WHY JUSTICE IS UNRESPONSIVE TO CRIME : THE CASE OF COCAINE IN COLOMBIA

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Abstract

In recent years, over ninety percent of all crimes in Colombia have gone unpunished. This paper addresses the reasons for this extreme unresponsiveness of the country´s judicial system to high rates of violence, in particular since the end of the seventies when drug trafficking became a major source of crime. A model of justice provision is presented where the reaction of authorities to shocks in the level of violence is analyzed within a framework of decentralized police and judicial decision-making, along the lines of Lucas (1973, 1976). Namely, law provision is performed at the regional level, with the response of authorities depending crucially on their perceptions regarding the origins of violence. To the extent that the causes of violence are systematically perceived as originating beyond local boundaries, the response to the violence shock at the regional level will vanish over time. This in turn implies that the total provision of justice in the country will be lower. We claim that this explanation describes the Colombian experience over the past fifteen years in two senses. First, regions within the country have considered the emergence of cocaine traffic to be an extra-regional phenomenon. Second, the country as a whole has also perceived it to be an international problem. Both of these aspects have led to an under-provision of justice in Colombia.

1. Introduction[1]

Colombian crime statistics are notoriously high. Just how high they are can be seen in Figure 1.1. In the early 1990s, murder rates in Colombia were triple those of Brazil, over eight times as high as US rates, and nearly eighty times those of China. At the height of the violence boom in 1991, the *average* murder rate was over 89 per 100,000 people, a record for a country without a declared war.

Colombia has not always been witness to these dramatic levels of violence. For over a decade, from the mid 1960s, after the end of the so-called *Violencia*[2], to the mid 1970s, murder rates hovered around 20 per 100,000; earlier, in the 1940s, rates were in the single digits (Rubio, 1996). Starting around 1975, crime rates in general, and murder rates in particular, began to climb (see Figure 1.2). The most dramatic increases occurred beginning in 1982. The total number of murders in the country climbed vertiginously from about 5800 in 1975 to a peak of over 28,000 in 1991, falling slightly to 26,600 in 1996 .[3] The figure shows that these surges in crime occurred in two waves, the first beginning in 1976 and lasting until 1981, followed by an even steeper increase between 1983 and 1991.

As these dramatic increases in levels of violence were occurring, justice failed to keep pace. Figure 1.3 illustrates the creation of the huge gap between murders and arrests that characterizes the Colombian situation today. While in 1975 the gap between the total number of murders and arrests amounted to 23% of murders that year, by 1995 this figure had risen to 570%. In other words, out of every 5 murders that occurred in 1995, 4 did not even reach the arrest, much less the sentencing, stage. The probabilities that a criminal faces of being accused or of being condemned have fallen, over the years, to less than 5%.

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[1] We are grateful to Roberto Chang, Armando Montenegro, Mariano Tommasi and Miguel Urrutia. Special thanks are due to Carolina Giraldo and Marcela Eslava for their research assitance. We also benefitted from the comments of participants at seminars in the Banco de la República, LACEA and DNP. This paper was prepared for presentation at the 1997 Meetings of Latin American and Caribbean Economics Association in Bogotá.

[2] Between the end of the forties and the beginning of the sixties Colombia experienced a bloody political conflict between partisans of the liberal and conservative parties which, according to some studies, cost the country nearly 300,000 lives.

[3] In the paper we will refer, interchangeably, to murders and to crimes. The decision to use homicides as our proxy for crimes is based on a general consensus that other crime figures (such as those for burglaries, etc.) are highly unreliable; in addition, the evolution of homicides over time closely reflects that of a number of other violent crimes.

[4] Homicides per 100,000 persons, 1995.

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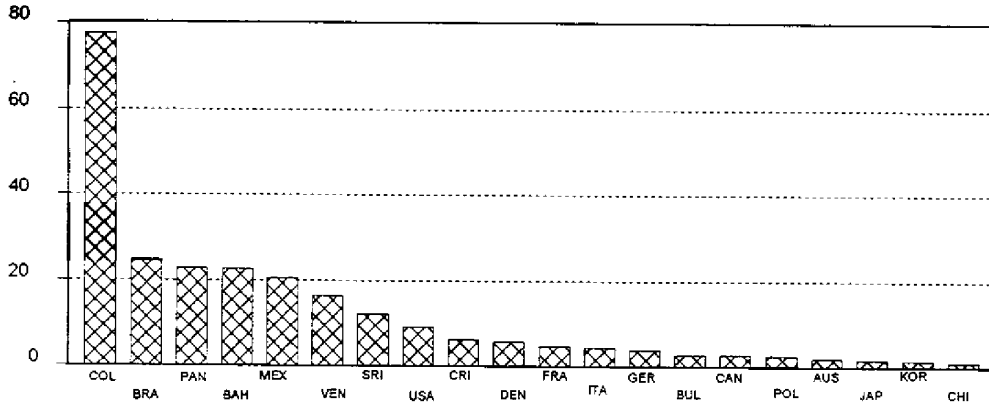Figure 1.1: International Comparison of Homicide Rates - 1995[4]

Figure 1.2: Crimes (Homicides) 1961-1995
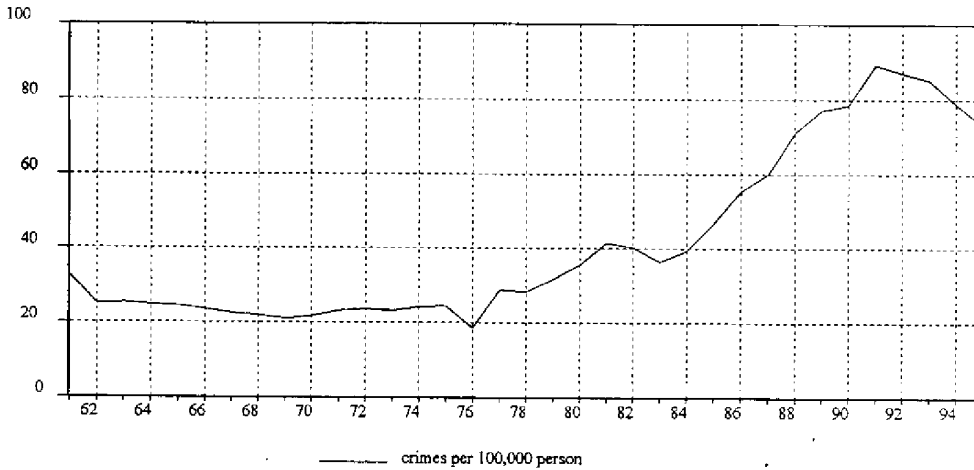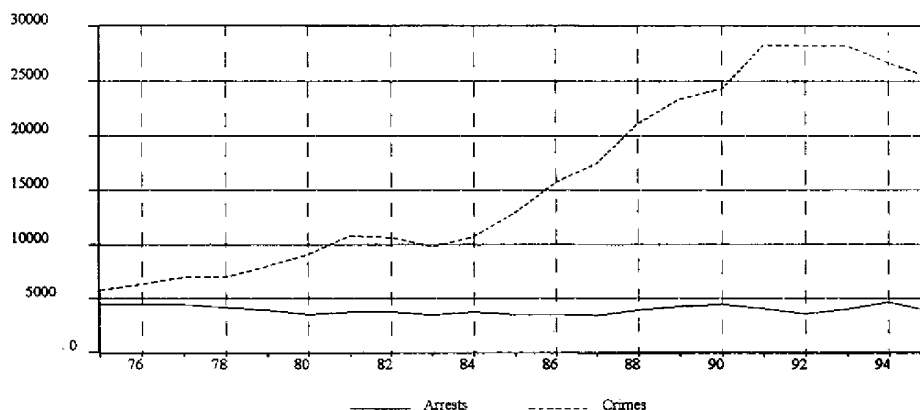

