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VIOLENCE AND DRUG PROHIBITION IN COLOMBIA

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Violence and Drug Prohibition in Colombia[1]

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Abstract
We assess the role of inequality, poverty and drug prohibition, in explaining homicide rates (HR) in Colombia using panel data at the municipality level between 1990 and 1998. We use maximum likelihood estimation to evaluate several specifications of spatial models. When we pool the data we find a significant relation between the HR and poverty which is reinforced when the inequality variables are included in the regression. We use rates of arrest related to drugs as proxy for drug prohibition enforcement, and find no evidence of any net effect in this exercise. We proceed to estimate the model for every year since 1991 to 1998, and find mixed results along the analyzed period, with statistically significant positive coefficients for some years, evidencing a positive net effect for those years of drug prohibition on violence. This result calls for caution in the implementation of global policies meant to improve specific countries' welfare, such as drug prohibition policies. On the other hand, our proxy for income inequality is not related to violence, while its relationship with poverty is weakly positive.

1. Introduction

The study of the possible causes of the use of violence in contemporary societies, and the discovery and design of mechanisms to prevent it, has motivated a broad set of contributions to the literature from different academic fields. Among the most common insights used to approach the problem, have been those pointing to inequality of opportunities, and in particular, to income inequality, along with poverty, as the main causes of violence. In countries like Colombia and its Andean neighbors, however, in recent years people have also been worried about the implications of illicit drug consumption, production, and trafficking on patterns of violence. Globalization and recent terrorist events have contributed to deepening these concerns.

Studying how inequality, poverty and drug prohibition are related is particularly appealing in the case of Colombia. Firstly, it is a country for which all three elements are present and potentially play a role in the determination of violence. Secondly, it is a country that has been subjected to strict international agreements leading to the prohibition and penalization of drug consumption, production, and trafficking. Even though such agreements are meant to prevent illegal drug use expansion throughout the globe, and to improve welfare in consumer and producer countries, such policies have raised serious concerns from several groups who wonder whether they are indeed having this effect.

[1] Generous financial support from the Development Research Centre (DRC) of the Development Studies Institute (DESTIN) of London School of Economics and Political Science (LSE), and from the Program *Jóvenes Investigadores* of COLCIENCIAS, is gratefully acknowledged. We thank participants of a seminar at DESTIN for their comments. The usual disclaimers apply.

Usually the belief that illegal drug consumption leads to violent behavior is taken as a given. Under this perspective, prohibiting its use and production would appear to lead straightforwardly to the reduction of violence in consumer countries. This is half of the story though, since on the other hand, as long as there is demand for illicit drugs, and market arbitrage in some way, there will be supply. Of course, this activity under prohibition becomes a risky one, but then again, even though it is true that the riskier the activity the lower the consumption, it is also true that the lower the consumption, the higher the price those consumers remaining in the market are willing to pay, and thus, the greater the risks those producers remaining in the market are willing to face.

The resulting high price that prevents the market from disappearing, does not fill the pockets of the producers. An important share of it is spent 'peacefully' corrupting officials in charge of the prohibition campaign, while another is spent violently in the production and distribution process. Regretfully, since by definition this is an illegal activity, producers in this market have no legal mechanism to enforce disputes, and thus can only resort to violence when a dispute emerges. The bottom line is that prohibition induces violent behavior as well.

It is of crucial importance to assess the net impact of these counteracting effects if we want to determine whether the prohibition policies are leading to the results they initially meant or not. In this paper we use a simple analytical framework to approach this question and determine whether inequality, poverty, and drug prohibition are positively related to violence or not in Colombia.

We use panel data at the municipal level between 1990 and 1998 to estimate a simple model that relates these variables to the homicide rate, our measure of violence. We find no relation between our measure of inequality and violence, a weak relationship with poverty, and mixed results with drug prohibition, with statistically significant positive coefficients for some years, evidencing a positive net effect for those years of drug prohibition on violence.

The article begins by presenting a brief review of previous related work and a description of the analytical framework, continues with the theoretical and empirical models, the data used, and finally, presents the results and conclusions.

2. Previous Work

There have been no previous studies attempting to assess the impact of drug prohibition on violence in Colombia, though there have been several concerned with the role of inequality and poverty. Maybe the work that most closely compares to ours is that of Martínez.[2] Using a similar set of data, that article assessed the role of spatial dependence in the determination of violence in Colombia, once controlling for a similar set of covariates to ours. In particular, he used the homicide rate for 678 municipalities, for the years 1990-1998, as the dependent variable. His set of covariates included urban and rural inequality, the presence of armed groups, and the population's poverty. The main focus of that work, though, was on the relationship of inequality and poverty with violence, and did not assess the potential role of drug prohibition in determining violence. The article found a significantly positive

[2] Hermes Martínez, 'Estudio Espacial de la Violencia en Colombia', Masters Thesis, Universidad de los Andes, 2002.

relationship between poverty and violence, and no relationship between inequality and violence.

Our work differs to that of Martínez by questioning the role of drug prohibition in violence. Just like Martínez, we get the Maximum Likelihood Estimation (MLE) with the pooled data of the period 1991-1998. In addition, we get MLE, Ordinary Least Squares (OLS) estimates and Instrumental Variables (IV) estimates for each of the years, getting results both with and without specific distributional assumptions about the error term.

Other works that were developed with similar motivations to that by Martínez are those of Sánchez and Núñez, and Sarmiento and Becerra.[3] These authors performed basically the same analysis as Martínez, but omitted the role of spatial dependence in the determination of violence. To the extent that the results obtained by Martínez reject the standard specification that omits the role of spatial dependence, these results lead to biased estimates. In some of the previous work the magnitude of this bias was small, while in others not only the magnitude, but also the sign, led to different conclusions.

Sarmiento and Becerra have also tried to explain the relationship between poverty and equity.[4] The purpose of their paper was to explain the homicide rate using a quantitative approximation. A multivariate regression model was used to explain the variations in the homicide rate over 867 municipalities. The model followed the basic hypothesis of the paper, which is that violence is a problem of a structural character. Thus the dependent variable was the homicide rate and the explicative variables were wealth, inequality, human capital, municipality's size, financial support from the government, citizen participation and the presence of illegal military groups, guerrillas and paramilitaries.

Their main result was that the probability that violence would be reproduced tended to be greater in places in which economic accumulation was highly probable. They conclude that this might be the reason why the wealthier departments were the most violent. On the other hand, in their results inequality is positively associated with violence, meaning that the most violent municipalities are likely to present more inequalities. Finally, education and citizen participation presented a negative association with violence.

In a similar study, Sarmiento and Becerra confirm the positive association between violence and inequality.[5] They find that inequality, measured using the GINI coefficient, has been the main cause of the increase in violence in the decade of the nineties.

Sánchez and Núñez have tried to find the variables that determine violence in Colombia and separate out their contribution in the national homicide rate and in the differences of homicide rates among violent and non-violent municipalities.[6] For that purpose, longitudinal data were compiled for the seven principal cities of the country, and for those municipalities for which there was information

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[3] Fabio Sánchez & Jairo Núñez, *Determinantes del Crimen Violento en un País Altamente Violento: El Caso Colombiano*, Documento CEDE, Universidad de los Andes, 2001; Alfredo Sarmiento & María Becerra, *Análisis de las Relaciones entre Violencia y Equidad*, Archivos de Macroeconomía. Departamento Nacional de Planeación, 1998; Alfredo Sarmiento & María Becerra, 'Violencia y Equidad', in Alvaro Camacho Guisado & Francisco Leal (eds), *Armar la Paz es Desarmar la Guerra*, Centro de Estudios de Realidad Colombiana (CEREC), Misión Social del Departamento Nacional de Planeación y Presidencia de la República, 2000, pp.227-262.

[4] Sarmiento & Becerra (1998).

[5] Sarmiento & Becerra (2000).

[6] Sánchez & Núñez (2001).

concerning socioeconomic factors, armed actors and judicial performance. Specifically, estimations of the drug trafficking per capita income, presence of armed actors, and distribution indicators of urban and rural property were realized for each municipality.

The purpose of that study was to contrast the hypothesis of inequality as the main cause of violence in the country. They got OLS estimates for a data panel of the mentioned municipalities for the years 1990-1998. They found that Colombian violence follows special characteristics originated in the existence of armed groups, illegal activities, judicial inefficiency and diverse interactions among these variables. According to their results, poverty, inequality and exclusion, do not produce a specific type of violence for Colombia.

