The deteriorating labour market conditions and crime: An analysis of Indian states during 2001-2008

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Abstract: *Incidence of crime in India has been mounting at a fast pace , especially during the last decade. Moreover, crime on body seems to be increasing in comparison to crime on property. Economics and Sociology literature on crime attributes labour market as a transmitting institution for crime. This paper is an attempt to understand the issue of crime in India as a socio-economic problem with particular reference to the Indian labour market. I argue that the poor labour market conditions in the Indian economy that has been developing in the recent past may be a prime factor in explaining the spate of rise in crime rates recently. Panel data analysis of Indian states during the period 2001-2008 show that unemployment and wage inequality are key variables that explains the crime rate in India, especially crime on body. Education similarly seems to reduce property crime rate. Crime also seem to be deterred by an efficient judicial delivery system, however the role of police as a deterrent is ambiguous.*

Introduction

Incidence of Crime in India has been mounting at a fast pace, especially during the last decade (see figure 1). The regional profile of crime rate and crime incidences also shows that they vary vastly across regions in India and these variations do not seem to follow social development patterns[1]. Also, the crime records show that the structure of crime incidences in India has undergone substantial changes since the early 1950s[2]. Despite this rising incidence and complexity of crime, the subject had attracted largely Indian sociologists and psychologists who understood the problem as primarily psycho-social phenomena with little relevance to other disciplines whatsoever. Though this is the case in India, the study of crime as an economic problem had been taken up in the western

[1] For instance, Kerala, the state that records the highest position in terms of human development also records one of the highest rate of crime in the country, while some of the poorest regions such as Jharkhand records very low rate of crime (see National Crime Records Bureau, Government of India, 2009).

[2] For instance, criminal activities on 'property' like dacoity and housebreaking has been waning, while homicide and other crime on 'body' have increased substantially in the recent years (see National Crime Records Bureau, Government of India, 2009).

academic world nearly a century back[3]. This paper is an attempt to understand the issue of crime in India as a socio-economic issue with particular reference to the Indian labour market. I argue that the weak labour market conditions in the Indian economy that has been developing in the recent past may be a prime factor in explaining the spate of rise in crime rates recently. The paper is divided into eight sections. Section 2 provides the analytical background. Section three provides the database and its limitations. Section four gives the trends and patterns in crime in India, while the next section provides the trends in the Indian labour market. Section six gives the hypothesis, and model. The empirical results are provided in the seventh section followed by conclusion.

2. Labour Market and Crime: The Analytical Background

The early works on the effect of the labour market on crime came from sociology and psychology. The pioneers in these disciplines had sought criminal activity as deviant behaviour, which reflected personality disorders and social anomie[4]. It was Becker (1968) who posited crime as essentially an economic problem. He sought to explain criminal behaviour as rational behaviour wherein the actors had to maximize their returns in activities that could be either legal or illegal after calculating the cost benefit analysis of doing an illegal activity versus legal activity. In this frame, the probability of conviction as well as the degree of punishment acts as costs against illegal activities while the probability of getting opportunity to have legal income sources as well as relative difference in earnings from legal and illegal activities acts as incentives to that helps in the deciding between legal and illegal activities. However, the policy implications of such a model emphasizing much on surveillance and incapacitation to increase the costs of illegal activities did not find much empirical evidence. On the

[3] Lowe (1914)

[4] Early works on crime came about from the psychological treatises of Freud (1961) who argued that deviant behaviour was the product of childhood experiences. Sociologists on the other hand expressed crime as deviant behaviour as an outcome of individuals interaction with the society at large. Anomie or strain theory as described by Durkheim (1897) and later generalized by Merton (1968) and Agnew (1992) view that crime or any other form of deviance as decision taken by individuals undergoing various types of strains in a changing society. Other prominent social theories also explain crime in society using different theoretical models such as Social Learning Theory and Control Theory.

contrary crime rates seemed to remain high with punitive justice and incapacitation, especially in US (Zimring and Hawkins, 1991; Freeman, 1996).

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Freeman(1996; 1999) further expanded this frame and added non-pecuniary benefits and costs, as well as opportunity costs to his model on crime supply. Thus in his model, the non pecuniary and pecuniary costs and benefits of both legal and illegal activities act as incentives/disincentives for crime. If the benefit-cost ratio of legal activities is higher than benefit-cost ratio of illegal activities then the probability of legal activities in the economy would increase. Other wise the probability of illegal activities would increase. The pecuniary benefits would include wages for legal activities and earnings of various types for illegal activities. The pecuniary costs for legal activities would include costs of skill development, while that of illegal activities would include opportunity cost of incapacitation such as lost income from being removed from the labour market, and the probability of being traced. The non-pecuniary benefits, according to Freeman are equally important. The non-pecuniary benefits for legitimate activities include social status and personal sense of achievement. The non-pecuniary costs of legitimate activities include stigma attached to being unemployed during job search period and being low wage earners. The non-pecuniary costs attached to being in illegitimate activities would be the social stigma of being sentenced to jails and the personal sense of alienation from the society may be due to guilt or due to the nature of the activity involved in.

This model in effect brings in the labour market to the centre of analysis of crime. Being unemployed increases the pecuniary and non-pecuniary cost of doing legitimate activity, while the pecuniary and non-pecuniary benefits are zero. On the other hand, the non-pecuniary costs of criminal activities is also very low since his status of being unemployed is already attached with social stigma, while the pecuniary benefits from crime is very high in relation to his status of being legally unemployed. Hence, it could be expected that crime rate may increase with unemployment rates in the economy. In line with this argument crime rates would be higher with the segments of the population

experiencing low levels of skills, low levels of wages, weak employment opportunities arising out of the presence of various social institutions of discrimination.