crimes per 100,000 person

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Figure 1.3: Crimes and Arrests, 1975-1995

Here, a justification for the use of arrests as our proxy of justice provision[5] is warranted. While a more obvious proxy might have been the ratio of sentences (or of convictions) to crimes, its use meets a non-negligible labyrinth of definitions and caveats, and, more importantly, time series data on homicide sentences are not available at the departmental level[6].

National figures, however, mask wide regional variations. Crime rates for the 1975-1995 period fluctuated between a high of 109 per 100,000 inhabitants for the department of Antioquia, and a low of 14 for Bolívar (see Table 1.1). Additionally, in a given department, crime and arrest rates vary substantially over time. In Antioquia, crime rates nearly quadrupled between the two subperiods,

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[5]Throughout the paper we will use, interchangeably, the terms justice provision and policing to refer to the general concept of a law enforcement mechanism.

[6]One caveat is due: the assumption we make is that the number of criminals increased pari-passu with the growth in the crime rate, and therefore that stagnating arrest rate indicates that a larger number of criminals have gone unpunished. Of course, if the efficiency in committing crimes dramatically improved a fairly constant number of criminals may have been behind the rise in crime figures reported. This was partially the case in Colombia with the emergence of organized crime. However, plenty of circumstantial evidence (the inmate population, arrests of Colombians abroad) points to a substantial increase in the number of people involved in criminal activities.

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while rates in Guajira fell over the same period[7]. Thus, while the average level of crime is certainly high for the country as a whole, it would be a misrepresentation to conclude that crime rates must thus be *uniformly* high.

What might explain these inter-departmental differences in crime rates and in the response of authorities to crime? This is the central question we aim to answer. Traditional explanations, which attribute increases in violence to the worsening of indicators such as poverty or inequality, or which see crime as a necessary consequence of rapid economic development, clearly fail to shed light on the Colombian situation. Rubio (1996) shows that over the past 40 years, concomitant with the dramatic rise in the murder rate, life expectancy, literacy, and per capita income have also shown steady growth. Infant mortality and income inequality have fallen over the same period.

An obvious candidate explanation is the narcotics trade and activities associated with it. In particular, the timing of the emergence of cocaine trafficking in the early eighties coincides with the sharp rise in Colombian murder rates. Unfortunately, data on drug-related crimes is by its very nature highly unreliable (for recent documentation regarding this, see Steiner, 1997, one of the more recent evidence in this respect). The National Police publishes data on both drug-related crimes and on arrests. However, as can be seen from figure 1.4, the remarkable similarity in the two series sheds doubts on the drug crime figures, and points to a serious underestimation of the total number of drug-related crimes.

To resolve this problem, the decision was made not to use the drug *crime* data at all, and to "correct" the arrest data, taking into account departmental variations in the efficiency of policing. The procedure adopted is presented in Annex 1.

The numbers indicate that as is the case with murder rates, national statistics dilute the marked variation across departments in terms of incidence of drug-related crimes. Figure 1.5 shows the large difference amongst regions in both absolute numbers and rates of drug crimes. For much of the analysis that follows, we ranked departments according to the incidence of drug-related crimes, and divided them into three groups:

1. High drug departments (HDD) **(8)**: Antioquia (capital Medellin), Valle (Cali), Caldas, Risaralda, Quindío, Tolima, Meta and Bogotá D.C.[8]

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[7]This fall is concomitant with the decline in marihuana production in that department.

[8]See Annex 2 for the criterion of classification.

Table 1.1: **Departmental Comparison of Crime Rates**

Crime-Arrest Ratios*

Departments	1975-1982		1983-1995		1975-1995	
	Crime Rate**	Crime Arrest Ratio	Crime Rate	Crime Arrest Ratio	Crime Rate	Crime Arrest Ratio
Antioquia	41	2.2	151	8.8	109	6.3
Atlantico	21	5.0	26	6.7	24	6.0
Bolivar	9	2.4	17	4.0	14	3.4
Boyaca	45	1.6	47	1.7	46	1.6
Caldas	36	1.8	82	3.7	64	3.0
Cauca	46	1.4	52	3.1	50	2.5
Cesar	48	3.5	71	7.8	62	6.1
Cordoba	14	1.8	36	6.6	28	4.8
Cund/ca	31	1.7	43	3.2	38	2.7
Choco	18	1.7	26	3.8	23	3.0
Guajira	92	13.1	73	8.3	80	10.0
Huila	26	1.0	45	3.4	37	2.5
Magdalena	39	6.0	49	8.9	45	7.8
Meta	64	1.8	102	4.9	88	3.7
Narino	18	1.1	26	1.8	23	1.5
N. Santander	34	1.9	59	4.7	49	3.6
Quindio	41	2.0	78	4.7	64	3.7
Risaralda	59	2.6	104	5.6	87	4.5
Santander	32	1.8	54	5.7	45	4.2
Sucre	10	2.6	20	5.2	16	4.2
Tolima	34	1.4	47	2.9	42	2.3
Valle	30	4.4	79	9.3	61	7.4
Bogota	20	2.5	50	5.8	39	4.5
High-drug	40.6	2.3	86.8	5.7	69.2	4.4
Low-drug	26.2	1.9	39.0	4.2	34.1	3.3
Total	32	2.0	67	5.4	54	4.1

