Manual Eradication, Aerial Spray and Coca Prices in Colombia

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Abstract

What are the effects of aerial spraying campaigns and manual eradication of illicit crops on the price of derivatives of coca in Colombia? The objective of this work is to determine the impact that these actions have on the price of coca in its various stages of production. In particular, we examine the impact on prices of the leaf, the paste and base of coca that manual eradication efforts and aerial spraying had in Colombia in recent years. Using a panel data econometric analysis based on information at sub-regional level from 2005 to 2011, and using fixed effects estimators and instrumental variables, we corroborate the hypothesis that the price is relatively inelastic to such actions. We argue that the low or no impact on the eradication of coca prices is a result of the predominantly monopsonistic structure of such markets, which remains despite eradication efforts, given the territorial control that the various armed groups illegal exercise on the main areas of coca production, allowing them to set prices with relative independence from the supply.

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1. Introduction

What are the effects of forced eradication campaigns of illicit crops on the price of these products illegal? The academic literature has addressed this question (Reuter and Kleinman 1986; Mejía and Posada 2008) tends to analyze the impact of suppression actions have on the offer price of final products, such as cocaine and heroin on the streets of major consuming countries. The results generally show the inflexibility of prices to actions such as seizure of shipments, the removal of supply in producing countries, or the prosecution and conviction of traffickers. Other studies have addressed the relationship between anti-drug policies and cultivated areas. While early works often show that eradication of illicit crops has no clear impact on the volume grown, recent studies suggest a decrease in supply as a result of such actions (Mejia, Restrepo and Rozo, 2012; Rozo, 2012).

In this paper we address the problem from a different perspective: we focus on explaining the relationship between aerial spray and manual eradication of illicit crops and prices of coca leaf and the products derived from coca paste and coca base.

Thus, this study is the first one to address the impact of the price war on drugs in producer countries. If the goal of this fight is to suppress the supply in the producing country, to increase the price of intermediates, and thus increase the price in the consuming country and discourage consumption, this paper analyzes the effectiveness of the fight against drugs on the first link which is expected to have an impact. Naturally, an estimation of the impact that manual eradication (ME) and aerial spraying (AS) had on the prices of the leaf, coca paste and base, made in this article, represents a contribution to the understanding of more efficient ways to allocate resources in the fight against drugs and the policy objectives against the supply of coca .

Our analyzes suggest that manual eradication and aerial spraying have no impact on the prices of these products. This result, while it may seem paradoxical at first, has a reasonable explanation: in the areas where these products are marketed, the various illegal armed organizations act as monopsony and have the pricing power due to its market power. Thus, so eradication policies have an impact on supply, prices remain relatively fixed because the armed groups – Bacrim and Farc- have the ability to keep them that way .

The analysis of the impact of alternative development programs in the prices of the production chain, as the third mechanism for reducing the supply of cocaine, was not included in this analysis because of the large geographical inconsistency observed between areas where coca crops are located and where the aid programs are allocated .

This chapter consists of seven sections, including this introduction. In the second section, we discuss the major literature related to this topic and its connection with our results. In the third section we describe the methodology used to analyze the relationship between eradication and prices. In section 4 we describe the data used in the study. Section 5 presents the main findings. In section 6 we discuss the mechanism by which prices are relatively inelastic to the eradication of illicit crops. Finally, in Section 7 we discuss these findings and policy recommendations.

2. Literature

Studies evaluating the impact of different anti-drug policies in Colombia tend to analyze the effects on coca cultivation. Moreno-Sanchez, Kraybill and Thompson (2003) and Dion and Russler (2008), using departmental data, and found a positive correlation between spray and presence of illicit crops. However, these studies have methodological problems that preclude the identification of causal effects. Naturally, if one of the criteria chosen by the authorities to eradicate is the abundance of illegal crops, it should be a positive correlation between the two variables, without this meaning that greater cause greater presence eradication of crops .

