

QUANTITATIVE DETERMINANTS OF THE FARC-EP GUERRILLA VIOLENCE IN COLOMBIA

This work was supported by the Observatory of Human Rights and International Humanitarian Law (ODHDIH by its abbreviation in Spanish) of the Vice-Presidency of the Republic of Colombia

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Abstract

The purpose of the following study is to explain the activism of the Revolutionary Armed Forces of Colombia – People's Army (FARC-EP) within the framework of the Colombian internal armed conflict between 2002 and 2012. In addition to being the time of the greater armed intensity, the investigation tries to explain the impact of different social, economic or institutional variables that, from a statistical exercise with regressions, show how it is possible to find foundation in understanding why the activism of this guerrilla responds in a greater manner to some scenarios than to others. Drawing on a multivariate exercise with institutional sources, a comprehensive exercise on guerrilla violence in Colombia is conducted, which escapes from unidirectional explanations and juxtaposes different variables in order to seek for an answer, with greater complexity, to what and how the logic of the guerrilla activism from the FARC-EP has been understood during the last decade and a half.

Keywords

Colombian Armed, Conflict, Determinants of Violence, FARC-EP, Political Violence.

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1. Introduction

This work presents, from a strictly quantitative approach, the analysis of some variables that have determined guerrilla violence in Colombia during the last decade. This, with the aim of identifying not only the patterns of direct violence exercised by the FARC-EP, but also to understand why violence happens to a greater or lesser degree, and according to which contexts.

The idea, therefore, is to analyze some of the variables that, considering the prolific literature on the internal armed conflict in Colombia, have traditionally been identified as those with the greatest influence to generate guerrilla activism and presence. So, socioeconomic, institutional, geographical, and other variables will be aggregated, same that in the end will allow us to understand why the internal armed conflict ended up becoming territorial in certain regions of the country, to such an extent that the military solution in favor of the State became impossible, and ended up making necessary to overcome the conflict through peaceful means of conflict resolution, culminating in the signing of the Peace Agreement between the guerrilla and the Colombian Government on November 24, 2016.

Based on the above, the work is organized around four parts. The first one, identifies the most relevant literature that has studied the internal armed conflict from different angles and perspectives, paying special attention to some of the factors that are identified as explanatory of the violence in Colombia, and that also construct a theoretical approach that understands that the violence generated from the armed conflict in Colombia responds to objective circumstances, especially of a socio-economic nature (Sánchez, 2009). Then, the details of the methodological analysis with which the econometric model, description of variables, their operationalization, as well as the origin and sources



of information are explained. In the third part, the analysis and results that would explain how and why the guerrilla violence has occurred in the last years are presented; to finally, as a corollary, present possible lines of research based on this work which, in particular, allow to identify not only the most vulnerable scenarios after the armed violence in Colombia, but also an eventual framework of the post-conflict such as the present one.

2. Status of the issue and theoretical framework

The Colombian armed conflict has been one of the most investigated in Latin America, given its longevity of more than half a century, so there are a wide variety of approaches that have tried to explain it and address it. Thus, among many others, historical studies, military studies, geographic-political approaches to violence, as well as strictly economic approaches could be highlighted as major fields of study.

From the historical contributions of armed violence, the works of Pécaut (2008), Aguilera (2010), and Pizarro (2011) about the FARC-EP become mandatory references; just as in the case of the ELN, the investigations by Medina (1996), or Hernández (2006) stand out; and in relation to paramilitarism, the publications of Medina (1990), Romero (2003), Duncan (2006), or Ronderos (2014), among others. All of them deal with the origins and evolution of armed groups that have been protagonists in the internal armed conflict, taking into account not only the root causes of their appearance, but also the organizational, economic and violence factors that determined the particular evolution.

From the military studies, there is another neat research line on violence in Colombia, focused on determining what the dynamics of violence were in terms of military strategies or types of military security and cooperation policies. For example, works such as those by Blair (1993) or Leal (1994), focus on analyzing the role of the Public Force, the influence of national security doctrines, and the concurrence of internal enemies, resulting from the influence of the American thought. Additionally, Ramírez (2000) and Rangel (2003) focus on the importance of US military cooperation policies, while others such as Echandía (1999, 2006), Salas (2010, 2015) or Ríos (2016a, 2016b) prioritize the study of the military strategy of the guerrillas, according to the change factors and the different stimuli concurrent in the internal conflict.