Notes:* crime-arrest ratio is the number of homicide crimes committed divided by the number of homicide arrests

Notes:** all rates are per 100,000 inhabitants
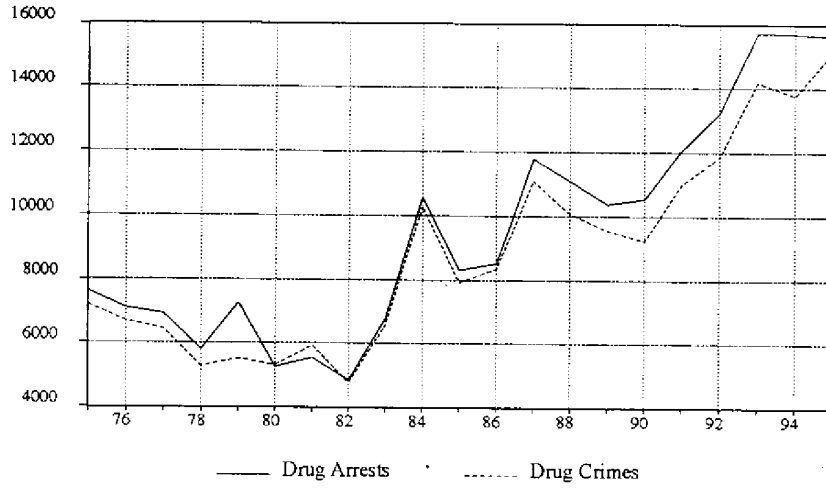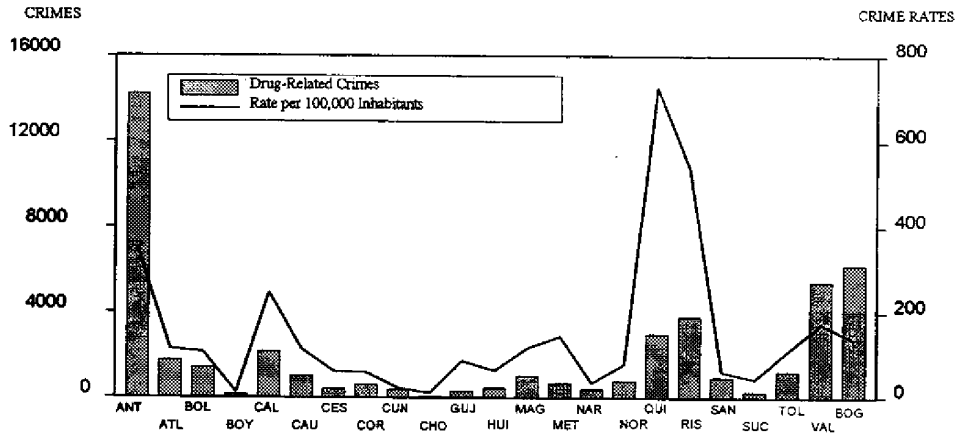
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Figure 1.4: National Police Series

Drug Arrests · ······· Drug Crimes

Figure 1.5: Departmental Variations in Drug-Related Crimes

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2. Low drug departments (LDD) **(8)**: Boyacá, Cesar, Chocó, Córdoba, Cundinamarca, Huila, Sucre and Nariño.

3. Indeterminate **(7)**: Atlántico, Bolívar, Cauca, Guajira, Magdalena, Norte de Santander, and Santander.

Using these groupings, further evidence on the correlation between the narcotics trade and general crime rates is found in the last two lines of table 1.1 and in figure 1.6 which show a much higher crime-arrest ratio for HDDs as compared to LDDs. Of particular interest is the 1983-1995 period, when cocaine trafficking burst onto the national stage: the crime-arrest ratio for high drug regions (7.4) was nearly triple that of low drug areas (2.5). While the crime-arrest gap grew in both groups of departments, the increase was much sharper in those suffering from a high incidence of drug activity. A graphic illustration of the tremendous growth in the number of crimes without matching arrests in HDDs can be seen in figure 1.7.[9]

In sum, national crime rates in Colombia are far higher than those of most other countries; these figures, however, hide the large variations that characterize the different regions within the country. A better exploitation of these interdepartmental differences could provide the means for a better understanding the dynamics of violence in Colombia. While the association of these variations and the surge of cocaine may be obvious, what is less obvious, is how this phenomenon was accompanied by a sharp decline in justice provision relative to crime. We propose one explanation for this stylized fact, along the lines of the signal extraction model developed by Robert Lucas at the beginning of the seventies.

The centerpiece of this model is the proposition that departmental authorities will respond differently to what they perceive to be national, as opposed to local, crime shocks. This is a result of the combination of two factors: the specific characteristics of the cocaine industry (and more generally, of organized crime) and the inevitable centralization of national law-making.

In contrast to "common" violent crimes, the industrial organization of a drug-related homicide involves at least two types of criminal: the actual perpetrator