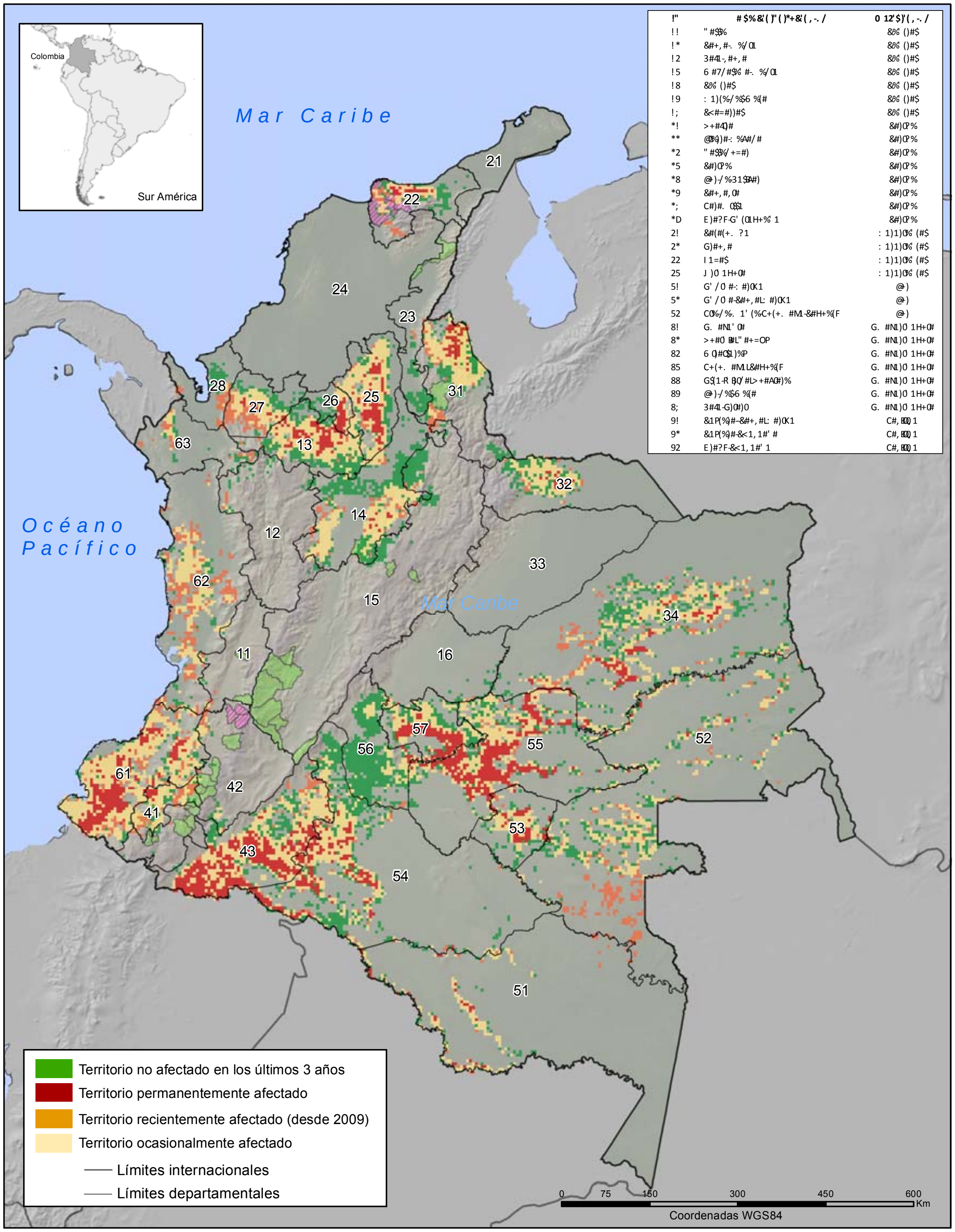
Other studies attempt to solve this problem. Using models in-difference and regression discontinuity, Mejía Restrepo and Rozo (2012) show that aerial spraying does reduce the amount of crops, at least in the region near the border with Ecuador. Reyes (2012) uses instrumental variables to analyze this relationship. In particular, the author uses the distance from the municipalities to the anti-narcotics base as a tool for eradication, and find a positive causal effect of such actions on crops. Rozo (2012) also uses instrumental variables, but found opposite results. Using growers distance to parks, which are legally protected areas in which there can be spray area, the author finds a negative relationship between fumigation and hectares .

Thus, it is clear that there is no consensus on the effect of forced eradication of the quantities measured in hectares cultivated. However, it is worth asking whether this is the relevant variable when judging the effectiveness of such policies. As suggested by Reuter and Kleinman (1986), the prices are usually a better indicator of the effectiveness, because ultimately the goal of the authorities is to discourage these activities increase the final price paid by consumers. In this sense, this study is the first to analyze the prices of intermediate products for the production of cocaine in the main producer.

3. Methodology

The Integrated Illicit Crop Monitoring System (SIMCI) of the United Nations Office on Drugs and Crime (UNODC), collects information on municipal leaf prices, based on fieldwork since 2005 of pasta and coca base in Colombia. However, one of the main challenges of this empirical study is to define the unit of analysis. The natural candidate, initially, is the municipality. However, given the nature of the information to construct a standard panel-year municipality implies serious problems of missing data. In addition, the integrated nature of these markets involves a substantial measurement error, because the amount grown in a municipality most likely it´s sold in another town .

So, it is necessary to define a larger geographic unit of analysis. The natural candidate is the department. Unfortunately, the heterogeneity of this unit of analysis associated with Colombian geography and the differences on the extents of many of the departments makes its use problematic. It is very difficult to justify homogeneity between Urabá and Magdalena municipalities of this department, to cite just one example. Thus, in this paper we use the sub division established by SIMCI for the study of illicit crops. Figure 1 presents the 32 subregions that SIMCI established by the study of the geographical distribution of illicit crops in Colombia.



Fuente: UNODC-SIMCI 2012

Therefore, in this paper we construct a data panel at the subregional, from 2005 to 2011, with the aim of identifying the relationship between MS and AA and leaf prices, pasta and coca base in Colombia. Thus, our basic specification can be characterized using the model

$$P_{it} = \alpha_i + \gamma_t + Manual_{it}\,\beta_1 + Aspersion_{it}\,\beta_2 + \boldsymbol{X}_{it}\phi + \varepsilon_{it} \quad (1)$$

Where P(it) is the price of the coca leaf, pasta or coca base in the subregion i in year t. The model includes fixed effects, captured by the term α(i). In this way, we control for these unobservable characteristics that do not change over time at the subregional level and could be correlated with the price of these products, such as the geography of the subregions which naturally affect the marketing of coca.

In turn, the model includes time effects, represented by the term γ(t), corresponding to dummy variables for each year and is intended to capture the impact of events occurring in a particular year and that equally affect all subregions. Our variables of interest are 〖Manual〗(it) and 〖Aspersion〗 it, which measure the number of hectares sprayed aerially and manual eradication in the subregion i in year t. Thus, the coefficients of interest are β_1 and β_2, as they capture the impact of ME and AS shares have on the price of the leaf, the base and coca paste, respectively. Finally, X_it , is a vector of subregional level control, That include the presence of armed groups, population, urbanization, and poverty. Additionally, in some of the specifications include variables eradication and spray are lagged one period, with the aim of capturing after effects of drug control efforts .