Political geography has also been an interesting starting point in the understanding of the Colombian conflict, mainly because of its attempt to understand how areas used to plant coca and other resources have operated as explanatory factors of violence in Colombia (Betancourt, 1991; Observatorio Geopolítico de las Drogas, 1996; Echandía, 1996). These visions, on the other hand, have been complemented by local approaches such as those developed by the Center for Research and Popular Education (CINEP by its abbreviation in Spanish) in the works developed by García (2003) on peace actors and violence in Bajo Cauca region of Antioquia; by Guzmán (2003), on Valle del Cauca and Cauca; or by Gutiérrez (1998; 2002) on the relationship of violence and political system in Cundinamarca. Also, we must highlight the contributions from Vásquez, Vargas, and Restrepo (2011) concentrated on the South area of the country; or Torres (2011) and Rodríguez Cuadros (2015), in particular case studies focused on Putumayo and Nariño, respectively. On the other hand, García and Aramburo (2011), with a marked geographical imprint, address the complexity of armed violence in the East area and the Urabá region in Antioquia; since González *et al.* (2012) focus on Eastern Colombia, and



particularly in Antioquia, Boyacá, Santander, Norte de Santander and Arauca; and in a second document, does the same work about the Caribbean region of the country (González *et al.*, 2014).

From the approaches that are closer to the economy, it may be noted, first of all, that there have been two currents that have dominated the explanation of the Colombian armed conflict. On one side, those focused on analyzing the cost of violence in Colombia and, in front of them, those that have analyzed, either with a more qualitative or more quantitative approach, the economic factors that have stimulated violence.

In reference to the first works, some outstanding contributions emerge from the second half of the nineties; there are works that are focused on showing the negative repercussion that the conflict has on the economy of the country and, by extension, on the continuation of the social problems. It is thus possible to highlight the contributions of Castro *et al.* (2000); Trujillo and Badel (1998); Granada and Rojas (1995), or Deas and Gaitán (1995), who agree, in brief, in indicating that the costs for Colombia of this armed conflict, in a macroeconomic study focused in the 1990s, would amount between 2 and 4 % of the Gross Domestic Product (GDP); a figure well below the 15.1% that Sánchez and Díaz (2005) quantified with respect to the percentage of GDP represented by illicit activities in Colombia. In more current literature, we can not overlook the work of Otero (2007. p. 10), who, being focused on the Democratic Security Policy, refers to an impairment of 4.5% of GDP, according to a conflict quantification exercise which states that between 1958 and 2012, it has left behind more than 220,000 deaths, 25,000 missing, 27,000 people kidnapped, 5.7 million displaced persons, almost 2,000 massacres and 5,000 attacks against public infrastructure (Centro Nacional de Memoria Histórica, 2013). In sum, an economic impact, only between 2000 and 2003, of \$35 billion Dollars in security costs, plus another \$2.3 billion in direct costs of war. Nor can we ignore other works, equally aimed at the economic deceleration that has involved armed violence in Colombia, as proposed by Álvarez and Rettberg (2008), Sánchez *et al.* (2009) or, more recently, from a sub-national perspective, the work of Querubín (2013).

From the group of works that are oriented on explaining violence based on economic factors, the work of Sánchez (1987) is one of the mandatory starting points, as it is the first one to alert the close relationship between structural violence and the emergence of armed conflict. This hypothesis, followed by Molano (1987), Reyes (1988) or Ramírez (1990) will open a line of research in the 1990s that is predominant in the Colombian academy, known as the violentology, which will be developed within the National University of Colombia.

Theoretically, this line has a linking point with the theoretical developments that try to understand the violence of an armed conflict from an unending correspondence, not only to legitimize the existence of an armed struggle but also, to identify a rational calculation and a use of economic resources as an input to sustain the aforementioned violence for the sake of a military victory (Montenegro & Posada, 2005). And, in fact, between one and the other, as will be seen below, is where the approach of this work comes into force.

That is to say, the explanatory contribution of this work evidences that there are structural factors from origin that allow explaining and understanding certain enclaves of greater guerrilla entrenchment since, due to the evolution of the internal armed conflict, there are other factors that, besides being derived from violence and not so much from origin, they also take on an argumentative force when it comes to understanding why



guerrilla violence is concentrated in certain scenarios rather than in others. Thus, for the case of Colombia, all the works coincide in highlighting the economic inequality (Candelo *et al.*, 2000), land concentration (Ibáñez and Querubín, 2004), or forced displacement and accumulation of land (Reyes, 2009).