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[9]Strictly speaking, arrests in any one year will not correspond exactly to the crimes committed in that year. The explanation for this is that an arrest may be associated with a crime committed in a previous year; we will make the assumption that the proportion of arrest for earlier crimes does not change significantly from year to year. Another complication is that several persons may be involved in a given crime. All this means for our purposes is that we may in fact be *underestimating* the gap between crime and arrest rates.
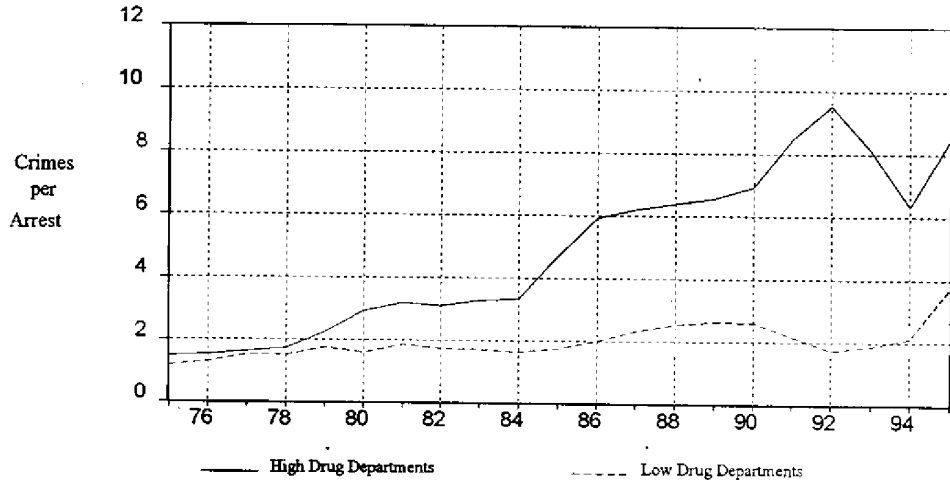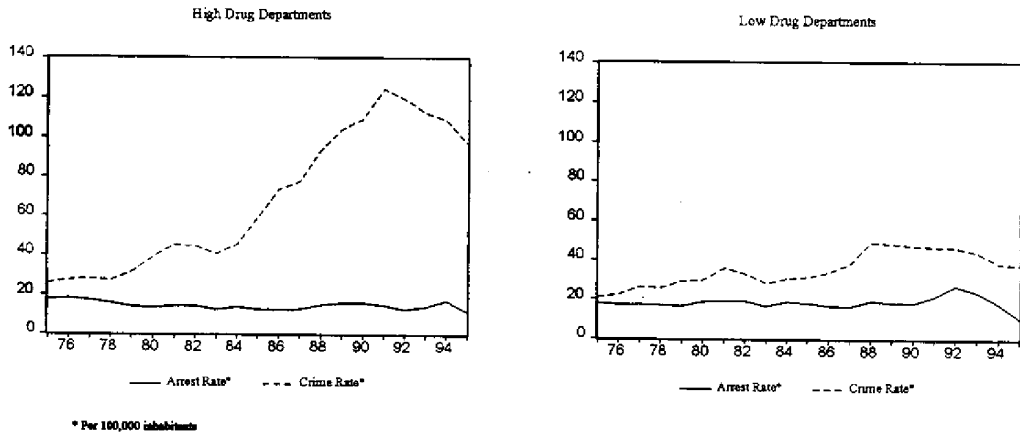
Figure 1.6: Crimes per Arrest

Figure 1.7: The Effect of Drug Trafficking on Crime and Arrest Rates

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of the crime, usually a mere hired-gun, and the mastermind, with whom the homicide is typically very difficult, if not impossible, to associate. The technology needed to respond to the first type of crime is readily available to local authorities in the form of a greater amount of crime-fighting resources which can lead to enhanced police efficiency and more arrests. These tools are ineffective, however, in fighting the latter type of criminal, whose networks exist precisely for the purpose of distancing him from the crime in question. To make matters worse, hired guns are all too easily replaced in this scheme, making it highly inefficient for local authorities to attempt to address a cocaine-related crime shock through the arrest of common criminals.

Regional authorities conclude that an effective strategy to address the source of the crime shock needs to focus on the masterminds of organized crime, and on the illegal activities – usually financial dealings – with which they are implicated. This is beyond the scope of local authorities, resting within the domain of centralized law-making. Thus a necessary, though perhaps not sufficient, condition for responding to a national crime shock is the passage of laws on such issues as the extradition of convicted drug lords, measures against money laundering, and for the confiscation of illicitly acquired wealth.

The futility of responding to a crime shock which has its origins in organized crime with policing tactics designed to address common crimes becomes apparent. Therefore, as regional authorities[10] realize that the jump in crime in their region is due to an underlying shock of national dimensions, we would expect their reaction to be less aggressive than in the case of a local shock[11]. The following section

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[10] We use the terms "regional", "departmental" and "local" authorities interchangeably to refer to law enforcement bodies that operate at the sub-national level. While the stylized facts and the empirical analysis rely on departmental data, the analysis should apply equally well at lower levels of government.

[11] An explanation of the flow of resources within the judicial system is warranted here. While funds are disbursed from the center to the various municipalities, the assignation is based on municipal demand. The procedure is as follows: The Executive Board of the Supreme Council of the Judiciary (*Consejo Superior de la Judicatura - SCJ*), allocates the yearly budget among 27 Precinct Authorities (*Direcciones Seccionales*). The Precinct Authorities, who are autonomous in deciding how to spend their resources, then coordinate the Judicial Offices at the local (municipal) level. In general, the share of the budget destined to a given precinct is proportional to the number of Judicial Offices in it. These offices, in turn, are created and eliminated by the CSJ according to the reported number of criminal proceedings in each municipal center. It is important to note that not all crimes result in the initiation of criminal proceedings. It has become increasingly common to start proceedings only in cases where the perpetrator is identifiable. This means that, ultimately, the budget assigned to a region depends on the effec-

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presents details of the model adapted from Lucas (1973, 1976).

2. The Model

The stylized fact that we aim to explain is the a surprisingly low number of arrests, given the high and increasing tendency of crimes committed in Colombia. We claim that this fact illustrates the inefficiency of Colombian police and judicial system. It was shown that there exist wide differences between regions, both in the evolution of crime rates (homicides) during the last twenty years and in the responsiveness of justice as proxied by arrests. And finally, we argued that these regional differences are highly correlated with cocaine production and trade.

Hence, in trying to account for the unresponsiveness of justice to crime, we need to provide an explanation for the regional discrepancies within the country. For this reason we sought a type of model where regional structure plays a crucial role in the dynamics of events. We consider that the model used by Lucas (1973, 1976) may be a good approximation to this problem. The reason is that this model helps in explaining differences in the responsiveness of geographically separated agents to observed shocks.

Let us say that agents can respond actively or passively to an identified stimulus. They will act one way or another depending on their perception of the origin of the shock. Since the a cause is not evident, the agent must extract information with realizations of the shock. Insofar as the agent considers that the shock is due to idiosyncratic sources pertaining to his region, he will respond actively. But insofar as he identifies the underlying source of shocks he is observing as being extra-regional (i.e. *aggregate nominal shocks* in Lucas' papers), the agent will react passively.

We claim that this type of mechanism may be at work in the unresponsiveness of Colombian regions to crime. More explicitly, a particular region will react actively to a sudden increase in crime if it identifies the cause as being an idiosyncratic phenomenon pertaining to that region, in the belief that the solution to the problem depends specifically on that region.

If, however, the information available leads to an increasing conviction that the cause of the growth in crime is extra-regional, and hence, that the resources directed to combatting it will only confront the consequences, rather than the

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tiveness of local police in identifying or capturing criminals. In sum, resource allocation among the regions is in accordance with demand from the municipalities and regions, which in turn depends on their judicial and police activity.

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causes, of a major problem, the response of justice can turn from active to passive. The result will be an increasing gap between crimes and arrests, as was documented in the previous section.