However, it is important to recognize that the specification described by (1) is not without limitations. In particular, problems of endogeneity and bias estimates could be misleading. For example, it could be the case that the price of coca derivatives determines which sites are manually eradicated or spray. The police, intentionally or unintentionally, may go behind the regions in which the business is healthy and the prices are higher, for example. In that case we would face a scenario of reverse causality, as the dependent variable to the independent cause of concern. This would bias the estimates based on (1).

Another source of endogeneity would be borne by the exclusion of relevant variables that are correlated to prices with eradication. For example, institutional factors, such as efficiency or the quality of justice, time-varying, could affect both prices as eradication. Most corrupt municipalities could exhibit healthier illegal markets in which the price of cocaine is higher, and also could be more diligent in preventing the central government antinarcotics action. The presence of omitted variables would reap also estimates based on (1) .

Given these potential endogeneity considerations, in this paper we propose an instrumental variables estimation. To be a valid instrument, it will firstly correlated with potentially endogenous variable. Secondly, the single channel through which the instrument must be correlated with the dependent variables must be the endogenous potentially independent variable. In this case, and to facilitate the analysis, we add the independent variables of interest, Aerial_it and Manual_it, into a single measure called Eradication〗 _it. In this way, we avoid the problems of having multiple endogenous variables and the need to find at least the same number of instruments (Angrist and Pischke, 2009).

Therefore, the first condition required to use a variable correlated with the eradication + spraying. Several factors explain why some regions are spray more than others. Of particular importance are the crop density and roughness. Density is important because the central objective of the eradication is to maximize hectares as possible. Thus, it is expected that in those subregions in which the density is greater, eradication is greater. However, we are aware that the density is not completely exogenous to the behavior of coca. Of course, higher density culture could mean lower prices. Therefore, our instrument interacts with roughness density. In areas of high topographic accident spraying is harder, not only because the overflights are complex, cloudiness is higher which decreases the detection and weather to spray the windows, but also because the tactics of using snipers to attack the armed groups aircraft from above.

Thus, in the first stage of the estimate calculated by instrumental variables

$$Erradicacion_{it} = \alpha_i + \gamma_t + (Densidad_{it} \mathrm{X} Rugosidad_i)\delta + \boldsymbol{X}_{it}\phi + \epsilon_{it} \quad (2)$$

where 〖〖Eradication〗 _it = Mist on〗 _it + 〖Manual〗 _it is the total number of hectares eradicated, 〖Density〗 _it is (defined as) in the sub-region i in year t, while 〖Roughness〗 _i is the standard deviation heights of the municipalities that make up each subregion. Thus, δ represents the correlation between the instrument and the potentially endogenous variable. We hope that δ is negative, then the positive effect of density on the eradication must be smaller in geographic areas with high accident rates.

The second stage is given by:

$$P_{it} = \alpha_i + \gamma_t + erradic\widehat{ac}ion_{it}\beta + \boldsymbol{X}_{it}\phi + \varepsilon_{it} \quad (3)$$

Where $erradic\widehat{ac}ion_{it}$ is the predicted value of the first stage. Finally, it's relevant noting that in all specifications standard errors are robust to clustering at the subregional level, to allow arbitrary serial correlation at this level.

4. Data

This work represents the first effort to analyze rigorously and systematically the price of derivatives of coca in Colombia. As such, the pricing information sheet, paste and base, collected by the project SIMCI the United Nations Office on Drugs and Crime-UNODC-through fieldwork conducted since 2005, is fundamental. Meanwhile, the main independent variables of this study are the number of hectares eradicated manually and sprayed. Hectares sprayed information comes from the National Police. The data are collected using aerial spraying georeferencing devices located in the aircraft used for spraying. Meanwhile, the number of hectares eradicated manually extracted from information collected by employees of government responsible for advancing this work and certify –audit- by UNODC.

As for the controls used in this study, data of population and urbanization (population density) are based on information from the National Department of Statistics (DANE). As our unit of analysis is the sub-region, the total population is the sum of the populations of the municipalities of the geographical unit, while the population density level is such population divided by the area of the subregion. Poverty information corresponds to Unsatisfied Basic Needs Index (NBI), calculated by the National Planning Department (DNP). Finally, the presence of armed groups measured as the number of armed actions carried out by the Revolutionary Armed Forces of Colombia (FARC), the National Liberation Army (ELN) and the United Self Defense Forces of Colombia (AUC), based on information from Human Rights Observatory of the Vice Presidency.

Table 1 presents the main descriptive statistics of the data used in this analysis. In the sub-years for which we have data, the real price of a kilogram of coca leaf is $ 1,935 (US$ 1.1) on average. The paste shows an average real price of about $ 1'800, 000 (US$ 1.000) while the base is approximately $ 2'064, 000. (US$ 1.150) These figures differ slightly from those averages by UNODC (2012), which is natural, since we averaged between subregions while the UN report national averages