Finally, the internal armed conflict can not be understood without the revenues of legal sources, and mostly illegal, that fuel every armed confrontation against the State but also construct particular dynamics of legitimacy (Collier, 2000; Collier & Hoeffler 2004; Bates, 2008). Something that, for that matter, Yaffe (2011, pp. 193) for the case of Colombia and taking up contributions such as Ballentine and Nitzchke (2003) or Ballentine and Sherman (2003), implies that:

...although the struggle for access to economic resources can be a perpetuating element of armed conflicts, it is not the main cause of their emergence (since) they agree in the fact that the origin of violent conflicts is in the resentments generated by the bad management of resources, the unequal distribution of wealth derived from these resources, and the government policies that prevent many sectors from benefiting from these fortunes. Yaffe (2011, pp. 193).

That is to say, both conditions originating from structural violence, translated into institutional abandonment, inequality, or socio-economic backwardness, such as conditions that are linked to the curse of resources for the survival of violence would come together as explanatory factors of the guerrilla activism in Colombia. An activism that, according to what is stated in the following section, seeks to be explained in the light of a list of variables that, in the beginning, should serve to understand how the dynamics of violence in Colombia are produced.

3. Methodological design

The methodological design is inspired by two investigations of mandatory reference. First, the work by Sánchez and Díaz (2005) that focuses on analyzing the economic effects of the armed conflict in Colombia and investigates the evolution of the armed activity of the FARC-EP, the ELN, and the United Self-Defense Forces of Colombia, between 1995 and 2002, throughout a vast sample of municipalities. In this work, the consequences of the activities of these groups are estimated on the forced internal displacement, human capital (in terms of education and infant mortality), socioeconomic variables (based on Unsatisfied Basic Needs and the Gini coefficient), in addition to geographic variables (distance and infrastructure), and fiscal activity (transfers and public investment). The technique that was used, and that also serves as a reference, is matching estimators, whereas what is compared is the reality of a municipality with the armed activity against a simulated municipality without armed activity, but that in other aspects maintains conditions that are very similar to the first one.

On the other hand, the contribution of Botello (2014) seeks to explain the determinants of the homicide rate at national level, transcending itself from the armed conflict,



between 1993 and 2005; this time, based on a Tobit model, which is used when the information of the dependent variable can be divided into two groups (municipalities without homicides and with homicides), we use explanatory variables that include the average income of the municipalities, the number of inhabitants, and the size of the urban sector.

Based on the above, the assumption on this occasion is to estimate and quantify the determinants of the armed conflict in Colombia although, unlike the previous ones, the dependent variable is the number of armed actions of the FARC-EP, whilst it is about explaining what factors explain their activism in recent years. In this way, and contrary to both, the period that is analyzed is more recent, covering the decade between 2002 and 2012, since it is the one of the greatest guerrilla violence in the recent history of the country, and so, emphasize in this way the explanatory imprint that pose the cultivation of coca, the mining activity, the operational capacity of the Armed Forces, or the legal changes focused towards the end of the conflict, among other factors.

3.1. Description of variables

All the indicators that are presented in this paper are analyzed by department according to an annual periodicity that, as noted before, covers from 2002 until 2012. In the case of most of the quantitative variables, the natural logarithm (symbolized by an "L" that precedes a variable) is applied. The number of clashes with the FARC-EP guerrillas and the armed contacts initiated by the Public Force were obtained from the Observatory of Human Rights and International Humanitarian Law (ODHDIH by its abbreviation in Spanish) of the Vice-Presidency of the Republic, whose information, in turn, was processed by the Department of Security Administration until 2011, and from then on by the General Command of the Military Forces. Thus, based on this indicator, armed actions are understood as the number of attacks against the Armed Forces, ambushes, harassment, attacks against the civilian population, and acts of terrorism carried out by the FARC-EP. An activism that, according to the data, would be mainly concentrated in the departments of Cauca, Nariño, Antioquia, Caquetá, Arauca, and Putumayo, where the annual average of fifty actions was exceeded by all of them.

The number of coca crops is measured per cultivated hectare, based on the calculations made by the United Nations Office on Drugs and Crime (UNODC), which coordinates all the information that nourishes the Illicit Crop Monitoring System in Colombia (SIMCI by its abbreviation in Spanish), in which all data on illicit drugs is concentrated. Similarly, departments such as Cauca, Nariño, Antioquia, Caquetá, Putumayo, Guaviare, and Meta would be the coca-growing departments of Colombia par excellence, surpassing the 4,000 hectares of cultivated coca plantations annual average in the period under study.

