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DR. NITASHREE BARMAN

CHAPTER 7

DETERMINANTS OF RAPE CASES REPORTING IN INDIA: A STUDY ON THE BASIS OF STATE LEVEL PANEL DATA

Susmita Das & Ritwik Mazumder

Abstract

Based on state level socio-economic and structural variables for the period 1992–2019 we perform empirical investigation on the determinants of rape cases reporting in India. Our study is motivated by recent reports and number of scholarly literatures stating that rape cases which along with other serious types of crimes against women are severely under-reported in India. Findings based on correlation and panel regressions suggest that rape cases reporting is significantly better in the relatively richer and more urbanized states. Particularly, states with better governance and sufficient crime reporting infrastructure have significantly better reporting. Further we establish that women empowerment, female educational level, sex ratio are crucial factors behind better reporting of rape cases. We claim that reporting behaviour of victims can be significantly improved through gender sensitive governance coupled with sufficient crime reporting infrastructure particularly in states with high gender bias and overall backwardness.

Keywords: Rape Cases, Crime Reporting Infrastructure, Panel Data

Introduction

Gender based violence is one of the worst forms of crime and is commonly known as violence against women throughout the world. While crime against women is a serious socio-economic problem, working with crime data can lead to serious challenges because of underreporting of gender-based crimes, and India is no exception in this regard. In India the rate of crimes against women in reality could be much higher than what it might appear. Several forms of violence against women could go unreported or undocumented (Chakraborty et al., 2021). Crime

reporting is likely to be a considerable challenge in India for some specific crimes such as violence against women including cases of rape and other forms of sexual abuse (Gupta, 2014). Numerous studies are available that discuss the impact of sanctions on criminal behaviour [for instance, see Becker (1968), Stigler (1970) and Ehrlich (1973)]. But the large size of sanctions do not necessarily reduce criminal activities unless victims report crimes to the police, this problem is even severe in crimes such as rapes. In case of such crimes victims prefer not to report mainly due to the pain and humiliation and non-recognition associated with reporting that surpass the benefits from punishing the criminals.

Over the years socio-economic and demographic determinants of crime is more popular with researchers and is well-studied area in applied criminology (see for instance, Brown 2001, Buonanno and Montolio 2008, Khan et al., 2015, Tarling and Dennis 2016, Anwar et al., 2017, among several others), studies on what determines the extent of crime reporting, especially in poor and socio-economically backward countries like India, is still an emerging field. Crime committed but unreported is a serious law and order problem that is indicative of poor social and psychological health of a society. Unreported crimes against women hide the true picture of women in any society.

It is generally assumed that official data is less useful for research on domestic and sexual assault than for other forms of violence because these crimes are more likely to be under-reported. Violence is unlikely to come to the attention of the criminal justice system unless someone reports it (Felson, 1995). The crimes against women and total crimes reported per annum in India as per the principal data source NCRB (Govt. of India, various issues), shows a steadily rising crime rate but this could also be due to better reporting of crimes against women throughout the country. This is possible if governance and people friendly policing gets promoted over time especially in poor governance states where traditionally crimes against women are severely underreported. Better reporting can also be triggered by higher female police recruitments in recent years, better access to mobile phones and especially by means of access to smart phones which can capture the scene of the crime during the course of the event. And of course, crimes reported would rise if registering of crimes by the law enforcement agencies (the police) is done better and finally if actual crimes against women

truly pick up due to socio-economic, psychological and other reasons over the long run.

Given this background we emphasize on explaining the interstate variations in the rape cases in numbers on the basis of state level data on socio-economic, structural, governance and women empowerment indicators. Our central research question is, "what are the factors that determine the extent of reporting of rape cases in India?" Our entire focus is thus on 'reporting'. We chose the period 1992-2019 as NCRB reports provide us with uninterrupted data on key components of reported rape cases across states for this period.