Tabla 1: Descriptive Statistics

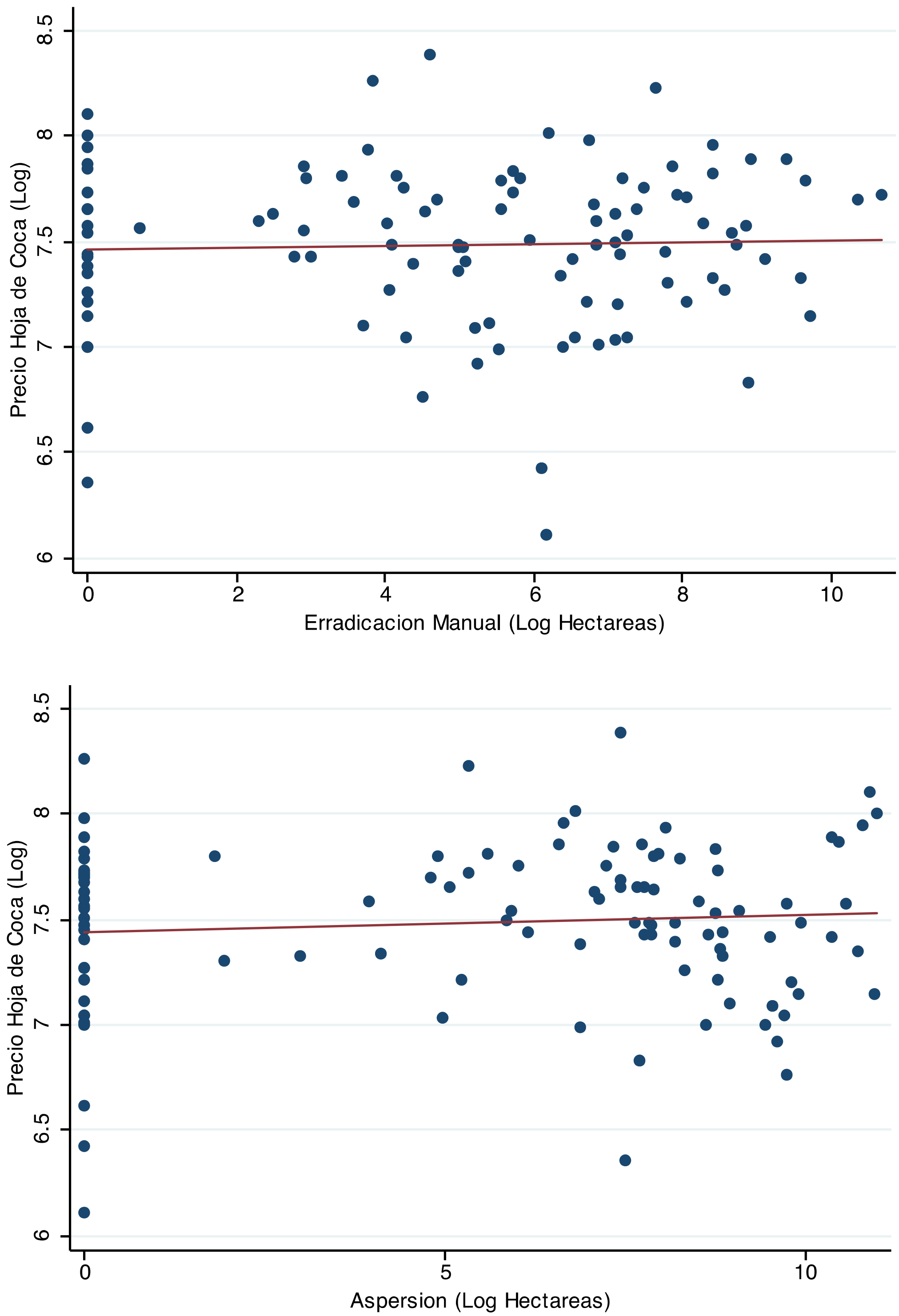
Variable	Mean	Std. Dev.	Min.	Max.	N
Hoja	1935.377	728.161	448.2	5131	120
Pasta	1579501.152	340683.569	865680	2500000	143
Base	2064218.75	335966.368	1400000	3300000	128
Manual (log)	4.041	3.023	0	10.671	256
Aspersión (Log)	4.467	3.987	0	10.975	256
Población	1342748.906	2809361.861	22973	14056765	288
Urbanización	0.625	0.745	0.012	2.684	288
NBI	68.013	15.662	31.76	100	288
Farc	226.5	295.319	1	1445	288
Eln	83.063	112.972	0	375	288
Auc	25.375	40.152	0	173	288

5. Results

We begin by describing the relationship between the different eradication strategies (manual and spray). Figure 2 shows the correlation between the price of coca leaf and the number of hectares eradicated manually (upper panel) and sprayed hectares (lower panel). Each observation in the graph corresponds to a sub-year[3]. In addition, the red line corresponds to the regression line simply adjusted. While there appears to be a positive relationship between eradication (manual or air) and the price of coca leaf, from the graph it is clear that this relationship is tenuous and hardly significant. Naturally, this is a purely descriptive exercise no casual connotations.