On the other hand, Cundinamarca and the departments of Santander, Valle del Cauca, and Antioquia would be the ones with the highest real GDP per capita, exceeding the \$8,000,000 Colombian Pesos (COP) per year, approximately \$3,000 Dollars (US), which would contrast with departments such as Vaupés, Chocó, Guainía, Guaviare, Nariño, and Sucre, where the same indicator is less than COP\$3,700,000 in annual average (approximately US\$1,200). On this occasion, it would be the National Administrative



Department of Statistics (DANE¹ by its abbreviation in Spanish) who will work as the source from which information on this type of indicator can be extracted, making also possible to calculate the population density by department.

Data about inequity, specifically in terms of ownership and distribution of land tenure, and covering all data and departments, with exception of the data for year 2012, are obtained through the Ministry of Agriculture of Colombia. In this way, the departments with the greatest inequality would be Antioquia, Meta, Arauca, Cauca, Valle del Cauca, and Boyacá, with a coefficient that exceeds the value of 0.82 in annual average. This, compared to the departments of Orinoquia and Amazonia, which like Vaupés, Vichada, Guainía, or Guaviare, share much more egalitarian trends (coefficient of 0.47 annual average).

The socioeconomic conditions of violence are integrated, fundamentally, based on three variables. On the one hand, educational performance is measured on the basis of the results of the mathematics tests from the exams that are given to enroll Higher Education (SABER 11)². These tests measure the level of quality of education, which is key for stimulating, or not, actions of guerrilla recruitment. In this way, this indicator was analyzed for all years, and the results showed a high performance from Cundinamarca, Santander, Boyacá, Nariño, and Valle del Cauca (above 44.5 annual average) compared to other departments such as Chocó, Vaupés, Amazonas, and Magdalena, where the lowest scores were recorded (below 42 annual average).

Also, the departmental tax collection per inhabitant would measure institutional capacities to combat violence, although it is available only for the years between 2009 and 2012, thanks to the figures that are housed in the National Planning Department (DNP³ by its abbreviation in Spanish). Tax revenues are high in San Andrés, Cundinamarca, Antioquia, and Boyacá (above COP\$149,000 annual average) compared to Putumayo, Cauca, Nariño, and La Guajira (below COP\$70,000 annual average) that is where the tax collection is much lower.

Besides, the Ministry of Health and Social Protection⁴ provided the infant mortality rate, which measures the number of deaths in children less than 1 year of age per 1,000 births, from 2000 to 2005. The best indicators of infant mortality are in Santander, San Andrés, Arauca, Casanare, and Valle del Cauca (below 15 deaths in the annual average), as opposed to Chocó, Vichada, Caquetá, and Guainía (above 29 deaths in the annual average).

Dichotomous variables were created to measure changes throughout time. This was the case of "Santos", who took the value of 1 for 2011 and 2012 (periods in which Juan Manuel Santos served as president) and the variable "justice" to which value 1 was assigned from 2006 to 2012, seeking to find the possible effects of Law 975 of 2005 on Justice and Peace in guerrilla violence in Colombia, while leaving with it the demobilization of more than 31,000 paramilitaries.

¹ Information can be found on www.dane.gov.co in the section *Estadísticas por tema* and then in *Cuentas Nacionales*.

² Information can be found on www.icfesinteractivo.gov.co/historicos/

³ Information can be found on www.dnp.gov.co/programas/desarrollo-territorial/evaluacion-y-seguimiento-de-la-descentralizacion/Paginas/desempeno-fiscal.aspx

⁴ Information can be found on www.minsalud.gov.co/estadisticas



Finally, variables were constructed to measure specific characteristics of the departments, especially in attention to the center/periphery binomial. *Distancia* measures the length in kilometers between the capital of a department and the capital of Bogotá. *Frontera*, *Mar*, *Andino*, *Minorías*, and *Minero* are qualitative variables that serve to compare the group of departments that share a border with some country, have access to the sea, where minorities are representative within their population or with respect to which the mining sector becomes especially important within the departmental GDP.