Finally, among the studies on the relationship between violence and inequality and poverty can be included the work of Rubio.[7] This work stresses the fact that Colombia has one of the highest homicide rates in the world, of a comparable level to those countries in which a civil war has been declared. In addition, he organized the homicide rate geographically, including all the cities and small towns of the country, and found that the presence of violence is greater in rural areas than in urban ones. The article shows that Medellín, Colombia's most violent city, ranked ninth in the country's general list.

He suggests that the causes of violence are not poverty or inequality, but that individual decisions provide the reason why groups with greater access to education and employment produce most of the violence. Usually violence takes place in the most developed regions in the country, where guerrilla, paramilitaries and drug trafficking can be found.

Also, Rubio states that the functioning of judicial institutions in Colombia generates incentives for criminal activity, and the increase in those activities affects the efficiency of the judicial institutions. Therefore, this could be understood as a vicious cycle between institutional efficiency and criminal activity.

One of the working papers most related to this study is that of Miron.[8] It is motivated by the question of the effects on violence of the prohibition of drugs and alcohol. One point of view states that prohibition decreases violence because the consumption of these substances induces aggressive behaviour and releases inhibitions. An alternative view is that prohibition potentially increases violence, since black markets are created and participants in those markets use violence to resolve commercial disputes.

Miron's paper uses longitudinal data to study the relationship between prohibition and violence using the historical behavior of the homicide rate in the United States. The document concludes that enforcement of drug and alcohol prohibition is associated with increases in homicide rate. In addition, this positive correlation reflects the causality of prohibition enforcement on homicide. The conclusion of the study robustly included other potential determinants of the homicide rate, like age composition, incarceration rate, economic conditions, gun availability and the death penalty. Thus, he concludes that drug and alcohol prohibition were associated with the rise of the homicide rate in the United States for over 100 years.

This paper complements the previous work done on Colombia by asking a similar question to that asked by Miron about the American economy, not previously addressed in the Colombian case: does drug prohibition increase violence? To answer this question, we use a different empirical approach than that used by Miron, since longitudinal data of the key variables needed to produce a robust

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[7] Mauricio Rubio, *Crimen e Impunidad, precisiones sobre la Violencia*, TM Editores y CEDE, 1999.
[8] Jeffrey A. Miron, 'Violence and US Prohibitions of Drugs and Alcohol', NBER Working Paper No. 6950, February 1999.

answer to this question is only available for a very short period of time. In particular, we use spatial information at the municipality level, like the other studies mentioned, and use a similar rationale to that adopted by Miron to answer our question.

3. Analytical Framework: Relationship between drug prohibition and violence

While arguing that inequality and poverty are related to violence might not seem to be a strange idea, a similar relationship between drug prohibition and violence seems less familiar and calls for a framework for analysis.

In this section we will provide a brief outline of the concepts used to relate prohibition to violence, and then proceed to identify their relationship. Our approach is the same as that used by Miron, which introduces the demand for violence as a mechanism for conflict resolution.[9]

Is it commonly observed that disputes arise from everyday market activities. Once these disputes emerge, agents can either attempt to resolve them by legal or illegal means. Clearly, disputes within legal activities are better suited to be resolved by legal means than disputes within illegal or prohibited activities. This framework provides us with a clear mechanism through which prohibition causes violence: economic agents involved in disputes over their market activities are more likely to employ violence to resolve them when such activities are prohibited.

Even if we accept such a claim, in our case it would not, by itself, be very useful to identify any causal relationship between drug prohibition and violence. Firstly, our available longitudinal data covers a short period of time that begins in 1978, through which prohibition laws showed little variation. The production and trafficking of drugs like cocaine was prohibited throughout the period, and changes in legislation associated to their prohibition was related to whether drug traffickers should be extradited and the like, rather than to any change in the legality of such activities. Secondly, these laws did not vary at the national level, that is to say, they remained the same across municipalities, our unit of observation.

Our claim becomes useful when we realize that even though the laws have not varied through time nor across municipalities, their enforcement has. While enforcement of an illegal market activity is not a necessary condition for the activity to be considered as prohibited, lack of enforcement leaves prohibition as a mere label associated to the illegal activity, which in several ways weakens the relationship between prohibition and violence. In other words, we can modify our claim by saying that prohibition of market activities causes more violence, the more enforced the prohibition of these activities is.

Our claim does not mean that enforcement produces a net increase in violence, since there might be mechanisms through which prohibition lowers violence as well. The net outcome would depend on the relative importance of the relevant counteracting forces. To this extent, it is useful to enumerate some of the possible channels through which more enforcement can increase violence.

One clear illustration of how increases in enforcement in Colombia produce an increase in violence is provided by the law for the extradition of Colombian drug traffickers. Early in the

[9] Miron (1999).

nineties, the presentation and approval of such a law in the congress led drug cartels to promote a war against it, which led to the murder of a candidate for the presidency and a Minister of Justice among others.

As mentioned above, though, this type of enforcement occurred at the national level and through rather rare interventions, and does not provide us with a neat mechanism for identifying the relationship of interest. Thus, we should focus on the channels that work even while maintaining constant legislation.

First consider what happens when enforcement is low, for example in municipalities with very low enforcement of the prohibition of production or trafficking of cocaine. In these municipalities, individuals would be more likely to get involved in the illegal activity than in other municipalities with higher levels of enforcement, since lack of enforcement lowers the risk premium workers in the illegal sector pay when involved in it. In addition, if disputes emerge related to land possession or the like, the use made of the land under dispute would not become an issue important enough to prevent the parties from resorting to legal means to resolve the dispute. Thus, we would expect lower demand for violence as a means for solving conflict. On the other hand, consider what happens when enforcement is high. In this case, supply is restricted, and thus those who manage to produce and traffic (consume) the illegal good and get involved in the illegal activity, are the ones that receive (are willing to pay) the highest price for it, and then are more willing to resort to violence when undertaking the illegal activity.

A different channel through which increases in enforcement can increase violence emerges when these increases in enforcement disrupt the equilibrium previously obtained in the black market. This happened to some extent in Colombia when the government first fought against the Medellín Drug Cartel and captured Pablo Escobar, and only then went after the leaders of the Cali Drug Cartel. Such timing chosen by the government, led to a new accommodation in the share of the Colombian cocaine market that these participants had, and generated some disputes between them during the period the government intervention was implemented. While this constitutes another interesting example of this mechanism, it does not provide important insights into the situation at the level of the Colombian municipalities either.

Another example of this type of situation, more suited for our purposes and data, is the disruption by the military forces of the equilibrium between illicit groups at the municipal level. During the 1990s, guerrilla and paramilitary groups gained a presence in particular regions of the country, which led Colombians to perceive the country as being split between military-, guerrilla-, and paramilitary-dominated regions. The action of the military forces weakened the equilibrium between the paramilitary and guerrilla forces, leading them to get involved in several territorial disputes. This was the case in regions like the *Urabá Antioqueño*, the South of the state of Bolivar, and the *Magdalena Medio*, to mention just three examples. Thus, increases in enforcement in these municipalities, clearly led to increases in violence.

In this example we are implicitly assuming that the actions of the guerrilla and paramilitary groups are highly determined by their involvement in drug production and trafficking. Although the caveat is valid, we consider that it does not invalidate most of our intuition relating to the causality between enforcement and violence. There are at least two reasons why this is to a large extent the case. Firstly, as reported and quantified by Matthiesen and Echeverry et al., it has been widely recognized that most of the economic resources of these groups come from these activities.[10] Secondly, the link between enforcement and violence was also demonstrated when the American government approved the use of the Plan Colombia resources (which in principle were meant to be used exclusively in the war against drugs) to fight guerrilla and paramilitary groups, due to the recognition by the American government of the important role played by these groups in drug production and trafficking.

Another common mechanism through which increases in enforcement lead to increases in violence is the use of retaliation on the part of the participants in illegal activities. Military victories by the Colombian armed forces have been commonly followed by retaliation on the part of guerrilla groups that take the form of attacks on small towns, the murder of their police, and currently, even the use of murder threats against the mayors of the municipalities and their officials, which have been followed in some cases by action.

