



2019

Crime, Unemployment and Society in India: Insights from Rape Data

Prashansa Srivastava Ms

Kamala Nehru College, University of Delhi, prashansa.srivastava98@gmail.com

Recommended Citation

Srivastava, Prashansa Ms (2018) "Crime, Unemployment and Society in India: Insights from Rape Data," *Undergraduate Economic Review*: Vol. 15 : Iss. 1 , Article 17.

Available at: <https://digitalcommons.iwu.edu/uer/vol15/iss1/17>

This Article is brought to you for free and open access by The Ames Library, the Andrew W. Mellon Center for Curricular and Faculty Development, the Office of the Provost and the Office of the President. It has been accepted for inclusion in Digital Commons @ IWU by the faculty at Illinois Wesleyan University. For more information, please contact digitalcommons@iwu.edu.

©Copyright is owned by the author of this document.

Crime, Unemployment and Society in India: Insights from Rape Data

Abstract

This paper empirically analyses the relationship between unemployment and rape, using data from 11 states of India. This is undertaken to test whether there is a positive or negative association between unemployment and crime, in particular rape, using the tools of econometrics. Three significant results emerge. First, there exists a negative association between rape and unemployment in India. Second, literacy rates have a positive coefficient with the reasonable interpretation being literacy increases reported rape not actual rape. Third, positive gender developments have a crucial bearing on violent crime against women. The paper is unique in studying rape in relation to unemployment in India and sheds light on the nature of the crime, reporting and impact of social developments on crimes against women

Keywords

crime, rape, unemployment, sex crimes

1. **Introduction**

Crime is a deterrent to social welfare and development. Freedom from violence is an often ignored issue in development studies. If development is concerned with improving the quality of life, the issue of violence should be a major interest of the discipline. It is essential to understand crime trends and factors that drive fluctuations in these trends to expand the study of crime and the influence of economic activity and development on crime trends. This understanding has both substantive and practical implications. Since crime trends are dynamic, gaining insight into mechanisms that drive the variance in crime patterns has significant policy and development implications. There are a number of factors that have been held responsible in explaining changes in crime trends, including economy-based determinants. Even though the relationship between crime and economic change has had a long history of investigative interest in criminological research, economic factors remain relatively underdeveloped when compared to areas that adhere more closely to criminological concepts. Presumably, criminologists are hesitant to incorporate economic concepts into criminological research due to the perceived complexities inherent to the study of economics. Nonetheless, the economy is a social structure of unequivocal importance, as economic changes can implicate shifts in the behavioural patterns of individuals and subsequently has a strong influence on crime trends. Moreover, using unemployment as an index of economic activity is important since unemployment can have severe psychological effects along with the commensurate loss of income that can have an impact on crime rates.

There is abundant literature available on the quantitative relationship that exists between crime and economic activity. Theoretical studies have predicted both

positive and negative associations of crime with economic activity, usually indexed by the aggregate unemployment rate taking into account different crimes across different countries.

The positive and negative association between unemployment rates and crime trends can be understood by the Cantor and Land (1985) model. This model of unemployment and crime separated the impact of an economic downturn (measured by the unemployment rate) into two counteracting effects: the lagged motivational effect and the contemporaneous opportunity effect. The model synthesized two distinct and counterbalancing structural effects of unemployment rates on crime rates: the motivation effect and the opportunity effect. Such a model effectively conjoins criminal motivation theories that relate unemployment to the prevalence of motivated offenders in the population with criminal opportunity theories that relate unemployment to the victim proneness of potential crime targets. The hypothesized relationship between unemployment and crime is not direct but instead mediated through two distinct and counteracting structures: an increase in unemployment has a lagged positive effect on crime through increased motivation and a contemporaneous negative effect on crime because of increased guardianship and reduced opportunity. The theoretical assumption behind the model rests on the notion that to accurately assess the unemployment-crime relationship, the impact of criminal motivation and criminal opportunity need be considered in a common framework.

