Is poverty the mother of crime? Empirical evidence of the impact of socioeconomic factors on crime in India

Ashish Bharadwaj

International Max Planck Research School for Competition and Innovation;

Munich Centre for Innovation and Entrepreneurship Research,

ashish.bharadwaj@imprs-ci.ip.mpg.de

Abstract

Economic analysis of crime and criminal law addresses the question of individual welfare (utility) maximization through optimal allocation of resources and time in accordance to their relative returns. In this paper I first summarize the theoretical and empirical evidence on the nexus between crime and socio economic indicators. After which I test the hypothesis that people who are vulnerable to fall under the poverty line indulge in criminal activities as a consumption smoothing strategy. I also empirically inspect the role economic growth, unemployment, urbanization and quality of legal system play in inducing property related crimes. India is chosen as the case study because it has to carefully channel its funds and resources towards economic growth, poverty alleviation and crime deterrence concomitantly. The results indicate a positive and statistically significant impact of poverty, inequitable income growth and low quality of the legal system on incidence of total property-related crimes. Moreover, the elasticity figures suggest that poverty has the highest impact on robberies. Most convincing result comes from the figures of elasticity of education with crime where a 10% increase in per capita expenditure on education in India leads to a decline between 9.2-11.2% of overall property crime rates.

Resumen

El análisis económico del derecho penal y crimen aborda la cuestión de la maximización del bienestar individual (utilidad) a través de una asignación óptima de recursos y tiempo de acuerdo a su relative retorno. En este trabajo en primer lugar se resumen las pruebas teóricas y empíricas sobre el nexo entre el delito y los indicadores socio-económicos. Posteriormente se testea la hipótesis de que las personas que son vulnerables a caer bajo la línea de pobreza se entregan a actividades delictivas como estrategia de consumo. Igualmente se estudia empíricamente el papel que juega el crecimiento de la economía, el desempleo, la urbanización y la calidad del sistema legal de jugarán en delitos relacionados con la propiedad. India es elegida como objeto del estudio porque tiene cuidadosamente canalizados sus fondos y recursos para el crecimiento económico, la reducción de la pobreza y la disuasión del crimen. Los resultados indican una repercusión positiva y estadísticamente significativa de la pobreza, crecimiento desigual del ingreso y la baja calidad del sistema legal sobre la incidencia de delitos relacionados con la propiedad totales. Por otra parte, las cifras de elasticidad indican que la pobreza tiene el mayor impacto en robos. El resultado más convincente proviene de las figuras de la elasticidad de la educación en rlación con el crimen: un aumento del 10% en el gasto per

cápita en educación en la India conduce a una disminución entre 9.2-11,2% de las tasas totales de criminalidad en asuntos relacionados con la propiedad.

1.   Introduction

Crime undoubtedly is prevalent everywhere in all countries in multifarious forms. Suggesting that there exists a connection between poor and criminals is to draw sharp criticisms and accusations on ethical and moral grounds. This could have connotations that poor people are innately criminal. In this research work, I attempt to delve deeper in to this controversial topic[1]. Economic analysis of crime and criminal law addresses the question of individual welfare (utility) maximization through optimal allocation of resources and time in accordance to their relative returns. Becker (1968) suggested various determinants of crime and a lot of theoretical and empirical investigation has gone through this topic since then. However, there is a lacuna in the literature with respect to developing countries. Numerous works focussed on the developed world, United States in particular. Like all models in economics, the economic model of crime involves rational utility maximising agents. The parties involved are the criminals, non criminals and the State. The first ones determine the supply while the other two determine the demand of crime. The State is the only actor that can determine both these mechanisms. The purpose of this study is not to delve into these mechanisms but to inspect what role poverty plays in criminal activities. I will try to answer the question- To what extent is poverty and social backwardness responsible for crime becoming a dominant fact of Indian urban life and also a growing blight on its countryside?

On one hand, there are crime theories with roots in sociological studies and methodology. In particular, strain, ecology and opportunity theories try to establish linkages between socio economic factors of an individual/ society with criminal behaviour/ tendencies. On the other hand, social control and learning theories link these factors to society's failure to control criminal tendencies and how individual get involved in (learns) criminal activities (Allen, 1996; Hughes and Carter, 1981; Bernard, 1987; Brown, Esbensen and Geis, 1991). Such assortment of theoretical findings offers us diverse (and at times confusing) relationships between socio economic conditions and crime. This paper attempts to investigate the relative impact of poverty along with certain deterrence and socio-economic variables on crime rates in Indian States.

According to relative-deprivation theory, individuals commit crimes to send a signal to the State that the system they are forced to live in is inherently biased against them and their socio economic standing in the society (Chester, 1976; Hughes and Carter, 1981; Stack, 1984). Thus, even individuals with employment and legitimate income earning opportunity will be inclined towards committing crime in light of deprivation of basic needs and general inequality in society.

However, not all research in this area conveys that socio economic factors (specifically poverty, inequality and unemployment) and crime are positively related. Certain theories postulate a

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[1] I am thankful to xxx who devoted valuable time to give helpful comments and suggestions.

negative relationship between absolute or relative poverty and property crime with the under lying explanation that crime subsides with widespread chronic poverty by lowering returns to crime (Sjoquist, 1973; DeFronzo, 1983; Cullen, 1988; Brown, Esbensen and Geis, 1991; Deutsch, Spiegel and Templeman, 1992). Cohen, Kluegel and Land (1981: 511) state that "income inequality results in housing, employment and activity patterns by upper income individuals that lower criminal opportunity". Returns to crime and opportunity theories contend that, controlling for the general income distribution, a reduction in absolute poverty is associated with a proportional growth in all income groups including that of the potential victims and offender.

In his study, Noveck (2007) identified cost of crime (expected and opportunity) and gains from crime as factors that should affect an individual's crime decision. He states that "... wealthier individuals will be less likely to commit crime, as those used to a higher standard of living have more to lose if convicted of a crime and imprisoned". Also, the available employment opportunities also play a role in the cost borne by the criminal for the crime he commits. High unemployment levels and joblessness might significantly reduce the opportunity cost of time he devotes to crime. Gains from crimes, particularly property crimes, are usually driven by economic motives and expected gains from crime are associated with wealth of the potential victim. Bjerk (2008) writes, "While the motivation for basic property crimes is generally purely monetary, becoming involved in violent crime may have a defensive motivation as well. In particular, individuals may choose to act violently toward others in their neighbourhood in order to gain a reputation."

High crime rate plagues several countries and has detrimental multi dimensional effects. Most importantly, it tends to hamper standard of living and the overall quality of life. Also, there is a potential vicious cycle between crime, unemployment and poverty. Prevalent criminal activities erode employment opportunities and are exacerbated by high unemployment rates. This further leads to increase in poverty rates through lack of accumulation of assets. On another dimension, crime can increase the cost of doing business thereby affecting entrepreneurial activities and overall business climate of a country. In worst circumstances, it might even 'drive out foreign as well as domestic investments and decrease availability of productive labour and skilled manpower' (Dutta and Husain, 2009). Due to an absence of safety nets and lack of resources for poor in developing countries, crime also has additional costs for these people. Consequently, the poor are unable to mitigate the resulting loss of productivity which further affects their livelihood options (UN, 2005). World Bank (2006) estimated that a 10 percent reduction in the homicide rate may raise per capita income of Brazil by 0.2 - 0.8 per cent over the next five years. Thus, crime might undermine development goals and strategies of developing countries.

Therefore, from a macro perspective, crime has negative effects on the aggregate socio economic fabric of a country and especially affects developing countries (such as India) whose macroeconomic sectors (such as tourism) and the critical foreign outsourcing dependent business activities that are highly sensitive to high crime rates. It is well understood that developing countries

are resource scarce and need to efficiently allocate them for their best utilization. A country like India, which has to battle high crime and widespread poverty, has to carefully channel its funds and resources towards poverty alleviation, crime deterrence among other issues. In this regard, any intervention can be effective only if it is based on a good understanding of crime and its determinants. Needless to mention, research that identifies these determinants and further explores crime-poverty linkages (among other socio economic factors) has substantial policy relevance.

It is important at this juncture to throw some light on the endogeneity problem that arises due to possibility of joint causality between poverty and crime. This has been addressed by researchers in numerous studies mainly focussing on crime deterrence variables such as expenditure on police force or number of police officers. Activities by poor people could be more likely criminalized because they lack power to influence criminal law compared to the wealthy people who can lobby to avoid their acts to be criminalized. In this scenario, inevitably there will be a high correlation between poverty and crime. If the criminal justice system is subject to such manipulation (which could be a result of rampant corruption and red-tape) then poor will more likely get convicted than the wealthy for the same underlying act. In this study, however, this problem is not relevant because criminal law is taken as exogenous in the model. Quality of legal system is taken into account to control for any association between crime and poverty due to poor and inefficient criminal justice system. Moreover, it was found that the pair-wise correlation coefficients between poverty, inequality and crime were small and rather insignificant. To consider any association between crime and poverty arising due to gap between rich and poor, income inequality is included in the model. Nevertheless, this relationship might be more complex than anticipated and such issues which lie in the purview of the political economy of criminal law (which could itself provide an explanation for this) are outside the domain of this paper.