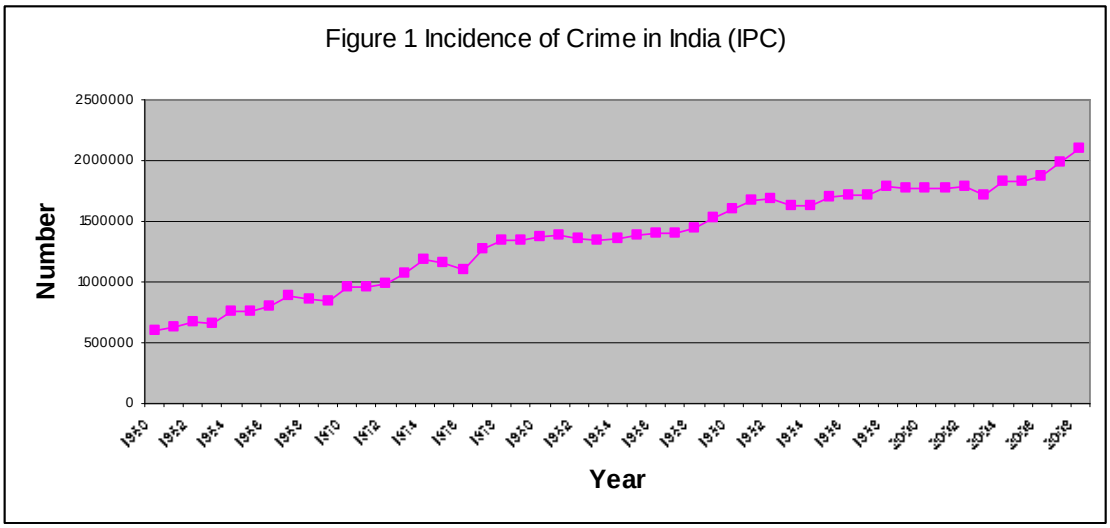
Moreover, the individual's non-pecuniary costs of crime may reduce with increasing rate of incarceration and incapacitation. This is so because the social stigma attached to being in jail may reduce as increasing numbers of people belonging to the same social strata (population segment) are jailed. On the contrary, this may be looked upon as an essential experience for being involved in crime and may add to the status of the person within the sub-culture of crime. Viewed from this framework, increasing the cost of crime may not reduce crime in society, but increase the returns to legitimate activities and reducing the costs of legitimate activities may reduce criminal activities.

Based on this framework, Freeman (1996) had argued that the depressed labour market in U.S., especially for the lower wage and less skilled workers had caused the rise of criminal activity in the U.S. in mid 70s. Despite large scale incarceration and police presence, the criminal activities among black youth kept rising. The stigma attached to incarceration having weakened, the deterrence effect of police also seems to have weakened. Overall, the pecuniary returns to crime, had increased relative to legitimate returns, while the pecuniary and non-pecuniary cost of crime had declined relative to legitimate employment.

The empirical reflection of Freeman's arguments was found in many studies. Studies (Allan,1985) in US showed that availability of employment was an important deterrent for crime, especially for juveniles. While for the young adults, the quality of employment also mattered. Total underemployment and juvenile unemployment were found to be positively associated with arrest rates for both personal and property crimes. While Imai and Krishna(2004) using maximum likelihood techniques and monthly panel data dynamic model estimated that current criminal activity impacts future labor market outcomes. Therefore, the threat of future adverse effects in the labor market when arrested acts as a strong deterrent to crime. Another study shows that increase in criminal activity has been identified both as a cause and a consequence of the generally declining

labor market prospects of less-skilled workers, in particular, less-skilled black workers (Boggess, Scott; Bound, John, 1997). Machin and Kristine (2002) shows that altering wage incentives can affect crime and therefore that there exists a link between crime and the low wage labour market.

The study by Buananno (2005) shows that crime rate in southern regions of Italy is strongly related to socio economic variables and particular to the labour market conditions. Entorf and Spengler (2000), using a regional panel for Germany, find unemployment to have "small, often insignificant and ambiguous signs". Likewise, Papps and Winkelmann (1999) find little effect for a panel of regions from New Zealand, while Raphael and Winter-Ebmer (2001), using U.S. state-level data, indicate that the decline in the crime rate in US during the 1990s was associated with the unemployment rate decline. Gould et al. (2002) provides further evidence supporting the important effect of wages on crime in a panel study of U.S. counties.



Source: Crime in India 2008

Studies on the economics of crime had been very limited in India. An interesting study on Indian data was done by Dreze and Khera (2000). The study focuses on inter-district variations in murder rate. The study finds that in India, murder rates have no significant relation between urbanization and poverty. Further, education has a moderating influence on violent crime. But the strongest correlate of the murder rate is the female-male ratio:

districts with higher female-male ratios have lower murder rates. The study argues for a 'strong link of some kind' between gender relations and criminal behavior. Datta and Hussain (2009) investigated the impact of a set of deterrence variables and socio-economic variables on crime rates in India. The results show that both deterrence and socioeconomic factors are important in explaining crime rates. With regard to crime against women in Kerala Mitra and Singh (2007) showed that the imbalance between newer aspirations fostered by educational attainment among women in Kerala and the patriarchal societal and cultural norms often contributes to family violence and suicides in Kerala. Panda and Agarwal (2005) argued that labour market outcomes of women were associated with greater intensity of crime and violence against women in Kerala. They find that women with irregular jobs and are marginally employed face greater violence than women who have regular employment while educational parity in families reduce violence against women.

However, to my understanding there have hardly been a few studies on the economics of crime and more so, the effect of the labour market performance on crime in India. Hence my contribution may be the first attempt at understanding crime in India from this perspective.

3. Database and its Limitations

The database used for the paper is the publication "Crime in India" published by the National Crime Records Bureau, Government of India. The publication has a continuous record of data from 1951 till date. The database provides various types of crimes based on the Indian Penal Code (IPC) and the Special and Local Laws (SLL). Since SLL criminal activities records seem to have breaches, additions and ambiguities over the years, we have used only the IPC crime statistics for this study and have excluded SLL crimes. Broadly all criminal activities are reported in the headings of crime against body and crime against property. Crime rate is defined by the publication as Incidence of crime as a ratio to total population expressed as crime per 1000 population.