4. ANALYSIS OF THE INVESTIGATION

4.1. Determinants of conflict (specification 1)

The model that has been proposed for analyzing the determinants of the conflict is the following (equation 1):

$$CO_{i,t} = \beta_0 + \beta_1 L(CI_{i,t}) + \beta_2 L(GOB_{i,t}) + \beta_3 (DESECON_{i,t}) + \beta_4 (MINE_i) + u_{i,t}$$

a) Illegal crops *CI*, government *GOB*, real GDP per capita *PIBRPC*, and the presence of mining *MIN* determine the evolution of the conflict *CO*. The error *u* captures all independent variables not explicitly included in equation (1).

b) Illegal Crops *CI*: when there is an increase in the coca crops, it requires the augmentation of troops from illegal armed groups, leading to greater conflict (positive beta 1). Coca crops were calculated using the variable *LCOCA*.

c) Government *GOB*: higher tax revenue per capita reflects a greater presence of the Government and a lower possibility of conflict (negative beta 2). In this scenario, it is also important to consider that a larger army can generate a greater conflict (positive beta 2). In this case, *LRECTRIPC* is the variable used to measure tax collection.

d) Economic Performance *DESECON*: since there is much part of the conflict with guerrillas occurring outside of urban centers, to a greater economic development reduced the incentives to generate conflict (negative beta 3). The variable used is *LPIBRPC*.

e) Miner *MINERO*: the departments that are most dependent on the mining sector, attract the attention of illegal armed groups given the ability to generate additional income. This in turn translates into greater conflict in protecting these new resources (beta 4 positive). The mining activity was estimated using the variable *MINERO*.

4.2. Determinants of conflict (specification 2)

Another model proposed to analyze the determinants of the conflict is the following (equation 2):

$$CO_{i,t} = \alpha_0 + \alpha_1 L(CI_{i,t}) + \alpha_2 L(DES_{i,t}) + \alpha_3 L(DI_i) + \alpha_4 (LEY_t) + \alpha_5 (IN_{i,t}) + v_{i,t}$$

Illegal crops *CI*, inequality *DES*, distance *DI*, justice *JUS*, and initiative *IN* determine the evolution of the conflict *CO*. The error *v* captures all the independent variables not explicitly included in equation (2).



- a) Illegal Crops *CI*: when there is an increase in the coca crops, it requires the augmentation of troops from illegal armed groups, leading to greater conflict (positive alpha 1). Coca crops were calculated using the variable *LCOCA*.
- b) Inequality *DES*: according to the literature, inequality and especially rural inequality are one source of conflict, but also of legitimacy to justify guerrilla action (alpha 2 positive). The inequality was estimated using the variable *LGINIT*.
- c) Distance *DIS*: the economic performance and the presence of the Government are also associated with the peripheralization of the conflict. A greater distance indicates the peripheralization of the conflict due to a lower presence of the Government and a reduced internal trade (alpha 3 positive). The variable used is *LDISTANCE*.
- d) Laws *LAW*: the legal framework also poses solutions to the conflict. Laws allowing the inclusion of illegal armed groups into civil society reduce future sources of violence (negative alpha 4). In this case, *JUSTICE* is the variable that is used to measure change in legal processes.
- e) Initiative *INI*: as mentioned above, it is important to consider that a larger majority of Public Force can generate intensification of the conflict (positive beta 5). The initiative of the Military Forces is evaluated with the variable *LFFMM*.

5. Results of the investigation

5.1. Ordinary Least Squares (double logarithmic model)

Using the statistical program Eviews version 9.5, the following regressions in which the dependent variable is the natural logarithm of the number of confrontations from the FARC-EP guerrillas were performed (Tables 1 and 2). The Ordinary Least Squares method allows us to know the marginal effect of an independent variable (coca crops) on a dependent variable (conflict), keeping the other variables constant. In all cases a Log-Log model is used since the coefficients have an intuitive interpretation (elasticities), it reduces the possible problems of heteroscedasticity and allows to compare variables in different units of measurement. The statistical program Eviews is used given that it is one of the softwares that allows to model information from panel data, and allows to analyze the information in an intuitive way.

In the first regressions (Table 1) the emphasis was on coca production, State presence (tax collection per capita), and economic performance (real GDP per capita). In all cases, the response of the conflict to coca cultivation is inelastic and positive. This result can be explained in the following way: when the production increases, the guerrilla group makes an additional effort to protect these lands from different threats (FARC, ELN, paramilitary, and National Army).

The presence of the State attenuates the magnitude of the conflict in a considerable way. When the departmental tax collection increases by 1%, the number of FARC-EP clashes decreases by 1.93% (Model 4). When the Government carries out a greater collection, it is probable that it will have a greater presence of Public Force in that department and in this way restrain confrontations with the guerrilla group.