Cantor and Land developed a structural approach that synthesized the counteracting effects of motivation and opportunity into a single working model. When opportunity dominates motivation, there is a negative association between rape

and unemployment which was the result found by Cantor and Land. In particular, a reduction of crime will be associated with increasing unemployment. This negative association will now be termed as the ‘opportunity perspective.’ The opportunity perspective states that since unemployed individuals are less involved in social activities, their probability of being either victims or perpetrators of violent crime is lower. The aggregate economic conditions can affect the frequency with which individuals are around the home as opposed to at work, in a public place or in transit between home and work. A deteriorating economy means fewer jobs, fewer hours worked, and less time spent in job-related and leisure travel, which in turn decreases suitable targets and increases guardianship, influencing the availability and vulnerability of criminal targets and thus the number of criminal opportunities. The opportunity perspective interprets the level of unemployment as an indication of social inactivity. Since most personal violence victimizations occur outside the home, by spending a greater proportion of time in or near their homes, unemployed persons expose a lower threat of violent behaviour and are less likely to be potential offenders. Other theoretical studies also support this negative association between violent crime and unemployment taking into account the minimized social interactions due to unemployment which reduces criminal opportunity.

The positive association is predicted taking into account the high economic stress, increased income disparities and increase in affinity to social vices associated with increased unemployment that can increase criminal motivation. There is a large body of empirical literature that confirms that unemployment and property crime are positively associated. A case for positive association between rape and unemployment

could be predicted by taking into account the fact that rape is often perpetrated by people known to the survivor, with sex offenders being friends, relatives or acquaintances. This means that criminal opportunity would arise even in the absence of social inactivity. The positive association between crime and unemployment can also be understood from the criminal motivational argument. The motivational perspective is the intuitive theory that economists expect to exist in the relationship between unemployment and crime. The criminal motivation argument predicts a positive relationship between crime and poor economic conditions, although there may be two different sources that may drive individuals to commit crime. One source of criminal motivation may result from the psychological effects of unemployment. The inability to obtain or maintain employment while wanting to maintain an adequate level of standard of living may result in frustration. Thus, with deteriorating economic conditions over time, the proportion of the population feeling frustrated and stressed will increase. The overall effect of an increased level of frustration and emotional stress in the population would result in an increased rate of crime. A second source of motivation may be the outcome of a rational individual choice process. That is weighing the costs and benefits of criminal behaviour against legitimate behaviour. This means that when an individual is unemployed the opportunity cost of committing a crime is low. According to this reasoning, crime would be more likely for unemployed persons, since the perceived total cost of crime is low relative to the total gains from crime. Since a high unemployment rate suggests that there are fewer employment opportunities available the opportunity cost of choosing crime over legitimate work is low, making motivation to commit crimes higher leading to an increase in crimes. The penalty on being caught such as imprisonment would not involve the loss of income from employment or loss of employment in general. In

either case, poor economic conditions would be responsible for higher rates of crime since they would lead to an increase in the proportion of the population prone to commit crimes.

There are different kinds of violent crime. This paper in particular analyses the relationship between rape and unemployment to test whether the 'opportunity perspective' dominates for rape. The definition of the crime of rape, according to Section 37 of the Indian Penal Code, is as follows. A man is said to commit rape when sexual intercourse takes place against the consent of the woman or without her consent or when consent is taken under threat or taken when the woman is unable to give consent or with or without her consent when she is under eighteen years of age. The full definition can be found under Appendix A.

In what follows, I present an econometric analysis on the relationship between rape and unemployment, by taking a sample of 11 states in India, namely-Madhya Pradesh, Maharashtra, Uttar Pradesh, Rajasthan, Delhi, Odisha, Assam, Karnataka, Chattisgarh, Haryana and West Bengal. These states are the top 11 contributors to rape and contribute to almost 80% of the total reported rapes in India. The dependent variable is the rape rate per 1,00,000 women. An OLS estimator is applied and multiple regression undertaken in order to understand this relationship. To further understand gender specific relationships, male and female unemployment rates are taken separately and regressed with respect to the dependent variables. Further independent variables taken are population density and literacy rate. Women Empowerment Index is taken to measure the effect of gender inequality and rape. Economic indicators of rate of GDP growth and Gross Fixed Capital Formation

(GFCF) are also included in the multiple linear regression model to capture the effects of future economic opportunities. Thus, multiple regression analysis is performed to test the following hypothesis:

H_0 : Rape is positively associated with unemployment.