An obvious limitation of the database is that it included only criminal activities that are reported. It in well known that a large number of criminal activities are unrecorded. So to

the extent that criminal activities are underreported, if there are biases in the underreported data then the results that we have obtained may be unreliable. However there is no apriori reason to believe that while there is underreporting, this underreporting is non-random in nature. In this study we use the data from the period 2001 to 2008. The choice of this data period is based on the structural shift in the crime during this period (See Figure 1).

4. Trends and Patterns in Crime Rate across Indian States

Table 1 shows the variations in crime rate across the Indian states during the period 2001-08. Crime rate defined as incidence of crime per thousand population was the highest in Pondicherry during the period from 2001 to 2008. It was followed by Kerala at 3.14 during the same period. States such as Tamil Nadu, Rajasthan, Karnataka, Delhi and Chandigarh recorded crime rate of above 2. The lowest crime rate was recorded in some of the poorest regions of the country such as, Uttar Pradesh, Meghalaya and Nagaland. However, during this period, most states that recorded low average rates of crime experienced rise in crime rate during this period. The highest increase in crime was recorded in Lakshadweep while the largest decline was in Delhi. Nevertheless, overall crime rate during the period had increased by 0.03 units.

When we disaggregate the crime rate into its components we find that the highest rate in crime was in case of body related crime (0.42) while incidence of crime on property was marginally lesser (at 0.31). Crime on women body was at 0.27. Economic and political crime was the least among the lot. Yet we find considerable regional variations across various types of crime. For instance, Pondicherry recorded the highest rate of body crime in India followed by Andhra and Madhya Pradesh, while these states recorded only around the national average in property related crime (0.3, 0.34, and 0.29). But property related crime rate was the highest in Chandigarh and Mizoram. Crime rate against women was the highest in Delhi followed by Tripura and Madhya Pradesh.

Table 1 Regional Variation in Crime Rates

state	Avg. Crime Rate: 2001-08	change in crime rate during 2001 to 200	crime rate during 2001	Average Body Crime Rate 2001-08	Average property Crime Rate 2001-08	average women body crime rate	average economic property crime rate	average political crime rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Puducherry	**4.06**	-0.11	3.89	**1.04**	0.3	0.22	0.04	**0.17**
Kerala	**3.14**	0.01	3.21	0.81	0.25	0.38	0.12	**0.23**
Madhya Pradesh	**2.91**	-0.08	2.94	0.82	0.29	0.48	0.03	0.06
Delhi	**2.89**	-1.1	3.36	0.45	0.81	**0.51**	0.17	0.01
Chandigarh	**2.6**	-0.91	3.22	0.3	**1.07**	0.41	***0.21***	0.07
Tamil Nadu	**2.48**	0.21	2.41	0.53	0.24	0.18	0.04	0.06
Mizoram	**2.44**	-0.48	2.51	0.32	**1.02**	0.29	0.11	0.03
Rajasthan	**2.35**	-0.48	2.67	0.67	0.36	0.44	**0.16**	0.08
Karnataka	**2.01**	0.07	1.99	0.53	0.27	0.17	0.06	0.12
Himachal Pradesh	1.97	0.2	1.87	0.38	0.14	0.27	0.04	0.12
Gujarat	1.96	0.08	1.93	0.38	0.29	0.26	0.06	0.05
Andhra Pradesh	1.94	0.42	1.67	0.83	0.34	**0.45**	0.11	0.04
Arunachal Pradesh	1.91	-0.17	2.1	0.63	0.47	0.3	0.06	0.03
Chhattisgarh	1.88	0.32	1.8	0.49	0.22	0.34	0.03	0.05
J and K	1.87	-0.09	1.86	0.41	0.2	0.43	0.05	**0.14**
A & N Island	1.77	0.1	1.84	0.4	0.27	0.2	0.05	0.05
Haryana	1.75	0.28	1.69	0.46	0.27	0.41	0.08	0.05
Maharashtra	1.66	0.08	1.68	0.46	0.42	0.26	0.07	0.08
Goa	1.5	-0.04	1.61	0.23	0.34	0.12	0.08	0.06
D & Nr Haveli	1.49	-0.24	1.52	0.26	0.31	0.19	0.12	0.08
Assam	1.46	0.37	1.37	0.48	0.28	0.43	0.05	0.12
Manipur	1.29	0.22	1.22	0.47	0.18	0.16	0.07	0.07
Orissa	1.29	0.14	1.25	0.35	0.2	0.28	0.03	0.06
Daman and Diu	1.15	-0.47	1.39	0.18	0.2	0.09	0.08	**0.14**
Jharkhand	1.14	0.29	0.92	0.29	0.23	0.17	0.03	0.09
Bihar	1.13	0.23	1.05	0.3	0.18	0.14	0.04	0.1
Punjab	1.12	0.15	1.09	0.35	0.23	0.19	0.13	0
Tripura	1.08	0.64	0.87	0.49	0.14	**0.49**	0.03	0.06
Sikkim	1.01	0.41	0.81	0.26	0.22	0.16	0.07	0.05
Uttarakhand	0.88	-0.05	0.91	0.26	0.2	0.21	0.07	0.05
Lakshadweep	0.82	0.68	0.59	0.11	0.15	0.06	0	**0.19**
West Bengal	0.82	0.45	0.74	0.23	0.18	0.29	0.03	0.04
Uttar Pradesh	0.74	-0.21	1.03	0.24	0.14	0.2	0.05	0.03
Meghalaya	0.73	0.14	0.72	0.2	0.25	0.1	0.04	0.02
Nagaland	0.44	-0.1	0.53	0.11	0.15	0.03	0.02	0.01
Total	1.71	0.03	1.72	0.42	0.31	0.27	0.07	0.07

Source: Government of India, Crime in India, National Crime Records Bureau

To analyze the co-occurrence of various crimes we calculated a correlation matrix across different states on various types of crime. It can be seen that the aggregate crime rate is closely related to body crime rate (r=0.77). But the relations between all other types of crime recorded less than a correlation coefficient of 0.05. The lowest relationship is with that of political crimes. The correlation between body crime rates and property crime rates is negligible, implying that there is no evidence of co-occurrence of these two types of crimes in the same region. Even the correlation between overall body crime rates and women body crime rates show only mediocre correlation (0.55), implying regionally varying incidence of women body crime and other body crime. Even in case of property crime the relation between economic property crime and other property crime is not very strong. What this means is that the aggregate crime rates displayed at the national or regional level hides varied distributional patterns of the components that contribute to the average. Hence, it is necessary to analyze crime rates at disaggregate levels.