The economic growth also has a significant impact on fighting. When GDP per capita increases by 1%, the number of FARC-EP clashes increases by 1.36% (Model 4). This



logic-challenging outcome can be explained by the productive structure of the region. Departments in which the mining sector generates a large part of its GDP attract the attention of illegal armed groups. Among the multiple sources of income of the FARC-EP, the extraction of minerals such as gold in the Pacific or oil in the department of Arauca can be included. When analyzing the variable *MINERO * LPIBRPC*, the results show a positive sign pointing out how the economic growth of departments with high dependence on mining generates more clashes with the FARC-EP.

As in the regressions in Table 1, the conflict response to coca crops is inelastic and positive (Table 2). In addition to the above, measures of inequality (GINI of lands), peripheralization of the conflict (distance to Bogotá), Law of Justice and Peace (Justice), and Military Forces (initiative) were incorporated into the models 6, 7 and 8.

Among all variables, inequality has the largest impact on the number of confrontations (models 6, 7 and 8). When the Gini coefficient of land per department increases by 1%, the number of FARC-EP clashes increases by 1.63% (Model 8). Thus, high levels of inequality generate discontent and discomfort in such a way that when injustices are perceived in the processes, the result is a greater conflict in those regions, according to what is posed in some previous works like the one by Whitworth (2012), which is centered in showing how there is a significant link between inequality and violence at the local level.

The presence of the State can also be modeled by the distance between the capital of a department and Bogotá. When the distance increases by 1%, the confrontations increase by 0.10% (Model 8). The distance indirectly reflects the transport costs and the influence of the capital city on a department, given by the easiness in the internal commerce (even from the times of the colony, as proposed by Safford & Palacios, 2012).

On the other hand, the Justice and Peace Law reduced the intensity of the conflict by 43% when comparing the period between 2001 to 2005 and 2006 to 2012. Given the strong acceptance of this Law by the United Self-Defense Groups of Colombia (AUC by its abbreviation in Spanish), it would be expected for the guerrilla of the FARC-EP to have less competition for coca crops (between 2002 and 2010, there were 31,810 group and 21,849 individual demobilizations carried out according to the Office of the High Commissioner for Peace).

When the military forces increase their initiative in the conflict by 1%, the number of conflicts with the FARC-EP increases by 0.66%. According to the above, the Army has also had an offensive position in the conflict which generates a response from the guerrilla and sharpens the conflict in the country. This poses a positive scenario for peace as both actors lose the incentive to start a fight.

5.2. Binary models

Another way to understand the consequences of the Colombian internal armed conflict is to estimate the probabilities of engagement with the FARC-EP. Under this scenario, the departments that have had at least one contact with this group differ from those without conflict. The technique that is used is the binary models that allow the calculation of regressions when the dependent variable acquires only two values (1 if it had conflict, 0 otherwise).



Tables 3 and 4 present the results of the Logit model including all the departments of the sample. A qualitative variable that allows comparing the departments with coca crops versus those that do not have them was constructed. The difference is statistically significant in most cases, and in model 16, the coca-producing departments are 39% more likely to have conflicts with the FARC.

When analyzing the incidence of inequality and the initiative of the military forces, one can observe their importance as conflict sources. For each additional point in the Gini coefficient of land, the probability of having a combat with the FARC increases by 63%. For every military initiative of the Colombian Public Force, the probability of generating a conflict with the FARC-EP increases by 7%.

5.3. Models with censored or truncated information

The Tobit model employs the best of the double logarithmic model (5.2.1) and the binary models (5.2.2). Just like the binary models, the Tobit model divides the sample into those departments that had conflict with those that did not have this condition, but in this case the regression allows to differentiate the severity of the conflict because the dependent variable assumes its original values (not binaries).

Similar to what is discussed in point 5.2.1, the conflict response to coca crops is inelastic and positive. In addition, the inequality has the greatest impact on the number of clashes (Table 6) and its coefficient is very similar to the one indicated in 5.2.1 (1.75% versus 1.63%). In spite of the above, the impact of the Justice and Peace Law, and the initiative of the Military Forces is larger in the Tobit models (71% compared to 43% in the first case and 0.66% compared to 0.71 %).

5.4. Assumptions review

Among the independent variables, the correlation coefficients register values that are lower than 0.63, indicating that multicollinearity is not a serious problem. This diagnosis was validated by the auxiliary regressions and the Klein rule.

When performing regressions with robust errors that correct problems of heteroscedasticity, the signs and magnitudes of the estimators did not change significantly.

The approximation to the normal standard of the Durbin Watson statistic shows that, in general terms, most of the regressions do not present autocorrelation order 1 (positive or negative).

