

Crime, Violence and Inequitable Development

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I thank two anonymous reviewers for useful comments.

Paper prepared for the Annual World Bank Conference on Development Economics, Washington, D.C., April 28-30, 1999. The findings, interpretations, and conclusions expressed in this paper are entirely those of the author. They do not necessarily represent the views of the World Bank, its Executive Directors, or the countries they represent.

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Introduction

The idea that too much inequality may generate inefficiency and slow down economic development attracts an increasing interest. Alternative hypotheses about this relationship between growth and inequality have been examined in the recent literature. These include in particular credit market imperfections and the role of income distribution for public decision making in capital taxation and public spending. Empirical evidence in favor of one or more of these hypotheses is presently rather weak, however, and policy implications of this burgeoning literature are still somewhat ambiguous.¹

The link between inequality and efficiency, and possibly economic development, investigated in this paper is in some sense more direct. It has to do with the potential effect of inequality on private and collective violence and the substantial economic loss these social ills may cause. Some authors have investigated the consequences of excessive inequality in a given society for political stability and social peace, and how harmful departures from such a situation could be for current social welfare and growth.² Although debatable, there seems to be some evidence in favor of such a direct link between inequality and development. Much less has been done on the more elementary stage of this process, that is situations where inequality and/or poverty produce private, rather than collective violence, essentially through crime and the development of illegal activity. This seems somewhat surprising in view of the fact that some of the early works in the economics of crime in developed countries precisely emphasized the role of poverty and inequality in explaining spatial differences in criminality.³

¹ For a survey of the theoretical and empirical recent literature in this area see Benabou (1996), Bertola (1999), Bourguignon (1999), Piketty (1999), Bardhan et al. (1999).

² See Perrotti (1996) for the relationship among income inequality, political instability and investment. The negative role of political instability and violence on growth was put forward in the lead empirical growth paper by Barro (1993).

³ See Ehrlich (1973)

The high and increasing level of crime and violence in some developing countries known for their relatively high degree of inequality and relatively poor growth performances, particularly in Latin America, is what motivates the analysis in this paper.⁴ The following general questions are addressed. Is the abnormally high level of crime and violence observed in these countries truly the consequence of poverty and inequality? Or is crime mainly due to other sociological or cultural factors more or less orthogonal to economic factors? In the first instance, are the economies caught in some kind of vicious circle whereby violence undermines the social and economic climate, and weakens economic incentives and development factors, which in turn leads to more violence?

The paper is organized in four parts. The first part attempts to give some idea of the magnitude of the problem through a short discussion and comparison of criminal statistics across countries. The second part is essentially theoretical and tries to identify the various ways inequality, or more generally the distribution of income and assets may be held responsible for the extent of criminality in a given country. It starts from the canonical economic model of crime due to Becker and Ehrlich where crime is explained by the extent of economic inequality in society, crime deterrence policy variables and socio-cultural factors. It then examines how this model could be extended to describe better reality and the specificity of developing countries. In particular it would seem important to consider the endogeneity of public decisions in safety matters - possibly including penal justice rules - the introduction of a spatial stratification of society in terms of crime and crime prevention, and the existence of a market for private protection. Interestingly enough, these extensions of the basic crime model give more weight and at the same time a different role to social stratification as a determinant

⁴ On this evolution see Fajnzylber et al. (1998) and Londoño and Guerrero (1998).

of crime and violence, or the cost of preventing them. inequality may be both among the causes and consequences of crime. Relative poverty is the most obvious incentive to crime, but it turns out that victims are more likely to be found in the lower part of the distribution of living standards. Some consideration is also given to illegal activity in general, rather than the 'straight redistribution' considered in the canonical property crime model, as the cause of violence.

The third part of the paper deals with available empirical evidence on the relationship between inequality, poverty and crime. Data on crime and violence are scarce and of ambiguous quality because they generally are drawn from secondary sources. This is still more so in developing countries. Interpreting the available evidence is thus particularly hazardous. Having said this, it turns out that this evidence suggests a significant relationship between observed inequality measures on one hand and the degree of criminality on the other, both across countries and time periods. Of special importance is the apparent evidence that strong economic recessions are generally accompanied by significant increases in crime which often prove irreversible at the time the economy goes back to its long-run growth path. Macro-economic volatility at the same time as inequality could thus be a cause for high criminality.

The last part of the paper is more policy oriented. Putting the preceding arguments together suggests that the social and economic efficiency cost of any increase in inequality and poverty which goes through higher criminality may be very substantial. In Latin American, 7 per cent of GDP may be a conservative estimate of the social and economic cost of crime as compared to approximately 2 per cent in (most) developed countries. Not much can be said on the consequence of that level of criminality for growth, however. But, in any case, such orders of magnitude suggest that there may be a big social payoff in making sure that economic

development, and in particular the urbanization process which is more closely related to the evolution of crime, takes place evenly and equitably.

1. Crime and development: some orders of magnitude

The most common data source on crime consists of police reports. But the problem is that, for various reasons, far from all crimes are reported to the police. Police reports are thus most likely to yield an underestimation of criminality and to unevenly cover different areas and different types of crime.⁵ When available, victimization surveys where a representative sample of individuals are asked whether they have been victims of a crime, at what cost, and in what circumstances are a more reliable data source. They indeed show that police reports tend to be biased. Although their number is increasing, such surveys are presently available only in a limited number of countries and often at a single point in time. They also tend to miss crime and violence not directed toward ordinary people but taking place among criminals or marginal groups - e.g. gang wars. International and intertemporal comparisons must thus primarily rely on police report data.

We mostly use in this section an international data base managed by the United Nations on the basis of national police reports.⁶ Because of the nature of the biases just mentioned, this data may be thought to be better for very serious crimes like major robberies and homicides. Series for homicides are available for a rather large number of countries, at least for some sub-periods. They are apparently consistent in the sense that no abnormal change in orders of magnitude occurs in the series. Yet these series are unavailable for various countries or available for too short or too distant periods to be of very much interest. Series for robberies

⁵ It may also be in the interest of the police to report inaccurate figures. In particular, under-reporting will occur if there is a need to hide inefficient performances.

are available for fewer countries and sometimes show inconsistencies over time suggesting changes of definition or coverage. But it is still possible to identify a sub-sample where data look approximately consistent. Series for crimes of less gravity – major thefts, thefts, burglaries, fraud, etc. - are still less reliable and have not been used.