H_1 : Rape is negatively associated with unemployment.

2. Literature Review

The empirical relationship between crime and unemployment has been studied in different countries over different time periods, often with varying conclusions.

Becker's (1968) seminal paper developed a theoretical model of crime behaviour to specifically address the role of deteriorating labour markets. He argued that an individual will engage in criminal activities as long as the expected utility of committing crime is greater than the expected utility of engaging in other activities; hence, deteriorations in labour market opportunities make crime relatively more attractive.

Early analysis of the relationship between crime and economic activity includes that of Cook and Zarkin (1985). The authors study economic activity indexed by real GDP with crime. They find that an expansion of economic activity (via a rise in real GDP) leads to a negative impact on property crimes. Wang and Minor (2002) look at the impact of physical access to jobs in the labour market on crime rates. They postulate that neighbourhoods with low job access also tend to be neighbourhoods with high rates of poverty, isolation and lacking other stabilizing factors. This could

further have impact not only on economic crimes but also violent crimes. They find that improvements in job accessibility occurring at times of economic expansions lower crime rates, however the relationship is stronger for economics crimes in particular property crimes than for crimes of violence.

Greenberg (1985) applied the criminal motivational perspective to the age distribution of crime in an attempt to explain why youth have the highest rates of crime. He hypothesized that employment has become increasingly important to youth, due to a variety of media influences that have increased the perceived needs of youth, at the same time that access to the adult labour market has been restricted. To obtain material possessions and to engage in leisure activities, youth are dependent on funds provided by their parents and/or own employment. In the absence of parental financial support, youth need to obtain some kind of employment. The problem for youth occurs when they discover that access to jobs in the adult labour market is restricted, thereby preventing them from successfully gaining independent economic support to satisfy their perceived needs. The conflicting trends of increased perceived needs and decreased access to the adult labour market are then expected to increase the level of motivation to crime among youth.

There can be different conclusions when looking at different crimes. Differing results are obtained in particular for violent crimes and property crimes. Violent crimes generally include: homicide, murder, assault, manslaughter, sexual assault, rape, robbery, negligence, endangerment, kidnapping (abduction), extortion, and harassment. Property crime is a crime to obtain money, property, or some other benefit and includes, among other crimes, burglary, larceny, theft, motor vehicle theft, arson, shoplifting, and vandalism. The definitions of these crimes may vary country to

country. Glaeser et al (1996) present a model to understand social interactions and different forms of crime which supports the opportunity perspective for violent crime with violent crime decreasing with decrease in social interactions. Britt (1997) in his model studied the crimes of homicide, rape, aggravated assault, robbery, burglary, larceny, and motor vehicle theft. The author discovered the opportunity effect to be significant for each of the crimes at the national level with the exception of motor vehicle theft, which had a negative sign but was not statistically significant. The negative relationship between unemployment and crime due to minimized social interactions is further supported by Levitt (2001).

In their seminal work Cantor and Land (1985) developed a theoretical framework to explain the link between unemployment and crime. They suggested two important links: opportunity and motivation. The motivation hypothesis, similar to the Becker (1968) analysis, suggested that a decrease in viable economic prospects will increase the incentive to engage in crime; so the unemployed are more likely to engage in criminal activities; this suggests a positive relationship between crime and unemployment. The opportunity hypothesis (also referred to as the guardianship hypothesis) on the other hand suggested that a decrease in economic activity will decrease the availability of criminal targets (the unemployed are also more likely to stay at home thus decreasing their vulnerability to crime, especially property crime), and hence reduce the incentive to engage in crime; this suggests a negative relationship between crime and unemployment. The two effects are expected to work differently based on the type of crime; with the motivation hypothesis being more important for property crime and opportunity hypothesis being relevant for both property and violent crimes (though the effect is still expected to be stronger for the property crimes).