With a significance of 1%, the Jarque Bera test of normality does not reject the null hypothesis that the regression errors of models 2, 3, 4, 7 and 8 follow the normal distribution. In the other cases, although the null hypothesis is rejected, the sample size allows statistical inference (minimum sample size of 238).

6. Conclusions

This research carried out a quantitative approximation by analyzing some variables that, segmented according to their socioeconomic, institutional, and geographic nature, and



pondering by their importance, explain much of the FARC-EP guerrilla activism that has occurred in recent years.

On the socioeconomic side, the emphasis was placed on the production of coca and the presence of the State (tax collection per capita), revealing a positive relationship between the armed conflict and coca cultivation. The response of the conflict to coca crops is less than 1%; a situation that can be explained by the additional efforts that the FARC-EP guerrilla must carry out in order to protect these lands. This result, although not so evident, is magnified when compared with groups of regions, showing that coca-producing departments are 39% more likely to have clashes with the FARC.

The guerrilla group gained ground in the economic environment thanks to illicit crops and criminal activities, before which the Colombian State has had serious difficulties to stop these phenomena. In this study, it is determined that the tax collection has influence in the conflict as, when it increases by 1%, the number of combats with the FARC-EP decrease by 1.93%. That is to say, it could be affirmed that when the Government carries out a greater collection, it counts on greater Public Force support from which to dissuade the violence produced by the internal conflict.

Within the findings of the study, it is evident that the mining activity is also a determinant of the armed conflict. When conducting the interaction of the percentages of the mining GDP with the per capita GDP of a department, it shows a positive relationship. The greater the mining wealth, the more conflicts are generated in that region, perhaps also related by the fact that illegal mining has stood out as one of the most important sources of income for the FARC-EP.

Amidst the socioeconomic variables, inequality plays a very important role in the confrontations. When the Gini coefficient of land increases by 1%, the number of FARC-EP combats increase by 1.63%. This, insofar as high levels of inequality generate malaise and nonconformity, and when injustices are perceived in the processes, the result is a greater conflict in those regions.

Likewise, the periferialization of the conflict (distance to Bogotá), and the Justice and Peace Law together with the initiative of the Military Forces were, on the other hand, included as institutional variables. The effect of distance and army initiative on the conflict is positive, but below 0.2% in the first case and below 0.7% in the second variable. Besides, it is evident that the guerrillas have been strengthened, thanks to the absence of the State, in regions that are far from the great capitals and the demographic centers. The further the department is from the capital the more reduced the presence of the State, which is reinforced by the greater costs of transport. The Justice and Peace Law, on the other hand, has a significant effect on the reduction of the conflict over the conflict, comparing the period between 2001 to 2005 and 2006 to 2012, its severity was reduced by 43%.

Finally, it can be concluded that guerrilla violence in Colombia is mainly determined by inequality, the presence of the State, cocaine crops, and armed demobilization processes (Justice and Peace Law).

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ANNEXES

Table 1. Conflict Regressions (dependent variable *LFARC*)

Variable	Model 1	Model 2	Model 3	Model 4
C	1,06(0,28)***	3,68(2,09)***	-21,93(1,25)***	-13,28(5,65)*
LCOCA	0,18(0,04)***	0,36(0,07)***	0,42(0,06)***	0,43(0,06)***
LRECTRIPC		- 0,84(0,41)***	-2,28(0,43)***	-1,93(0,47)***
LPIBRPC			2,04(0,34)***	1,36(0,42)***
MINERO				-16,67(9,03)*
MINERO*LPIBRPC				1,09(0,57)*
N	288	96	96	96
R2	0,07	0,27	0,47	0,51
F	22,47***	17,1***	28,04***	19,08**
DW	1,79	2,27	2,17	2,25

Source. Calculations prepared by the authors. *p<0,10; **p<0,05; ***p< 0,01

Table 2. Conflict Regressions (dependent variable *LFARC*)

Variable	Model 5	Model 6	Model 7	Model 8
C	1,06(0,28)***	2,10(0,28)***	1,11(0,39)***	0,03(0,34)
LCOCA	0,18(0,04)***	0,19(0,03)***	0,17(0,03)***	0,06(0,03)**
LGINIT		2,64(0,36)***	3,13(0,38)***	1,63(0,32)***
LDISTANCIA			0,22(0,06)***	0,10(0,16)**
JUSTICIA				-0,57(0,14)***
LFFMM				0,66(0,06)***
N	288	246	246	245
R2	0,07	0,24	0,27	0,58
F	22,47***	38,48***	31,16***	64,91**
DW	1,79	1,70	1,83	1,97