The paper is arranged as follows. Section 2 presents poverty and crime scenario in India. This is followed by a literature review in Section 3 which is followed by providing theory and presenting evidence of the nexus between crime and socio economic indicators in Section 4. Section 5 deals with data and related issues, variables, model used and the hypothesized relation of the chosen variables with crime rates. Econometric results of pair-wise correlation; cross sectional regression and estimated elasticities with their interpretation presented in Section 6. Section 7 discusses the results and Section 8 presents the conclusion

2. Understanding Poverty and Crime in India

In India, the Criminal Procedure Code divides crimes into two heads: cognizable and non-cognizable. In the former, police is responsible to take quick action on basis of a complaint received or on receipt of credible information. Some cognizable crimes fall under the category of Indian Penal

Code (IPC) while others come under the Special and Local Laws (SLL)[2]. Non-cognizable crimes, on the other hand, are supposed to be handled, pursued and managed in the Court by the affected parties. This study deals only with IPC crimes related to property. There are two reasons why SLL crimes are not part of this study. First, the goal of this study is to undertake the inter linkages between poverty and those crimes which are economic goal oriented. SLL crimes such as illegal possession of arms or copyright violation are typically not associated with people who live under poverty line. Second, SLL crimes and IPC crimes differ a lot in terms of motivation and enforcement mechanism (Dutta and Husain, 2009).

India is a large country and many of the Indian states are virtual countries in their own right—at least in terms of their absolute size. For instance, amongst the 15 major Indian states[3], the median state had a population of about 45 million in 1991, and the state of Uttar Pradesh alone has a population roughly the size of Brazil, the most populous country in Latin America (India 1993a; World Bank 1993). An analysis of the evolution of poverty and social progress across India's States should usefully complement the analysis of different rates of progress in improving living standards across developing countries (Dutt, 1998).

There are three reasons why Indian case was chosen to carry out this research. Firstly, large scale poverty which, even more than 50 years after independence from almost two centuries of British rule, remains the most shameful blot on the face of India. India, the world's largest democracy, accounts for almost a sixth of world's population, out of which more than 450 million people are poor[4]-almost one third of world's poor and the largest in a single country. Almost, three fourth of the total population resides in rural areas while close to 40 per cent are illiterates. To juxtapose more to these statistics, more than 1.8 million total cognizable crimes were committed alone in the year 2006[5]. It might be the case, as I hypothesise in this work, is that some poor (not chronically poor), who are vulnerable to fall under the poverty line, indulge in criminal activities as a consumption smoothing strategy.

Second, aggregate crime rate has been increasing overtime in India. According to a UN Study, India ranks 10th in the world in terms of total crimes committed[6]. In 2007, a total of 860,247 criminal cases were reported out of which the share of property-related crimes is the maximum at 376,262 cases in the same year. This is little more than 20 per cent of total IPC (Indian Penal Code)

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[2] SLL includes Act related to possessing Arms, Gambling, Indian Passport, Copyright etc. See page 27 of *Crimes in India*, 2002 for a complete list

[3] These are the fifteen "composite" states of Andhra Pradesh, Assam, Bihar, Gujarat, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab (including Haryana), Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal

[4] Poor defined by World Bank as those who live below $1.25 a day poverty line set by 2005 International Comparison Programme, World Bank (2008)

[5] Precisely 1, 878, 293 crimes under the Indian Penal code (IPC) covering only Murder, Kidnapping, Robbery, Burglary and Riots, National Crime Record Bureau (2006)

[6] The Eighth United Nations Survey on Crime Trends and the Operations of Criminal Justice Systems (2002) (United Nations Office on Drugs and Crime, Centre for International Crime Prevention)

crimes and it reported an increase of 1.8-3.2 per cent over the last eight years. Apart from the economic motivation related to property crimes, the fact that the rate of such crimes is more than 33 per cent while the conviction rate is merely 39.4 per cent is also the reason why property-related crimes were chosen for this study. Violent crimes are generally driven by psychological and social factors rather than driven by economic considerations. According to the National Crime Records Bureau (NCRB) of India, a governmental agency responsible for collecting and analysing crime data, in every 19 minutes in India one person is murdered while one woman is raped in every 29 minutes; one kidnapping takes place in every 23 minutes and finally one property crime takes place every five minutes.

Lastly, it is one of the fastest emerging economics and is, at the same time, battling with the problem of widespread poverty, inequality and crime. It serves as one of the best examples of a developing country opening itself to the globalized world while using its limited resources to fight against these ill effects.

Table 1: Top 13 countries by different crime heads

	Total Crimes		Total Convicted		Murders		Burglaries	
Rank	Figures	Country	Figures	Country	Figures	Country	Figures	Country
1	11,877,218	US	3,576,010	Egypt	37,170	**India**	2,151,875	US
2	6,523,706	UK	1,436,552	UK	28,904	Russia	1,055,812	Germany
3	6,507,394	Germany	1,183,630	Russia	26,539	Colombia	951,418	UK
4	3,771,850	France	1,069,550	France	21,553	South Africa	436,865	Australia
5	2,952,370	Russia	972,124	Turkey	16,204	United States	393,959	South Africa
6	2,853,739	Japan	923,769	Japan	13,144	Mexico	370,993	France
7	2,683,849	South Africa	667,061	Poland	8,022	Venezuela	304,625	Poland
8	2,516,918	Canada	604,547	**India**	6,553	Philippines	296,486	Japan
9	2,231,550	Italy	522,916	Germany	5,140	Thailand	274,894	Canada
10	1,764,630	**India**	468,984	Thailand	4,418	Ukraine	169,430	Italy
11	1,543,220	Korea, South	329,784	Canada	3,453	Argentina	139,679	Mexico

| 12 | 1,516,029 | Mexico | 288,500 | Burma | 2,204 | Indonesia | 120,735 | Sweden |
| 13 | 1,422,863 | Netherlands | 277,597 | Spain | 2,024 | El Salvador | 111,296 | **India** |

Source: The 8th United Nations Survey on Crime Trends and the operations of Criminal Justice Systems (2002), UN Office on Drugs & Crime, Centre for International Crime Prevention

Table 1 shows countries that have the highest number of crimes (including murders and burglaries) and convictions. It is confirmed that India has one of the highest crime rates in the world. The point to note here is that most of the countries in the table are rich and developed nations and India is overburdened by not only high poverty rates but also excess crime. In my understanding, the closest any research linking crime and poverty in India was done by Dreze and Khere in 2000. Their study revealed that violent crimes (murder rates) in India have no relation with poverty or urbanization. This is a study of determining how poverty affects property crime across individual states in India.

3.   Literature Review

Work by Belton M. Fleisher lead the way in 1960s by analysing effects of income and unemployment on juvenile delinquency (Fleisher, 1963, 1966). According to him, crime rates are positively associated with unemployment and low income levels. The argument that lower income levels lead to higher crime rates was confirmed by a study conducted in 1973 by Isaac Ehrlich. However, it was Gary Becker's path breaking work that viewed criminals not as poverty stricken oppressed groups but rational economic agents. Like any other person, the potential criminal weighs costs/risks and benefits when deciding whether or not to commit a crime. He, however, wrote that, "some individuals become criminals because of the financial and other rewards from crime compared to legal work, taking account of the likelihood of apprehension and conviction, and the severity of punishment" (Becker, 1968:176). Work by Ehrlich and Becker in late 1960s and in 1970s gave birth to the theory of deterrence which argues that potential criminals weigh both the possibility of detection (and conviction) and the resulting sanction, monetary and non-monetary (Becker, 1968, Ehrlich, 1973, 1975, 1996).

Certain studies support a positive relationship between poverty (absolute or relative) and property crime (such as Braithwaite (1979); Danziger and Wheeler (1975); Danziger (1976); Gillespie (1976); Jacobs (1981); Blau and Blau (1982); DeFronzo (1983); Howsen and Jarrell (1987) and Jarell and Howsen (1990. However, empirical support for significant positive effects is not universal (Gillespie, 1976). Carr-Hill and Stern (1973), Jacobs (1981), Blau and Blau (1982), Sjoquist (1973), Danziger (1976), and Patterson (1991) report negative or statistically insignificant relationships for absolute poverty while Cohen (1981), analyzing trends in reported property crimes for 1947 to 1972, concludes that crime rates increase as relative poverty decreases.

The lacuna lies in the fact that a substantial body of evidence for possible determinants of crime and the empirical literature has originated in developed countries while any focus on an under developed country is a rarity. Fafchamps & Minten (2002) write, "At this stage in the law and economics literature empirical studies seem to convey that poverty does not have a substantial effect on crime." This has been confirmed off late by Dreze and Reetika (2000); Krueger and Pischke (1997); Doyle, Ahmed and Horn (1999); Morgan (2000) and Freeman (1996). As pointed above, these evidences are largely based on data from rich countries, predominantly the U.S. There is an urgent need to verify whether the theories of crime originating in developed countries are relevant in developing countries. Fajnzylber, Lederman and Loayza (1998) have shown that crime rates in under developed countries tend to be equal to or higher than that of developed countries.