We go on now to present a simple version of Lucas' model, adapted to the case of crime. First, the supply of justice is claimed to depend on the regional level of crime, but decision-makers find themselves in an environment in which they cannot distinguish regional from national increases in crime. The provision of justice in each region will have two components: a normal or secular one, common to all regions, and a cyclical component which varies across areas. We use notation similar to that found in Lucas (1973), to postulate

$$j_t(i) = j_{nt}(i) + j_{ct}(i) \tag{1}$$

where, i is an index for regions, $j_{nt}(i)$ denotes the (log of the) secular component of justice in each region, and $j_{ct}(i)$ that of the cyclical portion. The secular component follows a trend:

$$j_{nt} = \beta_o + \beta_1 t \tag{2}$$

whereas the cyclical component varies with perceived relative regional levels of crime, and with its own lagged value:

$$j_{ct}(i) = \alpha \left[C_t(i) - E(C_t \mid \Omega_t(i)) \right] + \gamma j_{ct-1}(i) \tag{3}$$

here, $C_t(i)$ is the actual level of crime in region i at time t. $E(C_t \mid \Omega_t(i))$ is the mean general level of crime, conditional on the information available in region i at t, $\Omega_t(i)$; finally, $|\gamma| < 1$. The parameter α embodies technological characteristics in the supply of justice, indicating how flexibly it can respond to perceived changes in regional crime. The parameter is assumed to be stable in the short and medium run, and to be affected by effective reforms in the judicial system.

As was said before, there are two types of information available to decision-makers in region i at t: $j_{nt}(i)$ and past realizations of the cyclical component, $j_{ct-1}(i)$, $j_{ct-2}(i)$, etc. This information determines a prior distribution on C_t, common to decision makers in all regions, which is assumed to be normal: $C_t \backsim N(\bar{C}_t, \sigma^2)$.

Now, the observed level of crime in region i at t is given by the following expression:

$$C_t(i) = C_t + \mu_t(i) \tag{4}$$

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where $\mu_t(i)$ is the deviation of actual crime in region i from the country-wide average. It is assumed that $\mu_t(i)$ is distributed independently from C_t. and is normally distributed with mean zero and variance ρ^2. Since C_t is not observed by decision makers in region i, it has to be estimated with the information $\Omega_t(i)$, which consists of the observed level of crime in that region, $C_t(i)$, and the history embodied in $\bar{C}_t$. Agents use a linear projection to obtain the optimal estimate:

$$C_t = P[C_t \mid 1, C_t(i)] + \varepsilon_t \qquad (5)$$
$$P[C_t \mid 1, C_t(i)] = \delta_0 + \delta_1 C_t(i)$$

by straightforward calculations it is obtained that: $\delta_0 = \frac{\rho^2}{\sigma^2+\rho^2} \bar{C}_t$, and $\delta_1 = \frac{\sigma^2}{\sigma^2+\rho^2}$. Implying that:

$$E(C_t \mid \Omega_t(i)) = \phi \bar{C}_t + (1-\phi) C_t(i) \qquad (6)$$
$$\phi = \frac{\rho^2}{\sigma^2 + \rho^2}$$

which corresponds to the posterior expected value of C_t once the realization of $C_t(i)$ is observed, as demonstrated by Lucas in the two cited papers. Substituting (6) into (3), and replacing in (1), the justice provision function for region i is obtained:

$$j_t(i) = j_{nt}(i) + \alpha\phi \left[C_t(i) - \bar{C}_t \right] + \gamma j_{ct-1}(i) \qquad (7)$$

This function is appealing for two reasons: first, it implies that justice provision is dependent on variations in relative crime. For those regions with crime levels similar to the national average (i.e. with $C_t(i) \approx \bar{C}_t$), the provision of justice will depend on the secular component ($j_{nt}(i)$), and on what occurred in the region in the previous period ($\gamma j_{ct-1}(i)$). For those with atypical levels of crime (i.e. with $C_t(i) \neq \bar{C}_t$), the regional response to relative or *idiosyncratic* crime shocks will depend on the parameters α and ϕ.

As was already explained, the parameter α embodies technological characteristics in the supply of justice. The parameter ϕ is more interesting, as it reflects the learning process of regional decision-makers when facing crime shocks. Recall that ρ^2 is the variance of $\mu_t(i)$, the deviation of actual crime in region i from the country-wide average. Hence, insofar as the region faces a high idiosyncratic variance in crime (ρ^2), authorities will interpret sudden jumps in crime as a typically regional problem to which they should respond.

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In contrast, the higher the variance of the general level of crime (a larger σ^2), regional decision makers will interpret new realizations of crime as emerging from extra-regional, or national sources. They will then have a lower incentive to respond, which is represented by a smaller ϕ. This, of course, is a parallel conclusion, set in terms of justice provision, to Lucas' islands' response to aggregate shocks. From the regional point of view this feature stresses a *learning effect*: decision makers will update the ϕ parameter according to new realizations of C_t and $\mu_t(i)$. If they perceive an increasing variance of the national average crime component $(\overline{C_t})$, their justice provision will decline with the passage of time[12].

A central assumption in this derivation is that each decision maker gathers information exclusively from his own region. In what follows, the model is expanded to account for the fact that information can be transmitted across regions. Indeed, decision makers in region i at time t can observe the level of crime of another region $k \neq i$. In other words, $\Omega_t(i)$ consists now of the observed level of crime in those regions, $C_t(i)$ and $C_t(k)$, as well as $\bar{C}_t$. Here a structure similar to that of the previous problem is assumed: $C_t(i) = C_t + \mu_t(i)$ and $C_t(k) = C_t + \mu_t(k)$. The problem of obtaining the optimal estimate of C_t then becomes:

$$C_t = P[C_t \mid 1, C_t(i), C_t(k)] + u_t \qquad (5')$$
$$P[C_t \mid 1, C_t(i), C_t(k)] = \delta_0 + \delta_1 C_t(i) + \delta_2 C_t(k)$$

The solution of this problem yields

$$E(C_t \mid \Omega_t(i)) = \phi' \bar{C}_t + (1 + \phi')\frac{1}{2}(C_t(i) + C_t(k)) \qquad (6')$$

$$\phi' = \frac{\rho^2}{2\sigma^2 + \rho^2}$$

using (6') in (3) and replacing in (1), leads to the following expression:

$$j_t(i) = j_{nt}(i) + \alpha\left[\frac{C_t(i) - C_t(k)}{2}\right] + \alpha\phi'\left[\frac{C_t(i) + C_t(k)}{2} - \bar{C}_t\right] + \gamma j_{ct-1}(i) \qquad (7')$$

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[12] Averaging over regions yields the justice provision function for the whole country:

$$j_t = j_{nt} + \alpha\phi\left[C_t - \bar{C}_t\right] + \gamma[j_{t-1} - j_{nt-1}]$$

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Hence, the value of the information gathered from another region depends on two elements: first, how different it is from the one's own region (second element of the RHS). If the two regions are very similar the gain will be negligible; if they differ the new information will be more valuable. Second, decision makers of region i will now compare the average of the two regions they are gathering information from with the national crime average (third element of the RHS). In this comparison the same process already described for equation (7) holds.