Table 1 reports crime rates in various regions of the world during the period 1984-1994, as they may be roughly estimated using the U.N. data base. These figures refer to the mean and median rates in each region. It may be thought that the median is more reliable than the mean because it is insensitive to possibly inconsistent extreme values. But in fact, the overall picture is not that different whether one uses the median or the mean. Big differences observed across regions in Table 1 may be a sign that international police report data lack comparability. However, this should be less the case for homicides, which seem easier to record.

Before examining these figures in more detail, it may be useful having in mind some orders of magnitude for further reference. Because data are more reliable there, it seems natural to take high-income countries as a basis for comparison. Among them, the United States stands at the upper extreme with a frequency of robbery averaging 250 for 100,000 inhabitants during the 1984-1994 period and a homicide rate averaging 7.2/hti.⁷ Criminality is much lower in other high income countries, the UK being probably at the lower end of the range for big countries with a robbery rate around 60/hti and a homicide rate below 2/hti for the 1970-1994 period. However, it must be kept in mind that all the preceding figures are national averages. Criminality would be higher if only major metropolitan areas were considered. For instance,

⁶ United Nations World Crime Surveys of Crime Trends and Operations of Criminal Justice. In the case of homicides this data base is complemented for countries with missing data by WHO data on death causes.

⁷ The notation /hti in what follows indicates crime rates expressed per 100,000 inhabitants.

the homicide rate in New York City is approximately twofold the national U.S. average, i.e. 13/hti vs. 7.2/hti.

The most salient feature of Table 1 when looking at other regions is without any doubt the strikingly high level of criminality in Latin American and Caribbean countries. Reported robbery rate is almost uniformly comparable there to what it is in the U.S., i.e. around 200/hti, and often higher. Homicide rates are generally higher than in the US but there are more disparities. It is close to 5/hti in Argentina or Costa-Rica but above 10/hti in Venezuela, and close to 20/hti in Mexico and Brazil, not to mention the somewhat exceptional case of Colombia with 66/hti. Here again, these figures give a severe underestimation of what is going on in cities. The homicide rate was estimated to be 80/hti in Rio in 1995 and 52/hti in Caracas, as opposed to respectively 20/hti and 14/hti for national figures. Londoño and Guerrero (1998) report results of recent victimization surveys where the proportion of adults who have been the victims of armed robbery reach 9 per cent in Rio⁸ and 17 per cent in Caracas over a 12-month period. This is more than ten times the highest police-reported robbery rates in the region. It is probable, however, that the definitions of crime in these various sources are not fully consistent with each other.

Criminality appears to be much less important in the other regions of the world, except for intentional homicides in former socialist countries. In other regions homicide rates are comparable to what they are in high- income countries and robbery rates are lower. However, it must be kept in mind that there may be a serious underreporting bias for robberies in many of these countries in comparison with high-income countries. It must also be recalled that there may be a lot of diversity behind the mean and median rates shown in Figure 1. For instance, the figures

⁸ This rate was somewhat below that level in the 1988, but not by much. See below table 4.

for Asia certainly do not mean that criminality is uniformly lower there than in the rest of the world. The homicide rate in Thailand was 10/100,000 during the period under analysis and that of India is comparable to the homicide rate in the U.S.

Given the lack of comparability of crime rates across countries the time dimension may be more relevant than the cross-sectional dimension. From that point of view Figure 1 based on the same type of information as table 1 shows a very clear upward trend in various regions since the beginning of the 1980s. This is most noticeable for Latin America, and the Eastern Europe and Central Asia region, for both homicide and robbery rates. In both cases, the rate of increase of criminality is high and quite alarming. In both regions, criminality would have doubled over the last 10 years. That crime rates changed significantly in various countries and regions over the last 10 years at different levels of development shows that criminality is not a purely structural characteristic of society which changes very slowly with the process of economic, social and cultural development. It thus is important to examine the possible determinants of that evolution.

2. Crime, poverty and inequality: what economic theory has to say

The canonical theoretical model of the economics of crime goes back to Gary Becker in 1968. It was first given some empirical content by Ehrlich (1973). We briefly summarize here the basic argument behind this model using a simple general distributional framework. We then discuss the implications of the model and consider various possible extensions likely to modify them.⁹

⁹ For a brief survey and exhaustive bibliography of the theoretical and empirical literature on crime with a focus on developed countries, see Eide (1997).

Let us assume that society is divided into three classes: the poor (p), and the 'non-poor' (r) , with resources w, say income or wealth, such that $w_p < w_r$. Let n_p , and n_r be the demographic weights of these two classes. Assume that the utility function of wealth is logarithmic - i.e. unitary relative risk aversion - and let the crime activity be represented in the following simple manner. Crime pays a benefit equal to x with probability (1-q) and $-F = -f.w$ with probability q. Thus, q is the probability of being caught, in which case a fine F proportional to initial resources is due. Criminal activity is taken to be here an all or nothing decision. In each class, an individual i with wealth w_i will opt for criminal activity if his/her expected utility of crime is higher than in legal activity:

$$(1-q).Log(w_i + x) + q.Log[w_i.(1-f)] > Log w_i + h_i \quad (1)$$

where h_i is a parameter describing the degree of 'honesty' of this individual. It is assumed that this variable is independent of the level of income and is distributed uniformly in the population over some interval [0, H]. Rewriting (1) as:

$$(1-q).Log(1+x/w_i) > h_i - q.Log(1-f)$$

it may easily be checked that for a given degree of honesty, h, only the poorest individuals in society will engage in crime. To simplify let us consider the case where the honesty interval [0, H] and the parameters q and f are such that condition (1) may only hold for people in the poor class if they are sufficiently dishonest.¹⁰

The preceding model certainly is very crude and could be generalized in many directions. For instance, the 'loot' variable could explicitly refer to the mean income of the population - an assumption we shall make below - or that of the rich class. The probability of being caught q

¹⁰ In other words, (1) is not satisfied with $h_i = 0$ for $i = r$, whereas it holds for $i = p$.

could be made a function of initial wealth so as to reflect the possibility opened by corruption. Risk-aversion could be made an explicit parameter of the model, etc.. Although this could permit describing a wider array of possibilities, it is unlikely that these modifications would substantially alter the main implications of this simple model. Note also that the preceding framework may not be appropriate to describe the mechanics of violence and crime in some particular countries where specific idiosyncratic factors may be of more significance. Colombia is an obvious example of such an exceptionality.