Finally, important increases in drug enforcement, in particular under very tight budget conditions, which has been the case in Colombia, has led to the displacement of resources from general crime deterrence towards drug prohibition. This fact becomes even more acute in the Colombian case, since the country has been simultaneously involved in an internal conflict against organized groups, which has also taken resources away from general crime deterrence.

4. Theoretical and Empirical Models

We use Miron's approach to explain violence as a function of enforcement.[11] The model assumes that the production of goods requires conflict resolution, which in turn implies the demand of two inputs, lawsuits (*L*) and homicides (*H*). Given enforcement, individuals chose the number of lawsuits and homicides to minimize costs for any given level of output. Constant returns to scale are assumed, which implies input demand functions of the form

$$L^d = L(w_l(e)/w_h)Q \tag{1}$$

and

$$H^d = H(w_l(e)/w_h)Q \tag{2}$$

where w_l and w_h are the prices of lawsuits and homicides, e is the level of enforcement, and Q is the output. It is assumed that the price of lawsuits, w_l, is increasing in e, thus $w_l'(e)>0$. The equilibrium price of the good becomes

$$P(e) = w_l(e)L(w_l(e)/w_h) + w_h H(w_l(e)/w_h) \tag{3}$$

Finally, a demand curve is assumed of the form

$$Q = D(P) \tag{4}$$

Equations (2), (3) y (4) allow us to find the following function that relates the homicide rate to the level of enforcement

$$H/H(e) = D(P(e)) \tag{5}$$

Based on which we specify our empirical model as

[10] T. Matthiesen, *"Human Rights" Guerilla Movements and the Illegal Drug Industry in Colombia 1980-1996*, mimeo, Fedesarrollo-New School University, 1997; Juan Carlos Echeverry, G. Piraquive, N. Salazar, Ma. Victoria Angulo, Gustavo Hernández, Cielo Ma.Numpaque, I. Fainboim & Carlos J Rodríguez, 'El Balance del Sector Público y la Sostenibilidad Fiscal en Colombia', *Archivos de Macroeconomía*, Document 15, 1999.

[11] Miron (1999).

$$h_{it} = a\, x_{it} + b\, e_{it} + u_{it} \qquad (6)$$

where h_{it} is the homicide rate, x_{it} is a vector of covariates that might affect the homicide rate, among which we include proxies for inequality of income distribution and poverty, and u_{it} is the error term.

Equations (5) and (6) are reduced form equations of the homicide rate on the enforcement level and other variables, and to that extent, the parameter b indicates net effects of enforcement on the homicide rate. The mechanism by which enforcement induces violence in this model is through the increase in the price of lawsuits, which in turn leads to input substitution from lawsuits to violence in the model. While a statistically significant positive sign of the b parameter would indicate that a net increase of enforcement increases violence, it does not imply that there does not exist any other mechanism through which enforcement reduces violence as well.

Estimation of equation (6) will lead to an unbiased estimate of the parameter b if the level of enforcement, e_{it}, is exogenous, if u_{it} does not contain important information that might affect the homicide rate, and finally, given the spatial character of our data, if there is no type of spatial dependence.

The possible endogeneity of enforcement comes from the fact that one would expect more enforcement to be assigned to municipalities under higher levels of conflict, meaning that violence and enforcement mutually determine each other.

We use the rate of captures of individuals involved in prohibited drug related activities as the measure of enforcement. While at first sight this variable might seem highly endogenous, there are reasons to believe that there is no endogeneity, or at least, that it is very limited. The main reason comes from the fact that while drug related activities take place on a daily basis, a large share of the decisions concerning the monitoring and prosecution of drug related activities are taken only after months or years of observing the illegal behavior. In order to deter these activities, the government establishes standard procedures of monitoring illegal activities in strategic places suited for them to take place, and only revises its monitoring strategy after enough information has been collected. Thus we can expect enforcement decisions to be made based on historical rather than contemporaneous information on drug related activities.

The problem of omitted variables is one that will very likely affect to some extent our results, nonetheless, as we will see in the results, the estimated b parameter seems to be robust to the inclusion of variables and to the instrumentation of enforcement.

Finally, the issue of spatial dependence is tested, and three different specifications are considered in order to account for this problem. These specifications can be illustrated using the following model

$$h_{it} = a\, x_{it} + b\, e_{it} + r W\, h_{it} + e_{it}, \quad e_{it} = l W e_{it} + v_{it}, \quad v_{it} \sim N\left(0, s^{2}{}_{v}\right) \qquad (7)$$

Where W is a spatial matrix with zeros in the diagonal that determines the form of the spatial dependence among the municipalities.[12]

[12] For additional details on spatial models see Luc Anselin, *Spatial Econometrics: Methods and Models*, Boston: Kluwer Academic Publishers, 1988; and Harry H. Kelejian & Ingmar R.Prucha, 'A Generalized Spatial Two

5. Data

Table 1 (see Appendix) presents descriptive statistics of the variables used for the years 1990 to 1998. The variable used to measure the level of violence of the municipality is the homicide rate, which measures the number of homicides per 100,000 inhabitants. We also include two proxies for income inequality, the variables GiniUAA and GiniRAA, which are the Gini coefficients of distribution of the value of real state property in the urban and rural areas of the municipality respectively. Though we perceive these variables as poor predictors of income inequality in the municipality, we include them in order to compare our results to those obtained in previous work. In addition, we include the Index of Unsatisfied Needs (NBI), defined as the share of poor population in the municipality, as a measure of poverty. Other control variables include the number of attacks per capita by the first and second largest guerrilla groups in Colombia, the *Fuerzas Armadas Revolucionarias de Colombia* (FARC) and the *Ejército de Liberación nacional* (ELN). Finally, we include the presence of military police (PM) in the municipality and the real amount of social expenditure per capita. Again, our measure of enforcement in each municipality is given by the rate of captures in the state where it is located.

6. Results

This section presents the results obtained in the estimation of equation (6) and it is divided into two parts. The first part presents aggregate results for the nineties obtained by pooling the data for the 1991-1998 period, while the second part presents year specific results.

6.1 Aggregate Results for the Nineties

Table 2 (see Appendix) presents the MLE of model (7) with $\lambda=0$.[13] We begin noting that our proxies for income inequality in the municipality, i.e. GiniUAA and GiniRAA, show no relationship to the homicide rate. This result is likely to be due to the definition of the proxies themselves. Since for the cases when some people own more than one property we are unable to identify which properties belong to them, the indicators are just a measure of the inequality in the distribution of the value of the properties in the municipality. The relationship follows then from the lack of explanatory power to explain the homicide rate of variations in the inequality of the way land was split into properties across municipalities.

As found by Martínez, municipality poverty rates, as measured by the share of the population with at least one unsatisfied basic need, have a positive effect on the homicide rate, increasing it at a decreasing rate.[14] However, lack of significance of the coefficient of the linear term sheds doubts on the actual effect of poverty on violence.

Stage Least Squares Procedure for Estimating a Spatial Autorregressive Model with Autorregressive Disturbances', *Journal of Real State Finance and Economics*, 1997.

[13] Models with both $\rho\neq0$ and/or $\lambda\neq0$ were estimated and the autoregressive model ($\rho\neq0$ and $\lambda=0$) was chosen among them. MLE of the autoregressive model are obtained with a two-stage procedure in which all coefficients but ρ are estimated in the first step, and then ρ is estimated through a concentrated likelihood (for details see: James P. LeSage, 'Toolbox' Spatial Econometrics Applications Manual, http://www.spatial-econometrics.com, Department of Economics, University of Toledo, 2001.). Tests of spatial dependence are not presented since these tests have proven to reject the standard model which does not incorporates the spatial component by Martínez (2002), who uses a similar specification.

[14] Martínez (2002).

Next, we find that the estimate of b, the coefficient of the level of enforcement, has a positive but not statistically significant relationship with violence once we control for a set of covariates. The estimate is sensitive to the inclusion of the lagged homicide rate, FARC and ELN variables, but remains invariant to the inclusion of our inequality measures or the military police variables.

The number of attacks performed by FARC and ELN guerrilla groups are, as expected, positive and statistically significantly related to the homicide rate. The presence of military police in the municipality does not present any relationship to the homicide rate. This result might be due to an endogeneity problem with this variable, which we address below.

Finally, the spatial autoregressive term is strongly positively related to the homicide rate, evidencing the existence of important spillover effects in the transmission of violence across municipalities in Colombia.