Anderson (1990, 1999) and Massey (1995) discuss, on sociological grounds, the factors that affect poor residents living in isolated areas who have to adapt themselves to such social surroundings. This, according to these studies, is done by giving extra weight to reputational aspects in their neighbourhood to reduce the risk of their own criminal victimization where this reputation is maintained through use of force. Fajnzylber, Lederman and Loayza (2000) have conducted cross country comparisons and found that across countries crime rate differentials are linked to growth and poverty and, to some extent, by demographic factors. Separate studies on South Africa and Madagascar, using cross sectional data, conclude that local inequality is significantly correlated with both property and violent crimes and burglaries and crop theft are expected to increase with poverty as people turn to crime to mitigate the effect of the shock on their lives (Demombynes and Ozler, 2002; Fafchamps and Minten, 2002). Lott (1990) postulates that the poor are more likely to engage in criminal activity due to their relatively limited access to capital markets; therefore, property crime is the poor person's method of borrowing against future human capital. Deutsch, Spiegel and Templeman (1992), however, argue that the poor are more likely to commit a crime because cost of punishment is less for them compared to the relatively high income individual who has more accumulated wealth to lose.

In one of the very recent contributions to this field of law and economics, Spamann (2008) shows, in a global cross-section of up to 213 countries that only level of economic development, income inequality and legal origin are robustly correlated with crime and punishment. His econometric results based on the broadest possible cross-section of countries suggest that countries with common law (English legal origin) are associated with half a standard deviation more inmates per capita than civil law origin and they also appear to have higher crime rates. He finds a positive association of crime with per capita GDP and income inequality but a negative one with unemployment.

4.   Crime and linkages with socio-economic indicators: Theory & Evidence

It has been shown in various studies that certain deterrence variables such as probability of being arrested and convicted tend to have negative signs in a crime function. Since these deterrents are linked with the expected costs to the criminal of committing a crime, they have an inverse relationship with crime rates (Becker, 1968, Ehrlich, 1973, 1975, 1996, Grogger, 1991). The hypothesis of this study is that certain socio economic factors, poverty in particular, also determine crime. In other words, crime depends on how widespread poverty is in a particular region and other associated socio economic factors.

a)   *Crime and Poverty*

The linkages between poverty and crime seem to be based on the argument that people who have less (not by choice but due to lack of advantages, or simply capabilities, as Amartya Sen calls it) will want to take from those who have more. Of course it will be unreasonable and unfair to accuse or even associate poor people with crime than other people. This will, at best, be a pseudo-syllogism. There is absolutely no gene that has been or perhaps will be identified linking these two phenomena. According to Fesseha Gebremikael (2003), "crime rate is high in some low-income and minority populated rural areas. Poverty is widespread in communities that due to low income are living in public housing and where overpopulation is an issue".

This matches perfectly with a lot of States of India. Certain crimes, such as stealing food to feed himself or his dependent, can be considered as frantic or distressed response to poverty (or hunger as poverty is sometimes called in its extreme form). These crimes are almost always likely to rise with poverty. Thus, both poverty and income inequality are considered to be reasonable proxies of resource deprivation. But, some other types of crimes are different in their relationship with poverty. Fafchamps and Minten (2002) have argued that "(other) crimes are largely affected by the demand for illegal commodities and services such as drugs, prostitution or organized crime. In this case, an increase in poverty would increase the supply of criminals but at the same time reduce demand from illegal products." The combined effect is ambiguous depending on the relative strength of the two effects. In the Indian context, this argument is not likely to have a strong ground. Drug menace and prostitution are not high priority areas because they are not legal and are not as widespread and rampant as witnessed in some other countries. Criminal activities by organized gangs or mafias are unlikely to be affected by poverty simply because of the presence of barriers to entry for the very poor people who lack resources required to be a part of the group. Fafchamps and Minten (2002) on a study focussing on Madagascar state that "burglaries and crop theft are expected to increase with poverty as people turn to crime to mitigate the effect of the shock on their lives".

Figure 1: Percentage of people below poverty line for selected states during 2004-05
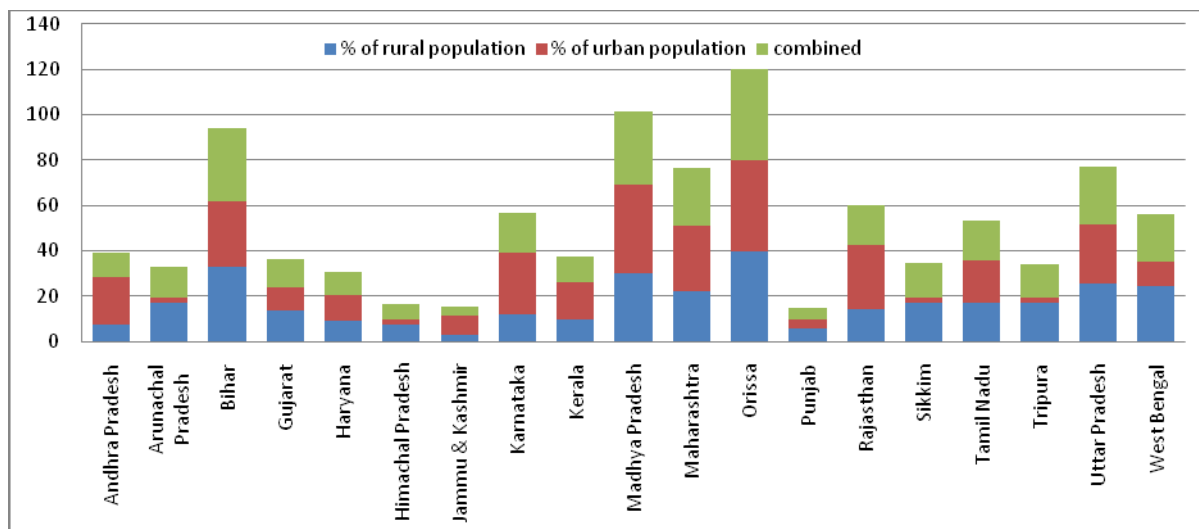

Source: Data from Indiastat

The regional disparities in poverty levels and other standards of living indicators in India stand bare in the face of today's development dilemma. For instance, States such as Orissa, Madhya Pradesh, Bihar and Uttar Pradesh have more than a quarter of their population below poverty line (BPL) while Punjab, Jammu & Kashmir and Himachal Pradesh are the best performers in this context. Then there are some States that have wide gaps between rural and urban BPL populations. This includes Andhra Pradesh, Arunachal Pradesh, Karnataka, Rajasthan and West Bengal. During 1990, the proportion of the north eastern state of Bihar's rural population living in poverty was about 58% and more than three times higher than the proportion (18%) in rural north western Punjab and Haryana. Some of these differences have persisted historically; for example, Punjab-Haryana also had the lowest incidence of rural poverty around 1960. However, looking back over time the more striking-though often ignored-feature of the Indian experience has been the markedly different rates of progress between states; indeed the ranking around 1990 looks very different to that 35 years ago and what it is now. For example, the southern state of Kerala moved from having the second highest incidence of rural poverty around 1960 to having the fifth lowest around 1990 (Dutt, 1998; Dutt and Ravallion, 1996).

A number of factors are responsible for poverty in the rural areas of India. Rural populations primarily depend on agriculture, which is highly dependent on rain patterns and the monsoon season. Inadequate rain and improper irrigation facilities can obviously cause low, or in some cases, no production of crops. Additionally, the Indian family unit is often very large, which can amplify the effects of poverty. Also, the caste system still prevails in India, and this is also a major reason for rural poverty – people from the lower castes are often deprived of a number of facilities and opportunities. The government has planned and implemented poverty eradication programs, but the benefits of all these programs have yet to reach the core of the country.

b)   Crime and Inequality

Crime is bound to increase when difference between the have's and have not's magnifies. Certain crimes are motivated by economic considerations. According to Kelley (2000), "In the economic theory of crime, areas of high inequality place poor individuals who have low returns from market activity next to high-income individuals who have goods worth taking, thereby increasing the returns to time allocated to criminal activity" and such motivations may be created by a sense of frustration, or an "envy effect". Worsening income gaps can have adverse impact on genuine and legal income generating opportunities and thereby carries with itself the possibility of rise in crime. Such criminal activities are not only carried out by (and result in) potential criminals, but also potential victims that have material goods worth seizing (Fleisher (1966), Ehrlich (1973), Chiu and Madden (1998), Burdett et. al (1999), Imrohoroglu et al. (2000, 2001), Kelly (2000), Fajnzylber et al. (2002), Burdett and Mortensen (1998), Juhn, Murphy and Pierce (1993), Pratt and Godsey (2003)). However, there is a growing consensus that resource deprivation is generally an underlying cause of violent crime (Land, McCall & Cohen, 1990; Mesner & Golden 1992). A review of studies with property crime in the Indian context can be quite useful. The division of resources, as well as wealth, is very uneven in India. This disparity creates different poverty ratios for different states. For instance, states such as Delhi and Punjab have very low poverty ratios. On the other hand, almost half of the populations in Bihar and Orissa live below the poverty line.