On the basis of the previous assumptions, the crime rate, or percentage c of criminals in the whole population is easily calculated. It is given by:

$$c = C(n_p, x/w_p, f, q, H) = [(1-q) \cdot \text{Log}(1+x/w_p) + q \cdot \text{Log}(1-f)] \cdot n_p / H \quad (2)$$

According to this elementary model the crime rate thus depends positively on the extent of poverty as measured by the proportion of poor, n_p , and the ratio, x/w_p and negatively on ‘crime-deterrent’ variables, that is the probability of being caught, q , as well as the size of the penalty relative to initial income, f . In addition, it depends negatively on the cultural or sociological attitude toward crime or the extent of honesty within society, as represented by H .

The probability of crime detection, q , can hardly be taken as given and therefore independent of the crime rate. It seems more natural to have it depending on the amount, P , that the community is spending on crime prevention and detection per inhabitant and the actual number of crimes, c . Let us denote that relationship by:

$$q = G(P, c) \quad (3)$$

$G(\)$ is a kind of production function of police activity. It is increasing with P - at a decreasing rate - and decreasing with c - at an increasing rate. Of course this function is a reduced form

for various important phenomena. In particular, a given level of expenditures, P , may be associated with more or less efficiency depending on the degree of corruption, or more exactly the incentives for corruption, that is the wage paid to the police and the loot of criminals. At the limit, an increase in P may be ineffective in increasing the probability of detection and conviction, q . This case of an inoperative police is considered below.

Substituting the preceding production function in (2) and solving with respect to c yields a new crime function:

$$c = C^*(n_p, x/w_p, f, P, H) \quad (4)$$

where the probability of being caught, q , has simply been replaced by police expenditures per inhabitant.

To complete this simple theoretical framework, we now evaluate the social loss due to crime. This loss is made of four components: (a) the direct cost of crime, i.e. the physical and psychological pain of the victims, (b) the cost of crime prevention (P) and that of the judicial system, (c) the cost F of sanctions to convicted criminals, typically foregone earnings due to imprisonment, and (d) all the negative indirect effects of crime on economic activity. Assuming that the cost of pain is a proportion s of the economic cost of crime, x , the social loss amounts to:

$$L = c.m.s.x + P + c.q.[j] + c.q.F + c.IC \quad (5)$$

where q and c are given by (3) and (4), m is the number of crimes committed by each criminal and j is the average cost of criminal justice by criminal. Note that the actual economic cost of crime, x , does not appear in that expression. This is because it may be considered as equivalent

to a 'transfer' from victims to criminals and therefore not as a social loss. However, some authors include it in the computation of L because x should also correspond to the opportunity cost of criminals, for instance time spent outside market work. The terms in IC in the preceding expression corresponds to all the external effects that criminality may have on economic activity after some critical level has been reached. These involve for instance the insecurity felt by all citizen, whether they are victims of a crime or not, as well as investment disincentives or negative effects on tourism and foreign investments. However, all these effects are extremely difficult to evaluate.¹¹

Despite its simplicity, the preceding model has several interesting implications for the analysis of crime. To understand them better, however, it is important to keep in mind that the preceding economic argument fits better crimes against property or illegal activity like drug dealing, illegal gambling or managing prostitution, which offer some economic gain, than crimes against persons. It cannot be ruled out that homicides, intentional or not, are more frequent among poor and less educated people and in areas where police is little present. Also part of intentional homicides and physical violence is directly linked to property crime or illegal activity. So, the homicide rate in a given area may be determined very much by the same variables as the rate of property crime. However, given the exceptional character of this type of crime the relationship with these variables is most likely to be weaker than for property crime.

From the point of view of economic policy, the first arguments in the general crime function (4) are the most interesting. They indeed correspond to the direct effect that the distribution of

¹¹ There may also be benefits associated with illegal activity. Drug trafficking or smuggling may contribute positively to national welfare in some instances. These are not the kind of crime that is considered here, which is directly against the property or the person of domestic residents.

income and other economic resources may have on criminality. This occurs through two channels: on one hand, the proportion of people being poor, n_p , and on the other hand the potential relative gain for these people to get into crime, x/w_p . Over time or across countries, it is likely that the gain from crime is some function of the general affluence of society, that is the mean or the median of the distribution of income. So, the second argument of the crime function really appears as some measure of *income inequality* at the bottom of the distribution, or in other words of 'relative' poverty.¹² Interpreted in those terms, one could say that *the basic model of crime predicts that the rate of crime should be a function of both the relative poverty headcount (n_p) and the relative poverty 'shortfall', \bar{w} / w_p or w^M / w_p , where w^M is the median of the distribution. Note that these concepts are different from standard measures of inequality that take into account the whole distribution.*

According to the preceding argument a process of economic development accompanied by an increase in relative poverty should lead, other things being the same, to an increase in the rate of crime. Equivalently, in two societies at the same level of development less crime should be observed in the society with less relative poverty. Clearly, this does not imply that criminality should be an increasing function of the inequality between the very rich and the rest of the population or that it should increase with its degree of absolute poverty. Presumably, these seem to be testable hypotheses.

The preceding argument about the relevance of 'relative' poverty is long-run oriented. At shorter sight, it may be noted that, according to the general crime function $C^*(\)$, any increase in the extent of 'absolute' poverty, either through an increase in the term n_p or through a drop in

¹² Absolute poverty would matter here only if the gain from crime, x , could be defined in absolute terms without any reference to the degree of development of society. This does not seem reasonable, however.

w_p , is likely to increase the crime rate. This is because the anticipated gain from crime, x , as well as all the other arguments of the function are likely to be somewhat rigid in the short run. Violent economic recessions may thus be expected to be accompanied by a surge in criminality. What is more, if there is some hysteresis in this process, then *the volatility of economic activity may be thought as an aggravating factor of crime*¹³, another testable hypothesis.