Using US data, Cantor and Land (1985) find evidence for both crime opportunity and crime motivation, especially when considering crimes with a property component (such as robbery, burglary and larceny). Findings of Cantor and Land are confirmed by Phillips and Land (2012), using relatively more recent and larger dataset for the US. Raphael and Winter-Ebmer (2001) and Gould et al. (2002), again using US data, report a statistically significant positive relationship between unemployment and property crimes, but not one between unemployment and crimes of violence. In their model of unemployment and crime, Cantor and Land (1985) posited that by altering the conditions of social strain and social control, economic change measured by the national unemployment rate (a conventional indicator of macroeconomic activity) would positively impact criminal motivation (Phillips & Land, 2012; Andresen, 2014). Secondly, economic changes influence the availability of vulnerable targets and, hence, the number of available criminal targets (Phillips & Land, 2012, p. 682). It is important to note that the unemployment-crime relationship set forth by Cantor and Land (1985) is not direct in the sense that unemployment directly impacts crime.

While a large body of evidence comes from the US, there is an expanse of literature available from different countries. Reilly and Witt (1996), Witt et al. (1999) and Wu and Wu (2012) look at the relationship between crime and unemployment for England and Wales; Papps and Winkelmann (2000) for New Zealand; Edmark (2005) and Oster and Agell (2007) for Sweden; Buonanno (1996) for Italy; and Altindag (2012) does a cross country analysis using a country-level panel data from European countries. Andresen (2013) used data from Canadian provinces to look at the relationship between the state of the economy and crime; where the state of the economy is captured by: GDP, unemployment and low income. In all the studies

mentioned, a positive association was found mostly when property crimes were considered. However, recent studies have found a negative association. Saridakis and Spengler (2012) examine the link among crime, deterrence and unemployment in Greece over the period 1991–1998, and find a strong negative coefficient, concluding that rising unemployment increases property crimes but not violent crimes, including rape. Yet, when testing for gender-specific measures of unemployment, the coefficient for female unemployment is negative. These results confirm the opportunity perspective. Caruso (2015) empirically analyses the relationship between unemployment and rape in a panel of European regions and finds a strong positive association between rape and unemployment, discrediting the opportunity perspective argument.

The key findings suggest a complex relationship between the state of the economy and crime differing from crime to crime and country to country. The empirical relationship between rape and unemployment seems to be inconclusive with findings varying significantly, and thus the result of any particular set of international studies cannot be assumed to generally apply in all cases. Therefore, this study will examine the relationship for India.

3. Data and Methodology

The data used in this analysis was obtained from a variety of government sources as listed in the table below and data for all variables is state wise data. Here, it is essential to highlight an important caveat before proceeding further. Survey evidence suggests that crimes such as domestic violence, sexual assault, sexual harassment, and stalking are typically under-reported crimes. Thus data quality suffers making the available data incomplete, adversely impacting the quantitative study. The

data on the rape cases may be a more accurate indicator of reported rape rates instead of the prevalence of the crime. Moreover, marital rape is not considered a criminal offence in India. Aashish Gupta from the Research Institute for Compassionate Economics (RICE) used 2005 unit-level data of the crime victimisation survey of the National Family Health Survey (NFHS) that included marital rape and recorded actual experiences of crime victims to compare it to the data provided by the National Crime Records Bureau (NCRB) that recorded official crimes recorded by the police. This comparison revealed a gap between the incidence of violence against women and reporting of violence against women. Reporting of violent crimes against women is low due to a number of factors. These obstacles include inaccessibility or hostility of the police and the criminal justice system, social sanction or the threat of retribution, harassment by insensitive law enforcement agencies, lack of resources to report crimes and pursue cases, poverty, and excessive control in the hands of armed and paramilitary forces in conflict-affected areas where rapes perpetrated by armed officers tend to be higher. Patriarchy, as well as notions of shame and “honour” associated with women’s sexuality, combines to make the pursuit of justice even more difficult in incidents of violence against women. Under reporting levels increase when looking at women belonging to marginalised communities such as Muslims, Dalits, Adivasis, or residents of certain areas. Marginalised groups face overwhelming obstacles in obtaining justice. Though there is cause to believe that reporting levels have improved over the years due to increased awareness, the data inconsistency must be highlighted before proceeding further.