What is crucial here is that if information about relative crime levels in other regions becomes easier to obtain the parameter ϕ' will change[13]. In particular, if decision makers in one region can gather information about relative crime shocks in n other regions

$$\phi^{(n)} = \frac{\frac{\rho^2}{n\sigma^2}}{1 + \frac{\rho^2}{n\sigma^2}}$$

hence, $\phi^{(n)}$ will become smaller as n is larger. In the extreme

$$\lim_{n \to \infty} \phi^{(n)} = \lim_{n \to \infty} \frac{\frac{\rho^2}{n\sigma^2}}{1 + \frac{\rho^2}{n\sigma^2}} = 0$$

This indicates that justice provision will not depend on relative crime shocks when information about other regions is widespread in the economy. This can be referred to as the *information sharing effect*, and has the same consequence as the learning effect on the response of justice to relative crime shocks.

In sum, the model's prediction is that if the judicial system is set within an environment characterized by difficulties in extracting signals regarding the origins of crime shocks, and insufficient information about crimes in other regions, decision-makers will respond actively to relative crime shocks in their own regions. However, as new shocks of a national character arrive and as more information regarding other regions becomes available, the regional response to shocks and the provision of justice will diminish over time.

Accordingly, the *working hypothesis* of this paper is that the provision of justice dramatically declined in Colombia during the eighties because the regions, which were directly responsible for it, became increasingly aware that the underlying

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[13] Averaging over regions, the response for the national level is given by:

$$j_t = j_{nt} + \alpha \phi' \left[C_t - \bar{C}_t \right] + \gamma \left[j_{t-1} - j_{nt-1} \right]$$

cause of the rise in crime rates was an external, more general phenomenon, namely drug trafficking. This process was not sudden. Some time was necessary for this new cause to reveal itself as the catalyst for the increases in violence. In the first stages of the cocaine boom, towards the end of the late seventies, regional governments reacted with more arrests to the jump in crime that accompanied illegal trafficking. Once it became evident that drug trafficking was behind the events, the regions stopped responding to new surges in crimes.

Of course, we do not restrict the sources of violence that have battered the country during these decades to drug trafficking. Another salient cause was the expansion in corruption and in guerrilla activities and businesses, which partly explains the stylized facts reported in the first section[14]. Our claim, however, is that the behavior of justice provision described for Colombia can be explained through this model, without explicit recourse to the incidence of corruption or other variables. The incentive to fight crime declined with the perception that the problem was not solvable through an expansion of regional justice provision. The spread of information throughout the country regarding the extent of drug trafficking made this a national, rather than an idiosyncratic regional phenomenon.

3. Testing the model for Colombia

The model stresses the process of decision making at the regional level. Our hypothesis is that a national shock affected this process, reducing the willingness of regional authorities to react to crimes with more arrests. The obvious national shock we chose is the boom in drug trafficking in the country, which started in the late seventies and which continues to the present. In order to make our case it is necessary to show that several events occurred: first, that there was a period in which all regions behaved according to the original model (i.e. equation (7)), responding to an increasing crime rate with more arrests. Such a period should coincide with the first years of the shock. Second, and in the spirit of Lucas (1973), that the drug trafficking shock implied a different behavior for HDD and LDD. In particular, HDD should decrease their justice response with the passage of time, due basically to the *learning effect*. LDD, on the other hand, will display a similar behavior with a lag, due to the *information sharing effect*.

The empirical equation we aim to estimate is:

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[14]See Matthiesen (1997).

$$j_t(i) = \theta_0 \, j_{nt}(i) + \theta_1 \left[C_t(i) - \bar{C}_t \right] + \theta_2 \, j_{ct-1}(i) + \varepsilon_t \qquad (8)$$

here i is the index for the 23 departments for which data are available.

The dependent variable is justice. However, we restricted our attention to one proxy: the number of homicide arrests. We chose that variable because of its relative reliability. Other types of crime and justice data suffer from underreporting. The trend variable $(j_{nt}(i))$ was defined as the Hodrick-Prescott filter of the dependent variable for each department. The crime variables, $C_t(i)$ and $\bar{C}_t$ are homicide rates for each department and for the country as a whole. Finally, the cyclical variable is defined as the difference between observed justice and the Hodrick-Prescott filter for the same variable over the previous period.

The theoretical model predicts that the value of θ_1 in (8) should be significantly different from zero during the first periods following the shock for both HDD and LDD. As times passes, θ_1 should lose its significance. Hence, for the model to be valid, the null hypothesis $(H_0 : \theta_1 = 0)$ should be rejected for the first stages of the cocaine trafficking period in Colombia, and not rejected afterwards. We expect the same behavior for LDD, but with a lag, and will interpret this lag as the time taken for information sharing to come into effect.

The data used are of an annual frequency, and the estimation period is 1978 to 1995. This span comprises almost the entire period in which Colombia has been involved in cocaine trafficking[15]. The estimation was performed with panels for HDD and LDD separately[16]. In order to observe the performance of the model across time the estimation was undertaken using a window of 8 years. That is, equation (8) was run first for a panel of HDD for the period 1978-1985. Then 1978 was dropped from the sample and 1986 added to it, and the regressions was run again. This procedure was repeated until 1988-1995; the same procedure was applied to LDD. Table 3.1 presents the first and the last of these regressions, and figure 3.1 displays the evolution of θ_1 across time.

The crucial variable in these regressions is $\left[C_t(i) - \overline{C}_t \right]$, the measure of relative crime in each department, in relation to average crime in the country as a whole. As can be seen from table 1, the coefficients for this variable are signifi-

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[15] During the first half of the seventies the country exported significant amounts of marihuana. However, this phenomenon was restricted to basically two departments: Guajira and Magdalena, and did not have a truly national impact. It was also relatively short lived. See Steiner (1996) for a thorough explanation of the main characteristics and dimension of this business in Colombia.

[16] Indeterminate departments were included, but their erratic behavior across time undermined the results. The results are therefore not robust to the inclusion of this regions.