6.2 Specific Results by Year

In this section we present the results obtained from estimating the model (7) year by year. We present ML estimates, along with yearly instrumental variable estimates.

First, let us analyze the MLE of model (7) for each year, which are presented in Table 3 (see Appendix). The first thing to highlight is that most of the estimated coefficients present significant variation with time, which suggests that the equality of coefficients for all years, implicit in the pooled data estimation, might be too restrictive. The intuition obtained in the pooled estimation follows in this case for several of the variables included in the estimation, as it is the case for the autoregressive term, the inequality, the FARC and the lagged homicide rate. While the NBI2 was significantly negatively related to the homicide rate in the pooled data estimation, it is not so for any one year. However, its magnitude does not vary much with time, which suggests that the result obtained by pooling the data might actually be informative, allowing the larger sample to produce significant estimates. ELN is only significantly positively related to the homicide rate for a single year, and captures for no year.

Now let us study the OLS estimates of model (6), which ignore spatial dependence. Table 4 (see Appendix) presents these results along with several tests of spatial dependence. The tests provide a strong indication of misspecification of the model due to its omission of the different forms of spatial dependence, which precludes this specification from providing consistent parameter estimates. While the table has some interesting and contrasting results with respect to those obtained for the pooled data, we will only discuss the consistent results to be obtained from specification (7).

Table 5 (see Appendix) presents OLS estimates of the autoregressive spatial model. Since the term WY is clearly endogenous, the r coefficient estimated in the table is not consistent. Still, the estimates are similar to those found once WY is instrumented, as is shown in Table 6 (see Appendix). In that table, we follow the recommendations made by Anselin, and Kelejian and Prucha, and use X and WX as instruments for WY.[15] Again, the estimates are similar in both tables, and its significance changes only in 1993, when once instrumented, the coefficient of the autoregressive term becomes insignificant. In this case, as opposed to the MLE, the

[15] Anselin (1988) and Kelejian & Prucha (1997).

estimated r coefficient is allowed to be larger than one, as turns out to be the case in the OLS estimate for 1994, and the IV estimates for 1994 and 1996.

The results show that none of the estimated coefficients of the variables related to inequality or poverty is significantly different from zero. The estimated coefficient of NBI2 is very similar for all the years to the one obtained with the corresponding specification in the MLE with the pooled data. This suggests that in this case, restricting the coefficients through time is a reasonable assumption to allow us to identify the actual relationship between poverty and violence, as obtained in the pooled MLE. That is, according to the results, it is reasonable to accept the negative relationship between NBI2 and violence obtained in the pooled MLE.

On the other hand, the results show that the net effect of prohibition, as measured by the b coefficient in equation (7) (the coefficient of captures in the table), is not as stable as is assumed in the pooled data estimation. That is, the results by year suggest that the null of constant b during the 90s is likely to be rejected. In fact, both significantly negative (in 1991, 1992, 1995 and 1997) and positive (in 1993 and 1994) coefficients are found in the analyzed period.

We now proceed to assess the robustness of the results on inclusion of two variables, military police (PM) and real per capita social public expenditure (GSocRP). The OLS and IV results are presented in Tables 8 and 9 respectively (see Appendix). Most results follow through. The estimated coefficient of captures is now only significant in three years, 1994 (positive), and 1995 and 1997 (negative)

6.3 Endogeneity of Captures and Military Police

As previously discussed, there are reasons to believe that the estimates of the coefficients of the captures and PM might be biased due to the endogeneity of these variables. In this section we present IV estimates obtained by treating these variables as endogenous. The results are presented in Table 10 (see Appendix). Only the coefficient of the PM variable changes slightly for 1997, becoming significantly positive, while the coefficients of this variable and of captures, remain similar to those obtained by IV assuming these variables as exogenous. Thus, the results suggest that the endogeneity of captures does not seem to be driving the results obtained. Additional results (not presented here), including in the set of instruments covering the lags of PM and captures, lead to similar conclusions.

7. Conclusions

Although we find that the relationship between drug prohibition and violence has not been monotonous during the 1990s, it has been positive in some years, evidencing the existence of a positive net effect of drug prohibition on violence. This result calls for caution when implementing global policies oriented toward improving specific countries' welfare, such as drug prohibition policies.

We find a significant relationship between second quadratic term of poverty and violence for the pooled data. This relationship is reinforced when the inequality variables are included in the regression. On the other hand, poverty is only weakly positively related to violence when using data for each year. Finally, our proxy for income inequality is not related to violence.

Thus, even though reducing poverty and trying to guarantee equal conditions to the population are always reasonable objectives to promote, we find no clear evidence that by these means any significant reduction of violence in Colombia will be obtained.

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Table 1. Means and Standard Deviations of Variables. 1990-1998

Year	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
Homicide	52.076	59.277	60.435	59.548	54.120	45.566	47.528	50.714	48.319
	61.484	*66.729*	*64.809*	*72.755*	*61.304*	*50.658*	*49.776*	*60.926*	*64.753*
GiniUAA	0.3279	0.3589	0.3656	0.3722	0.386	0.3823	0.3785	0.3772	0.3787
	0.1208	*0.1299*	*0.113*	*0.116*	*0.115*	*0.1029*	*0.103*	*0.1015*	*0.0991*
GiniRAA	0.5143	0.5202	0.5298	0.5394	0.5449	0.5419	0.5389	0.5364	0.5348
	0.1431	*0.1413*	*0.136*	*0.1397*	*0.1392*	*0.1334*	*0.1348*	*0.1347*	*0.135*
NBI	54.884	53.397	51.981	50.631	49.344	48.116	46.946	45.829	44.764
	16.747	*16.901*	*17.116*	*17.381*	*17.685*	*18.021*	*18.384*	*18.770*	*19.177*
NBI2	3292.27	3136.48	2994.50	2865.10	2747.07	2639.47	2541.37	2452.12	2371.02
	1905.60	*1897.36*	*1898.39*	*1907.53*	*1924.35*	*1949.06*	*1982.29*	*2025.40*	*2080.07*
FARC	0.22	0.4504	0.2575	0.2127	0.2403	0.4126	0.4975	0.6029	0.454
	1.0205	*1.4747*	*0.7605*	*1.1547*	*0.9387*	*1.6995*	*1.3932*	*2.1362*	*1.6203*
ELN	0.191	0.151	0.1413	0.1152	0.1106	0.1579	0.2181	0.2117	0.1391
	0.7663	*0.6625*	*0.6158*	*0.6148*	*0.5248*	*0.6703*	*0.9001*	*0.7868*	*0.6842*
PM	17.173	17.526	17.816	17.157	18.284	16.413	16.243	16.038	16.376
	6.2668	*6.4476*	*4.9481*	*5.7094*	*5.4597*	*4.5581*	*4.7478*	*5.3851*	*5.6606*
GSocRP	27.675	27.270	27.981	44.759	45.681	40.344	57.987	57.003	36.682
	28.475	*23.218*	*20.053*	*40.498*	*41.140*	*68.806*	*84.430*	*72.682*	*38.285*
Captures	2176.46	4091.01	4347.85	4031.37	3506.44	6945.02	4371.81	4684.65	3513.32
	2532.58	*5388.34*	*5182.24*	*5424.19*	*4590.08*	*10858.52*	*5068.97*	*6164.37*	*4570.62*
N	678	678	678	678	678	678	678	678	678

Definition of variables:

Homicide: Homicide rate of the municipality. Number of homicides per 100.000 inhabitants.

GiniUAA: Gini coefficient of distribution of the value of real state property in the urban area of the municipality.

GiniRAA: Gini coefficient of distribution of the value of real state property in the rural area of the municipality.

NBI: Percentage of population living in poverty in the municipality

FARC: Number of attacks per capita of the largest guerrilla group in Colombia: *Fuerzas Armadas Revolucionarias de Colombia*.

ELN: Number of attacks per capita of the second largest guerrilla group in Colombia: *Ejército de Liberación Nacional*.

PM: Military Police.

GSocRP: Real per capita social expenditure. in pesos de 1998.

Captures: Number of captures per million inhabitants related to drug production or trafficking in the municipality.