In order to make the model more comprehensive and compensate for data inconsistencies a number of economic and population indicators have been included.

This helps us to better understand the extent of future and present economic opportunities and demographic characteristics. The rationale for including each variable in the model is given below the table.

Table 1 Variables and Data Sources Used in Regression Model

<i>Variable</i>	<i>Classification</i>	<i>Abbreviation</i>	<i>Year</i>	<i>Source</i>
Rape per 1,00,000 women	Dependent	<i>raperate</i>	2016	National Crime Records Bureau
Unemployment Rate	Independent	<i>unplymntrate</i>	2011	Population Census Abstract
Population Density	Independent	<i>popden</i>	2011	Population Census Abstract
Literacy Rate	Independent	<i>litrte</i>	2016	Population Census Abstract
SGDP Growth Rate	Independent	<i>gdp</i>	2016	Niti Aayog
GFCF	Independent	<i>gfcf</i>	2016	Reserve Bank of India
Women Empowerment Index	Independent	<i>wei</i>	2016	National Family Health Survey

Population density is defined as the number of persons per square kilometer.

Population density is included to test the opportunity perspective. A denser population means a higher likelihood of encounters between individuals.

Literacy rate is taken to measure education. The working definition of literacy since the 1991 Census is the total percentage of the population of an area at a

particular time aged seven years or above who can read and write with understanding. Education is a strong predictor for committing crime. Lochner (2004) argues that higher levels of education increase the probability of higher earnings, consequently raising the opportunity costs of crime. Therefore, more intelligent and more educated adults should commit fewer street (unskilled) crimes. Dutta and Hussain (2009) say that education may have a 'civilisational effect' by improving moral stance, thereby leading to a reduction in unlawful activities. However, considering the nature of rape as a highly under reported crime, education may increase crime reporting, since more educated individuals may be more likely to report crime since they are more capable of computing both the personal and social advantages of reporting than less educated people so determining a positive sign for the coefficient.

Economic indicators of state wise GDP and GFCF have been included in the model to capture past and future economic opportunities. In general, better economic opportunities are expected to be negatively associated with emergence of crime. Several authors, such as Krohn (1978), argue that violent crimes tend to decrease with increasing economic development.

The Women Empowerment Index (WEI) is calculated for every state using data from the National Family Health Survey (NFHS-4) 2015-16. The index uses data from the Health and Family Welfare Ministry under the category 'Women's Empowerment and Gender-Based Violence'. These indicators measure empowerment- measured by participation of women in household decisions, ownership of land, owning and using cell phones and bank account and safety and health- measured by instances of spousal violence, violence during pregnancy and hygiene during

menstruation. A higher value means a better rank. For instance, more women having bank accounts is a positive indicator, so data remains as it is. But higher proportion of women reporting to have experienced spousal is worse; hence inverse of this parameter is taken. Lower the rank of a state worse is the inequality. Feminists have long pondered the insidious connection between structural gender inequality and rape. Russell (1975) implicated unequal positions in society and the male monopoly on power as causes of rape when she asserted, "Eradicating rape requires getting rid of the power discrepancy between men and women, because abuse of power flows from unequal power." Similarly, Ellis and Beattie summarized their interpretation of the feminist hypothesis with the following statement: "Deep-rooted social traditions of overwhelming male domination on socio-political and economic activities in a community or society (and the consequent exclusion of women) are the primary and ultimate factor responsible for rape" (1983, 75). Positive social developments (gender equality) thus are predicted to lead to a reduction in rape rates.