Table 2 Correlation Matrix of the Rates of Various Types of Crime Rates

	Crime rate	Body crime rates	Women Body Crime rate	Property Crime Rates	Other Property Crime Rates	Economic Property Crime Rates	Political Crime Rates
Crime rate	1						
Body crime rates	0.773	1					
Women Body Crime rate	0.4848	0.5533	1				
Property Crime Rates	0.4959	0.0834	0.3318	1			
Other Property Crime Rates	0.4735	0.0598	0.2886	0.9838	1		
Economic Property Crime Rates	0.3948	0.1478	0.3801	0.6775	0.5345	1	
Political Crime Rates	0.2926	0.2565	-0.0213	-0.1703	-0.1714	-0.0993	1

Source: Government of India, Crime in India, National Crime Records Bureau

Table 3 represents the distribution of the incidence of various types of crime. The single largest component consists of “other IPC crimes” accounting for nearly 43 percent of all incidences of crimes. This is followed by total body crime which accounts for 28 percent of all crimes and property crime which accounts for nearly 21 percent of all crime. However, there are vast variations across regions with regard to the distribution of crime. For instance, in Tripura 45 percent of all incidence of crime were body crimes. Out of the 35 States/UTs 21 of them had a share of more than 25 percent of incidence of crime

which came from body crime. Women body crime is high in some of the eastern and north east regions such as West Bengal, Tripura, Assam and Orissa.

Table 3 Distribution of various types of crime across Region

	total body crime	total women body crime	total property crime	other property crime	economic property crime	political crime	other IPC crime	death by negligence
Andaman and Nicobar Island	22.4	5.3	25.6	22.6	3.0	2.9	48.8	0.3
Andhra Pradesh	42.8	11.6	22.8	17.1	5.7	2.2	25.5	6.7
Arunachal Pradesh	32.7	7.4	35.8	32.5	3.3	1.7	27.8	1.9
Assam	33.1	14.5	25.7	22.1	3.6	8.3	27.0	5.8
Bihar	26.3	5.8	19.4	15.9	3.5	9.1	42.2	3.0
Chandigarh	11.6	6.8	50.3	42.1	8.3	2.5	35.2	0.4
Chhattisgarh	26.0	8.9	20.7	19.2	1.5	2.7	46.3	4.2
Dadra and Nagar Haveli	17.5	5.5	30.4	22.5	7.9	5.5	44.5	2.1
Daman and Diu	15.8	3.3	37.7	31.2	6.5	12.1	25.9	8.5
Delhi	15.5	8.0	32.7	26.7	5.9	0.3	50.5	1.0
Goa	15.2	3.7	36.3	30.6	5.7	3.9	34.8	9.8
Gujarat	19.4	6.3	19.8	16.8	3.0	2.4	54.6	3.8
Haryana	26.3	10.8	24.0	19.5	4.5	2.6	44.3	2.8
Himachal Pradesh	19.5	6.8	13.1	11.0	2.2	5.8	57.6	4.0
Jammu and Kashmir	21.6	10.9	17.5	14.7	2.7	7.6	51.7	1.7
Jharkhand	25.1	7.3	25.0	22.0	3.0	8.0	39.4	2.6
Karnataka	26.1	4.2	18.7	15.4	3.2	5.9	49.1	0.3
Kerala	25.9	6.3	12.2	8.5	3.7	7.5	54.4	0.0
Lakshadweep	13.1	3.7	24.2	23.8	0.4	22.5	40.2	0.0
Madhya Pradesh	28.4	7.9	16.5	15.5	1.0	2.0	50.7	2.4
Maharashtra	27.8	7.6	34.2	29.8	4.4	4.8	27.1	6.0
Manipur	36.5	5.8	16.5	11.3	5.2	5.6	41.0	0.4
Meghalaya	27.5	7.0	43.0	37.9	5.1	2.5	24.4	2.6
Mizoram	13.0	5.8	59.6	55.3	4.3	1.3	25.1	0.9
Nagaland	24.9	3.0	45.2	40.4	4.8	1.4	25.1	3.4
Orissa	27.3	10.7	21.3	18.6	2.7	4.3	41.4	5.7
Puducherry	25.6	2.7	9.7	8.6	1.1	4.1	55.9	4.7
Punjab	30.8	7.9	27.9	16.0	11.9	0.2	32.5	8.6
Rajasthan	28.3	8.9	19.6	12.6	7.0	3.4	44.6	4.1
Sikkim	25.8	7.5	34.9	28.2	6.7	4.5	29.9	4.9
Tamil Nadu	21.5	3.6	12.5	10.9	1.7	2.5	57.2	6.3
Tripura	44.9	22.2	18.1	15.8	2.3	5.8	27.5	3.6
Uttar Pradesh	32.3	12.9	23.5	16.9	6.7	3.6	35.0	5.6
Uttarakhand	29.7	11.9	29.7	22.2	7.5	5.9	28.6	6.1
West Bengal	28.7	17.1	22.9	19.3	3.6	4.7	39.4	4.3
Total	27.8	8.4	21.3	17.3	4.0	4.1	42.8	4.1