Table 2. MLE of the Spatial Autorregressive Model. Pooled Data. 1991-1998[16]

Variable	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)	(xi)	(xii)	(xiii)	(xiv)
Constant	9.5135 *1.32*	2.6802 *0.37*	0.1353 *0.03*	-2.1288 *-0.40*	-2.2440 *-0.41*	2.3820 *0.33*	-2.2039 *-0.42*	-2.2503 *-0.41*	1.7674 *0.44*	3.4677 *0.48*	0.1095 *0.02*	-2.1668 *-0.41*	-2.2561 *-0.41*	1.8279 *0.45*
GiniRAA	0.7715 *0.11*	-0.6080 *-0.09*	-0.6660 *-0.13*	2.0849 *0.40*	2.0884 *0.40*	-0.8109 *-0.11*	2.0316 *0.39*	2.0342 *0.39*		-0.9941 *-0.14*	-0.7053 *-0.13*	2.0218 *0.39*	2.0203 *0.39*	
GiniUAA	13.9256 *2.42*	7.5448 *1.31*	1.5588 *0.37*	4.2827 *1.02*	4.3366 *1.02*	7.2110 *1.25*	4.1926 *0.99*	4.2174 *0.99*		8.2762 *1.43*	1.4977 *0.35*	4.2311 *1.00*	4.2603 *1.00*	
NBI	0.7318 *3.56*	0.9557 *4.62*	0.2677 *1.76*	0.2328 *1.55*	0.2315 *1.53*	0.9696 *4.68*	0.2367 *1.57*	0.2361 *1.56*	0.2026 *1.37*	0.9348 *4.51*	0.2705 *1.77*	0.2350 *1.56*	0.2341 *1.55*	0.2001 *1.35*
NBI2	-0.0092 *-4.88*	-0.0107 *-5.65*	-0.0030 *-2.18*	-0.0029 *-2.14*	-0.0029 *-2.11*	-0.0108 *-5.69*	-0.0030 *-2.16*	-0.0030 *-2.14*	-0.0027 *-1.96*	-0.0106 *-5.57*	-0.0031 *-2.19*	-0.0030 *-2.15*	-0.0030 *-2.13*	-0.0026 *-1.94*
Captures		2.9582 *9.50*	0.1171 *0.50*	0.2376 *1.02*	0.2368 *0.99*	2.4598 *4.96*	0.1011 *0.28*	0.1019 *0.28*	0.1161 *0.32*					
Captures -1						0.6687 *1.31*	0.1847 *0.49*	0.1839 *0.49*	0.2103 *0.56*	2.6414 *8.17*	0.1512 *0.63*	0.2640 *1.11*	0.2603 *1.06*	0.3022 *1.24*
Homicide -1			0.6789 *68.43*	0.6673 *67.19*	0.6675 *65.98*		0.6674 *66.07*	0.6675 *65.98*	0.6678 *66.04*		0.6791 *67.96*	0.6676 *67.46*	0.6675 *67.28*	0.6682 *66.25*
FARC				4.8257 *12.63*	4.8241 *12.56*		4.8282 *12.63*	4.8277 *12.57*	4.8118 *12.54*			4.8269 *12.63*	4.8247 *12.57*	4.8101 *12.54*
ELN				2.0729 *2.56*	2.0699 *2.55*		2.0759 *2.56*	2.0748 *2.55*	2.0336 *2.51*			2.0683 *2.55*	2.0651 *2.54*	2.0240 *2.50*
Military Police					0.0100 *0.09*			0.0045 *0.04*	-0.0116 *-0.11*				0.0055 *0.05*	-0.0097 *-0.09*
W*Homicide	0.4794 *28.07*	0.4491 *27.23*	0.2094 *15.57*	0.1983 *13.38*	0.1971 *11.50*	0.4469 *24.85*	0.1974 *11.56*	0.1967 *11.47*	0.1970 *11.49*	0.4574 *25.77*	0.2081 *13.97*	0.1980 *13.41*	0.1982 *13.37*	0.1972 *11.57*
N	5.424	5.424	5.424	5.424	5.424	5.424	5.424	5.424	5.424	5.424	5.424	5.424	5.424	5.424
log-likelihood	-48.386	-48.340	-46.623	-46.538	-46.538	-46.623	-46.538	-46.538	-46.539	-48.352	-46.623	-46.538	-46.538	-46.539
R2	0.1850	0.1936	0.5584	0.5716	0.5715	0.5584	0.5716	0.5716	0.5715	0.1915	0.5583	0.5716	0.5716	0.5715

[16] See definitions of variables in table 1

Table 3. Yearly MLE of the Spatial Autorregressive Model. 1991-1998[17]

Variable	1991	1992	1993	1994	1995	1996	1997	1998
Constant	11.4950	-1.6750	24.1375	15.3989	5.2053	-10.5189	-11.9378	4.3522
	0.5870	*-0.0906*	*1.3262*	*0.9919*	*0.4029*	*-0.8223*	*-0.8035*	*0.2907*
W*Homicide	0.0515	0.2785	0.1580	0.3049	0.1824	0.2233	0.0942	0.0646
	0.4801	*7.1030*	*4.1682*	*7.5421*	*3.6765*	*4.5223*	*1.2702*	*1.3592*
GiniRAA	5.1102	-1.7761	8.7745	5.6102	-5.2251	12.9309	-5.6805	0.9433
	0.4106	*-0.1251*	*0.6107*	*0.4285*	*-0.4301*	*0.9966*	*-0.3459*	*0.0517*
GiniUAA	-9.2896	4.6271	-4.1262	13.4139	1.8880	1.0946	4.9053	4.5271
	-0.7772	*0.3876*	*-0.3437*	*1.2245*	*0.1962*	*0.1074*	*0.3749*	*0.3311*
NBI	0.0111	0.0831	0.3506	-0.1158	0.1242	0.3474	0.0259	0.1688
	0.0198	*0.1573*	*0.6802*	*-0.2618*	*0.3620*	*1.0391*	*0.0681*	*0.4544*
NBI2	-0.0020	-0.0016	-0.0058	-0.0005	-0.0015	-0.0024	-0.0010	-0.0032
	-0.4047	*-0.3288*	*-1.2308*	*-0.1229*	*-0.4874*	*-0.7570*	*-0.2733*	*-0.9309*
FARC	2.9919	3.2400	22.7964	-1.5320	3.4086	3.1605	2.2680	7.3970
	2.6139	*1.5591*	*16.6101*	*-0.9567*	*4.7947*	*3.2652*	*2.9656*	*6.4872*
ELN	-1.4322	2.6867	1.5777	3.2781	-0.7173	6.3549	1.0314	3.1023
	-0.5720	*1.0667*	*0.6090*	*1.1936*	*-0.3958*	*4.2382*	*0.4846*	*1.1886*
Captures	-0.4890	0.4620	0.3995	0.4656	-0.9163	0.9288	1.0970	0.3959
	-0.3770	*0.7282*	*0.8873*	*0.9411*	*-1.3283*	*1.2883*	*1.0721*	*0.4642*
Homicide-1	0.8104	0.6500	0.7870	0.5649	0.6019	0.5974	0.7953	0.6654
	21.7945	*25.3700*	*28.5029*	*24.9506*	*25.7975*	*20.3443*	*20.8470*	*21.2840*
Military Police	0.6215	0.1880	-1.7242	-0.7896	-0.0476	-0.0093	1.0590	-0.0024
	2.0972	*0.5405*	*-5.6039*	*-2.8189*	*-0.1734*	*-0.0305*	*3.1465*	*-0.0069*
N	678	678	678	678	678	678	678	678
log-likelihood	-5101.3	-5096.7	-5114.9	-5053.2	-4925.4	-4979.9	-5128.2	-5189.7
R2	0.6379	0.6265	0.6843	0.6339	0.6281	0.5490	0.5304	0.5012

[17] t-statistics in italics. See definitions of variables in table 1.