The third and fourth arguments of the general crime function, $C^*()$, refer to the direct control that policy makers may have on crime through the severity of the sanctions decided by the judicial system and the probability of crime detection, itself determined by expenditures on the police force. These look like standard exogenous or policy variables. Therefore, it should be no surprise that so much of the literature on the economics of crime focused precisely on these 'punishment' and 'crime deterrence' issues. Rather than repeating what has already been said elsewhere, and in line with the main theme in this paper, we would like to insist here on the reasons why these variables are also likely to be influenced by the distribution of income and well-being within the population. We shall see that this may provide a second important, although indirect link between crime and inequality.

Rather than considering the crime deterrence parameters, P and f , as exogenous, we consider them here as the endogenous result of some public decision process. Suppose the amount of police expenditure, P , has to be decided by some voting mechanism, possibly a degenerated one where only the richest citizen participate. Under the simplifying temporary assumption that

¹³ One channel for that hysteresis may go through the anticipation of the probability q of being caught by would be criminals. In times of recession, the rate of criminality increases because of the first arguments of (4) whereas police expenditures remain the same. It follows that the rate of crime increases and the rate of detection falls. When going back to normal times, the anticipated probability of crime detection by criminals and therefore the rate of crime may fail to adjust to their initial level. For such an expectational model of crime, see Sah (1991)

there is no other possible crime prevention than public police, one may reasonably assume that private benefit from public police is an increasing function of the income of potential victims. Majority voting by the whole population should thus lead to the standard result in the redistribution literature that redistribution should be an increasing function of initial inequality.¹⁴ In the present case, police expenditure would be an increasing function of inequality. A different result may be obtained in non-democratic countries where votes at the top of the distribution of income and wealth may have more weight than others. But it will remain the case that spending on police expenditure will depend in one way or another on the characteristics of the distribution of income. The important point is that through this political economy of spending on crime deterrence, economic and social inequality may in effect play an indirect role on crime, on top of the direct incentives they represent for criminals.

Having said this, it is not clear a priori whether more inequality should lead to a larger anti-crime budget or the opposite. Not only the whole income structure of society and the political weight of the various classes is important here, but also the social geography of the city and the private and public technology of crime prevention. One may easily imagine circumstances where the public decision mechanism about spending on crime protection may lead to rich neighborhoods and business districts being heavily protected and relatively little being spent in poor neighborhoods or on more general crime disincentives.

Another point to take into account is the possibility for part of the population to buy private protection through more or less sophisticated alarm systems, private guards and strict residential segregation improving the capacity to spot intruders and would be criminals. If the social class which can afford or produce itself this type of security has some control over

¹⁴ See Romer (1975)

political decisions, one may again very well imagine a situation where nothing substantial is done to increase public security despite mounting criminality. An extreme case of this sort might be the development of militias and para-militaries in a country like Colombia.

An interesting implication of private protection against crime is that it clearly modifies the relationship between poverty, inequality and crime. The possibility of self-protection against criminals logically lessens the relationship between the rate of crime and poverty. This works as follows. Potential victims anticipate that more poverty and inequality associated with an unbalanced development process increase crime risks. They buy additional protection, which may reduce the actual change in criminality. The marginal social cost of poverty and inequality going directly or indirectly through crime remain the same, however. In the expression (5) of this loss, the effect of a marginal increase in the rate of crime c at constant 'police' expenditures, P , is simply replaced by a change in the 'private protection part' of P .

When private and public crime protection benefit to the rich class, the relative poverty which may be initially responsible for criminality has an additional social cost. It is that what remains of criminality will necessarily be directed towards middle and poor classes. In other words, the negative social externality arising from excessive relative poverty through criminal activity is itself distributed in a regressive way. In effect, both criminals and victims are to be found in the lower part of the distribution of income, a feature that is observed in many metropolises of developing countries.

We now come to the last argument of the general crime function (4). This is certainly the most difficult to discuss for an economist. For the sake of simplicity, it was referred to simply as a 'honesty' parameter. But, actually, one should include in it all the variables which may explain that, in front of some cost-benefit ratio of crime and some characteristics of the justice and

police systems, the degree of crime may vary from a city or a country to another. These include ethnicity, religion, family structures, residential segregation, etc.. Some of these factors may clearly be related to economic phenomena. The increase in the proportion of single parent families in urban areas, which is known to be related to the development of juvenile crime and violence, is probably not foreign to conditions on the labor market. Likewise, residential segregation has been analyzed as a mechanism to reproduce existing economic inequalities – see for instance Benabou (1996). The variable H in the general crime function (4) thus provides a third channel through which economic cycles or the equalizing or unequalizing nature of the development process may affect crime and violence. This goes through the influence of economic conditions on some of the sociological factors behind the propensity of individuals to commit crime.¹⁵ Analyses based on the concept of social capital may be of relevance here.

It may be objected to all this analysis of the relationship between distribution and crime that it takes too much an economist' view of criminal behavior and may therefore be misleading for policy. In particular, many observers insist that violence in big metropolitan areas of developed and developing countries is often not directed towards the property of others but internal to specific segments of society located in the poorest districts. Obvious examples of this include all the violence related to the control of illicit activities like drug dealing, drug trafficking, different types of gambling or the control of prostitution. In many violent parts of today's metropolises this, rather than more conventional burglary or robbery, seems to be the single dominant cause for the development of violence and the surge in homicides. Another departure from the canonical model might lie in the very low probability of crime detection and sanction

¹⁵ For a general analysis of these factors with a framework similar to the present one, see Hagan (1994).

noted in many studies of crime and violence in marginalized urban areas of developing countries. Typically, the probability of being arrested and incarcerated for a murder is estimated to be below 10 per cent in many Latin American cities.¹⁶