Figure 2: Rural and Urban Gini Coefficient (*100) for selected states during 1999-00
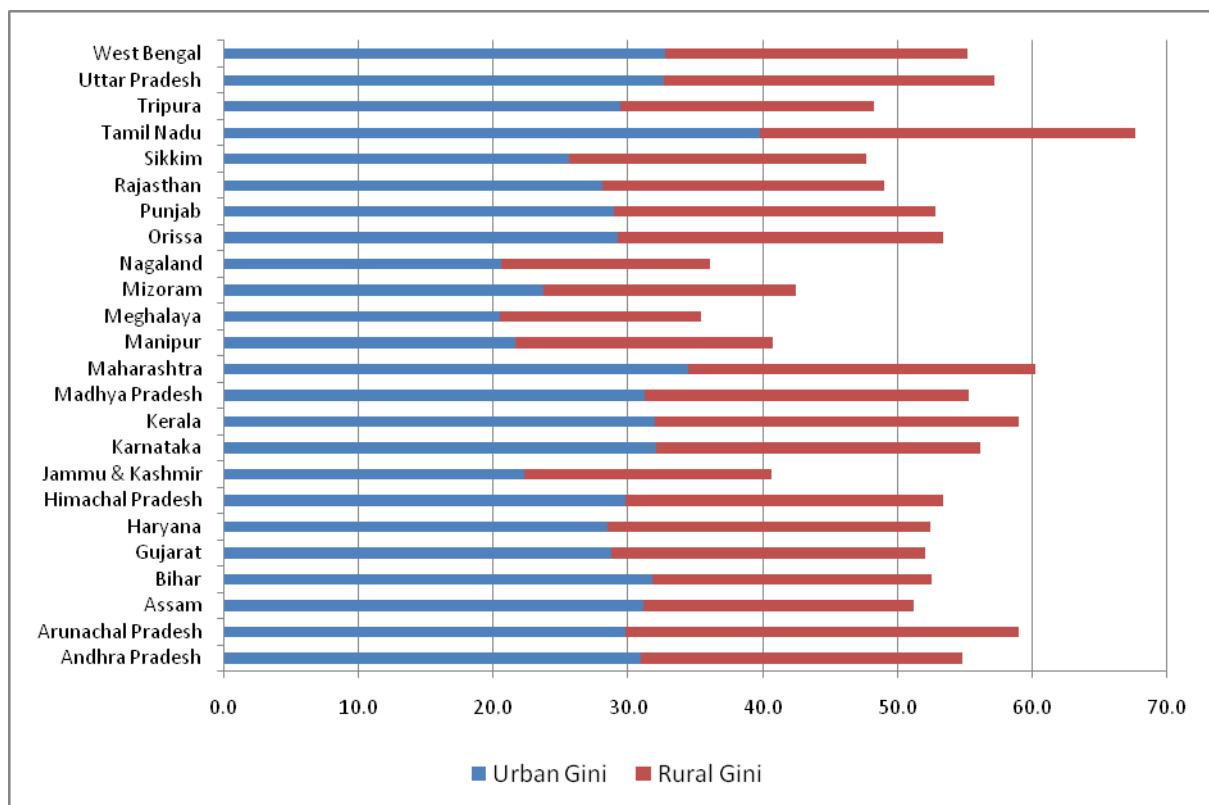
Source: National Human Development Report 2001, Planning Commission

Figure 2 above gives a good flavour of the variations in income levels between rural and urban areas among States. Income inequality is strikingly high in States such as Tamil Nadu, Maharashtra, West Bengal and Karnataka which have big metropolitan cities like Chennai (Madras), Mumbai (Bombay), Kolkata (Calcutta) and Bangaluru (Bangalore). In the Indian scenario, inequality can be segregated into two critical features:

i.   There is a wide rural-urban divide in terms of wage differential, job opportunities, availability of resources, basic infrastructure and social development in India. As shown by the Nobel winning work by Arthur Lewis, this gap manifests into large scale migration from rural to urban regions. This is exactly what is witnessed in India during the last so many decades. It is, however, yet to be tested empirically whether higher crime rates in urban areas are also due to migration from rural areas. This might sound unethical to some arguing that poor people in villages come to cities to commit crimes. But, this is an incomplete picture. High cost of living, lack of appropriate jobs due to relatively lower employability, material dissatisfaction and closeness to crime in informal sector can in some cases force the poor migrant to commit a crime..

ii.   Neither reawakening of ancient hatred nor consequence of religious fundamentalism is usually responsible for Hindu-Muslim conflicts, particularly in secular India which has been home to people and races from everywhere and treats all religions equally. It can be argued that such tension occurs due to socio economic developments and, of course, strategies and tactics of India's politicians. Following are the excerpts from an interview of a Muslim lady. When asked why, in her opinion, Muslims (in India) are more backward, she reveals that, "It is because they don't study much. Schools are there but they don't send their children there. They are also very poor. They are tempted to put their children into work for extra income. Since parents are not educated themselves, they do not realize that a good education could change the lives of their children."[7] Although, the same might hold true for all religions in India (including Hinduism), this brings into light the other three aspects of crime and inequality- terrorism (in its extreme form but has plagued India since a long time), naxalism (rampant in India) and education (explained below).

Fajnzylber, Lederman and Loayza (2002) show that "crime rates (homicide and robbery) and inequality are positively correlated within countries and this correlation reflects causation from inequality to crime rates, even after controlling for other crime determinant". Social disorganization theory (Shaw and McKay, 1942) highlights that a breakdown of social control machinery can lead to higher crime rates. This collapse can be attributed to factors such as poverty, racial heterogeneity, mobility, social instability. However, in most cases, inequality is associated with crime because it is linked to poverty.

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[7] Mrs. Falak Khan is a young wife with two children and lives near Jamia Milia Islamia University- a Muslim populated locality of New Delhi. The interview was conducted and published by Mayank Austen Soofi, on his blog http://hindumuslimindia.blogspot.com/

In place of an individual's own wealth, we substitute two variables. First, we use Gini coefficient as a measure of income inequality. There is generally a positive relationship between high income inequality and percentage of people with low income & instable employment opportunities. The model tries to predict that it is these individuals that are most likely to commit a crime. Second, unemployment rate is added in the model due to its negative association with available legitimate work opportunities. The second point will be discussed shortly.

c)   Crime and Economic Growth

Since the work of Quetelet (1842), irrespective of the criticisms it faced, it is quite an established conventional perception of criminology that macro economic factors are significantly associated with crime rates. Many studies (Fleisher 1963, 1966; Ehrlich, 1973) have used economic growth rates as substitutes for level of economic prosperity. According to Bennett (1991), growth rates are relevant with respect to creation and availability of opportunities. He also finds that significant non-linear effects may be present. Figures on State Domestic Product at factor cost (constant at 2000 prices) have been used in this study as a measure of economic growth. However, the quality of growth is more relevant and it is captured by levels of poverty, education, employment and other socio economic factors. Going by intuition and popular perception, a negative relationship can be expected between per capita city income and crime. As per capita income increases, in general, we can expect wealth of everyone in the city to increase, thus the incentive committing crime based on it is reduced. An alternative (and unconventional) argument is presented by Entorf and Spengler (2000) in their study on criminality, social cohesion and economic performance. According to them, wealth varies positively with crime for property related crimes. Wealth was measured by GDP per capita which covered both legitimate income opportunities and illegal income opportunities (i.e. potential targets). They estimated a range of 0.6-0.9 as mean elasticity for theft of motor vehicles and 0.7-1.0 for robbery with respect to real GDP per capita.

Table 2 provides ranking of selected Indian States in terms of education, life expectancy (a measure of health) and income (measured by per capita NSDP) and human development index. Some of the important observations are: a) Kerala which ranks one in education and life expectancy ranks fifth in terms of income while Punjab which has the highest SDP ranks eight in education; b) Bihar and Uttar Pradesh, one of the most populated States in India, fare poorly in all three aspects; c) Haryana, a State with second highest agricultural output and one of the best contributor to service sector in India, has one of the worst education ranking.

Table 2: Selected State-wise Human Development Index (HDI) in India during 2000

States	Education		Life Expectancy		Income		HDI	Rank
	Index	Rank	Index	Rank	Index	Rank		
Andhra Pradesh	0.539	13	0.672	8	0.513	8	0.575	9
Assam	0.588	6	0.57	14	0.431	13	0.53	11
Arunachal Pradesh	0.525	14	0.484	16	0.493	10	0.501	14
Bihar	0.413	16	0.626	11	0.308	16	0.449	16
Gujarat	0.612	4	0.661	9	0.544	5	0.606	7
Haryana	0.57	10	0.703	4	0.579	3	0.617	5
Karnataka	0.607	5	0.687	6	0.531	7	0.608	6
Kerala	0.751	1	0.867	1	0.544	5	0.721	1
Madhya Pradesh	0.569	11	0.552	15	0.447	12	0.523	12
Maharashtra	0.678	2	0.728	3	0.581	2	0.662	2
Orissa	0.56	12	0.582	13	0.403	15	0.515	13
Punjab	0.58	8	0.766	2	0.589	1	0.645	3
Rajasthan	0.578	9	0.628	10	0.466	11	0.557	10
Tamil Nadu	0.662	3	0.702	5	0.549	4	0.638	4
Uttar Pradesh	0.456	15	0.587	12	0.423	14	0.489	15
West Bengal	0.588	7	0.679	7	0.511	9	0.593	8
India	0.57		0.63		0.53		0.577	