Literature Review

When and why crime victims report their victimization to the police has been the subject of empirical criminological research since the 1970s, partially due to the emergence of population surveys on victimization such as the National Crime Survey in the United States (Biderman & Lynch, 1981). Studies show that the recording of crime by the police is a process that relies on victim's reports, and is thus influenced by the reporting decisions of victims (Bowles et al., 2009). There are evidences of substantial underreporting of crimes in India (Chaudhuri et al., 2015) and many incidences of violence are not reported because of the shame and fear associated with being a victim. Rates of sex trafficking, sexual violence in armed conflict situations, female infanticide, and violence in school and the workplace, for example, are thought to be significantly under-documented, particularly in developing countries (Coomaraswamy, 1996). Crime reporting behaviour is not just a function of one attribute but rather is a function of multiple identities and structural inequalities. Poverty and lack of a high school education, were found to increase the probability of more female crime reporting to the police, but decreased the likelihood that males did so (Zaykowski et al., 2019). Studies in developing countries like Ghana, reveal that most victims of sexual assault were dissatisfied with the reporting process because the police paid little attention to their complaints. Victims essentially want the police to handle their cases effectively (Boateng, 2015). Moreover, victims' decisions to disclose crime are positively influenced by their attitudes toward the police (Boateng, 2016). Increased female workforce participation, urbanization and policing increases crime

reporting but increased female literacy does not necessarily lead to increased reporting of crime against women (Banerjee, 2018). Particularly, in the case of vulnerable sections of society in India, such as Dalits and other backward castes, the victims may even face the risk of becoming a worse victim of further crimes by the perpetrators. Reporting is therefore likely to be a considerable challenge in India for crimes such as violence against women including cases of rape and other forms of sexual abuse (Gupta, 2014). Gupta and Sachdeva (2017) find a strong relationship between population density, sex ratio, literacy rate and per capita crime in India and these factors play a key role in determining the reported crime rate. Also, per capita net state domestic product and per capita schools only marginally influence crime. Rural and minority populations play negligible roles in determining the criminal cases registered.

A couple of points are worth noting. In literature the role of socio-economic and women empowerment factors in explaining rape cases reporting in India in a panel data set-up is barely reported. Although to some extent we follow Dreze and Khera (2000), our work is a clear addition to existing literature as it considers governance and women empowerment factors in explaining reporting variations across states. Throughout the paper we view 'reporting of rape cases' as desirable, or something which the reporting state must be given credit for. In addition, we take the NCRB published data on RAPES 'reporting' and not 'rapes' simply because what is published essentially represents 'reporting' rather than actual 'rapes'. The approach adopted in this article, in this respect, is unique.

Data and Econometric Methods

Our principal data sources are National Crime Records Bureau (NCRB)- Crime in India (1992-2019, Government of India) and National Family Health Survey-5 (NFHS-5). The 'NCRB – Crime in India', gives us comprehensive data on reported crimes- particularly state and union territory-wise variables of interest like total reporting of crimes against women (RCAW), registered cases of rapes (RAPE). All reported crime statistics used are expressed per lakh of state level population (where, 1 lakh = 0.1 million or 10 lakhs = 1 million). Next, we incorporate explanatory variables like per capita net state domestic product (PCNSDP), the extent of

urbanization as captured by the percentage of state level urban population (URBAN) and rural population (RURAL), percentage share of agriculture and allied activities in state domestic product (AGRI), and the percentage of population below poverty line (BPL). We draw the data from secondary sources including the Census of India, (1991, 2001 and 2011).

Among the variables related to women empowerment, we include the percentage of females literacy (FLR), female work force participation rate (FWPR). The literacy gap (LITGAP) across males and females captures the gender gap in educational attainments. The total fertility rate (TFR) is taken as proxy for the socio-economic status of women (see Malhotra, et al., 1995). Total police personnel available per lakh state populations (POLICE) along with the proportion of women police personnel (PWP) are taken as the crime control instruments. We present all variable definitions in detail along with data sources in Appendix 1. Our cross-section analysis covers 34 states and union territories while the panel covers 33 (union territories of Dadra and Nagar Haveli and Daman and Diu are merged).