In effect, such a view of criminality may be seen as an extension of some of the previous arguments. Consider for instance the limit case where the rich and the middle class are able to protect themselves against crime. In this case the potential gain from property crime, x , shrinks and would be criminals must then rely on the market for illicit activities mentioned above. Suppose in addition that people engaged in these activities run no big risk of being arrested and prosecuted. Crime then becomes a matter of industrial organization and occupational choice. The main difference with other economic sectors and occupations is that there is likely to be no market rule in that activity. So, individuals operating in it must rely on their capacity to physically 'neutralize' potential competitors. At some stages of the organizational development of this sector in a given local environment, 'non-market' competition is strong and is responsible for a high level of violence among persons or gangs. At other stages or in a different environment, the sector may be fully controlled by organized crime with, paradoxically, some drop in the level of violence. The analysis of crime and violence linked to illegal activities thus becomes that of the conditions under which some type of organization of this particular sector of activity predominate over others.¹⁷

This view of the causes of violence does not deeply modify the nature of the initial model of crime and the role of the various factors discussed above. It seems natural to consider that the premium, x , of getting into illegal activity keeps being related to the affluence of the economy

¹⁶ A rate of 8 per cent is reported for El Salvador in Londoño and Guerrero (1998), p. 37. This figure was lower than 6 per cent in 1983 in Cali, and probably of the same order of magnitude in other big metropolitan areas in Colombia. Moreover, it most certainly, worsened since then. See Guerreo (1997, p. 98).

but it modifies the nature of the risk, q , involved and penalty, F , incurred in doing so. The risk is not any more given exogenously by public expenditures on crime deterrence. They are supposed to be too small for deterrence to be effective. It is now endogenous and depends on the organization of the illegal sector. For instance it may be the probability of being killed by a competitor willing to control a given territory for drug dealing. In any case, the main economic factor pushing toward crime remains the income people may get if they remain in legal activities in comparison of the expected utility of illegal activity. In the present framework as in the original model any fall in this level of income, that is, an increase in relative urban poverty, increases the incentives to switch to illegal activities.

The preceding analysis is essentially static. In a dynamic framework the prospect of permanently, rather than transitorily low relative income may be the main factor pushing some individuals toward crime and illegal activities. This adds another dimension to the issue of the relationship between crime and inequality. Namely, the absence of income and social upward mobility, arising itself from various poverty trap mechanisms like credit market imperfections, may be as important as relative poverty at a given point of time to explain criminality at the bottom of the income scale.

3. Available evidence on the relationship between inequality, poverty and crime

The main conclusion of the preceding analysis is that urban inequality and poverty may be the main *economic* determinants of crime and violence. The relationship may be direct, as more inequality and poverty make crime more profitable at a given level of crime deterrence. It may also be indirect, going through the amount that a society is willing to spend in crime

¹⁷ On organized crime see Fiorentini and Peltzman (1995).

deterrence. The question we ask in this section is whether there is evidence of such a relationship between crime and inequality or poverty.

It must be stressed at the outset that it is extremely difficult to answer the preceding question. There are two main sets of reasons for this. First, we have seen that a host of sociological factors could be responsible for the degree of violence observed in a society but controlling for them in a statistical analysis of crime is practically impossible. Even though there is little doubt that economic disadvantage has always been an important cause of criminality, it is a necessary, but certainly not a sufficient, condition of high crime rates in a given social group.¹⁸ The second difficulty is purely statistical. We have previously seen how difficult it is to get reliable series and data on crime and violence across countries or cities, and even across time in a given country or city. It is still more difficult to put into evidence a relationship between these series and data on international or inter-temporal differences in poverty and inequality.

Time series analysis is feasible only for a few developed countries. However, they most often are inconclusive on the relationship between crime and inequality because few countries have actually experienced distributional changes likely to have significantly affected the degree of criminality.¹⁹ We mostly consider here cross-sectional evidence.

Figure 2 plots average criminality rates taken from the U.N. data source discussed above against inequality figures drawn from the Deininger and Squire (1996) data base. Criminality rates are averages over the 1985-1995 period, whereas inequality figures refer as much as possible to the mid 1980s. Both samples for robbery and intentional homicides comprise 50 observations.

¹⁸ In developed countries for instance, differences in crime rates among ethnic minorities equally discriminated against is a well documented fact. See for instance Tonry (1997).

The discussion in the preceding section made it clear that the way the distribution of income and wealth may affect the degree of criminality in a given economy is complex and subtle. In particular, we insisted upon the fact that the direct effect of distribution on crime was more likely to be related to the bottom of the distribution and the concept of relative poverty than to the top of the distribution and the income share of the richest. It may therefore be somewhat surprising that a simple scatter diagram like Figure 2 relating crime rates and Gini coefficients shows some positive relationship, and, in accordance with intuition, a stronger relationship for robberies than for homicides.

Even though the preceding result is reminiscent of Ehrlich's early attempt at putting into evidence the role of relative poverty in explaining crime across American States, cross-sectional evidence is essentially ambiguous and fragile. Figure 2 is no exception. As a matter of fact, it is sufficient to take out of the sample a few Latin American countries, known for both their relatively high degree of criminality and inequality, for the relationship between these two variables to considerably weaken.

A complete cross-sectional analysis based on the same data is offered by Fajnzylber, Lederman and Loayza (1998) – FLL in what follows. Core independent variables are GNP per capita, the Gini index for the distribution of income, average education, urbanization rate, and variables controlling for the importance of drug consumption. Among them, the only variable more or less systematically significant turns out to be the Gini index. Its effect is sizable. A 5 percentage point change in the Gini index, not an unlikely figure in a country experiencing true distributional changes, would produce on average an increase of approximately 15 per cent in the homicide rate, and two or three times this figure for robberies. As mentioned above,

¹⁹ From that point of view, the U.S. is an exception. However, evidence available there on the effect on crime of

however, the corresponding coefficient becomes insignificant when a dummy variable is introduced for Latin America in the homicide regressions. This result may suggest that the significance of inequality as a determinant of crime in a cross-section of countries may be due to unobserved factors simultaneously affecting inequality and crime rather than to some causal relationship between these two variables. Results obtained with robbery rates are more robust. The coefficient of the Gini index remains significant even when dummy variables controlling for regions or other groupings of countries are introduced. Somehow, this is reassuring since it fits the intuition that the economic determinants of crime are likely to be stronger for property than other crimes.