Source: Government of India, Crime in India, National Crime Records Bureau

5. The labour market in India

The Indian labour market had been traditionally marred by problems of low wages, underemployment and poor quality of employment. However, since the liberalization and opening up of the Indian economy in 1990s even these poor figures had become worse off. Even when the open unemployment rates are very low at approximately 2 to 3 percent on the average and are comparable to that of developed economies, the current weekly status of employment shows that unemployment rates for rural males had been increasing since 1993-94 and had increased from 3.1 percent to 3.9 percent during the period 1993-94 to 2004-05 (Table 4). At the same time, the indicator for underemployment, namely unemployment measured using the current daily status shows that underemployment is increasing and the rate increased from 5.6 percent to 8 percent during the same period, the highest rate of underemployment recorded since 1983 for rural males. For rural females the unemployment rate as per US increased from 1.3 percent in 1993-94 to 3.1 percent in 2004-05, while CWS, measure of unemployment increased from 2.9 percent to 4.2 and CDS unemployment increased from 5.6 to 8.7 percent. For urban males there was a decline in unemployment rates for US and CWS measure, but there was a continued rise in CDS unemployment rated from 6.7 to 7.5 percent, while for urban females the open unemployment rate3s increased from 8.3 to 6.1, while CWS unemployment rates increased from 7.9 to 9 and CDS rates increased from 10.4 to 11.6 percent. Thus the unemployment rates in general seem to be rising in the post liberalization era, along with a sharp rise in underemployment through out India.

Moreover, even among the fully employed workers, more than 90 percent are in the informal sector[5] working at poor employment conditions, low wages and adverse conditions of work, with nearly a third of the workers in casual work and a half of the workers having self employment.

[5] National Commission For Enterprises In The Unorganized Sector , 2008

Table 4 Unemployment Rates in India (per 1000)

rural		**Male**			**Female**		
		Usual status	Current weekly status	Current daily status	Usual status	Current weekly status	Current daily status
61st	(2004-05)	21	38	80	31	42	87
55th	(1999-00)	21	39	72	15	37	70
50th	(1993-94)	20	31	56	13	29	56
43rd	(1987-88)	28	42	46	35	44	67
38th	(1983)	21	37	75	14	43	90
32nd	(1977-78)	22	36	71	55	41	92
27th	(1972-73)	-	30	68	-	55	112
Urban							
61	(2004-05)	44	52	75	91	90	116
55	(1999-00)	48	56	73	71	73	94
50	(1993-94)	54	52	67	83	79	104
43	(1987-88)	61	66	88	85	92	120
38	(1983)	59	67	92	69	75	110
32	(1977-78)	65	71	94	178	109	145
27	(1972-73)	-	60	80	-	92	137

Source: 61st Employment –Unemployment Survey of NSS

Similarly, another labour market indicator, namely average wage growth to the workers slowed down during the years after year 2000, and wage inequality widened as well. The real wage rate among regular workers had increased from Rs. 20.67 in 1983 to Rs39.0 in 1999[6], but there was, for the first time in the quarter of a century, a decline in the real wage rates by more that one rupee to Rs. 37.8 in 2004 (See Tables 5 and 6). Among the casual workers the real wage rates increased from Rs.7.2 to Rs.13.4 during the period 1983 to 2004-05. However, whether it is casual or regular employment, between every round of NSS there has been a secular deceleration in growth of wage rates. For the regular workers the growth rates declined from 4.1 percent per annum during the period 1983 to 1993, to 3.9 percent during 1993 to 1999, and by 2004 the rate turned out to be negative at –0.62 percent. For the casual workers the rates had declined from 3.3 % to 3.1% to 1.9% during the same periods.

The deceleration in growth rate of wages is pervasive across location and gender, especially so in the period 1999 to 2004. Among urban males and females, in both regular and casual employment the real wage level itself had declined during 1999 to

[6] Throughout the text, 1983,1993, 1999 and 2004 pertains to periods 1983, 1993-94, 1999-2000 and 2004-05 respectively.

2004. The decline in growth rate is pervasive across both rural and urban, male and female, regular and casual employment.

Table 5 Real Wage Rate Levels and Growth Rates-Regular Employees (at 1983 prices)

	Regular						
	Rural			Urban			Total
	male	female	Persons	male	female	Persons	
	Real Daily Wage Rate						
1983	15.33	10.44	14.63	24.45	17.02	23.48	20.67
1993	28.33	18.9	26.94	33.45	27.2	32.46	30.92
1999	36.98	24.88	34.99	41.77	35.1	40.67	39.05
2004	41.72	25.7	38.73	39.69	28.37	37.27	37.84
	Compound Annual Growth Rate						
1983-1993	6.33	6.11	6.30	3.18	4.80	3.29	4.11
1993-1999	4.54	4.69	4.45	3.77	4.34	3.83	3.97
1999-2004	2.44	0.65	2.05	-1.02	-4.17	-1.73	-0.63
1993-2004	3.58	2.83	3.36	1.57	0.38	1.26	1.85

Source: Abraham (2007).

Table 6 Real Wage Rate Levels and Growth Rates- Casual Workers (at 1983 prices)

	Casual						
	Rural			Urban			Total
	male	female	Persons	male	female	Persons	
	Real Daily Wage Rate						
1983	7.79	4.89	6.77	11.1	5.62	9.51	7.28
1993	10.69	7.31	9.56	13.62	7.78	12.01	10.09
1999	13.02	8.39	11.51	16.01	9.27	14.54	12.17
2004	15.23	9.04	13.23	15.59	8.98	14.05	13.42
	Compound Annual Growth Rate						
1983-1993	3.22	4.10	3.51	2.07	3.31	2.36	3.32
1993-1999	3.34	2.32	3.14	2.73	2.96	3.24	3.17
1999-2004	3.19	1.50	2.82	-0.53	-0.63	-0.68	1.97
1993-2004	3.27	1.95	3.00	1.24	1.31	1.44	2.63

Source: Abraham (2007).

Not only was the wage growth slower during the period after liberalization, but also the level of wage inequality seem to have widened during this period. To analyze wage inequality the workers are classified into decile groups based on their wage rates (Table 7). Between 1983 and 1993 the variations between extreme deciles had declined from approximately 33 times to nearly 22 times, but then increased to 26 times in 1999. Thus between 1983 and 1993 the range of the wage rates had reduced, but since 1993 the

range had been widening, and by 2004 the range had reached to 1983 levels. A comparison of the values across time period brings out one important observation: below the 5th decile the distance between the first and the other deciles are reducing over the years. But if we take the points above the 5th decile, interestingly there is a clear rise in the ratio over time. It can be argued that at the lower spectrum (below the 5th decile) the wage inequality is declining, while at the upper spectrum (above 5th decile) the wage inequality is widening among the regular workers.