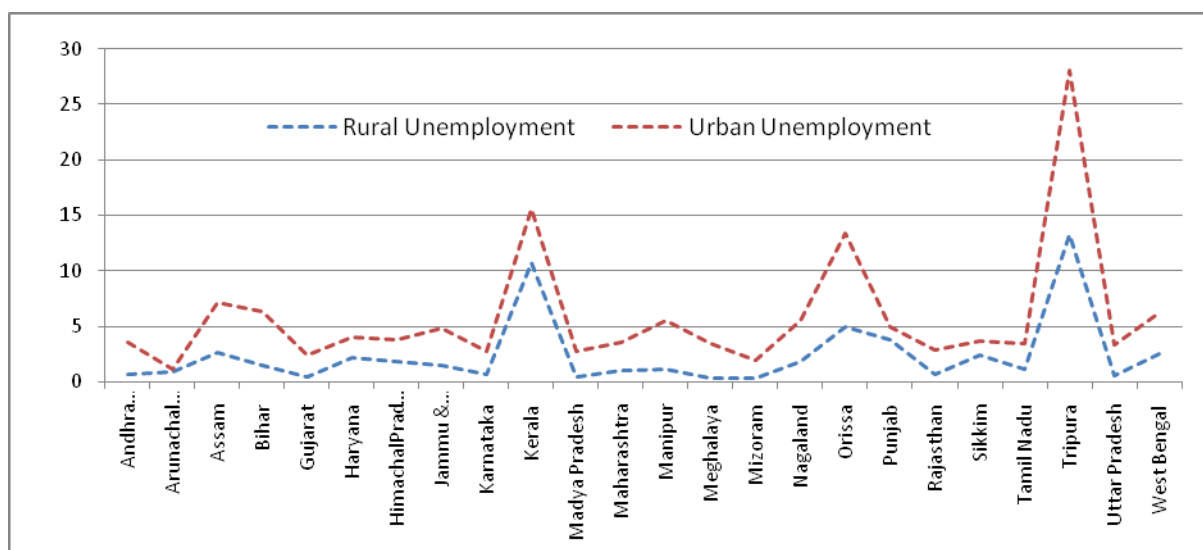Source: Indiastat

d)   *Crime and Unemployment*

Availability of legitimate employment opportunities acts as an effective deterrent for potential offenders from committing crimes. Unemployment, by generating poverty is hypothesized by most authors to stimulate property crime activity (Sjoquist, 1973; Howsen and Jarrell, 1987; Phillips, 1991). An instinctive appeal of this perception is undermined by the lack of empirical research that documents a strong effect of unemployment on crime. Raphael and Ebmer (2001) have found that unemployment consistently increases property crimes but they also state that "studies of aggregate crime rates generally find small and statistically weak unemployment effects, with stronger effects for property crime than for violent crime. In fact, several studies find significant negative effects of unemployment". Theodor Chiricos in 1987 reviewed 68 studies and showed that fewer than half find positive and significant effects of aggregate unemployment rates on crime rates. However, Cohen and Felson (1979), Cohen, Felson and Land (1980), Cohen (1981), and Cohen, Kluegel and Land (1981), argue that during high unemployment periods there are more individuals at home to serve as

guardians and unemployment reduces the wealth of crime targets. These studies confirm the hypothesis that unemployment decreases criminal activity.

Gumus (2004) states that, 'As people become unemployed they would, in the short run, search for new jobs. In the long run, if they do not find jobs, they would tend to be criminal'. He adds that there is no common agreed result of unemployment and crime relationship yet. Masih and Masih (1996: 1094) have conducted a thorough examination of the existing literature on this relationship and found that more than one third of studies find negative or no relationship between crime and unemployment. Correlations between crime and unemployment offer less conclusive results and the exact relationship between the variables remains to be clarified in further research.

Figure 3: Rural and urban unemployment rate in selected Indian states, 2004-05

Source: Indiastat

Regarding the situation in India, the labour force is growing at a rate of 2.5 per cent annually, but employment at only 2.3 per cent. Thus, the country is faced with the challenge of not only absorbing new entrants to the job market (estimated at seven million people every year), but also clearing the backlog. Sixty per cent of India's workforce is self-employed, many of whom remain very poor. Nearly 30 per cent are casual workers (i.e. they work only when they are able to get jobs and remain unpaid for the rest of the days). Only about 10 per cent are regular employees, of which two-fifths are employed by the public sector. More than 90 per cent of the labour force is employed in the unorganised sector, i.e. sector which does not provide with the social security and other benefits of employment in the organised sector. These employees are therefore more likely to be frustrated (due to social and economic factors) and commit a crime.

e)   *Crime and Urbanization*

With rapid globalization, industrialization is what follows in many poor countries. This process involves a transformation from an agrarian rural economy to an urbanized economy with superior infrastructure and growth. Crime, through various channels, is a side-effect of this process. Migration of population from rural to urban areas and the attempts of elite groups to modernise may stimulate an increase in criminal activities (Fisher, 1987). It also leads to several developmental (social, cultural and economic) bottlenecks and a fall in standard of living. An up shot is generation of social friction leading to eruptions of violence and crime particularly in communities characterized by diversity (UN, 2005). Such unstable urbanization might also have adverse selection problem in the sense that individuals working in legitimate jobs might end up into criminal activities. Percentage of people living in urban cities and towns has been swelling rapidly in India due to various factors- employment opportunities, infrastructure, better living standards, availability of public services and governance. It is argued that, as urbanization increases, crime also rises (Galvin, 2002:130; Gaviria and Pagés, 2002:190). According to Gumus (2004), the relationship between crime and urbanization may be uncertain. "At low levels of urbanization, crime may be high because of sparsely located residents; a further increase in urbanization may lead to decrease in crime because of closer proximity of residents; and finally, with even further increase in urbanization, crime may rise because individuals may not identify whether they are engaged in a legal or illegal activity" (Masih and Masih, 1996: 1093). Indeed, Gaviria and Pagés, (2002:193) found positive relationship between city size and victimization. Thus, it can be presumed that the crime-urbanization relationship can swing either way depending upon the urban setting. Only through an empirical examination it can be ascertained which effect outweighs the other in the India.

f)   *Crime and Quality of Legal system (or Judiciary)*

Kohling (2002: 11) states that "I define a weak judiciary as an institution that is inefficient or even ineffective due to contradictory, unclear, or complicated mechanisms. These inefficient laws prolong a trial and can be misused by litigants. This misuse of the laws might result in delays and the prevention of the execution of summons, orders and judgements". An aspect of public life that has a significant economic impact and is evidently influenced by the quality of the judiciary is the crime rate. A quick and predictable judiciary is supposed to contribute to a lower crime rate. This certainly holds true in the case of the backlog in Indian Courts. The federal government of India resorted to setting up fast track courts to reduce the backlog of millions of cases. As of 2006, a total of 18 million cases were pending in India's courts, of which 16 million cases are criminal ones. Due to this, India's judicial system is notoriously slow and the fast track courts will take up cases which have been pending for three years or more. According to India's Chief Justice, Y. K. Sabharwal, "there is no doubt that this

investment by the government will go a long way in the dispensation of real social, economic and political justice to the common man.[8]"

Thus, speedy disposal of cases and easing overcrowding of prisons reflects a robust judiciary to counter rising crimes[9]. India's penal code has been amended to provide that inmates must be released if they have served time on remand equal to half the maximum prison tariff for the offence they are to be tried for. However, the measure does not apply to those charged with offences for which the death sentence is a possible punishment[10]. Since this move is only applied to crimes which attract a maximum sentence of seven years and does not cover more serious felonies such as murder or crimes against women and children, it was considered in this study which is focussed on property related crimes. While fast track courts serve as a good measure of the an efficient and speedy judiciary, including trials with duration of more than ten years also serve as a good measure of quality of the legal system, although in the opposite way. A higher number of cases with trials exceeding ten years reflect a somewhat poor quality of legal system. The length of the trial determines the quality of the judiciary where a lower value of trial duration indicated a better judiciary (Kohling, 2002: 26).

g)   Crime and Education

Educational expenditure and attainment are singularly the most important facets of the supply and demand of social development in a developing country. The effect of education on crime can be explained by two effects. Higher levels of educational attainment increases opportunity cost of criminal behaviour through higher skill level and the associated higher returns in the labour market (Freeman, 1991, 1996; Grogger, 1995, 1998; Lochner and Moretti, 2001; Lochner 2004). Some studies signal that learning, by improving moral stance and promoting the virtues of hard work and honesty, might have a 'civilization effect' (Fajnzylber et al 2002, Usher, 1997). This is the direct effect on crime rates.

The indirect effect works through employment and wages. There is abundance in the literature of studies associating wages and unemployment rates to crime. High unemployment and low wage rates leads to high crime rates (Raphael and Winter-Ebmer, 2001; Gould, et al., 2002; Machin and Meghir, 2004). Higher attainment of education levels leads to better prospects of getting employed and might eventually result in higher wage rates. It, thus, increases the opportunity costs of crime and will tend to reduce criminal activity. Higher wages raise the opportunity costs of crime in two distinct ways, time commitment and expected incarceration period (Lochner, 2007). According to

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[8] Quoted from BBC report on fast track courts in India published online on Saturday, 29 July 2006 on their weblink http://news.bbc.co.uk/1/hi/world/south_asia/5227038.stm. Last viewed on 25th June 2009

[9] During July 2006, the government also introduced the concept of plea bargaining, under which an accused in a criminal case will be able to plead guilty in exchange for a reduced sentence. Although this move is expected to go a long way in reducing pressure on the courts but due to lack of data it could not be incorporated in the study.