Table 4. OLS Estimates and Test for Spatial Dependence. 1991-1998.[18]

Variable	1991	1992	1993	1994	1995	1996	1997	1998
Constant	15.6590 *0.99*	11.1701 *0.62*	7.4806 *0.36*	1.9412 *0.13*	19.6983 *1.61*	-10.666 *-0.94*	-13.662 *-1.11*	-3.0013 *-0.19*
GiniUAA	4.1289 *0.41*	-1.8276 *-0.13*	4.8402 *0.32*	4.0592 *0.35*	-3.9317 *-0.40*	11.1824 *0.99*	-1.1348 *-0.07*	1.9831 *0.12*
GiniRAA	-10.502 *-1.02*	5.2795 *0.45*	-6.4691 *-0.51*	14.3810 *1.28*	4.5421 *0.45*	5.0416 *0.53*	13.3204 *1.00*	-1.5749 *-0.12*
NBI	-0.0112 *-0.02*	-0.0266 *-0.06*	0.5024 *1.10*	-0.0174 *-0.05*	-0.0416 *-0.17*	0.2902 *1.12*	0.0519 *0.22*	0.3317 *1.07*
NBI2	-0.0020 *-0.50*	-0.0014 *-0.36*	-0.0059 *-1.43*	-0.0003 *-0.08*	-0.0007 *-0.29*	-0.0015 *-0.64*	-0.0011 *-0.49*	-0.0041 *-1.55*
FARC	3.0703 *1.40*	3.7429 *1.42*	22.6980 *7.09*	-2.8834 *-1.26*	3.7227 *2.38*	3.1396 *2.36*	1.8632 *1.79*	6.8525 *1.77*
ELN	-1.7396 *-0.63*	1.7141 *0.56*	2.5145 *0.68*	4.3446 *0.92*	-5.1103 *-0.79*	8.0493 *1.99*	-2.7003 *-0.95*	0.6525 *0.28*
PM	0.6129 *1.37*	0.7709 *1.32*	-1.1462 *-2.06*	-0.2220 *-0.67*	-0.3377 *-1.19*	0.2336 *0.68*	1.1177 *2.86*	0.6154 *1.16*
GSocRP	0.0078 *0.14*	-0.2331 *-3.12*	0.1006 *1.80*	0.0739 *1.46*	0.0102 *0.68*	0.0525 *1.75*	0.0044 *0.09*	-0.1526 *-1.50*
Captures	-0.0001 *-0.36*	0.0004 *0.95*	0.0015 *3.88*	0.0025 *5.72*	-0.0004 *-3.17*	0.0004 *1.54*	-0.0001 *-0.44*	0.0011 *1.98*
Homicide-1	0.8232 *9.92*	0.7129 *10.28*	0.8165 *15.05*	0.6114 *9.22*	0.6480 *19.82*	0.6513 *12.52*	0.8246 *14.00*	0.6736 *5.55*
FARC*ELN	0.1098 *0.17*	4.3677 *2.62*	-0.7665 *-0.16*	2.3069 *0.26*	14.9795 *3.29*	-0.3835 *-0.34*	2.5334 *1.00*	7.6172 *2.43*
N R2	678 0.6370	678 0.5979	678 0.6852	678 0.6149	678 0.6385	678 0.5325	678 0.5318	678 0.5173
(i) Moran I Statistic P-value	0.0060 0.0225	0.0166 2.0000	0.0124 1.9993	0.0268 2.0000	0.0117 1.9990	0.0129 1.9996	0.0075 1.9793	0.0063 1.9581
(ii) Lagrange Multiplier P-value	1.4443 0.2294	10.8736 0.0010	6.0384 0.0140	28.5245 0.0000	5.4419 0.0197	6.5674 0.0104	2.2479 0.1338	1.5914 0.2071
(iii) Lagrange Multiplier P-value	10.7513 0.0010	37.5254 0.0000	11.7326 0.0006	64.4133 0.0000	16.5808 0.0000	19.9415 0.0000	7.8254 0.0052	2.2446 0.1341
(iv) Lagrange Multiplier P-value	12.1092 0.0023	38.3235 0.0000	11.9364 0.0026	64.6944 0.0000	16.5808 0.0003	20.4624 0.0000	8.2973 0.0158	2.3004 0.3166
(v) Lagrange Multiplier P-value	1205.37 0.0000	1118.49 0.0000	429.27 0.0000	1493.76 0.0000	689.17 0.0000	272.30 0.0000	550.62 0.0000	2888.33 0.0000
(vi) Lagrange Multiplier P-value	1206.81 0.0000	1129.37 0.0000	435.31 0.0000	1522.29 0.0000	694.61 0.0000	278.86 0.0000	552.86 0.0000	2889.92 0.0000
(vii) Lagrange Multiplier P-value	1217.48 0.0000	1156.82 0.0000	441.21 0.0000	1558.46 0.0000	705.75 0.0000	292.76 0.0000	558.91 0.0000	2890.63 0.0000

[18] Asymptotic t-statistics in italics. White standard errors used to get the statistic. See definitions of variables in table 1. (i) Test for Residual Spatial Autocorrelation. (ii) Test for Residual Spatial Autocorrelation. (iii) Test for the Omitted Spatial Lag (WY). (iv) Test for Spatial Dependence (rho and lambda). (v) Test for Spatial heterogeneity (alpha). (vi) Test for Residual Spatial Autocorrelation and Heteroskedasticity. (vii) Test for Residual Spatial Autocorrelation, Omitted Spatial Lag and Heteroskedasticity.

Table 5. OLS Estimates of the Spatial Model 1991-1998.

Variable	1991	1992	1993	1994	1995	1996	1997	1998
Constant	-20,0130	-54,7216	-37,6293	-52,2805	-12,6616	-39,6327	-33,2313	-22,9850
	-	-	-	-	-	-	-	-
W*Homicide	0,7290	1,2634	0,3841	1,0877	0,6176	0,8586	0,8863	0,5565
	3,74	*5,97*	*2,25*	*6,13*	*3,13*	*4,31*	*4,66*	*1,53*
GiniUAA	6,5268	-2,2161	3,3178	-2,2257	-6,6615	11,6672	-2,9302	-1,8370
	0,66	-	*0,21*	-	-	*1,04*	-	-
GiniRAA	-11,1002	1,3653	0,1747	8,5044	2,0089	-0,8244	12,4288	-1,8853
	-	*0,13*	*0,01*	*0,87*	*0,20*	-	*0,91*	-
NBI	0,1881	0,1809	0,6794	0,2723	0,0992	0,4358	0,1306	0,4067
	0,41	*0,41*	*1,46*	*0,78*	*0,39*	*1,73*	*0,56*	*1,24*
NBI2	-0,0032	-0,0021	-0,0065	-0,0022	-0,0014	-0,0031	-0,0024	-0,0044
	-	-	-	-	-	-	-	-
FARC	2,8128	3,6104	22,8284	-1,8000	3,5378	3,4289	2,0048	7,0148
	1,36	*1,42*	*6,89*	-	*2,26*	*2,66*	*1,85*	*1,73*
ELN	-1,4909	1,0590	2,3347	4,4237	-4,7509	6,8045	-3,0905	0,7482
	-	*0,36*	*0,62*	*0,99*	-	*1,67*	-	*0,32*
Captures	-0,0006	-0,0009	0,0016	0,0012	-0,0004	0,0000	-0,0008	0,0007
	-	-	*4,58*	*2,88*	-	-	-	*1,51*
Homicide-1	0,7929	0,6521	0,7613	0,5526	0,6094	0,6099	0,7936	0,6475
	9,30	*9,23*	*12,4*	*8,16*	*14,6*	*10,8*	*12,1*	*4,68*
FARC*ELN	0,0953	4,0047	-0,2072	3,9513	15,1097	0,0347	3,2702	7,6036
	0,14	*2,36*	-	*0,42*	*3,46*	*0,03*	*1,33*	*2,45*
N	678,0000	678,0000	678,0000	678,0000	678,0000	678,0000	678,0000	678,0000
R2	*0,64*	*0,62*	*0,68*	*0,64*	*0,64*	*0,54*	*0,54*	*0,51*

Asymptotic t-statistics in italics. White standard errors used to get the statistic. See definitions of variables in table 1.

Table 6. IV Estimates of the Spatial Model. 1991-1998.