3.1 Descriptive Statistics

Table 2 Descriptive Statistics Table

<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>Min</i>	<i>Max</i>
Rape Cases	2640	1451	1110	4882
Rape per 1,00,000 women	10.67	6.62	2.50	27.62
Unemployment Rate	4.71	2.53	1.5	9.6
Male Unemployment Rate	3.45	1.44	1.3	5.7
Female Unemployment Rate	9.23	5.82	1.8	20.9
Population density	1427.63	3284.42	189	11297

GDP Growth Rate	14.53	3.4	7.55	21.15
GFCF (In ₹ million)	162006	140055	11081	551820
Literacy Rate	74.87	5.74	67.06	86.34
Women Empowerment Index	0.31	0.055	0.23	0.39

3.2 Gauss Markov Assumptions

Linear in Parameters

The model is linear in parameters such that the following is true:

$$y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \dots + \beta_kx_k$$

Random Sampling

Data for all variables for all 11 states was collected from state and government data sources. All states that had data available were considered for the analyses conducted, satisfying the condition of random sampling.

No Perfect Collinearity

To assess collinearity between regressors, correlations between all explanatory variables were computed using STATA. The correlation coefficient computations, shown in Appendix B reveal that some correlation does exist between regressors in the model. The correlations exist at levels less than 1.0, thus the no perfect collinearity assumption is satisfied.

Zero Conditional Mean

In the multiple linear regression model, the expected value of the error term is zero, thus the conditional mean assumption is satisfied.

Homoscedasticity

The variance of the error term in the multiple linear regression model is non-zero, thus satisfying the homoscedasticity assumption.

4. Results*Model 1: Without gender specific estimations***Table 3** Model 1 Results

<i>Independent Variables</i>	<i>Estimates</i>
Unemployment	-0.85** (-2.15)
Population density	0.53** (2.65)
GDP Growth Rate	-0.36** (-4.16)
GFCF	-0.79* (-1.87)
Literacy Rate	3.61** (6.78)
Women Empowerment Index	-3.2** (-4.73)
R squared	.60
p value	.0021

() =t ratios

Statistically significant: **1% *5%

In general the association between rape and unemployment appears to be negative and robust. Coefficients are negative and significant at desirable levels. Put differently, regions with higher level of unemployment have lower incidence of rape, meaning that the opportunity perspective holds true. This is further supplemented with positive coefficients for population density. With a denser population, chances of encounters increases, increasing criminal opportunity, which supplements the opportunity perspective argument. Control variables exhibit the expected signs. GDP growth rate and GFCF are negatively and significantly associated with lower level of rapes. Interpreting them as proxies for future economic growth, it would mean that expectations of economic growth are associated with fewer rapes. Literacy Rate is positively related to rape. As noted above, the reasonable interpretation of this result is that increase in literacy rate does not increase rape but rather ‘reported rape’. Reasonably, this would explain the positive association with the dependent variable. Interpreting the Women Empowerment Index, it can be seen that more the gender equality in a state, lower will be the rape rate. The model explains 60% of the variation in rate of rapes. The low p value means that we reject the null hypothesis, thus the opportunity perspective argument or a negative relation holds true.

Model 2: With gender specific estimations

Table 4 Model 2 Results

<i>Independent Variables</i>	<i>Estimates</i>
Male Unemployment Rate	-0.52** (-2.78)

Female Unemployment Rate	0.081 (1.27)
Population density	0.51** (2.63)
GDP Growth Rate	-0.45** (-2.6)
GFCF	-0.801* (-2.01)
Literacy Rate	2.87** (6.03)
Women Empowerment Index	-3.19** (-4.87)
R squared	.62
p value	.0018

() =t ratios

Statistically significant: **1% *5%

Moving from Model 1 to Model 2, I take gender specific unemployment rates into account in order to verify whether or not male and female unemployed have a different impact on level of rape. Here the negative association between rape and unemployment is strongly maintained with male unemployment rates and the opportunity perspective holds true. However, female unemployment rates are not statistically significant. The main result that could be claimed is that the male unemployment rate explains the negative association between rape and unemployment entirely. Other variables display the expected behaviour, similar to Model 1. The model explains 62% of the variation in rate of rapes. The low p value

means that we reject the null hypothesis, thus the opportunity perspective argument or a negative relation holds true.

5. **Conclusion**

The fundamental research question of this paper was to investigate the relationship between rape and unemployment, and understand the relationship based on previous theoretical studies between other forms of violent crime and unemployment. The opportunity perspective argument that predicted a negative relationship between rape and unemployment is proven.

