	0.244	0	1
Selected PC	30304	0.038	0.192	0	1
Selected GIC	30304	0.037	0.189	0	1
Selected GIP	30304	0.056	0.231	0	1
Selected GPC	30304	0.033	0.178	0	1
Selected IPC	30304	0.029	0.168	0	1
Selected GIPC	30304	0.029	0.166	0	1
Density	30294	128.317	504.818	0.068	12000
GDP pc (logged)	30294	1558.455	2413.71	4.085	39000
Population (logged)	30294	9.513	1.085	5.056	15.853
Coca cultivation area	30294	105.647	739.098	0	17000
Oil production contracts	30294	0.162	0.368	0	1
Coca price shocks	30294	1.323	3.481	0	15.21
Oil price shocks	30294	1.888	4.758	0	17.729
Coffee price shocks	30294	3.037	5.778	0	14.532
Coca price shocks (std)	30294	0.000	1.000	-0.380	3.990
Oil price shocks (std)	30294	-0.000	1.000	-0.397	3.330
Coffee price shocks (std)	30294	0.000	1.000	-0.526	1.989
Coca×Oil×Coffee (std)	30294	-0.010	0.723	-5.648	13.984
Department - year variables					
Oil production	30294	18000	45000	0	510000
Municipal variables (time invariant)					
Coffee prone altitude	30294	0.217	0.412	0	1
Country year variables					
Cocaine price	30294	187.398	36.534	120.75	287.29
Oil price	30294	46.763	29.366	15.899	98.133
Coffee export price	30294	134.312	53.287	64.448	283.671
Coffee production for export	30294	10000	2121.616	6213	17000
Plan Colombia	30304	0.556	0.497	0.000	1.000
Peace talks	30304	0.185	0.388	0.000	1.000

Selected subactors refers to the following set of actors:
G: Selected government subactors: Army, Navy, or Police.
I: Selected insurgent subactors: Generic insurgents, FARC, ELN or EPL.
P: Selected paramilitary subactors: Generic paramilitaries, AUC, or ACCU.
C: Selected criminal subactors: Urabeños, Rastrojos, or independent.

8 Appendix B: Reduced from Tables

Table 7: Reduced form: Number of main actors and subactors

	(1)	(2)
Dependent variable	Homicides	Homicides
Coca price shock	0.02**	0.02**
	(0.01)	(0.01)
Oil price shock	0.01*	0.01*
	(0.01)	(0.01)
Coffee price shock	0.05	0.05
	(0.15)	(0.15)
Coca×Oil×Coffee	-0.02**	-0.02**
	(0.01)	(0.01)
Controls	Yes	Yes
Observations	30,294	30,294

+ $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 8: Reduced form: Main actor types

	(1)	(2)	(3)	(4)
Dependent variable	Homicides	Homicides	Homicides	Homicides
Coca price shock	0.02**	0.02**	0.02**	0.02**
	(0.01)	(0.01)	(0.01)	(0.01)
Oil price shock	0.01*	0.01*	0.01*	0.01*
	(0.01)	(0.01)	(0.01)	(0.01)
Coffee price shock	0.05	0.05	0.05	0.05
	(0.15)	(0.15)	(0.15)	(0.15)
Coca×Oil×Coffee	-0.02**	-0.02**	-0.02**	-0.02**
	(0.01)	(0.01)	(0.01)	(0.01)
Controls	Yes	Yes	Yes	Yes
Observations	30,294	30,294	30,294	30,294

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001.

Table 9: Reduced form: No selected subactor overlap

	(1)	(2)	(3)	(4)
Dependent variable	Homicides	Homicides	Homicides	Homicides
Coca price shock	0.02**	0.02**	0.02**	0.02**
	(0.01)	(0.01)	(0.01)	(0.01)
Oil price shock	0.01*	0.01*	0.01*	0.01*
	(0.01)	(0.01)	(0.01)	(0.01)
Coffee price shock	0.05	0.05	0.05	0.05
	(0.15)	(0.15)	(0.15)	(0.15)
Coca×Oil×Coffee	-0.02**	-0.02**	-0.02**	-0.02**
	(0.01)	(0.01)	(0.01)	(0.01)
Controls	Yes	Yes	Yes	Yes
Observations	30,294	30,294	30,294	30,294

+ $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 10: Reduced form - Overlapping selected subactors: dyads

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	Homicides	Homicides	Homicides	Homicides	Homicides	Homicides
Coca price shock	0.02**	0.02**	0.02**	0.02**	0.02**	0.02**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Oil price shock	0.01*	0.01*	0.01*	0.01*	0.01*	0.01*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Coffee price shock	0.05	0.05	0.05	0.05	0.05	0.05
	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)
Coca×Oil×Coffee	-0.02**	-0.02**	-0.02**	-0.02**	-0.02**	-0.02**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	30,294	30,294	30,294	30,294	30,294	30,294

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001.

Table 11: Reduced form - Overlapping selected subactors: tetrad and triads

	(1) Homicides	(2) Homicides	(3) Homicides	(4) Homicides	(5) Homicides
Coca price shock	0.02**	0.02**	0.02**	0.02**	0.02**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Oil price shock	0.01*	0.01*	0.01*	0.01*	0.01*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Coffee price shock	0.05	0.05	0.05	0.05	0.05
	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)
Coca×Oil×Coffee	-0.02**	-0.02**	-0.02**	-0.02**	-0.02**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	30,294	30,294	30,294	30,294	30,294

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001.