One way of correcting for the structural weakness of cross-sectional estimates is to use panel data and to control for country fixed-effects. This is done by running regressions on first differences of all variables of interest. FLL did so on a reduced sample of countries while also controlling for possible hysteresis effects of changes in crime rates. The resulting estimates are reproduced in Table 2. Although they are essentially based on the longitudinal dimension of the data, these results confirm the pure cross-sectional analysis and put into light interesting additional effects. The samples of countries used in each case differ due to distinct data requirements. However, such a coincidence between cross-sectional and longitudinal estimates is somewhat remarkable and would suggest that the phenomena put into evidence by all these regressions are more robust than expected.

This is true, first of all, for the effect of income inequality upon criminality. This effect is significant and substantial both for homicides and robberies. In the short-run a one percentage point increase in the Gini coefficient would produce on average in the countries included in the

the surge in relative poverty that occurred in the 1980s is still very much debated.

sample a 3.6 per cent increase in the homicide rate and a 1.1 per cent increase in the robbery rate. However, this effect is much stronger in the long run because of the compounding effect of hysteresis in crime rates. The coefficients of the lagged crime rate are such that the effect of inequality would be multiplied by 3 for homicides and by 7 for robberies.²⁰ These orders of magnitude are still higher than those suggested by the pure cross-sectional results mentioned above.

Table 2 exhibits other interesting features. Of special relevance is the role of short-run variations of GDP and the very substantial hysteresis in the evolution of criminality. Here again, and as could be expected, it is more pronounced for robberies than for homicides. In the former case, a simple calculation made on the basis of the coefficients shown suggests that a major recessions leading to a sudden and once for all 5 per cent drop in GDP would produce an instantaneous 50 per cent increase in the robbery rate. The hysteresis effect is such that the crime rate would practically remain at the same abnormal level until the initial loss is fully compensated by faster growth. However, the dynamics of aggregate criminality may be more complex than postulated in this model.²¹ These orders of magnitude are only indicative. But such recessions are not uncommon in developing countries and the preceding figures show that the lasting increase in crime caused by a temporary surge in poverty may add very much to their social cost.

It might be thought that because they are based on a restricted number of observations and countries, the preceding results are not truly representative. It turns out that fixed effects are less of a problem in the case of homicides than in the case of robberies, so that alternative

²⁰ These multiplicative factors are simply the inverse of $1 - \lambda$, where λ is the coefficient of the lagged crime rate in Table 2.

²¹ There clearly are not enough observations in the time dimension of the sample to estimate a richer time structure.

specifications may be estimated in that case on larger samples. The results reported by FLL lead to the same general conclusions as above. In addition, they confirm that crime deterrence variables, essentially police and conviction rates, have a significant negative influence on homicides.

Convergent findings are reported by Londoño and Guerreo (1998) who ran fixed effect regressions on homicides in a panel sample of 17 Latin American countries between 1970 and 1995. The specification that they chose to estimate is not as complete as FLL so that a detailed comparison is not possible. But they also find sizable effects of poverty and inequality on homicide. According to the figures they report, a 1 percentage point increase in the poor population would produce on average an instantaneous 2.5 per cent increase in the number of homicides. This does not seem very different from the orders of magnitude seen above.

The preceding estimates must be viewed with very much care. We already have insisted on the natural limitations of pure cross-sectional exercises. The introduction of fixed effects in samples where observations of different countries at different points of time are pooled together certainly lead to more robust conclusions. In the present case, however, it must be kept in mind that both in the FLL study and in that of Londoño and Guerrero observation samples are limited to at most 20 countries. Final estimates may thus be strongly influenced by a small number of observations. All this definitely points to the need for better and more consistent data being regularly collected on crime and victimization, both across and within countries over time.

Having said all this, it remains somewhat remarkable that both with cross sections and panel data the distribution of income appears to be a significant determinant of international and intertemporal differences in crime rates. This suggests that some of the mechanisms envisaged

in the preceding section to explain the influence of distributional phenomena on crime may indeed be at work. However, identifying more precisely these mechanisms, and in particular whether the effect of the distribution of crime is direct, as in the canonical model, or indirect, through policy and other structural variables, seems impossible with presently available data.

4. The social cost of crime and inequality: scope for equitable development policy

Given the preceding evidence of a likely positive association among crime, poverty and inequality, we now seek to measure the social cost of crime and then that part of the social cost of inequality which goes through crime. This should give some idea of the scope of policies aimed at controlling and reducing the extent of inequality and poverty in urban areas. Although we can rely only on very rough estimates, we shall see that it is surprisingly important.

Table 3 puts together some crude estimates of the various components of the cost of crime in the U.S. and in Latin America as a proportion of GDP. It follows equation (5) above and draws on Freeman (1996) and Londoño and Guerrero (1998) - hereafter LG. As a first approximation, one may consider that estimates for other countries or regions may be obtained by scaling these estimates up or down depending on observed crime rates.

The first line of the table corresponds to the straight estimate of property crime, that is, the total amount of robberies, thefts, burglaries, frauds, etc.. For the U.S., the figure is obtained from the National Crime Victimization Surveys. For Latin America it is based on special surveys taken in six countries²² as part of a research project organized under the auspices of IDB. Assuming that the average amount involved in property crimes is proportional to income per

²² Brazil, Colombia, El Salvador, Mexico, Peru, Venezuela.

capita, the figures appearing in this row of Table 2 suggest that the rate of property crime in Latin America is three times that in the U.S., which seems not an unreasonable order of magnitude.²³ Notice that this row is entitled 'transfers' and is not included in the social cost of crime. Such a view corresponds to the theoretical model seen above where property crime indeed appears as a simple exchange of property and therefore as a transfer of wealth or income from the victim to the criminal. However, part of this wealth may be destroyed in the transfer. This part appears in the second line of Table 2 as a 'monetary' cost of crime. But this item also includes the actual costs incurred by victims in addition to what they lost, that is, medical expenses in case of violent robbery, repair of property in case of a burglary, time spent dealing with the police or justice personnel, etc. There is no direct estimation of that cost in the Latin American case.²⁴ The figure appearing in Table 3 is obtained by assuming the same proportionality factor as in the U.S