The wage inequality among casual workers is considerably lower than the regular workers. There is no widening of wage inequality in the case of casual workers. Intertemporal comparison of the calculated ratios shows that between 1983 and 1993 there was some reduction in wage inequality across all deciles, and after that there has been remarkable stability in wage inequality till 2004.

Table 7 Inter-Decile Variations in Wage Rate-Regular Employees

	Regular				Casual Workers			
Decile ratio	1983	1993	1999	2004	1983	1993	1999	2004
1st/ 1st	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2nd/1st	1.6	1.5	1.5	1.4	1.3	1.2	1.3	1.2
3rd/1st	2.0	2.1	1.9	1.9	1.7	1.5	1.5	1.5
4th /1st	2.9	2.8	2.6	2.5	1.7	1.7	1.7	1.7
5th/1st	3.6	3.6	3.6	3.2	2.0	1.9	2.0	1.9
6th/1st	4.2	4.4	4.6	4.7	2.3	2.1	2.2	2.2
7th/1st	5.0	5.3	5.8	6.5	2.7	2.5	2.5	2.5
8th/1st	6.0	6.5	7.2	8.6	3.3	2.9	2.9	2.9
9th/1st	8.0	8.5	9.5	11.5	4.0	3.7	3.7	3.7
10th/1st	33.2	21.6	25.9	33.0	50.5	20.8	40.0	24.8
9th /5th	2.2	2.4	2.7	3.6	2.0	1.9	1.9	1.9

Source: Abraham (2007).

Thus since the liberalization of the Indian economy, India had been undergoing a period of increasing underemployment with no perceptible decline in open unemployment in large segments of the population. At the same time wage growth had stagnated and wage inequality seemed to be widening. Moreover, there has been an increasing trend of informalisation of the labour market, not only in the informal labour market but even in some segments of the formal labour markets (NCEUS, 2009). These changes in the

labour market point towards the weakening of the labour market in general such that the probability for legitimate earnings as well as the level of legitimate earnings is shrinking, which makes the benefits of illegitimate earnings higher while reducing the costs of illegitimate earnings. This in effect may induce many to turn to crime, though not all. Now we turn to testing this argument in a formal model.

6, Hypothesis, Model and Variable Construction

The following hypotheses are built to test in a formal model that explores the determinants of crime rate in India.

Unemployment: The effect of unemployment on crime has been studied by many. However, the results have been ambiguous, with some studies reporting positive effect of unemployment on crime, while others state no effect. The survey by Chiricos (1987) showed that relationship between crime and the unemployment rate was ambiguous. Moreover, the empirical evidence on unemployment shows that not all types of crime are affected by unemployment. Study by Hale and Sabbagh (1991) showed that while some types of crime such as theft, burglary, and robbery had positive relationships with unemployment rates, other types of crime did not show any particular evidence. Witt, Clarke and Fielding (1999) also found a positive relationship between crime and the male unemployment rate. Recent studies by Edmark (2005) on Swedish counties for the period 1988-1999 and Lee and Holoviak (2006) in three Asian-Pacific countries found positive relation between unemployment and crime.

In the Indian and other developing countries case, the both open unemployment and underemployment are looming problems. The effect of unemployment on crime could manifest in two ways, one the psycho-social effect of unemployment leading to deviant behaviour. Here the individual may seek gratification to his sense of 'lack of achievement' through violent criminal activities. Though the gains may not be monetary, ultimately the offender gains non-pecuniary utility through this act. The other behavioural effect may manifest crime as a substitute for legitimate work. The individual, when faced with dwindling legal earnings or employment opportunities would turn to crime, especially crime on property as a means to livelihood. We expect that unemployment, be it open unemployment or underemployment, will have a positive effect on crime rate.

Open unemployment in the Indian case is represented by the measure of open unemployment by name UPS(*Usual Principal Status) Unemployment Rate*. Underemployment rate is measured through the other measure of employment *CDS (Current Daily Status) Unemployment Rates.* Though both these variables are expected to have a positive effect on crime, they may represent different types of effects. UPS unemployment rates, we expect, would instigate both violent crimes and property crimes. Violent crime may be largely due to the need for non-pecuniary gratification, while property crime may be for pecuniary gratification. CDS unemployment rate, on the other hand may be much stronger for property crime, and its effect on body crime may be marginal. We expect this so, because, CDS unemployment may not lead to feeling of alienation as physically the individual is apparently employed. However since, the earnings potential is very low the individual may turn to property related crime for supplementing or substituting his own legitimate income. Cruchfield (1989) and Krivo and Peterson (1996) used such measures of unemployment, namely joblessness and part time employment to capture the effect of unemployment on crime in US and argued that these different definitions of unemployment produced different results on crime behaviour. Wadsworth (2004) similarly came to conclusion that while joblessness encouraged crime, part time employment discouraged criminal behaviour.

Both the measures UPS unemployment rates and CDS unemployment rates are taken from the National Sample Survey Organisation's employment –unemployment surveys. These surveys are of twp types; One that consists of large samples and the other thin samples. The large sample surveys are done once in five years, and the thin sample surveys in regular intervals of one or two years. We have used both the large sample and small sample estimates to construct a panel series of unemployment rates of both CDS and UPS types for the period 2001-2008 at the state level. For most years we get the estimates published by the NSSO. But for some years, we have interpolated the data to arrive at estimates of unemployment rates.

Wage inequality: Similar to unemployment we expect that crime rates may increase as the degree of inequality in the society increases. The link between crime and inequality is

routed through deprivation. Income inequality may lead to higher levels of crime due to the sense of relative deprivation among the poor. Fajnzylber, Lederman, and Loayza (2001) find that income inequality, measured by the Gini index, is an important factor driving violent crime rates across countries and over time.