Source. Calculations prepared by the authors. *p<0,10; **p<0,05; ***p< 0,01

Table 3. Conflict Regressions (Logit) (dependent variable *FARCD*)

Variable	Model 9	Model 10	Model 11	Model 12
C	0,64(0,21)***	0,55(0,58)	-0,18(0,71)	-0,79(0,84)
DCOCA	0,79(0,26)***	1,11(0,44)**	1,46(0,49)***	2,07(0,62)***
RECTRIPC		- 0,005(0,003)*	-0,02(0,006)***	-0,01(0,006)**
PIBRPC			0,00(0,00)***	0,00(0,00)
MINERO				2,01(1,74)
MINERO*PIBRPC				0,00(0,00)
N	372	124	124	124
R2 (Mc Fadden)	0,02	0,08	0,20	0,29
LR	8,72***	12,35***	31,13***	45,58***

Source. Calculations prepared by the authors. *p<0,10; **p<0,05; ***p< 0,01



Table 4. Conflict Regressions (Logit) (dependent variable *FARCD*)

Variable	Model 13	Model 14	Model 15	Model 16
C	0,64(0,21)***	-2,00(0,83)**	-2,46(0,89)***	0,02(1,05)
DCOCA	0,79(0,26)***	1,31(0,31)***	1,29(0,31)***	0,40(0,39)
GINIT		3,61(1,07)***	4,13(1,12)***	0,65(1,36)
DISTANCIA			0,0001(0,00)	-0,00(0,00)*
JUSTICIA				-1,13(0,38)***
FFMM				0,07(0,01)***
N	372	323	323	323
R2	0,02	0,08	0,08	0,35
LR	8,72***	24,5***	26,65***	64,91**

Source. Calculations prepared by the authors. *p<0,10; **p<0,05; ***p< 0,01

Table 5. Conflict Regressions (Tobit) (dependent variable *LFARC*)

Variable	Model 17	Model 18	Model 19	Model 20
C	0,62(0,21)***	4,07(2,77)	-30,66(6,70)***	-15,60(8,55)*
LCOCA	0,21(0,03)***	0,33(0,07)***	0,38(0,07)***	0,41(0,07)***
LRECTRIPC		-0,96(0,55)*	-3,03(0,65)***	-2,15(0,67)***
LPIBRPC			2,82(0,51)***	1,55(0,62)**
MINERO				-11,01(11,84)
MINERO*LPIBRPC				0,80(0,75)
N	360	120	120	120
Criterio de Akaike	3,65	3,44	3,21	3,13

Source. Calculations prepared by the authors. *p<0,10; **p<0,05; ***p< 0,01

Table 6. Conflict Regressions (Tobit) (dependent variable *LFARC*)

Variable	Model 21	Model 22	Model 23	Model 24
C	0,62(0,21)***	1,92(0,23)***	1,07(0,43)**	-0,54(0,35)
LCOCA	0,21(0,03)***	0,24(0,03)***	0,24(0,03)***	0,04(0,02)
LGINIT		3,67(0,47)***	4,07(0,50)***	1,75(0,38)***
LDISTANCIA			0,17(0,08)**	0,07(0,05)
JUSTICIA				-0,71(0,14)***
LFFMM				0,91(0,06)***
N	360	312	312	312
Criterio de Akaike	3,65	3,45	3,44	2,76

Source. Calculations prepared by the authors. *p<0,10; **p<0,05; ***p< 0,01



Table 7. Descriptive Statistics

Variable	Average	Des Est	Maximum	Minimum
ANDINO	0,34	0,47	1	0
COCA	3.472	5.252	47.120	0
DENS	119,09	256,58	1.433	0,45
DISTANCIA	719,9	1.565	9.281	0
FARC	30,1	33,6	169	1
FFMM	50,87	71,79	506	0
FRONTERA	0,31	0,46	1	0
GINI T	0,73	0,13	0,94	0,20
HOMI	47,48	35,46	195,4	0
JUSTICIA	0,58	0,49	1	0
MAR	0,30	0,50	1	0
MATE	43,49	2,62	52,28	37,91
MINERO	0,28	0,45	1	0
MINORIAS	0,31	0,46	1	0
MOR INF	19,61	7,00	11	44,7
PAZ	0,60	0,50	1	0
PIBRPC	6.846.656	4.571.636	38.439.912	2.168.265
RECTRIPC	126,24	68,84	446	43
SANTOS	0,16	0,37	1	0
SUPER	35.631	28.522	109.665	52

Source. Calculations prepared by the authors.