To these monetary costs, we now add non-monetary costs corresponding to the cost of the pain and suffering in case of property crime, and to the disappearance of human capital in case of homicides. The first figure is based on jury estimates of the cost of pain in the case of property crime in the U.S. The same proportionality factor with respect to the total amount of property crime in the U.S. is applied for Latin America leading to a cost of 2.1 per cent of GDP.²⁵ The human capital loss is computed by LG in the case of Latin America on the basis of the average life expectancy of homicide victims and unskilled wage rates. The resulting cost is substantial

²³ U.N. data indicate a comparable robbery rate in the two regions and a homicide in Latin America that is the double of that in the U.S. But, this data is most probably affected by a negative bias in the case of Latin America.

²⁴ LG only report .2 per cent for medical expenses and a much higher amount than shown in Table 3 for 'productivity losses'.

²⁵ Actually LG give a much larger estimate for that component -5.3 per cent of GDP- based on reported willingness to pay for safety. However, the figure they derived from the surveys at their disposal seems artificially high in comparison to the U.S. figure.

since it amounts to 1.7 per cent of GDP. The figure for the US is obtained by proportionality with the homicide rate.

Other costs arise through crime prevention and punishment. The opportunity cost of the time of the incarcerated population in the U.S. is estimated by Freeman (1996) to be .6 per cent of GDP. Assuming this cost is proportional to the number of incarcerated people per inhabitant leads to a figure of only .1 per cent of GDP in Latin America. Indeed, the incarceration rate, i.e. number of incarcerated persons per inhabitant, is a little more than five times higher in the U.S. than in Latin America. Expenditures on criminal justice and police may be compensating somewhat for this difference since they amount to 1.6 per cent of GDP in Latin America and only 1.3 per cent in the U.S. More is also spent on private crime prevention through security guards, alarm systems, armored cars and the like in Latin America. As a result, total expenditures on crime prevention and sanction amount to a higher proportion of GDP there than in the U.S., although the ratio between these two figures is still below the ratio of crime rates.

Summing all these components leads to a sizable total cost of crime equal to 3.7 per cent of GDP in the U.S. and an impressively high 7.5 per cent in Latin America. Needless to say, both figures are very rough. But it is difficult not to believe their orders of magnitude is about right. It must also be reminded that, by world standards, the countries covered by the preceding analysis have levels of criminality way above average. It is likely that the same calculation would lead in most European and Asian countries to figures below 2 per cent of GDP.

The preceding calculation is fully aggregated and does not take into account the potential social cost arising from the fact that crime victims may not be distributed uniformly within the population. The basic crime model reviewed at the beginning of section 2 suggests that the

probability of being a victim should increase with income. However, in case of private protection against crime or a high income bias in policing the opposite might occur. Table 4 obtained from the 1988 Brazilian Household Survey (PNADE) seems to infirm this second hypothesis. For theft and robbery, the victimization rate is quite clearly an increasing function of income. Interestingly enough the slope of that function becomes significant only in the top half of the distribution. For assault no significant tendency seems to be present. This might reflect the combination of two phenomena. Victimization rates are high in the upper half of the distribution because assaults' motivation is essentially the same there as for property crime. But they are also high in the bottom half of the distribution as a consequence of the youth violence in low income urban districts. Unfortunately, existing data do not permit to check whether this actually is the case.

Putting together the various estimates discussed in this section and the previous one leads to a strikingly high order of magnitude for that part of the social cost of poverty and inequality which may go through crime and violence in Latin American countries. Consider for instance the elasticity of crime rates with respect to inequality and poverty suggested by the coefficient reported in Table 2. According to these figures a 5 percentage point increase in the Gini coefficient in a given country might produce after some delay an increase in the crime rate of the order of magnitude of 50 per cent. The same kind of effect may be expected from a major recession leading to a 5 per cent fall in GDP or more. That part of the social cost of such events which might go through crime may be inferred from the figures appearing in Table 2. If nothing is done to increase crime deterrence, then the bottom half of the table has no reason to change. However, all of the top half is likely to increase proportionally to the crime rate. In 'high crime' countries like many Latin American countries, the cost would be above 2 per cent

of GDP. Moreover, if one takes into account that the increase in criminality is likely to concentrate in large metropolitan areas, then the local social cost in these areas would be much larger. These are not small effects.

One could think that an active crime deterrence policy could reduce the preceding cost of unequal development or recessions. In that case, it is the bottom of Table 3 that should be modified. The extent of modification depends on the efficiency of crime deterrence. However, there might not be very much to gain. The situation of the U.S. in the 1980s is illustrative of this. According to Freeman (1996), it is likely that the potential increase in criminality which could be expected from the dramatic fall in the real income of low-skilled workers during the 1980s was offset by a drastic increase in the incarceration rate, which more than doubled between 1980 and 1992.²⁶ If this is the case, then, approximately half the opportunity cost of incarceration, and that part of the budget of criminal justice which covered the direct cost of that policy, e.g. the cost of prisons, must be considered as a price that society had to pay for increasing inequalities. As may be judged from the upper part of Table 3, the resulting figure is probably not far from the hypothetical cost that would have been observed if crime had been left increasing.

Of course, the preceding estimates and conclusions rely very much on the Latin American experience, which may be seen as very specific. The potential cost of inequitable development going through crime would probably be much less important in Asia or in Africa. However, making everything proportional to reported crime rates this cost may still be sizable in several Asian countries, whereas the problem of Africa may precisely be to prevent urbanization to produce the same increase in criminality as in Latin America.

²⁶ And still increased by 50 per cent since then.

A final cost to take into account is the potential negative effect of a high criminality rate on economic efficiency and growth. Several attempts at introducing the criminality rates given by the U.N. data base in a conventional cross-sectional growth regression framework failed yielding significant coefficients. This was done for the 1985-1994 period and it is possible that the deviation from long-run growth was too large for a relationship between crime and growth to show up. It may also have been the case that crime rates reflected very much the bad economic conditions in a number of countries. Clearly a more comprehensive time-series framework with both economic growth and criminality being endogenous is called for. Unfortunately, there is no reliable data base for such an analysis.