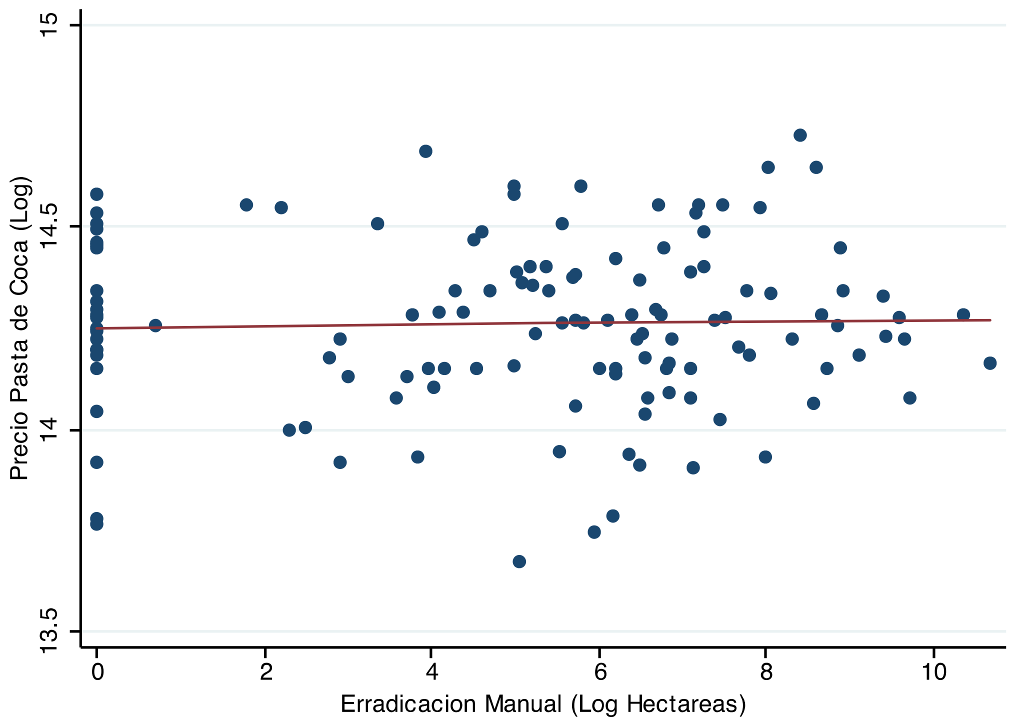
[3] Considering the large amount of 0 in the data, we use the Log scale to "clean" the series.

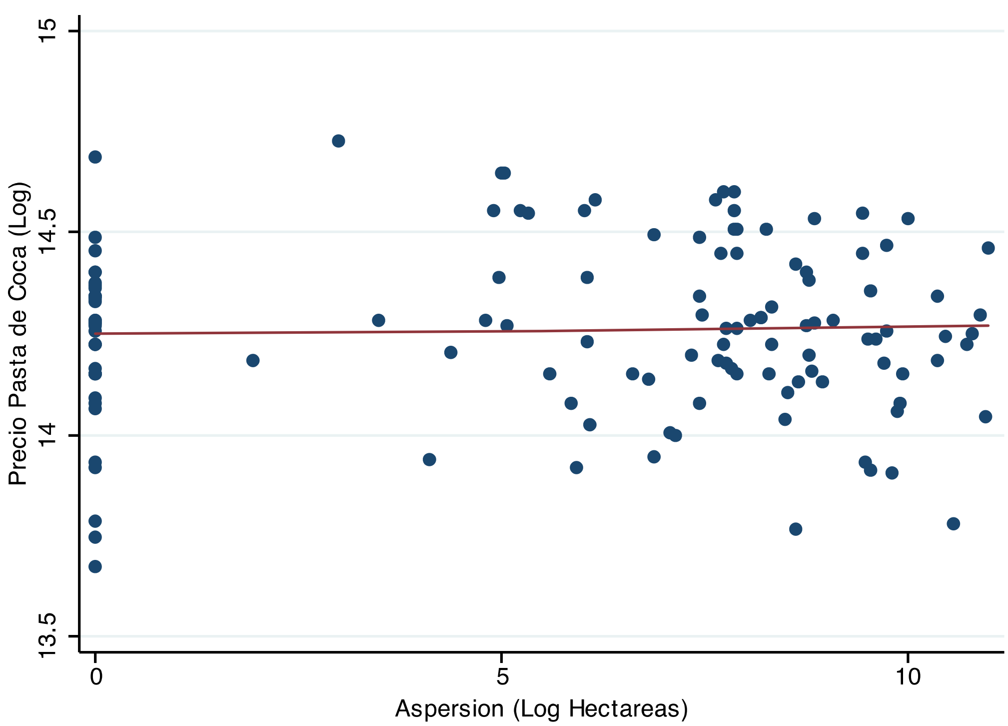
Figura 2: Correlation between ME (top)/ AS (low) and coca prices.



Authors own estimations based on SIMCI data.