In the past, unemployment has been blamed for rapes in Haryana by members of the legislative assembly; however this is disproved. Since it is seen that it is not the idleness of men due to unemployment that increases rape but in fact when there are lesser social interactions there are lesser rapes. As a policy recommendation to decrease the number of rape cases, it is irrelevant to generate more employment opportunities for males but more important to change patriarchal mind-sets. Often during discussions on the increasing rate of sexual assault in India the actual cause is conveniently ignored. Policy makers often use the argument that the idleness and frustration caused by unemployment leads to rape. These arguments are evidence of the symptomatic treatment of rape culture in India.

The findings of this paper also improve our understanding of rape as a crime and the randomness in the nature of selecting victims, based on volume and frequency of the social activity of the perpetrators. This understanding of rape and unemployment in terms of social activity also helps to deconstruct arguments

presented about the nature of the crime. For example, the Chief Minister of Haryana said that most rapes were perpetrated by people known to the survivor and rape cases are merely cases of arguments. If this was true, the criminal motivation argument would have always dominated.

The positive association between rape and education is also worth noting. This association appears to be robust across the models estimated. As noted above, *ex-ante*, the sign was difficult to predict. In sum, the positive association between rape and education can be interpreted more accurately as the association between education and 'level of reported rape' rather than actual level of rape.

The inclusion of the WEI and the result that positive social developments (gender equality) lead to a reduction in rape makes a case for improving the socio-economic status of women through improvements in access to health services and hygiene, safety from domestic violence, involving women in household decisions, empowerment through ownership of land and amenities like cell phones and financial autonomy.

More in general, this work also contributes to throw light on the relationship between economic factors and emergence of different forms of crime. Studying rape separately from other forms of violent crime would help to better explain the relationship between violent behaviours and economic opportunities.

6. References

- Aashish Gupta. (2014) Reporting and incidence of violence against women in India, Working Paper, *Research Institute for Compassionate Economics*.
- Altindag D.T., (2012), Crime and Unemployment: evidence from Europe, *International Review of Law and Economics*, 32: 145-157.
- Andresen, M.A. (2013) Unemployment, business cycle, crime, and Canadian provinces. *Journal of Criminal Justice*, 41, 220-27.
- Becker, G. (1968) Crime and punishment: An economic approach. *Journal of Political Economy* 76, 169-217.
- Britt, Chester. (1994). Crime and Unemployment Among Youths in the United States, 1958-1990.: A Time Series Analysis. *American Journal of Economics and Sociology*. 53. 99 - 109.
- Buonanno, P. (2006) Crime and labour market opportunities in Italy (1993–2002). *Labour*, 20(4), 601-624.
- Cantor, D., & Land, K. (1985). Unemployment and Crime Rates in the Post-World War II United States: A Theoretical and Empirical Analysis. *American Sociological Review*, 50(3), 317-332. doi: 10.2307/2095542
- Caruso, Raul, (2015), What is the Relationship between Unemployment and Rape? Evidence from a Panel of European Regions.
- Cook, P.J. and Zarkin, G.A. (1985) Crime and the business cycle. *Journal of Legal Studies*, 14, 115-28.
- Dutta, Mousumi & Husain, Zakir. (2009). Determinants of crime rates: Crime Deterrence and Growth in post-liberalized India.
- Drèze, Jean & Khera, Reetika. (2000). Crime, Gender, and Society in India: Insights from Homicide Data. *Population and Development Review*.