Machin and Meghir (2004), "crime rates should be higher where wages at the bottom end of the wage distribution are lower, reflecting poorer labour market opportunities where the probability of being caught is lower, where crime rates are already higher, and where the potential returns to crime are high."

h)   Crime and Economic Development

Welfare expenditures can arguably be thought of as reducing the pain from unemployment and thus reducing the net return of crime. Alternatively, it can be interpreted as a state's propensity to help disadvantaged population segments. The measure of economic development, EDEV is a multi faceted proxy variable used to control for vast differences among States. State outlay for general economic services was used for this. This broad category of development includes tourism, self employment schemes, computerization of government administration, setting up statistical offices, providing infrastructure to public sector enterprises, conducting surveys for effective policy making, strengthening planning machinery among others. It is expected that this variable will be positive.

5.   Data Issues, Sources, Definitions and Model

Ideally I would like to estimate the effect of changes in household income levels (or consumption expenditure) on the crime decision at the individual level but this was not possible because such detailed data is not available for a sufficiently large random sample of individuals for Indian States. There are important data issues and problems regarding crime in India. Some of them are highlighted below:

i.   There is a severe lack of consistent and comprehensive data at State or city level over a period of time.

ii.   Using city/ district level data has problems of identification of origin of crime and that of the criminal because an individual may live in one region but commit crime in another. This explains the assumption of the model in this study that the amount of crime in a region is related to values measured in that same region.

iii.   There is a general problem of underreporting by victims of crime due to costs associated with reporting crimes in terms of time, effort and litigation.

iv.   Reporting by local or State law enforcement agencies has its own shortcomings.

In some cases only the most serious crimes are counted, neglecting the less serious ones, while in some other cases there is serious undercounting in order to show that crime has fallen, which could be a temptation around election times (DiIulio, 1996). Singh and Keniston (2009) write that "the present system (of crime survey by Government) is unlikely to yield accurate data; rather it

rewards governments, policymakers and police for hiding the crime they are expected to prevent and investigate"[11].

Indian statistics on crime are published annually by the National Crime Records Bureau, under the Ministry of Home Affairs. State-wise data is available on number of different crimes committed, enforcement mechanism and judicial institutions in a standardized format. Data on people living below poverty line (BPL) was compiled from the statistics released by Press Information Bureau, Government of India and data on income inequality (Gini coefficient) was obtained from National Human Development Report (2001), published by Planning Commission, Government of India. Data on National Legal Service Authority (NALSA) and Fast Track Courts (FTCs) were collected from Indiastat[12]. The origin of this are Parliament sessions, namely Lok Sabha (Lower House) Unstarred Question No. 573, dated 03.12.2004, Unstarred Question No. 2112, dated on 30.11.2007 and Rajya Sabha (Upper House) Unstarred Question No. 1439, dated 06.03.2006, Unstarred Question No. 548, dated 22.07.2002. Figures on duration of trials for all court types are provided by Ministry of Home Affairs, Government of India and were taken from Indiastat. Data on Health was taken from reports published by Ministry of Women and Child Development, Government of India. Data on education was taken from National Sample Survey Organization (NSSO), 2001 and from Ministry of Human Resource Development, Government of India through Indiastat.

Unemployment was again obtained from Census of India (2001) and Indiastat. Population statistics were also taken from Census of India (2001). Data on developmental outlays by different States was compiled from the statistics released by Handbook of Industrial Policy and Statistics (2002), Ministry of Commerce and Industry, Government of India. State Domestic Product (SDP) figures were obtained from reports published by Central Statistical Organisation (CSO). Finally, data on State outlay for general economic services is published by Ministry of Commerce and Industry, Govt. of India in their Handbook of Industrial Policy and Statistics (2002) made available online on Indiastat.

Definitions of some of the property-related crimes used in this study are as follows[13]: Robbery is the act of taking or attempting to take anything of value from the care, custody, or control of a person or persons by force or threat of force or violence and/or putting the victim in fear. Burglary, on the other hand, is considered as an unlawful entry of a structure to commit a felony or a theft including attempted forcible entry. Finally, Theft is the unlawful taking, carrying, leading, or riding away of property from the possession or constructive possession of another while Automobile Theft, in particular, is the theft or attempted theft of a motor vehicle.

Variables for the analysis and the model used are explained below.

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[11] Indian Express, Feb 04, 2009. http://www.indianexpress.com/news/telling-it-like-it-is/418946/. Nina Singh is an IPS officer and Daniel Keniston is a researcher in Economics at the Massachusetts Institute of Technology

[12] An online data bank whose subscription was taken to access data

[13] Defined by United States Federal Bureau of Investigation in their Uniform Crime Reports (any year)

Table 3: Variables and their description

Variable	Description	Units	Remarks
CRIME (dependent variable)	State wise per capita total property related crimes	Logarithmic	Total property crime recorded in 2004 and includes Robbery, Burglary and Auto Theft.
POV	Poverty measured by per capita number of persons below poverty line	Logarithmic	Based on mixed recall period consumption[14] calculated for 2004 and $1.08 a day poverty line
INEQ	Inequality measured by 1999 Gini coefficient	Percentage	The coefficient varies between 0 (complete equality) and 1 (complete inequality). Multiplied by 100
EGROW	Economic growth measured by 2004 per capita net state domestic product (NSDP)	Logarithmic	Calculated at constant (1999-00) prices
UNEMP	Rate of unemployment in rural and urban areas	Percentage	
URBAN	Urbanization measured by per capita number of workers (males and females) in urban areas	Logarithmic	
TRIALO	Trials exceeding a duration of 10 years under all types of Courts	Raw levels	Indicator of the quality of legal system
FTC	Assistance released by Ministry Finance for setup of fast track Courts	Raw levels (Amount in 100,000 Rupees)	Indicator of the quality of legal system
TRIALU	Trials not exceeding 1 year under all types of Courts	Raw levels	Indicator of the quality of legal system
NALSA	Funds allocated by Central government in 2004 through National Legal Services Authority to various State Legal Services Authorities for meeting the cost of legal services,	Raw levels (Amount in Rupees)	Indicator of the quality of legal system

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[14] This estimation is based on mixed reference period consumption in which the consumer expenditure data for five non-food items, namely, clothing, footwear, durable goods, education and institutional medical expenses are collected from 365-day recall period and the consumption data for the remaining items are collection from 3-day recall period.

EDU	particularly legal aid Education measured by per capita total expenditure on education sector by State	Logarithmic
EDEV	Economic development measured by per capita expenditure on general economic services by State	Logarithmic

The hypothesised form of the crime rate function used here therefore takes the form:

$$CRIME_i = \alpha + \beta_1 POV_i + \beta_2 INEQ_i + \beta_3 EGROW_i + \beta_4 UNEMP_i + \beta_5 URBAN_i + \beta_6 TRIALO_i +$$

$$\beta_7 FTC_i + \beta_8 TRIALU_i + \beta_9 NALSA_i + \beta_{10} EDU_i + \beta_{11} EDEV_i + \varepsilon_i$$

Where i = States of India[15] and ε stand for residual error in the model

For the variables that do not already correspond to percentages, they have been transformed using a logarithmic transformation because doing so reduces the influence of outliers and allows a simple elasticity interpretation[16]; for instance, when POV increases by one (or ten) percent, *CRIME* increases by 'some' percent. Because larger states represent larger samples and provide more accurate information, all regressions are weighted by state population. Table 4 below provides descriptive statistics for the crime variables and all explanatory variables used in the model.

Variable	Mean	Std. Dev.	Min	Max
CRIME (Total Property Crime)[a]	13861.12	15443.26	142	61469
ROB (Robberies)	667.04	846.77	3	2986
BURG (Burglaries)	3380.48	3894.50	64	14659
AUTO (Auto thefts)	2736.68	3180.96	0	11307
POV*[b]	0.17	0.09	0.04	0.42
INEQ[c]	0.51	0.08	0.35	0.68
EGROW*	19994.16	7740.00	6724	45394
UNEMP	5.98	5.67	1.20	28

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[15] Out of a total 28 States and 7 Union Territories (UT's), 3 States- Jharkhand, Chattisgarh, Uttarakhand were not included in the study. This is because sufficient data was not available for these States as they were formed in November 2000. All 7 UT's- Dadra & Nagar Haveli, Lakshadweep, Daman & Diu, Andaman & Nicobar Islands, Chandigarh, Delhi and Pondicherry have also not been included in the sample. This is because of their relatively very small geographical area, population, economic activities etc. However, Delhi was an exception and an outlier which had to be dropped after conducting certain tests.