Ideally an index of income inequality, such as the gini coefficient should have been used as the indicator for income inequality. However, since India does not produce data that can be used to generate gini index annually across states, this indicator cannot be used. A good proxy for income inequality would be wage inequality (Blank and Card, 1993). Study of crime based on wage inequality shows that rise in wage inequality could cause a rise in crime rate of the violent type but no significant effect was detected in case of property crime. (Fowles and Merva, 1996). Theoretically it can be argued that the rise in wage inequality could increase the relative deprivation among some groups of the population who in turn could resort to crime as an illegal source of income or as avenue for non-pecuniary benefits such as self satisfaction.

Wage inequality is measured as the wage ratio between 'regular' male workers in the urban areas and 'casual' male workers in the rural areas. This ratio represents the wage inequality between the richest workers in the society and the poorest workers in the society. The data is from the National Sample Survey Organization's employment – unemployment surveys using both large sample and thin sample surveys. Wherever data was not available we have interpolated using compound growth rates.

***Urbanization*:** We also expect a positive and significant effect of urbanization on crime rate. Urbanization, which is a representation of modernization and industrialization, has been found to have positive and significant effect on crime in many parts of the world. Urbanization is measured as urbanization rate, which is the ratio of population in the urban areas to the total population of the region

Education: *Education* is expected to have a negative effect on crime. Education provides people with greater opportunities for legitimate earnings and it also increases the non-pecuniary costs of crime. Education is measured as the share of population that has had education of above school level.

Police presence and judicial efficiency: The presence of police and the efficiency of the judiciary are expected to act as deterrents to crime. Efficient police and judiciary affects criminal behaviour through two effects. On the one hand they increase the expected cost of committing crime through deterrence and hence discourage potential crime. On the other hand, through incapacitation the system takes criminals from their fields of action. However one of the main problems associated with police presence is the issue of simultaneity. A literature survey by Cameron (1988) showed that most studies on deterrence found no effect or a positive effect of police presence on crime. This, he attributes to the issue of simultaneity bias, as it is possible that increased police presence is due to the increase in crime. However, studies done by Levitt (2004) and Di Tella and Schargrodsky (2004), after correcting for simultaneity bias using instrumental variables found that different types of crime rates fell with the increased presence of police. The presence of police is measured as police density per lakh population and the judicial efficiency is measured as the number of cases pending for less than a year in the court as a share of all cases that has been pending and cases with trials completed.

The Econometric model

Buananno (2005) puts forward the case of using panel data to understand the effect of labour market opportunities on crime. It is argued that given the fact that time series[7] or cross-sectional data introduces omitted variable bias, and the individual data is very hard to get, regional panel data provides a very plausible second best to study the relation between crime and labour market opportunities.

The following model is estimated to understand the determinants of crime rate in India,

$$Crimerate_{it} = \alpha + \beta_1 unemploymentrate_{it} + \beta_2 wageinequalty_{it} + \beta_3 Urbanizationrate_{it} + \beta_4 Highereducationrate_{it} + \beta_5 Policeintensity_{it} + \beta_6 Judicial\ pendancy_{it} + \mu_i + u_{it} - (1)$$

[7] See Lee and Holoviak (2006) for a time series analysis of the issue of crime and labour market

Where i&t are the Indian states and time period from 2001 to 2008 repectively. Crime rate and all other variables are as defined in the text above. We do panel data estimations across Indian states and union territories for the period 2001-2008.

7. Empirical Results

All results discussed below are the fixed effects models based on panel data estimation methods. Random effects and OLS regressions were also estimated. However, the results of the Langragian multiplier test and the Hausman specification test suggested fixed effects model to be the favoured model compared to the other two. First I analyze the aggregate crime rate in Table 8. In the subsequent tables, the results of the various types of crime, under the three broad headings, crime on body, crime on property and political crime are discussed.

Panel 1 in Table 8 provides the results of the complete model. Overall the model is significant at one percent level. As expected, open unemployment, expressed as usual principal status unemployment rate is significant, though only at ten percent level. The results suggest that a rise in the open unemployment rate would lead to a rise in the aggregate crime rate. Now, compare this with the results in panel 2 of Table 8 , where I use an alternative measure for unemployment rate, which is the Current daily status of unemployment rate in the economy, keeping all other variables the same. Here we find that the current daily status of unemployment rate does not have any significant on the crime rate in the economy. It can also be seen that the R squared values declined from 0.114 to 0.09 between the two estimates, while the value for the constant increased from 1.069 to 1.269. All these points to the fact that unemployment rate measured as current daily status does not account for crime rate in India, while unemployment rate measured as open unemployment seem to explain away crime rate in a significant manner. The results seem to be similar to the results obtained by studies such that of Wadsworth (2004); Allen and Steffensmeier (1989). The study by Allen and Steffensmeier (1989) found that while joblessness led to violent crime, part time employment led to a reduction in crime, especially among the teenagers. They explained this phenomena as since teenagers faced the highest rates of joblessness, any form of employment, be it part time

or full time, would greatly reduce their need for illegitimate source of income. Wadsworth (2004) alos concluded that while joblessness positively affected crime rates, part time jobs reduced the crime rates in US.

Wage differential between the poorest working group and the richest working group, represented as wage difference between casual rural workers and regular urban workers, has a positive and significant effect on crime rate. This variable is significant in both the estimations. Widening wage inequality in the economy has been noticed in many works (Abraham, 2007; Ramaswamy, 2008) in the recent years. Widening wage inequality among workers, the dearth of legitimate opportunities to catch up with the richer segments of the working class also seem to add to the rise of crime in India.