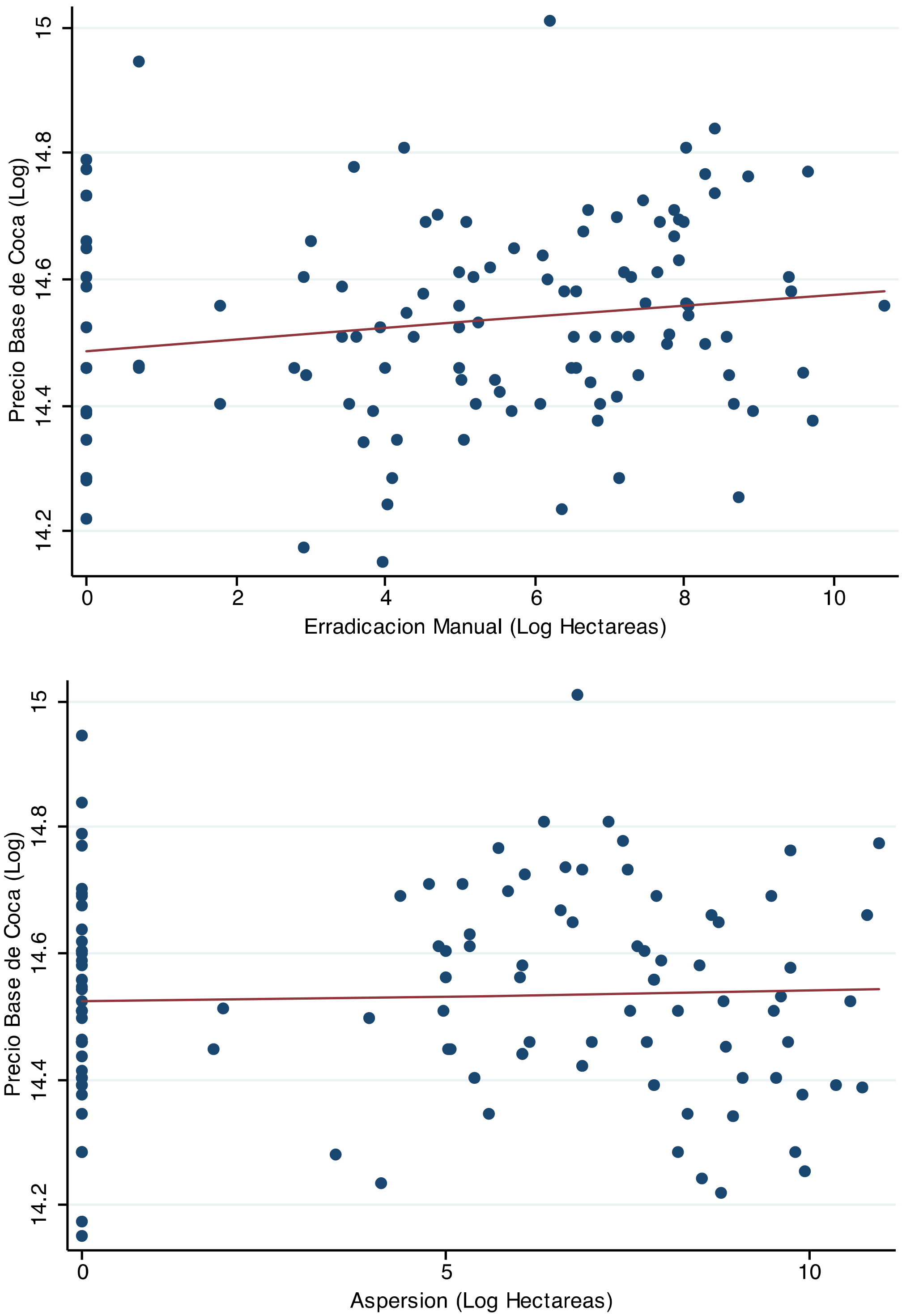
Figura 3: Correlation between ME (top)/ AS (low) and pasta price





Authors own estimations based on SIMCI data.

Figura 4: Correlation between ME (top)/ AS (low) and base price



Figures 3 and 4 show similar patterns. Figure 3 shows that the relationship between price of coca paste and eradication is quite tenuous. It is difficult to suggest, as would be the case if the policy fulfill its objective, which in those subregions and in those years in which more hectares were eradicated, the price of coca paste is higher. The coca base, a more elaborated product than the coca paste or leaf had a similar relation, as shown in Figure 4. Perhaps the top panel of this figure reveals a strong relationship between manual eradication of the base price. We will test whether this relationship is really strong in the regression analyzes that follow.

Table 2 presents results of the estimation of the model represented by equation (1), using the price of coca leaf as a dependent variable. In all cases we estimate fixed effects, with the intention, as stated earlier, controlling for those subregional unobservable variables that do not change over time. Furthermore, all estimates include subregional level controls. We control for population, urbanization, poverty and the presence of armed groups. Column 1 estimates the relationship between forced manual eradication of coca crops and the price of the sheet. The estimated coefficient is not significantly different from zero, suggesting a lack of correlation between anti-drug this policy and the price of the leaf derivative.

Column 2 shows that the lack of correlation also exists between the spraying and the price of the leaf. In fact, as shown in column 3, this result is robust when we include both eradication and spray. One might think that the effect of eradication campaigns on prices takes time to materialize. In column 4 we include lags of one year for such actions. Again, there is a clear lack of correlation between the spraying and manual eradication and the price of coca leaf in the different sub-regions of Colombia. It is worth remembering that all these specifications include time fixed effects to control for events that took place in each year and transversely affecting equally all subregions of the country. In addition, the standard errors are clustered at the subregional level, to allow arbitrary serial correlation at this level.

Tabla 2: Manual Eradication, Aerial Spray y Coca leaf Price

	(1) Hoja	(2) Hoja	(3) Hoja	(4) Hoja
Manual	0.00784		0.0132	0.0107
	(0.0316)		(0.0315)	(0.0320)
Aspersión		0.0198	0.0351	0.0508
		(0.0151)	(0.0449)	(0.0462)
Constante	7.714***	7.626***	7.491***	7.363***
	(0.157)	(0.0982)	(0.342)	(0.362)
Controles	S	S	S	S
Rezagos	N	N	N	S
Efectos Temporales	S	S	S	S
R^2 (within)	0.6076	0.6355	0.6130	0.6370
N	92	107	92	92

Cluster-robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3 presents estimates equivalent, but this time using the price of coca paste as dependent variable. Again, aerial spraying has a zero correlation with the price of the derivative. The main difference is that manual eradication shows a negative correlation with the price of pasta, a result that is robust to the inclusion of the two variables simultaneously eradication (column 3) and lags (column 4). Naturally, this result is counter-intuitive and in any case is against the fundamental objectives of the anti-drug policy.

Tabla 3: : Manual Eradication, Aerial Spray y Coca Paste Price

	(1)	(2)	(3)	(4)
	Pasta	Pasta	Pasta	Pasta
Manual	-0.0356**		-0.0329**	-0.0322**
	(0.0136)		(0.0125)	(0.0133)
Aspersión		0.0102	0.0191	0.0163
		(0.0105)	(0.0147)	(0.0167)
Constante	14.54***	14.27***	14.40***	14.42***
	(0.0954)	(0.0935)	(0.133)	(0.149)
Controles	S	S	S	S
Rezagos	N	N	N	S
Efectos Temporales	S	S	S	S
R^2 (within)	0.6470	0.6296	0.6551	0.6658
N	109	128	109	109

Cluster-robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Finally, Table 4 shows that the price of cocaine base follows a similar pattern of the leaf. This price does not correlate with the number of hectares sprayed or manually eradicated. In any case, from these estimates we can conclude that if the objective of the eradication of illicit crops is to increase the price of coca products, that goal is not being achieved.