- Edmark, K. (2005) Unemployment and crime: Is there a connection? *The Scandinavian Journal of Economics*, 107(2), 353-373.
- Edward L. Glaeser, Bruce Sacerdote, José A. Scheinkman; Crime and Social Interactions, *The Quarterly Journal of Economics*, Volume 111, Issue 2, 1 May 1996, Pages 507–548, doi:10.2307/2946686
- Gould, E., Weinberg, B. and Mustard, D. (2002) Crime rates and local labor market opportunities in the United States: 1979-1991. *Review of Economics and Statistics*, 84, 45-61.
- Levitt S., (2001). Alternative strategies for Identifying the Link between Unemployment and Crime. *Journal of Quantitative Criminology* 17, 377-390
- Lochner L, (2004). Education, Work, and Crime: A Human Capital Approach *International Economic Review* Vol. 45, No. 3 pp. 811-843
- Oster, A. and Agell, J. (2007) Crime and Unemployment in Turbulent Times. *Journal of the European Economic Association*, 5(4), 752-775.
- Papps, K. and Winkelmann, R. (2000) Unemployment and crime: New evidence for an old question. *New Zealand Economic Papers*, 34(1), 53-71.
- Raphael, Steven and Winter-Ember, Rudolf, (2001), Identifying the Effect of Unemployment on Crime, *Journal of Law and Economics*, 44, issue 1, p. 259-83, doi:10.1086/320275
- Reilly, B. and Witt, R. (1996) Crime, deterrence and unemployment in England and Wales: An empirical analysis. *Bulletin of Economic Research*, 48(2), 137-159.
- Saridakis, George and Spengler, Hannes (2012) Crime, deterrence and unemployment in Greece: a panel data approach. *The Social Science Journal*, 49(2), pp. 167-174 doi:10.1016/j.soscij.2011.08.005

Sen, M. (2018) 'Unemployed, frustrated youths commit rape, says Haryana BJP MLA,' *India Today*, 16 September <https://www.indiatoday.in/india/story/unemployed-frustrated-youths-commit-rape-says-haryana-bjp-mla-1340865-2018-09-16>

Wang, F. and Minor, W.W. (2002) Where the jobs are: employment access and crime patterns in Cleveland. *Annals of the Association of American Geographers*, 92, 435-50.

Witt, R., Clarke, A. and Fielding, N. (1999). Crime and economic activity: A panel data approach. *British Journal of Criminology*, 39(3), 391-400.

Wu, D. and Wu, Z. (2012) Crime, inequality and unemployment in England and Wales. *Applied Economics*, 44(29), 3765-3775.

7. **Appendices**

Appendix A

Definition of rape under Section 37, Indian Penal Code

A man is said to commit "rape" if he:— (a) penetrates his penis, to any extent, into the vagina, mouth, urethra or anus of a woman or makes her to do so with him or any other person; or (b) inserts, to any extent, any object or a part of the body, not being the penis, into the vagina, the urethra or anus of a woman or makes her to do so with him or any other person; or (c) manipulates any part of the body of a woman so as to cause penetration into the vagina, urethra, anus or any part of body of such woman or makes her to do so with him or any other person; or (d) applies his mouth to the vagina, anus, urethra of a woman or makes her to do so with him or any other person, under the circumstances falling under any of the following seven descriptions:

Firstly.— Against her will.

Secondly. — Without her consent.

Thirdly. — With her consent, when her consent has been obtained by putting her or any person in whom she is interested, in fear of death or of hurt.

Fourthly. — With her consent, when the man knows that he is not her husband and that her consent is given because she believes that he is another man to whom she is or believes herself to be lawfully married.

Fifthly.— With her consent when, at the time of giving such consent, by reason of unsoundness of mind or intoxication or the administration by him personally or through another of any stupefying or unwholesome Substance, she is unable to understand the nature and consequences of that to which she gives consent.

Sixthly. — With or without her consent, when she is under eighteen years of age.

Seventhly. — When she is unable to communicate consent.

Exceptions — 1. A medical procedure or intervention shall not constitute rape; Sexual intercourse or sexual acts by a man with his own wife, the wife not being under fifteen years of age, is not rape.

Appendix B

Test for no perfect collinearity among variables

	<i>unplymntrate</i>	<i>popden</i>	<i>gdp</i>	<i>gfcf</i>	<i>litrte</i>
<i>unplymntrate</i>	1				
<i>popden</i>	-0.16	1			
<i>gdp</i>	0.00	0.16	1		
<i>gfcf</i>	-0.37	-0.37	-0.59	1	
<i>litrte</i>	-0.47	0.67	-0.24	0.24	1