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cant for the early period, and lose significance during the final years of our sample. This is precisely what the model predicts: during the first years following the cocaine shock, as crime rates escalate departments increase their provision of justice in the form of arrests. This is a result of their inability to distinguish between national and regional shocks. The logic applies to the HDDs, who witnessed a dramatic rise in homicide rates during the late 1970s and early 1980s and to the LDDs where crime rates did not increase to the same extent during this period (see Figure 1.7).

|	High Drug Dep.		Low Drug Dep.	
Table 3.1. Justice Provision in Colombia[17]				
Dependent variable: rate of arrests for homicides, per department				
	1978 - 85	1988 - 95	1978 - 85	1988 - 95
Included observations	8	8	8	8
Total panel observations	64	64	64	64
$j_{nt}(i)$	0.9340**	1.026**	1.007**	1.023**
	(35.04)	(33.53)	(42.58)	(34.39)
$\left[C_t(i) - \bar{C}_t \right]$	0.0598**	0.0020	0.0362*	0.0015
	(2.06)	(0.20)	(1.677)	(0.161)
$j_{ct-1}(i)$	0.267**	0.331**	0.0765	0.1207
	(2.26)	(2.56)	(0.618)	(0.925)
R^2	0.84	0.73	0.88	0.92
F	165.34	83.73	217.87	336.18
Prob(F-statistic)	0	0	0	0

** coefficient is significant at the 5% level, t-statistic in parentheses.

* coefficient is significant at the 10% level. In the following eight-year window (1979-1986), this coefficient becomes significant at the 5% level.

A decade later, it had become obvious that the shock which had resulted in the explosion of crime in Colombia was a national one, intimately tied to the surge in cocaine production and trafficking. This learning process led to a decline in

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[17] All regressionas were run with common coefficients and no intercept.

Figure 3.1: Response of Justice to Relative Crime in Colombia (θ_1)

HIGH DRUG DEPARTMENTS   LOW DRUG DEPARTMENTS

—— Relative Crime Coeffcient --- 2 S.E. ----·+ 2 S.E.
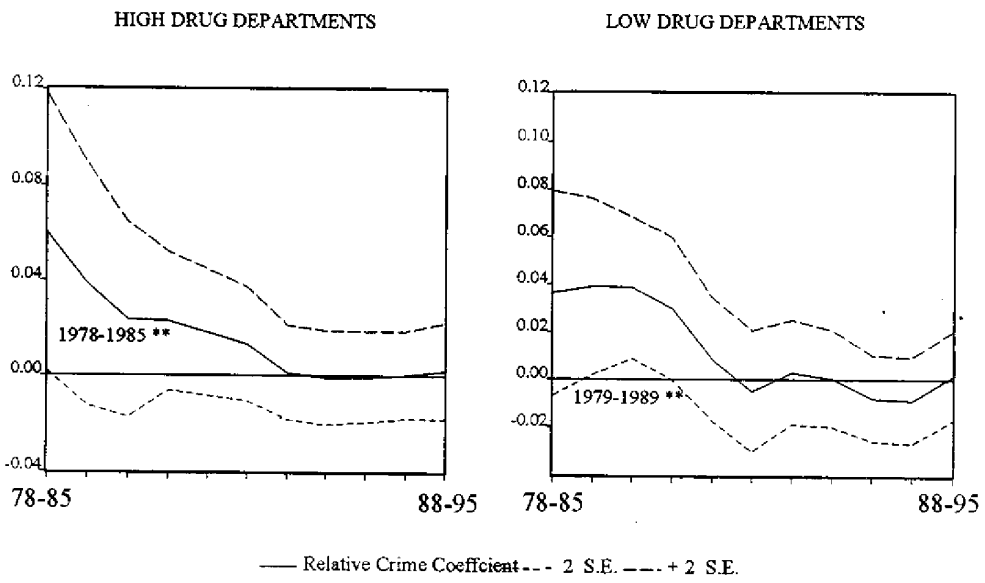
During these years relative crime is a significant explanatory variable for justice (arrest rate).

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the provision of justice in the HDDs despite the continued growth in crime rates. The lack of response of justice to new crime shocks occurred in the mid-eighties and continues to this day, as demonstrated by the non-statistical significance of θ_1 for the 1988-1995 period. Arrest rates also fell in the LDDs, but with a lag of four years, a result that can be attributed both to the learning effect, but perhaps even more importantly, to the *information-sharing* effect.

As the LDDs did not experience such strong crime shocks as the HDDs, the learning effect, while arguably present, should not have a dramatic effect on justice provision. A more plausible explanation is that the information they began to receive regarding crime in *other regions* led to the fall in arrest rates in LDDs. Figure 3.1 illustrates the behavior of HDD and LDD departments over the period of study. It plots the eleven estimates obtained of θ_1 using the window procedure already described. The first observation represents the regression starting in 1978 and ending in 1985. It can be seen that θ_1 was positive and statistically significant between 1978-1985 for HDD, and between 1979-1989 for LDD.

4. Conclusion

In Colombia, the lack of responsiveness of justice to crime has been dramatic. We have proposed one explanation for this stylized fact, which stresses the lack of incentives for geographically separated decision-makers to confront what they perceive to be events originating outside their borders. For local justice and police authorities, the recognition of the size and importance of an emergent cocaine industry in the 1980s was accompanied by the realization that, in the absence of a national strategy, local efforts at crime fighting were inefficient.

This is due to the industrial organization of drug activities: while common criminals may be easy to apprehend and try with traditional policing and judicial practices, this has little effect on the centers of organized crime networks. Regional authorities rationally reduce their own efforts as they conclude that the response to a national crime shock must lie in the passage of national laws with the ability to penetrate organized crime operations. These might consist of laws enabling extradition, and measures against money laundering or for the confiscation of illicitly acquired wealth. When timely action is not taken at the national level, however, the result is the inability of the country as a whole to fight back, an attitude that becomes self-defeating once crime is entrenched in society. The theoretical model and the econometric results provide support to this story. Circumstantial evidence points to the fact that this phenomenon is currently taking

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place in a number of countries where drug trafficking is important, such as Mexico, Peru and Bolivia.

It is natural to carry this argument to another level: that of the country as a whole, facing drug trafficking in the international arena. The incentive to act is undermined by an awareness that the structure of the drug industry makes national efforts irrelevant if undertaken in isolation. Those countries in the front line realize the futility of an approach that addresses the consequences, but not the origins, of crime, and respond by decreasing their efforts.

A timely reaction by central authorities is all important in this set-up. One disturbing consequence of the behavior outlined here is that once set in motion, it debilitates the will to fight crime in general, whether or not it is related to drug trafficking. People lose their belief in institutions, making it costly to return even to the pre-shock stage. If the argument carries to the international arena, as we believe it does, the implication is that an important share of justice enforcement should be relegated to international bodies, both in terms of policing and in the courts. This last issue, regarding the trial of drug lords whose crimes cross national borders, is a sensitive one in the Colombia-USA relationship. An argument can be made for pursuing such cases at a supranational level, for example in an international criminal court. This would diffuse the problems associated with what has become a highly contentious binational issue.