[16] That is, one can explain the estimated coefficients, $b1$, $b2$, and so on, as the percentage change of *Y* that is associated with a 1 percent change of any particular explanatory variable

					Table 4:
URBAN*	0.09	0.05	0.03	0.24	Summary
TRIALO	971.44	1451.44	0	4874	statistics for
FTC	94.25	277.31	0	1287.27	different
TRIALU	11120.40	17948.59	31	72694	crime
NALSA	1100409	1217097	0	5584000	heads and
EDU*	1137.82	663.55	413.27	3046.92	explanatory
EDEV	128.76	102.72	18.82	330.70	variables

*variables represented in per capita terms; a) Crime= Robbery+ Burglary+ Auto Theft; b) Poverty Line at $1.08 a day; c) Measured by Gini coefficient

6.   Econometric Results: Correlation Matrix, OLS Regression and Elasticities

Before presenting the results of multiple regression analysis, a correlation matrix is presented below to highlight the association of independent variables among themselves and, more importantly, with the dependent variable. The table displays all the pair-wise correlation coefficients between variables. The advantage of doing this is that an observation is dropped only if there is a missing value for the pair of variables being correlated. Each correlation is considered in isolation from other variables, and no effort is made to control for the effects of other explanatory variables.

Table 5: Correlation matrix of Crime variable and explanatory variables

	CRIME	POV	INEQ	EGROW	UNEMP	URBAN	TRIAL	FTC	EDU	EDEV
CRIMEa	1									
POVb	-0.13 (0.52)	1								
INEQc	0.17 (0.41)	0.32 (0.12)	1							
EGROW	0.36*** (0.07)	-0.51* (0.00)	0.15 (0.46)	1						
UNEMP	-0.34*** (0.09)	0.08 (0.71)	-0.02 (0.92)	0.04 (0.83)	1					
URBAN	0.40** (0.04)	-0.24 (0.24)	0.18 (0.39)	0.58* (0.00)	-0.23 (0.27)	1				

TRIALO	0.12 (0.55)	0.61* (0.00)	0.40** (0.04)	-0.40** (0.05)	-0.18 (0.38)	-0.05 (0.79)	1			
FTC	0.36*** (0.07)	-0.06 (0.77)	0.15 (0.47)	0.33 (0.11)	-0.03 (0.89)	0.13 (0.53)	0.17 0.39	1		
EDU	0.09 (0.67)	-0.40** (0.05)	-0.23 (0.28)	0.48** (0.02)	-0.09 (0.69)	0.21 (0.33)	-0.49** (0.02)	-0.10 (0.64)	1	
EDEV	0.19 (0.36)	-0.44** (0.02)	0.54* (0.00)	0.08 (0.68)	0.11 (0.59)	-0.04 (0.85)	-0.54* (0.00)	-0.33 (0.11)	0.71* (0.00)	1

a) Crime is Total Property Crime= Robbery+ Burglary+ Auto Theft; b) Poverty Line at $1.08 a day; c) Measured by Gini coefficient (multiplied by 100); p values given in parenthesis where * represents significant at 1%, ** significant at 5% and *** significant at 10%

Generally, the findings are that economic growth, urbanization, fast track courts are positively correlated while unemployment is negatively correlated with total property crimes. These are also significant at 5% or 10% since the p value is less than 0.05 or 0.10 respectively. Poverty, inequality and education not being (statistically significantly) associated with crime seem to be an anomalous result. Almost all the correlations among independent variables are consistent with intuition. For instance, significant negative correlation between poverty with economic growth, urbanization, education and economic development confirms the very basic tenet of development economics. While the correlation analysis is suggestive, there are several reasons to view the correlation analysis with scepticism. Although significance level of each correlation coefficient is provided in the matrix, each correlation is treated in isolation without controlling for the effects of other variables. Young (1993) finds non-significant Pearson correlation coefficients for theft rates and the percentage of unemployed men and women for 20 nations. He states that there are cross-cultural questions about the validity of strain theories that predict positive correlations, and competing theories that predict negative correlations. In light of this argument, multiple regression results and estimated elasticities are presented in the below.

Table 6: OLS Regression Results

Independent Variables	Dependent Variables					
	Total Property Crime[a]			Robbery	Burglary	Auto Theft
Prob.>F	0.000	0.000	0.000	0.002	0.000	0.001
POV[b]	0.26	0.27***	0.27***	1.13**	0.78	0.19
INEQ[c]	0.01	0.02**	0.02**	-0.01	0.05**	0.01
EGROW	1.07*	1.12*	1.03*	1.66***	1.08***	0.54*

UNEMP	-0.04***	-0.04**	-0.04**	-0.02	-0.04	-0.05
URBAN	0.03		0.08	-0.55	0.03	0.77**
TRIALO	0.001**	0.001**	0.001**	0.001	0.002**	0.00
FTC	0.006**	0.006*	0.006*	0.00	0.007	0.009**
EDU	-0.91*	-0.98*	-0.96*	-1.34***	-1.03**	-1.12**
EDEV	0.51*	0.51*	0.51*	0.50**	0.78*	0.31
Constant	-7.03	-7.31	-6.36	-10.76	-5.63	-1.92
R^2	0.88	0.86	0.87	0.50	0.80	0.79
Mean VIF[d]	2.76	2.56	2.63	2.63	2.63	2.75
Het test[e] (p>chi2)	**0.53**	**0.11**	**0.76**	**0.86**	**0.18**	**0.50**

a) Total Property Crime = Robbery+ Burglary+ Auto Theft; b) Poverty Line at $1.08 a day; c) Measured by Gini coefficient (multiplied by 100); d) Mean Variance Inflation Factor to check for Multicollinearity; e) Breusch-Pagan / Cook-Weisberg test for heteroskedasticity where H_0: Constant Variance.

* represents significant at 1%, ** significant at 5% and *** significant at 10%

Inspecting the p-value of the F-test to see if the overall model is significant reveals that with a p-value of zero to at least three decimal places, the model is statistically significant. Now, with total property crime as the dependent variable, results show that POV is significant (and positive) at 10% level when two variables measuring quality of legal system were dropped from the first full model. Although URBAN was insignificant throughout (except in the last column with auto theft as the dependent variable), dropping it in the second regression (second column) did not change the significance of POV variable. The other socio economic and control variables (except URBAN) are significant. Like POV, INEQ, with a positive coefficient, is significant but at a higher 5% level of significance. EGROW is consistently highly significant for all three initial regressions at 1% level of significance. Similarly, UNEMP is throughout significant with a negative coefficient. Out of all the variables used to measure quality of legal system, only TRIALO and FTC came out significant in all equations. The coefficients of other two, TRIALU and NALSA were found to be insignificant (with very low t values) and therefore dropped from the final regressions. Finally, EDU and EDEV were significant throughout at 1% level with (as expected) opposite signs of coefficients, negative for EDU and positive for EDEV. Coefficient of determination or R^2 has a range of 86% to 88% suggesting that about 87% of the variance of total property crime is determined by the model.

Now, looking at individual property related crimes it was found that POV is statistically significant only for Robbery while INEQ is significant only for Burglary. EGROW and EDU are the only variables that are significant for all three property related crimes with the same signs as observed for total property crime. While UNEMP is insignificant for all three, URBAN variable came out to be significant (at 5%) only for Auto theft. Regarding the legal system variables, coefficient of only TRIALO was significant for Burglary while FTC was for Auto theft, both at 5% level of significance.

However, these coefficients are too small to predict any substantial impact on the crime variables. Lastly, coefficient of EDEV was found significant for Robbery and Burglary but not for Auto thefts. While R^2 was 79% and 80% for Auto theft and Burglary respectively, it was found to be at a lower 50% for Robbery.

The analysis of the normality plots indicates that the normality assumption is appropriate for hypothesis testing. Cook-Weisberg test for heteroscedasticity using fitted values of crime variables was conducted with constant variance as the null hypothesis. High p values for this chi-square test indicate homogenous errors and do not pose any problem. Multicollinearity does not appear to be a potential problem. This is depicted by the VIF (variance inflation factor) values given in the second last row of the table. None of the values exceed 2.76 implying that the variable is not a linear combination of other independent variables. This clears the way to predict the correct elasticities (given in the table below) from the above model.

Table 7: Estimated Elasticities

Elasticity	Total Property Crime	Robbery	Burglary	Auto Theft
10% increase in incidence of poverty (number of people below poverty line)	0.27	1.13		
	2.7% increase in total property crimes	*11.3% increase in robberies*		
10% increase in inequality (Gini Coefficient)	0.02		0.05	
	0.2% increase in total property crimes		*0.5% increase in burglaries*	
10% increase in State Income (SDP)	1.03-1.12	1.66	1.08	0.54
	On average, 10.75% increase in total property crimes	*16.6% increase in robberies*	*10.8% increase in burglaries*	*5.4% increase in auto thefts*
10% increase in unemployment	-0.04			
	0.4% decline in total property crimes			
10% increase in urbanization (urban workers)				0.77
				7.7% increase in auto thefts
10% increase in	-0.91 to -0.98	-1.34	-1.03	-1.12

expenditure on education	On average, 9.35% decline in total property crimes	13.4% decline in robberies	10.3% decline in burglaries	11.2% decline in auto thefts
10% increase in outlay on economic activities/ services	0.51	0.50	0.78	
	5.1% increase in total property crimes	5% increase in robberies	7.8% increase in burglaries	

These elasticity figures suggest that poverty has the highest impact on robberies. This 1.13 elasticity has a more than proportionate impact of being poor on committing a robbery. Inequality, on the other hand, has a relatively less magnitude of elasticity with crime. An unequal distribution of income among the population or a big divide between the rich and poor does not show a big impact on property crimes in total or burglary in particular. It can be reasonably inferred that high inequality, *per se*, is more likely to give rise to violent crimes like murder and kidnapping. This conform to the Indian scenario of inequality combined with rampant cases of inter caste, inter regional and inter religion friction culminating in violent tendencies. A much more concrete finding is the elasticities of economic growth (State incomes) and education with respect to property crimes, both aggregated and individually. A 10% increase in per capita state domestic product gives rise to more than proportionate rise in total property crimes, robbery and burglary with the impact on robbery being the maximum at 16.6%. This can be explained by the fact that economic growth and rise in personal income levels in States with high inequality and poverty (such as Uttar Pradesh, Bihar, Madhya Pradesh and Rajasthan) result in the rich getting richer while poor not benefiting much. In other words, benefits of growth do not trickle down to all sections of the society. This, in the indirect way, results in a rise of property crimes, robberies in particular.