Variable	1991	1992	1993	1994	1995	1996	1997	1998
Constant	-22.8336	-53.1251	-32.2855	-51.8494	-10.2988	-41.3925	-33.1436	-23.9521
	-1.33	*-2.87*	*-1.53*	*-3.38*	*-0.83*	*-3.48*	*-2.43*	*-1.01*
W*Homicide	0.7694	1.2385	0.2933	1.0785	0.5606	0.9033	0.8842	0.5773
	3.40	*5.58*	*1.49*	*5.54*	*2.78*	*4.21*	*4.20*	*1.50*
GiniUAA	6.5983	-2.2691	3.4843	-2.1624	-6.4258	11.5756	-2.9250	-1.8909
	0.66	*-0.17*	*0.22*	*-0.20*	*-0.65*	*1.03*	*-0.18*	*-0.12*
GiniRAA	-11.0400	1.3936	0.2164	8.5692	2.3802	-1.1909	12.4420	-1.8738
	-1.07	*0.13*	*0.02*	*0.87*	*0.24*	*-0.12*	*0.91*	*-0.14*
NBI	0.2030	0.1739	0.6603	0.2702	0.0862	0.4407	0.1305	0.4094
	0.45	*0.40*	*1.41*	*0.77*	*0.34*	*1.75*	*0.55*	*1.23*
NBI2	-0.0032	-0.0020	-0.0064	-0.0022	-0.0013	-0.0031	-0.0024	-0.0045
	-0.81	*-0.51*	*-1.56*	*-0.67*	*-0.58*	*-1.32*	*-1.01*	*-1.64*
FARC	2.7876	3.6231	22.8647	-1.8066	3.5476	3.4211	2.0053	7.0090
	1.33	*1.41*	*6.92*	*-0.90*	*2.26*	*2.64*	*1.84*	*1.71*
ELN	-1.5184	1.0719	2.3784	4.4240	-4.7884	6.7701	-3.0898	0.7438
	-0.48	*0.37*	*0.63*	*0.99*	*-0.79*	*1.66*	*-1.12*	*0.32*
Captures	-0.0007	-0.0008	0.0017	0.0012	-0.0004	0.0000	-0.0008	0.0007
	-2.39	*-2.42*	*4.59*	*2.74*	*-4.08*	*-0.08*	*-3.07*	*1.46*
Homicide-1	0.7904	0.6536	0.7673	0.5531	0.6129	0.6071	0.7937	0.6468
	9.14	*9.08*	*12.28*	*7.99*	*14.71*	*10.63*	*11.82*	*4.66*
FARC*ELN	0.1000	4.0137	-0.2357	3.9501	15.1125	0.0448	3.2695	7.6051
	0.15	*2.44*	*-0.05*	*0.43*	*3.43*	*0.04*	*1.34*	*2.44*
N	678.0000	678.0000	678.0000	678.0000	678.0000	678.0000	678.0000	678.0000
R2	*0.64*	*0.62*	*0.68*	*0.64*	*0.64*	*0.54*	*0.53*	*0.51*

Asymptotic t-statistics in italics. White standard errors used to get the statistic. See definitions of variables in table 1.

Table 7. 3SLS Estimates of the Spatial Model. 1991-1998.

Variable	1991	1992	1993	1994	1995	1996	1997	1998
Constant	-19,9747	-54,7651	-37,6612	-52,4521	-12,5970	-39,5958	-33,2445	-34,8210
	-0,92	*-2,57*	*-1,82*	*-3,21*	*-0,93*	*-2,70*	*-1,98*	*-1,89*
W*Homicide	0,7293	1,2652	0,3854	1,0909	0,6175	0,8605	0,8865	0,8097
	4,05	*7,06*	*2,13*	*7,09*	*3,76*	*4,30*	*4,13*	*3,25*
GiniUAA	6,5250	-2,2023	3,3209	-2,2710	-6,6468	11,6279	-2,9277	-2,4273
	0,53	*-0,15*	*0,23*	*-0,17*	*-0,56*	*0,88*	*-0,18*	*-0,13*
GiniRAA	-11,1111	1,3689	0,1796	8,5232	2,0022	-0,8083	12,4269	-1,8133
	-0,96	*0,11*	*0,02*	*0,79*	*0,22*	*-0,08*	*0,97*	*-0,13*
NBI	0,1882	0,1813	0,6799	0,2721	0,0994	0,4349	0,1307	0,4390
	0,34	*0,34*	*1,31*	*0,62*	*0,30*	*1,28*	*0,35*	*1,18*
NBI2	-0,0032	-0,0021	-0,0065	-0,0022	-0,0014	-0,0031	-0,0024	-0,0046
	-0,66	*-0,44*	*-1,40*	*-0,55*	*-0,48*	*-0,98*	*-0,70*	*-1,36*
FARC	2,8136	3,6072	22,8286	-1,8093	3,5489	3,4484	2,0028	6,9212
	2,35	*1,68*	*16,48*	*-1,14*	*5,12*	*3,28*	*2,59*	*6,24*
ELN	-1,4920	1,0565	2,3333	4,4164	-4,7416	6,7893	-3,0930	0,6578
	-0,45	*0,39*	*0,73*	*1,35*	*-2,47*	*3,17*	*-1,30*	*0,24*
Captures	-0,0006	-0,0009	0,0016	0,0012	-0,0004	-0,00001	-0,0008	0,0005
	-1,99	*-2,41*	*4,38*	*3,00*	*-3,46*	*-0,03*	*-2,63*	*1,12*
Homicide-1	0,7929	0,6521	0,7613	0,5528	0,6091	0,6097	0,7935	0,6384
	28,48	*25,03*	*27,56*	*24,68*	*26,84*	*20,74*	*21,89*	*20,51*
FARC*ELN	0,0954	4,0048	-0,2072	3,9558	15,0865	0,0292	3,2716	7,6514
	0,15	*1,42*	*-0,04*	*0,64*	*5,73*	*0,05*	*3,93*	*2,73*

Asymptotic t-statistics in italics. See definitions of variables in table 1.

Table 8. OLS Estimates of the Spatial Model with PM and GSocRP. 1991-1998.

Variable	1991	1992	1993	1994	1995	1996	1997	1998
Constant	-22,5987	-50,3209	-24,1102	-43,1549	-3,7530	-41,9916	-37,7469	-21,5218
	-1,39	*-2,58*	*-1,09*	*-2,65*	*-0,27*	*-3,38*	*-2,71*	*-0,94*
W*Homicid	0,6785	1,2305	0,6835	1,1996	0,7161	0,9632	0,7288	0,4814
	3,46	*6,15*	*3,54*	*6,77*	*3,56*	*4,59*	*3,87*	*1,50*
GiniUAA	5,3416	0,6099	4,2160	-2,9696	-6,5490	8,8730	-2,8886	1,2472
	0,54	*0,04*	*0,28*	*-0,27*	*-0,66*	*0,80*	*-0,18*	*0,08*
GiniRAA	-10,3583	0,6335	-9,1223	3,0894	-1,4427	-3,5054	10,4046	-0,5224
	-1,01	*0,06*	*-0,71*	*0,29*	*-0,14*	*-0,35*	*0,80*	*-0,04*
NBI	0,1876	0,2592	0,6360	0,2892	0,1246	0,3970	0,1082	0,3928
	0,42	*0,59*	*1,40*	*0,85*	*0,50*	*1,54*	*0,47*	*1,22*
NBI2	-0,0030	-0,0029	-0,0066	-0,0027	-0,0021	-0,0026	-0,0017	-0,0045
	-0,75	*-0,73*	*-1,64*	*-0,83*	*-0,89*	*-1,09*	*-0,77*	*-1,69*
FARC	2,7440	3,6233	22,4892	-1,8848	3,6711	3,1425	1,8235	6,8835
	1,31	*1,41*	*6,88*	*-0,98*	*2,38*	*2,36*	*1,80*	*1,75*
ELN	-1,9221	1,3310	2,2203	4,2474	-4,5876	7,5777	-2,9551	0,6282
	-0,67	*0,44*	*0,58*	*0,92*	*-0,75*	*1,89*	*-1,07*	*0,27*
PM	0,2233	-0,0288	-1,5452	-0,7650	-0,6480	-0,1359	0,6790	0,3569
	0,50	*-0,07*	*-2,26*	*-2,19*	*-1,97*	*-0,42*	*1,83*	*0,76*
GSocRP	0,0328	-0,1609	0,1061	0,0897	0,0160	0,0641	0,0111	-0,1492
	0,55	*-2,34*	*1,92*	*1,87*	*0,98*	*2,38*	*0,22*	*-1,49*
Captures	-0,0005	-0,0008	0,0007	0,0008	-0,0006	0,00002	-0,0005	0,0007
	-1,65	*-1,83*	*1,70*	*2,16*	*-4,45*	*0,10*	*-1,98*	*1,46*
Homicide-1	0,7911	0,6517	0,7811	0,5521	0,6038	0,5910	0,7885	0,6602
	9,13	*9,11*	*13,30*	*8,20*	*14,56*	*10,45*	*11,95*	*5,19*
FARC*ELN	0,1528	3,8957	-0,6305	2,0225	14,8371	-0,2094	2,8613	7,6543
	0,23	*2,34*	*-0,13*	*0,23*	*3,42*	*-0,18*	*1,15*	*2,40*
N	678	678	678	678	678	678	678	678
R2	0,6433	0,6214	0,6913	0,6453	0,6477	0,5472	0,5385	0,5197

Asymptotic t-statistics in italics. White standard errors used to get the statistic. See definitions of variables in table 1.