Tabla 4: Manual Eradication, Aerial Spray and Coca Base Prices

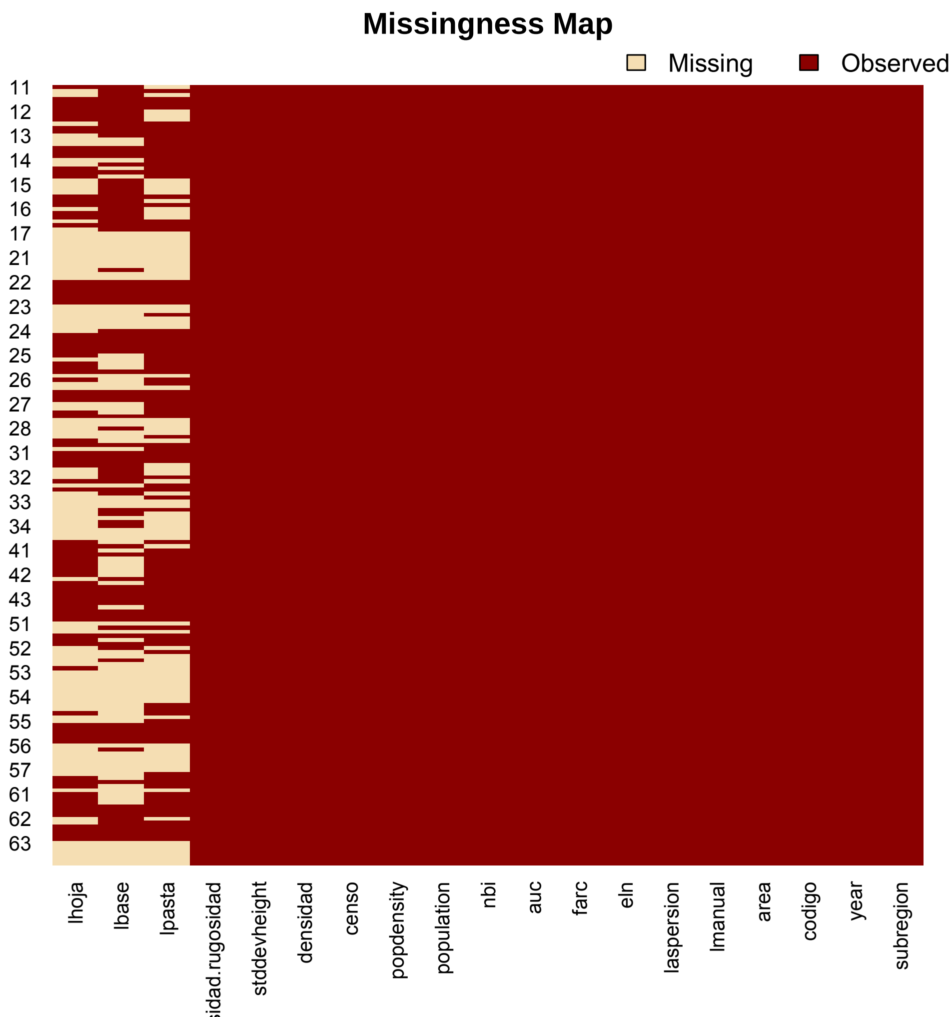
	(1) Base	(2) Base	(3) Base	(4) Base
Manual	0.0175		0.0148	0.0112
	(0.0144)		(0.0151)	(0.0146)
Aspersión		-.0129*	-0.00978	-0.00977
		(0.0070)	(0.00693)	(0.00713)
Constante	14.25***	14.60***	14.35***	14.40***
	(0.228)	(0.105)	(0.204)	(0.205)
Controles	S	S	S	S
Rezagos	N	N	N	S
Efectos Temporales	S	S	S	S
R^2 (within)	0.6612	0.7562	0.6741	0.6992
N	97	119	97	97

Cluster-robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

One of the main challenges of the analysis based on the prices of coca derivatives is the strong presence of missing data. In technical terms, the estimates described by Tables 2-4 correspond to what we would call an unbalanced panel. This is because the measurement of prices is not systematically for all subregions in the same years. Also, it is possible that in some subregions there is even a market for some or all products. If the absence was completely random data, analysis will have no major problems. However, if the absence is correlated with variables observable or non-observable relevant to the model, the estimates presented above would be skewed. Figure 5 allows to analyze some patterns in the absence of data.

Figure 5: Patrons on data Absence



The rows correspond to the 32 subregions, identified by numbering. For its part, the columns correspond to the variables analyzed in this chapter, arranged left to right and starting with the one with more missing data. In this vein, one can see that the only ones that have no variables are leaf prices, base and coca paste, respectively. Furthermore, it can be seen that there is no randomness. For some subregions no data at any time or for any product. In other subregions, no greater completeness of the data. In any case, it is clear that the problem of lack of data, either through lack of measurement or market, is important and can lead to biases in the analysis .