We use ordinary correlation and regression analysis throughout the analysis. Regression models are estimated using robust standard errors throughout. A family of models are estimated in order to explain our key dependent variable, namely reported rape cases. All variables except binary dummies are in natural logarithm. For panel data we routinely test for the presence of state-specific fixed effects.

Association among Rape Cases Reporting and Socio-Economic Factors

As a prelude to our state level panel regression Table 1 and 2 show correlation analysis among Rape Cases reporting and socio-economic factors:

Correlation values in Table 1 suggest that states where overall crime against women reporting is high rape cases reporting is also high. RAPE is found negatively associated with BPL implying that poorer states have lesser reporting. The table also suggests that rapes reporting is higher in states with higher per capita income, higher percentage of urban population and female literacy. That, crimes are reported more in the richer and more urbanised states. Also, even for state level penal data it is seen that

agricultural states and states with higher poverty reports lower crimes.

Table 1: Ordinary Correlations between Crime Against Women reporting, Rape cases reporting and State level Human development and Social Indicators (N = 32)

Variables	CRW	RAPE	PCNSDP	URBAN	AGRI	BPL	FLR	FWPR
CRW	1.00							
RAPE	0.33 (0.00)	1.00						
PCNSDP	0.16 (0.00)	0.52 (0.00)	1.00					
URBAN	0.14 (0.00)	0.14 (0.00)	0.47 (0.00)	1.00				
AGRI	-0.17 (0.00)	-0.34 (0.00)	-0.64 (0.00)	-0.60 (0.00)	1.00			
BPL	-0.11 (0.00)	-0.24 (0.00)	-0.58 (0.00)	-0.43 (0.00)	0.58 (0.00)	1.00		
FLR	0.10 (0.00)	0.34 (0.00)	0.58 (0.00)	0.53 (0.00)	-0.69 (0.00)	-0.69 (0.00)	1.00	
FWPR	-0.07 (0.04)	0.12 (0.00)	-0.07 (0.04)	-0.41 (0.00)	0.09 (0.01)	0.11 (0.00)	-0.08 (0.01)	1.00

Note: Computed based on panel data on 32 states and union territories of India.

Source: Authors' Computation

The correlation values in Table 2 suggest that states with higher percentage of backward castes and higher IMR report lesser crimes. Moreover, states with higher unemployment rates report lesser Rape cases. However, a high percentage of Working Age Population has a positive association with RAPE implying that

higher work force participation is positively correlated with crime reporting.

Table 2: Ordinary Correlations between Crime Against Women reporting, Rape cases reporting and State level Human development and Social Indicators (N = 32)

Variables	CRW	RAPE	TLR	UNEMP	YNG	RURAL	CAST	MNRTY
CRW	1.00							
RAPE	0.33 (0.00)	1.00						
TLR	0.12 (0.00)	0.29 (0.00)	1.00					
UNEMP	-0.11 (0.00)	-0.12 (0.00)	0.10 (0.00)	1.00				
WAP	0.13 (0.00)	0.29 (0.00)	0.51 (0.00)	0.12 (0.00)	1.00			
RURAL	-0.04 (0.22)	-0.02 (0.47)	-0.10 (0.00)	-0.07 (0.03)	-0.03 (0.32)	1.00		
CAST	-0.19 (0.00)	0.19 (0.00)	-0.01 (0.66)	-0.29 (0.00)	-0.05 (0.09)	0.04 (0.23)	1.00	
MINORITY	0.11 (0.00)	-0.05 (0.14)	-0.20 (0.00)	0.09 (0.00)	-0.04 (0.22)	0.04 (0.19)	-0.34 (0.00)	1.00

Note: Computed based on panel data on 32 states and union territories of India.