Table 9. IV Estimates of the Spatial Model with PM and GSocRP. 1991-1998.

Variable	1991	1992	1993	1994	1995	1996	1997	1998
Constant	-25,6205	-48,4786	-22,7105	-43,9815	-1,9911	-44,2505	-40,1742	-20,6028
	-1,48	*-2,49*	*-1,01*	*-2,61*	*-0,15*	*-3,47*	*-2,73*	*-0,88*
W*Homicide	0,7321	1,1936	0,6532	1,2216	0,6623	1,0327	0,8023	0,4575
	3,35	*5,82*	*2,87*	*6,39*	*3,26*	*4,67*	*3,68*	*1,34*
GiniUAA	5,4374	0,5369	4,2436	-3,0985	-6,3524	8,7064	-3,0654	1,2837
	0,55	*0,04*	*0,28*	*-0,28*	*-0,64*	*0,78*	*-0,19*	*0,08*
GiniRAA	-10,3470	0,7727	-9,0048	2,8824	-0,9930	-4,1217	10,1107	-0,5746
	-1,01	*0,07*	*-0,70*	*0,27*	*-0,10*	*-0,42*	*0,78*	*-0,04*
NBI	0,2033	0,2506	0,6301	0,2949	0,1121	0,4047	0,1138	0,3898
	0,45	*0,57*	*1,39*	*0,86*	*0,45*	*1,57*	*0,48*	*1,19*
NBI2	-0,0030	-0,0029	-0,0066	-0,0027	-0,0020	-0,0027	-0,0018	-0,0045
	-0,77	*-0,72*	*-1,63*	*-0,85*	*-0,85*	*-1,11*	*-0,78*	*-1,66*
FARC	2,7183	3,6269	22,4984	-1,8665	3,6749	3,1427	1,8195	6,8820
	1,29	*1,39*	*6,87*	*-0,97*	*2,38*	*2,35*	*1,79*	*1,75*
ELN	-1,9365	1,3425	2,2333	4,2457	-4,6268	7,5436	-2,9808	0,6295
	-0,68	*0,45*	*0,59*	*0,93*	*-0,76*	*1,88*	*-1,08*	*0,28*
PM	0,1926	-0,0048	-1,5275	-0,7750	-0,6247	-0,1626	0,6348	0,3697
	0,44	*-0,01*	*-2,16*	*-2,27*	*-1,90*	*-0,51*	*1,67*	*0,77*
GSocRP	0,0348	-0,1630	0,1059	0,0900	0,0155	0,0649	0,0118	-0,1494
	0,59	*-2,35*	*1,90*	*1,87*	*0,98*	*2,39*	*0,24*	*-1,49*
Captures	-0,0006	-0,0007	0,0008	0,0008	-0,0005	0,0000	-0,0005	0,0007
	-1,80	*-1,79*	*1,66*	*1,92*	*-4,38*	*-0,02*	*-2,06*	*1,45*
Homicide-1	0,7886	0,6535	0,7827	0,5510	0,6071	0,5866	0,7848	0,6609
	9,01	*8,96*	*13,07*	*8,01*	*14,62*	*10,19*	*11,63*	*5,19*
FARC*ELN	0,1562	3,9098	-0,6365	2,0172	14,8478	-0,1969	2,8943	7,6524
	0,24	*2,42*	*-0,13*	*0,23*	*3,39*	*-0,17*	*1,18*	*2,40*
N	678	678	678	678	678	678	678	678
R2	0,6439	0,6180	0,6903	0,6435	0,6458	0,5470	0,5392	0,5192

Asymptotic t-statistics in italics. White standard errors used to get the statistic. See definitions of variables in table 1.

Table 10. IV Estimates of the Spatial Model
Treating Captures an PM as Endogenous. 1991-1998.

Variable	1991	1992	1993	1994	1995	1996	1997	1998
Constant	-24,9128	-49,9294	-20,9433	-43,1549	-1,8946	-44,0926	-39,9181	-20,8963
	-1,48	*-2,55*	*-0,93*	*-2,65*	*-0,14*	*-3,42*	*-2,68*	*-0,89*
W*Homicide	0,7391	1,1999	0,6257	1,1996	0,6676	1,0087	0,7651	0,4642
	3,32	*5,77*	*2,76*	*6,77*	*3,23*	*4,52*	*3,53*	*1,35*
GiniUAA	5,5527	0,4730	4,0907	-2,9696	-6,2013	8,8473	-2,7986	1,2663
	0,56	*0,03*	*0,27*	*-0,27*	*-0,63*	*0,80*	*-0,17*	*0,08*
GiniRAA	-10,0296	0,8715	-9,5381	3,0894	-0,8728	-3,6027	10,4709	-0,5739
	-0,98	*0,08*	*-0,75*	*0,29*	*-0,09*	*-0,37*	*0,81*	*-0,04*
NBI	0,1868	0,2579	0,6452	0,2892	0,1046	0,3917	0,0970	0,3908
	0,42	*0,59*	*1,41*	*0,85*	*0,42*	*1,52*	*0,42*	*1,19*
NBI2	-0,0030	-0,0029	-0,0067	-0,0027	-0,0019	-0,0026	-0,0016	-0,0045
	-0,75	*-0,72*	*-1,65*	*-0,83*	*-0,83*	*-1,06*	*-0,71*	*-1,66*
FARC	2,7369	3,5936	22,5349	-1,8848	3,6845	3,1240	1,8051	6,8813
	1,30	*1,38*	*6,89*	*-0,98*	*2,39*	*2,32*	*1,77*	*1,75*
ELN	-1,9777	1,3342	2,2965	4,2474	-4,6466	7,5060	-2,9948	0,6288
	-0,69	*0,45*	*0,60*	*0,92*	*-0,76*	*1,88*	*-1,08*	*0,27*
PM	0,1713	0,0348	-1,5672	-0,7650	-0,6290	-0,1011	0,7389	0,3681
	0,39	*0,08*	*-2,20*	*-2,19*	*-1,95*	*-0,32*	*1,95*	*0,77*
GSocRP	0,0367	-0,1640	0,1059	0,0897	0,0153	0,0639	0,0101	-0,1494
	0,62	*-2,36*	*1,90*	*1,87*	*0,97*	*2,36*	*0,20*	*-1,49*
Captures	-0,0007	-0,0007	0,0009	0,0008	-0,0006	0,0000	-0,0005	0,0007
	-1,98	*-1,70*	*1,89*	*2,16*	*-4,51*	*-0,09*	*-2,05*	*1,45*
Homicide-1	0,7885	0,6525	0,7850	0,5521	0,6076	0,5885	0,7865	0,6606
	9,00	*8,96*	*13,11*	*8,20*	*14,63*	*10,20*	*11,64*	*5,19*
FARC*ELN	0,1545	3,9132	-0,6477	2,0225	14,8416	-0,2002	2,8556	7,6528
	0,24	*2,42*	*-0,13*	*0,23*	*3,39*	*-0,18*	*1,16*	*2,40*
N	678	678	678	678	678	678	678	678
R2	0,6436	0,6185	0,6899	0,6453	0,6457	0,5462	0,5385	0,5192

Asymptotic t-statistics in italics. White standard errors used to get the statistic. See definitions of variables in table 1.

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- We will examine the effects of international interventions promoting democratic reform, human rights and market competition on the 'conflict management capacity' and production and distributional systems of existing polities.

- We will analyse how communities have responded to crisis, and the incentives and moral frameworks that have led either toward violent or non-violent outcomes.

- We will examine what kinds of formal and informal institutional arrangements poor communities have constructed to deal with economic survival and local order.

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