For this reason, and to verify the robustness of the results, in this chapter we used multiple imputation techniques to mitigate the effects of a lack of data. Multiple imputation has been shown to further reduce bias and increase the efficiency of the estimators compared with the method of elimination of observations with missing data (Honaker, King and Blackwell, 2012). Besides the absence of data that cannot be completely random and be correlated with observable and unobservable variables, which introduce bias, removing observations with missing data shows significantly reduced, decreasing the efficiency of the estimates and standard errors affecting thus spoiling statistical inference. This is evident in the previous analysis, as the sample sizes when analyzing the leaf prices, paste and base are only 92, 109 and 97 subregions / year, respectively .

Multiple imputation made in this chapter follows the guidelines of Honaker and King (2010). Based on the observed data for the subregions, five impute missing values for each cell, or in other words, built five databases "complete". This aims to incorporate the uncertainty inherent in the imputation process. The thrust of the analysis is to use the observed data to, through statistical models, "predict" the value of the missing data, and then perform the original analysis on the complete data .

Formally, suppose that Q is a certain amount of interest of the population, as the mean or the regression coefficient. If m is the number of databases that we have after charging (in our case m = 5) and q_j is the estimator corresponding to the base Q j, for j = 1, ..., m, then the total estimator Q after charging is

$$\bar{q} = \frac{1}{m}\sum_{j=1}^{m} q_j \qquad (4)$$

For example, if we are interested in the regression coefficient for fixed effects the price of coca leaf on the spray, we estimate this regression for the five bases and average coefficients imputed to find the final estimate .

For its part, the standard error estimator is given by

$$SE(\bar{q}) = \frac{1}{m}\sum_{j=1}^{m} SE(q_j)^2 + S_q^2(1 + 1/m) \qquad (5)$$

Where $SE(q_j)$ is the standard error for q_j , and $S_q^2 = \sum_{j=1}^{m}(q_j - \bar{q})^2/(m-1)$ is the simple variance to the m estimators.

6. Mechanism

If the target of forced manual and aerial eradication is reducing the supply of cocaine to discourage their consumption and production conditions, it is worth asking why the price of its derivatives is shown as inelastic to such shares. In this paper we show that it is not true that in those subregions that eradicates more, the price is higher. We found at least four reasons which explain the inflexibility:

i) Changes in productivity
ii) Strategic response of producers
iii) Competition between illegal armed groups
iv) monopsony power of illegal armed groups

The first two explanations correspond to adjustments in supply: producers would be able to readjust, either increasing the productivity of their crops or responding strategically eradication campaigns, making the aggregate supply of products derived from the coca be affected and hence the price will not rise.

However, recent empirical evidence would undermine the argument that changes in productivity, or offer generally explain the inflexibility of prices. For example, Rozo (2012) shows that aerial spraying campaigns decrease productivity of coca crops. Orchestrating the aerial spraying growers proximity to parks and nature reserves, places where you can legally spray, Rozo found that spraying affect both productivity and reduce the total amount of this type of planted crops.

Similarly, Mejía Restrepo and Rozo (2012), exploiting the diplomatic friction between Colombia and Ecuador that led to the ban on spraying ten kilometers from the border with that country, show that spraying campaigns have a significant negative effect, although modest, on the number of hectares of coca cultivation. In any case, if the fumigations have a negative impact on the amount cultivated and productivity of these crops, it is difficult to justify the inflexibility of leaf prices, pasta and coca base from positive adjustments in the amounts available on the market.

Thus, the relative inelasticity of prices to changes in the ME and AS a consequence of adjustments in the demand for products derived from the coca, but not supply. There are two possibilities. First, one might think that the cartels and illegal armed groups act as sellers of leaf paste and base, and market competition in these subregions keeps prices down. However, information field and the field workers assigned to UNODC and DEA, corroborate the opposite. Illegal armed groups like the FARC or criminal gangs, acting as buyers, and sellers of these products coca derivatives that are required to produce the cocaine.

In fact, according to some reports on the structure of these markets (UNODC, 2012), illegal armed groups and major Colombian cartels enjoy monopsony power. This means that these groups have the ability to set the prices of the leaf , the paste and cocaine base. For this reason, and manual eradication and aerial spraying have a negative impact on production, and even on productivity, the shock is assumed entirely by growers as major buyers have the ability, or coercive market, to maintain fixed prices and sustained low. In fact, based on interviews conducted by the UNODC field workers to growers in different regions of the country, this phenomenon is most clearly evident in the regions controlled by the FARC.

7. Discussion

In this chapter we have shown that manual eradication campaigns and aerial spraying of illicit crops do not impact the price of the main products of coca cultivation. This price inelasticity of the leaf, coca paste and base would be the result of monopsony power enjoyed by illegal armed groups and the main posters. Territorial control and enforcement capacity of these organizations enables them to set the prices of these products, so that the potential negative impact that may have eradication campaigns must be absorbed by the small farmers.

In light of the results, what policy recommendations can be formulated? To answer this question, first, it should be clarified what the goal of this type of anti-drug actions. If the purpose of forced eradication is to increase the final price of cocaine paid by citizens in consuming countries, we should be quite pessimistic. Studies show that the participation of the sheet, the paste or base in the final price of cocaine on the streets of the United States or Europe is negligible. So, for that purpose, if eradication seems to have little effect, perhaps it is important to devote more resources to other actions, such as interdiction of shipments.

Moreover, the goal may be discouraging local production of these products derived from coca. In principle, the policy recommendation easy, even trivial, would disrupt the manual eradication campaigns and spray. No matter how trivial is a successful recommendation. As we argue in this paper, if the inflexibility of prices is a consequence of market power and territorial control of illegal armed groups, such government actions must be accompanied by efforts to recover the territory, increase capacity and reduce state coercive capacity of groups outside the law

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