Source: Authors' Computation

Panel Regression of State Level Factors on Rape Cases Reporting

Guided by the correlation results, we next run a family of panel regressions explaining RAPE on the basis of state-level socio economic indicators. Results are in Table 3. We routinely test for the presence of state specific fixed effect by means of the usual F test. As the F-values show, the null hypotheses of no state specific effects are rejected in each case, which means that the state specific fixed effects specification is more suited for the data as opposed to

the pooled estimation. All six models presented in Table 3 are thus fixed effects panel regression models. Throughout models 1 to 6, we keep a 1 period lagged dependent variable to adjust for possible serial correlation in residuals. As Table 3 shows, all our estimated models have Durbin-Watson statistics reasonably more than 2.0.

Coming to the estimated equations, PCNSDP is statistically significant in models 1 and 4 and have positive and coefficient meaning that even in the panel of 33 states and union territories of India spanned over 28 years (1992-2019) positively influence rape cases reporting. As before, the role of poverty in this is consistently negative (see model 5). Broadly it appears that poverty could be a significant impediment in the path of gender related crime reporting. Perhaps women from poorer sections find it more difficult to report crimes against them, and perhaps the ease of crime reporting is significantly lower for the poor. Relatively more agricultural states consistently report lesser crimes against women when other factors are controlled for (model 4). RURAL is found to have negative coefficient in the same model indicating rape cases are reported less in rural areas.

LITGAP has a highly significant and negative coefficient in models 1 to 3, implying that states with higher gender gaps in overall literacy find it more difficult to report rape cases. Thus, gender bias and patriarchy can potentially create severe impediments in the path of gender based crime reporting when socio-economic and infrastructure factors are controlled for. In model 5, female work participation rate (FWPR) has a positive coefficient meaning that greater proportion of working women induces better reporting of gender based crime. Female Adult Literacy Rate is found to have positive influence in reporting. In models 1,2,3 and 5 the panel regression results reveal a 1 period lagged Log(RAPE) is inserted in each model to tackle the problem of serial correlation on one hand and also to estimate the partial impact of 1 year lagged RAPE on current RAPE. This indicate keeping other things constant a 1% rise in RAPE last year leads to a 0.73% rise in RAPE in the current year. Thus, our chosen crime control instruments interestingly have contrasting impacts on crime reporting.

Table 3: The Log Linear Panel Regression Results of Rape Cases on State Level Socio-Economic Factors

Dependent Variable: LOG(RAPE)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	-1.54** (-5.40)	-3.91** (-3.94)	-0.16 (-1.05)	-0.54 (-1.56)	0.10 (0.55)
LOG (RAPE (-1))	0.73** (35.17)	0.76** (36.79)	0.72** (36.49)		0.76** (36.36)
LOG(BPL)					-0.09** (-3.81)
LOG(RURAL)					-0.07* (-2.11)
LOG(BPL)					-0.09** (-3.81)
LOG(PCNSDP)	0.18** (8.33)			0.75** (35.71)	
LOG(DENS)		-0.02 (-1.24)	-0.03* (-2.20)		
LOG(CAST)				-0.13** (4.15)	-0.07* (1.94)
LOG(FWPR)					0.14* (2.07)
LOG(AGRI)				-0.09** (-3.62)	
LOG(LITGAP)	-0.02 (0.50)	-0.09* (-2.10)	-0.05 (-1.35)		
LOG(WAP)		1.08** (4.73)			
LOG(FLR)				0.14 (1.83)	
LOG(TIME)			0.29**(12.23)		
R-Squared	0.67	0.65	0.69	0.65	0.65
Adjusted R-Squared	0.67	0.65	0.69	0.65	0.65
F-Statistic	608.46**	422.61**	513.27**	422.55**	331.42**
Durbin-Watson	2.02	2.08	2.06	2.05	2.07

Notes: Figures in parentheses indicate t-values; * and ** indicate significant at 5% and 1% levels.
Source: Authors' own calculation

Concluding Remarks

Steadily rising crimes in a country could be the result of better reporting of gender related crimes like rapes. This is possible only in the presence of improved socio economic status of women in the country along with people friendly governance and policing. That is, crimes reported would rise if registering of crimes by the law enforcement agencies (the police) is done better and finally if actual crimes against women truly pick up due to socio-economic, psychological and other reasons over the long run.