Most convincing result comes from the figures of elasticity of education with crime where a 10% increase in per capita expenditure education leads to a *decline* between 9.2-11.2% of crime rates. Also, urbanization tends to trigger only auto thefts by a 0.77% rise in response to 1% increase in urban workers. This can be explained by the fact that urbanization of rural towns and villages and further growth of cities tend to have a 'demonstration effect' on the rising Indian middle class which prefers to spend their wages and salaries on durable/ semi-durable goods such as automobiles, house hold electronics, real estate among other commodities. This further gives rise to incidents of auto thefts. However, it is difficult to explain the insignificant impact of urbanization on robbery, burglary and aggregated property crimes. Unemployment tends to impact only total property crimes and not any individual crime. This anomalous phenomenon will be discussed below.

7.   Discussion

The positive coefficient of poverty variable confirms the economic theory of crime that poverty leads to more criminal activities. This result is also in line with Fafchamps and Minten's (2002) econometric result that poverty is associated with rise in property related crime. They took into account the number of people below poverty line in Madagascar rather than the more challenging relation with chronic poverty, i.e., extremely poor people suffering from hunger. Property crime, in line with their findings, is a consumption smoothing strategy that helps such poor people (not the extremely poor) to avoid their already low standards of living falling further down. This is also referred to as the 'vulnerability' of the poor.

The significant positive relationship between poverty and crime (total property crimes and robbery) rejects both opportunity and returns-to-crime theories while confirms the relative deprivation theory of crime. An explanation for this in the Indian context could be the possible failure of poverty reduction programmes. However, this does not imply that such schemes implemented by governments are totally redundant but it means that could rather be misdirected. Rather than shifting the relative positions of those in the lower class who are most prone to commit crimes (such as the young, unemployed, unskilled and uneducated males), certain other groups have been targeted, principally distressed women with children, handicapped, malnourished children and the elderly. Such a failure to identify the real target group by State sponsored social and economic schemes has been suggested before by DeFronzo (1983) and Plotnick and Smeeding (1979)[17]. Allen (1996) puts forth the argument that "a change in relative positions resulting from social forces perceived to be unjustified may result in increased criminal behaviour by the disadvantaged groups."

What was expected was a positive association between income inequality and crime (positive INEQ variable) simply because as the number of poor people increase relative to the rich, their opportunity cost to commit crime comes down. In other words, they have relatively more to gain than few others who lose from crime. The regression results fit into this line of reasoning but are in conflict with the findings of Hsieh and Pugh (1993), Kelly (2000) and Brush (2007). The only exception to this was the negative coefficient with robbery but it was statistically insignificant. EGROW representing economic growth (per capita income of the States) convincingly remains a positive determinant of property related crime in India. This result is in perfect accordance with that of Entorf and Spengler (2000). There are two possible explanations for this relationship. First, wealth measured by per capita income incorporates both legal and illegal income opportunities reveals the growth of black market also since income figures do not exclude gains to criminals from selling stolen goods or

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[17] Empirical evidence of a direct link between anti-poverty programmes and crime, however, is inconclusive (DeFronzo, 1983; Howsen and Jarrell, 1987; Devine, Sheley and Smith, 1988).

cars. Second, rising incomes in light of high inequality and poverty can result in rise in property crimes, robberies in particular.

Chiricos (1987) suggested that unemployment-crime relationship, if it in fact exists, is apparently more complex than is commonly assumed. This fits well in light of the results obtained in this study since effect of unemployment is significant only for total property crimes and not for any individual property crime. Nonetheless the coefficient is negative in all regressions. The empirical results obtained here do not support the view that increase in relative return to crime due to unemployment dominates the effect of having newly unemployed family members at home to protect property. However, in line with Cohen, Felson and Land (1980), Cohen (1981) and Cantor and Land (1985) , the negative relation between total property crimes and poverty indicates that effect of reduced criminal opportunities resulting from increased guardianship dominates. In the Indian context, any increase in unemployment rate, in most cases, culminates from recessionary pressures exerted by deceleration of production and consumption in the economy. In such phases, it could decrease the opportunity for property crime by increasing the capacity and ability to protect one's own possessions and belongings by devoting more time at home.

The urbanization variable, URBAN, was insignificant in all regression except for Auto theft where its coefficient was 0.77 and significant at 5% level. The only possible explanation for this could be the link between urbanization (in the form of increasing jobs and concomitant rise in incomes resulting in greater number of automobiles being purchased by individuals) and crime in light of high poverty and inequality. The demonstration effect mentioned above juxtaposed with an unjust society (high Gini coefficient in cities) might be leading to rise in auto thefts. It also supports the finding of Glaeser and Sacerdote (1996). As they mention in their article, when cities are getting larger, this make the return on stolen goods higher, the probability of getting caught is adversely related with city size and finally, availability of resale market of stolen goods are also increases with city size. .

Only two variables for quality of legal system and judiciary, trials taking more than ten years and fast track courts, have been significant in all regressions for total property crimes but not individually. Results show that longer the duration of trial of criminals (depicting inefficiencies and imperfections of criminal justice system), higher is the crime rate. This confirms the theories of Becker and Ehrlich of 1960s and 1970s that for the first time gave evidence to the hypothesis that higher chance of getting apprehended and punished lowers the expected relative returns to crime (Becker, 1968; Ehrlich, 1973). However, subsequent theoretical analysis indicates that these criminal justice system factors do not unambiguously deter crime (Block and Heineke, 1975; Heineke, 1978; Cook, 1977; Nagin, 1978; Brier and Fienberg, 1980). TRIALO having a significant and positive coefficient is in line with the arguments extended by Kohling (2000) that it indicated a weak and inefficient form of legal system and judiciary. This acts as an anti-deterrent for potential criminals and thus increases crimes. However, FTC having a positive and significant coefficient might, in the Indian context, indicate that benefits of such measures (setting up fast track courts for speedy trials) are either getting

diluted or not reaching the masses. A possible reason for this could be rampant corruption in the police and judicial system.

EDU was negative and significant in all types of property related crimes. This implies that State spending on education has a favourable impact on wages of individuals which might be raising the opportunity cost of committing crimes. Also, by altering preferences for risk taking or patience and improving social networks, education reduces crime. This result is in line with almost all empirical studies in this area with the exception of Gumus (2000) who finds a positive and significant relationship between education and property crimes.

8. Conclusion and way ahead

In direct contrast to some views that fighting poverty, inequality and social disorganization is not helpful for reducing crime, the findings indicate that property crime increases with incidence of absolute poverty and that income distribution and social structure apparently have impact on property crime activity when controlled for other socioeconomic factors. In addition, the alternative (political) view of fighting crime with effective poverty alleviation programmes along with strong criminal justice actions is consistently supported. These findings also indicate that macroeconomic stability (especially high growth and employment) policies, *per se*, cannot reduce property crimes. These policies only if combined with pulling poor people above poverty line, raising their standard of living and social progress can abate crime. From a policy perspective these results imply that enhancing human capital accumulation can reduce crime. This can be carried out through strengthening education system and making education institutions robust and efficient can upgrade labour market productivity and expected incomes of individuals. This combined with suitable deterrence measures and good quality reliable judiciary are likely to be most critical ingredients in reducing crime.

Different measures of poverty that capture the *depth* and *severity* and not only incidence of poverty can be used. While the first one is measured by the poverty gap index, the squared poverty gap index measures the second. Since these are sensitive to distribution of inequality amongst the poor they can serve as better indicators of poverty. This study took into account only absolute poverty measure which focuses poor but impact of relative poverty with focus on vulnerable chronically poor deserves more research. Regarding inequality, Gini coefficient might not reflect the true picture because it ignores the crucial facet of wealth distribution that is critical for aggregate crime rates especially in the Indian context. Efforts should be made to use inequality variable that measures effective egalitarianism. "The relationship between crime and resource distribution is dominated by the extremes" (Noveck, 2007: 19). Since Gini considers the entire income distribution, further research on this can take into account other measures of inequality which corresponds more to the top and bottom quintiles of income distribution.

It is clear from the literature that crime-unemployment relationship is ambiguous. In light of this, wages can act as a better determinant than unemployment. If ample and time consistent data is available then using unemployment rates lagged by one or two years might provide different results. Also, some authors have mentioned that by stressing unemployment, crime theory generally ignores the effect of inflation on criminal activity. Useful insights can be drawn if future work in this area can include price and wage adjustments in the economy to adjust real incomes. Finally, considering a random sample of countries/ states/ regions could be used and research using a time series may be more informative. However data may be difficult to get especially for developing or emerging economies.

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