Urbanization, an often quoted correlate of crime, does not seem to reflect in the Indian crime scenario in a significant way. Crime rate and urbanization rate does not seem to be significantly related. Education, especially higher education has a significant and negative effect on crime rate. As the higher education enrolment rates increase the rate of crime rate tends to decline in the country. The presence of police to deter crime incidence seem to be rather limited. The density of police personnel per lakh population does not seem to have any significant effect on crime rate. To take support from the Freeman (1996) it reflects the U.S. evidence of incarcerations being ineffective in deterring from crime. As more people get incarcerated, the stigma attached to incarceration declines; hence the role of police as a deterrent to crime becomes ineffective. The efficiency of the judicial system in the country seems to have a strong effect on crime rates. Judicial pendency rates, measured as the number of cases in court for less than a year as a share of total cases in courts, seems to show that as this rate increase the rate of crime declines. Thus the efficiency of judiciary has a deterrence effect on crime in India.

Table 8 Determinants of Crime Rate in India
Fixed effects panel data estimates 2001 to 2008

VARIABLES	(1) crime rate	(2) crime rate
Unemployment Rate (UPS)	0.00110*	
	(1.787)	
Unemployment Rate (CDS)		0.000423
		(1.124)
Wage differential (Ureg/Rcas)	0.0312*	0.0339*
	(1.682)	(1.788)
Urbanization rate	1.809	1.229
	(1.440)	(0.981)
Higher education rate	-0.00531**	-0.00440**
	(-2.572)	(-2.230)
Police per lakh population	0.000780	0.000722
	(1.636)	(1.482)
Judicial pendancy rate	-0.00298*	-0.00332*
	(-1.802)	(-1.854)
Constant	1.069**	1.269***
	(2.567)	(2.996)
Observations	188	186
R-squared	0.114	0.090
Number of States	32	32
F	3.215	2.432
prob>F	0.00534	0.0285

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

However, when we disaggregate crime into its various types and search for its determinants it can be found that the aggregate picture may be misleading. Table 9 , panel 1 shows the rate of crime on body. Here we find that open unemployment rate has a positive effect on crime on body. In other words, as the rate of open unemployment increases, the rate of crime on body also increases. It is intriguing that unemployment rate should have any effect on body crime. One would expect that unemployment would have an effect on property crime, if one were to believe in the Becker hypothesis. However, this effect of unemployment on body crime in India, is indicative of the psycho-social behavioural effects of being unemployed rather than making a rational economic choice of taking up crime as a substitute for legitimate earnings options. This is also backed by the way the next variable, namely that of wage differential also behaves. As the wage

differential seems to widen the rate of crime on body seem to increase. However, this is not true in case of property crime. Though the sign is the same, it is not significant, implying that the relation between property crime and wage differential may not be statistically valid. This poses the question then how does wage differential affect only crime on body and not on property? By again taking recourse to the behavioural models it can be argued that the relative deprivation acts as a catalyst to violent criminal activities as a form of psycho-social gratification.

Urbanisation rate has a negative effect on crime rate among all the three types of crimes. Higher the rate of urbanization rate, lower the rate of body crime. In other types of crimes also urbanization shows a negative rate, though it is not statistically significant. Higher education does have a negative effect on property crime, as expected. However, higher education does not seem to have any significant effect on body crime rate. The efficiency of the judiciary seems to be effective in acting as a deterrence factor against property crime, but it has no significant effect on body crime. Neither does the presence of police deter body crime. Other studies also point to the fact that deterrence variables are generally more effective towards property crime but with little effect on body crime (Entorf and Spengler, 1998). Strangely, police presence seems to be related to higher rates of property crime rates and political crime rates. This is possibly due to a simultaneity issue involved, wherein police presence is increased to meet security needs in crime ridden regions. To overcome this problem, we had tested the model with lags of upto five years and yet found that police presence in a state had a statistically significant and positive relation with property crime rate and political crime rate even five years later. Further explorations need to be done in this direction.

Table 9 Determinants of Body, Property and Political Crime Rate in India
Fixed effects panel data estimates 2001 to 2008

VARIABLES	(1) Body crime rate	(2) Property Crime rate	(3) Political Crime Rate
Unemployment Rate (UPS)	0.000470**	0.000457*	-4.73e-05
	(2.014)	(1.665)	(-0.556)
Wage differential	0.0158**	0.00761	0.00200
(Ureg/Rcas)	(2.231)	(0.917)	(0.777)
Urbanization rate	-0.966**	-0.144	-0.0457
	(-2.019)	(-0.256)	(-0.262)
Higher education rate	0.000485	-0.00441***	-0.000286
	(0.616)	(-4.771)	(-1.000)
Police per lakh population	0.000231	0.000422**	0.000147**
	(1.273)	(1.977)	(2.223)
Judicial pendancy rate	-0.000938	-0.00170**	-0.000322
	(-1.493)	(-2.301)	(-1.408)
Constant	0.669***	0.431**	0.0630
	(4.217)	(2.311)	(1.091)
Observations	188	188	188
R-squared	0.103	0.196	0.048
Number of states	32	32	32
F	2.864	6.095	1.269
prob>F	0.0114	9.80e-06	0.275

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Conclusion

Indian society has been witnessing a rapid rise in crime rate in the recent past. This had attracted the attention of sociologists and psychologists. Yet, even though economics of crime had been an active area of research at least since the mid 1960s internationally, this issue had remained largely outside the purview of main stream economics of Indian academics. This paper was an attempt to grab the attention of my peers to look into this issue as an economics one.

Analysis of available data tends to support the view that labour market is a very strong agent of crime in India. Crime in India seems to be largely influenced by the functioning of the labour market. However, it does not seem to follow the Beckerian model of

opportunity cost related to legal and illegal activities. Rather, crime seems to be the psycho-social manifestations of relative deprivations in a weak labour market marred by problems of unemployment and widening wage inequality. While efficiency of the judicial system does seem to control criminal activity, the role of police in controlling is doubtful and needs much more analysis.

Given the deleterious effects that weak labour market conditions can have on the society, it may be in the interest of the society at large , and the state in particular to take steps towards redressing these issues, rather than leaving the labour market to pure economic considerations. After all, human being is not only *homo economicus*, but also a social animal with a mind, who may try to gratify himself psychically, even when his loses or gains are in the economic world.

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