Conclusion

It was shown in this paper that crime and violence are likely to be a socially costly by-product of, among other factors, *uneven or irregular* economic development processes. Simple economic theory shows how property crime and, more generally, all the violence associated with illegal activity may partly be the consequence of excessive inequality and poverty. Limited available evidence in this field suggests that an increase in the degree of relative poverty or income inequality in a country generally leads to a rise in criminality. By increasing the extent of poverty, major recessions may have an effect of comparable amplitude on crime. Moreover, hysteresis in the way crime changes over time in a given society, of which there also is evidence, may considerably magnify these effects. It follows that, through crime and violence, the social cost of inequality, poverty and macroeconomic volatility may be large. In countries where the level of crime is already high, it is not unreasonable to think that severe recessions of the type witnessed by several developing countries in the recent past or major increases in inequality measures comparable to what was observed in several countries during

the 1980s could be responsible for social losses as high as 2 per cent of GDP. This order of magnitude would even be greater if only urban areas where most of that increase in criminality is likely to take place were considered.

It is interesting that observed aggregate regional differences in criminality are consistent with this analysis. Latin America is by far the region with the highest level of crime, and at the same time it is a region where the distribution of income is generally more unequal than elsewhere and also where economic growth has been extremely volatile. The recent surge of criminality in some countries of former socialist countries in central Europe and central Asia may probably be analyzed in the same way. However, that evolution also raises the issue of the social control of crime. High levels of inequality or increases in poverty need not lead to a higher rate of crime if crime deterrence is simultaneously strengthened. But this raises two observations. First, in a political economy framework crime deterrence may itself be the consequence of existing or increasing inequality. A highly unequal society may in fact have a low propensity to invest in safety infrastructure. Second, even if increased crime deterrence measures may prevent an increase in inequality to yield higher levels of crime, these measures are costly too.

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Table 1. Crime rates by regions (1985-1995)

(Number of crimes per 100,000 inhabitants)

	Number of countries	Major robberies		Intentional homicides	
		Regional Mean	Regional Median	Regional Mean	Regional Median
Africa	8	36.0	34.4	5.1	2.5
Asia	10	13.4	7.6	5.4	2.1
Latin America and Caribbean	17	200.5	172.0	14.0	8.5
Eastern and Central Europe	15	28.3	23.0	6.8	7.1
Western Europe	16	54.4	54.0	4.4	3.8
Other high income countries (U.S.A)	8	87.3 248.7	54.0	3.2 7.2	2.2

Source: United Nations World Crime Surveys of Crime Trends and Operations of Criminal Justice. Countries included in the analysis are (by region): Botswana, Burundi, Madagascar, Malawi, Mauritius, Rwanda (prior to 1992), Zimbabwe, Bangladesh, China, India, Indonesia, Korea Rep., Malaysia, Nepal, Philippines, Sri Lanka, Thailand, Argentina, Bolivia, Brazil, Chile, Colombia, Costa-Rica, Dominican Rep., Ecuador, Honduras, Jamaica, Mexico, Nicaragua, Panama, Peru, Trinidad and Tobago, Uruguay, Venezuela, Armenia, Azerbaijan, Belarus, Bulgaria, Czech Rep., Estonia, Hungary, Kazakstan, Kyrgyz Rep., Latvia, Lithuania, Poland, Romania, Russian Fed., Slovak Rep., Egypt, Jordan, Morocco, Turkey, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Israel, Italy, Netherland, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, Australia, Canada, HongKong, Japan, Kuwait, New Zealand, Singapore, United States.

Table 2. Panel regressions of crime rates: first difference auto-regressive models^{a)}

(p-values in italics)

Explanatory variables	Homicide rate (growth rate)	Robbery rate (growth rate)
Difference in:		
Gini coefficient ^{b)}	0.036	0.011
	0.000	0.009
Urbanization rate	0.004	0.011
	0.063	0.000
GNP per capita (log)	-0.207	-0.045
	0.000	0.035
GDP growth rate ^{b)}	-0.036	-0.072
	0.001	0.000
Drug possession crime rate	0.001	0.001
	0.047	0.019
Secondary enrollment rate	0.009	0.002
	0.000	0.191
Lagged crime rate	0.640	0.839
	0.000	0.000
Number of observations (countries)	54 (20)	50 (17)

^{a)} Source, FFL (1998). GMM estimates. Second lags and third lags of dependent and independent variables used as instruments with the exception of the lagged crime rate for which third lag is used as an instrument.

^{b)} Strictly exogeneous

Table 3 Estimates of the cost of crime in the U.S. and in Latin America

(Per cent of GDP)

	U.S.	Latin America
"Transfers" = monetary amount of property crime	(0.5)	(1.5)
Monetary cost (medical expenses, opportunity cost of time, ..)	0.2	0.6
Non-monetary cost (cost of pain)	0.7	2.1
Human capital loss (homicides)	0.4	1.7
Opportunity cost of incarceration	0.6	0.1
Criminal justice	1.3	1.6
Private crime prevention	0.6	1.4
Total	3.8	7.5

Source: Based on estimates by Freeman (1996), Londono and Guerrero (1998) and own calculations

Table 4. Distributional incidence of crime in Brazil (1988): victimization rates per deciles^a in metropolitan areas

(percents)

Decile	Men		Women	
	Theft and robbery	Assault	Theft and robbery	Assault
1	4	1.2	3.6	1.3
2	4.9	2.1	3.8	1.1
3	5	1.7	3.7	2
4	5.1	1.3	3.8	0.7
5	5	1.3	3.8	1.3
6	6.4	1.6	4	0.7
7	7.6	1.3	5.2	1
8	7.8	1.4	6.1	0.8
9	10	1.9	7.6	1.1
10	13.4	1.7	9.7	0.9
Total	6.92	1.55	5.13	1.09

Source: PNADE, 1988. Tabulation by the author

a) deciles are defined with reference to the households people live in.