In this paper we investigate the socio-economic determinants of rate cases reporting in India on the basis of state level secondary data. Our findings suggest that Indian states with lower attainments in female education report significantly lower crimes where women are the victims. In contrast, reporting is significantly better in richer, urbanized, and relatively more women empowered states of India. To the best of our understanding, gender sensitive governance coupled with women's access to the cell-phone and internet enhance the ease of crime reporting.

The first policy lesson of this exercise is that women empowerment needs to be promoted in states where gender gaps are significant and patriarchy is severe and thus female secondary education is something that must receive high priority. Higher success rates of female education can stimulate female work participation in the formal sector ultimately leading to improved levels of female economic empowerment. The second is that governance, especially civil policing has to be gender sensitive and women friendly. Higher recruitments of female police personnel across the country would undoubtedly be a significant step. Finally, infrastructure, in the form of roads, electricity and access to the mobile phone, betters both the ease as well as the actual rate of crime reporting especially when women are the victims. Thus, improvement of physical infrastructure in remote and backward regions could be the key to better governance and better crime reporting in India.

Appendix 1
Variable definitions and Data sources

AGRI: Percentage contribution of State Domestic Product from agriculture and allied activities, compiled from RBI Handbook of Statistics on Indian Economy available at https://www.rb

i.org.in/scripts/AnnualPublications.aspx? (Table 8: Net State Value Added by Economic Activity at Constant Prices, Base: 2011-2012)

BPL: Percentage of population below poverty line at the state level based on Tendulkar Methodology. State level figures for combined poverty estimates obtained from https://niti.gov.in/state-statistics (Data Source: Planning Commission).

CRW: Reported Crimes against Women (all) per lakh state population, compiled from 'Crime in India 1992-2019', National Crime Records Bureau (Ministry of Home Affairs, Government of India), State/UT-wise, available at https://ncrb.gov.in/sites/default/files/Crime.

FLR: Female Adult Literacy Rate for the Census years, 1991, 2001 and 2011, obtained from https://www.census.gov/data/tables

FWPR: Female Work Force Participation Rate refers to the number of females who are either employed or are actively looking for work divided by the number of working age group women and is expressed as a percentage, as per 1991, 2001 and 2011 Census, obtained from https://www.census.gov/data/tables

LITGAP: Gender gap in literacy (total literacy rate for males minus total literacy rate for female), for the Census years, 1991, 2001 and 2011, obtained from https://www.census.gov/data/tables

MNRTY: Percentage of share of Minority population in total population for the Census years, 1991, 2001 and 2011, obtained from https://www.census.gov/data/tables

PCNSDP: Per capita NSDP for 1992-2018, at 2011-12 prices, compiled from RBI Handbook of Statistics on Indian Economy available at https://www.rbi.org.in/scripts/PublicationsView.aspx?id=19743. [*Source*: National Statistical Office (NSO)].

URBAN: Urban population as a percentage state population based on Census 1991, 2001 and 2011. For each state it is compiled from https://www.census2011.co.in/census/state/ (*Source*: Census of India, 1991, 2001 and 2011).

RAPE: Rate of crimes against women in the form of rape, recorded under Sec. 376 IPC. "Crime rate" for crimes committed against women has been calculated using only the female population based on mid-year projected female population, National Crime Records Bureau (Ministry of Home Affairs, Government of India), State/UT-wise, available at https://ncrb.gov.in/sites/default/files/Crime.

RURAL: Rural population as a percentage state population based on Census 1991, 2001 and 2011. For each state it is compiled from https://www.census2011.co.in/census/state/ (*Source: Census of India, 1991, 2001 and 2011*).