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Figure 4.1: Drug-Related Crimes
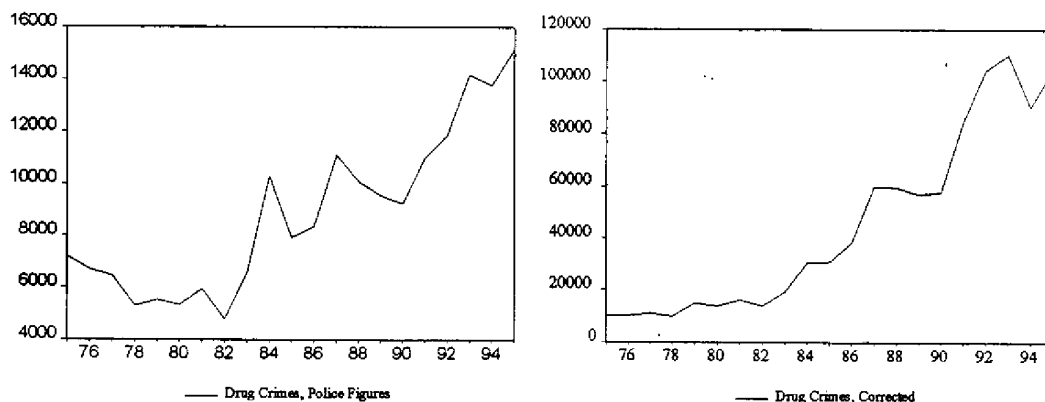
ANNEX 1

In order to correct police figures on drug-related crimes, the following proce-
dure was followed. Departmental police data on drug-related arrests were multi-
plied by an index which measures police-force efficiency. This index uses the two
crime variables for which reliable data are available, namely homicides and homi-
cide arrests; the ratio of the two is then computed for each department. Thus, the
corrected figure for drug-related crimes was calculated according to the following
formula:

$$Drug\ Crimes_{i,t} = Drug\ Arrests_{i,t} * (\frac{\#\ of\ Homicides_{i,t}}{Homicide\ Arrests_{i,t}})$$

where i indexes departments. Figure 4.1 compares the original and the cor-
rected series. As can be seen in figure 4.2, drug arrests have evolved along similar
lines to homicides.

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Figure 4.2: Homicides and Drug-Related Crimes

— Homicide Crimes
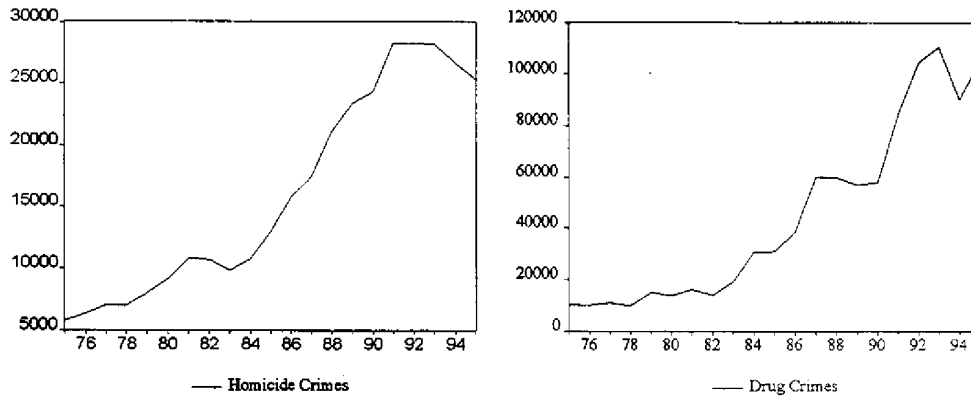
— Drug Crimes

ANNEX 2

The criterion of classification of HDD and LDD relied on the information presented in figures 4.3 and 4.4. HDD are departments whose drug crime rates are consistently at or above the national rates for the better part of the period analyzed. On the other hand, LDD display the opposite behavior.
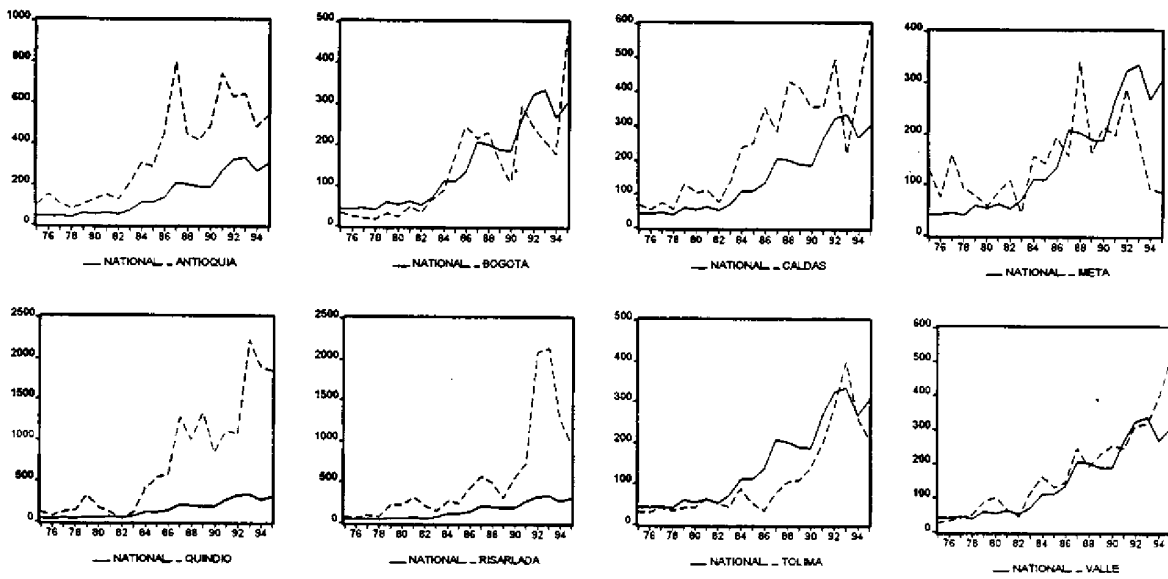
Figure 4.3: High Drug Departments and National Drug Crime Rates

Figure 4.4: Low Drug Departments and National Drug Crime Rates

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