TLR: Adult Literacy Rate for the Census years, 1991, 2001 and 2011, obtained from https://www.census.gov/data/tables

TFR: Total Fertility Rate defined as the average number of children that would be born to a woman over her lifetime, compiled from Fact Sheets of National Family Health Survey (NFHS-5) 2019-20, published by the Ministry of Health and Family Welfare Government of India available at: chiips.org/nfhs/factsheet_NFHS-5.shtml

WAP: Working Age Population (Population in the age group of 15-60 years) as a percentage of total population for each state it is compiled from https://www.census2011.co.in/census/state/ (*Source: Census of India, 1991, 2001 and 2011*).

References

Anwar, A., Arshed, N., & Anwar, S. (2017). Socio-economic determinants of crime: An empirical study of Pakistan. *International Journal of Economics and Financial Issues, 7*(1), 312-322.

Banerjee, S. (2018). Women on top and/or 'economic progress': What affects actual and reported crime against women? An analysis of socio-economic factors in India.

Becker, G. (1968). Crime and punishment: An economic approach. *Journal of Political Economy, 76*(2), 169–217.

Biderman, A. D., & Lynch, J. P. (1981). Recency bias in data on self-reported victimization. *Proceedings of the social statistical section of the American Statistical Association,* 31-40.

Boateng, F. D. (2015). Victims of sexual assaults: The experiences of Ghanaian women. *International Review of Victimology, 21*(3), 343-360.

Boateng, F. D. (2016) Crime reporting behavior: Do attitudes toward the police matter? *Journal of Interpersonal Violence, 17,* 432-456.

Bowles, R., Reyes, M. G., & Garoupa, N. (2009). Crime reporting decisions and the costs of crime. *European Journal on Criminal Policy and Research, 15*(4), 365–377.

Brown, K. V. (2001). The determinants of crime in South Africa. *South African Journal of Economics, 69*(2), 269-298.

Buonanno, P., & Montolio, D. (2008). Identifying the socio-economic and demographic determinants of crime across Spanish provinces. *International Review of law and Economics, 28*(2), 89-97.

Chakraborty, C., Afreen, A., & Pal, D. (2021). Crime against women in India: A state level analysis. *Journal of International Women's Studies, 22*(5), 1-18

Chaudhuri, K., Chowdhury, P., & Kumbhakar, S. C. (2015). Crime in India: Specification and estimation of violent crime index. *Journal of Productivity Analysis, 43*, 13-28.

Coomaraswamy, R. (1996). Report of the special rapporteur on violence against women, its causes and consequences. *United Nations Commission on Economic and Social Council.* E/CN.4/1999/68/Add.3, https://www.refoworld.org/docid/3ae6b0fb4.html

Dreze, J., & Khera, R. (2000). Crime, gender, and society in India: Insights from homicide data *Population and Development Review, 26*(2), 335-352.

Ehrlich, I. (1973). Participation in illegitimate activities: A theoretical and empirical investigation. *Journal of Political Economy, 81*(3), 521-65.

Felson, M. (1995). Those who discourage crime. *Crime and place, 4*, 53-66.

Gupta, A. (2014). Reporting and incidence of violence against women in India. *Rice Institute, 130*.

Gupta, M., & Sachdeva, P. (2017). Economic, demographic, deterrent variables and crime in W. Bilsky, C. Pfeiffer, & P. Wetzels (Eds.), *Fear of crime and criminal victimization* (pp. 141–157). Stuttgart: EnkeVerlag.

Khan, N., Ahmed, J., Nawaz, M., & Zaman, K. (2015). The socio-economic determinants of crime in Pakistan: New evidence on an old debate. *Arab Economic and Business Journal, 10*(2), 73-81.

Stigler, G., (1970). The Optimum Enforcement of Laws. *Journal of Political Economy, 78*(3), 526-536.

Tarling, R., & Dennis, R. (2016). Socio-economic determinants of crime rates: Modelling local area police-recorded crime. *The Howard Journal of Crime and Justice, 55*(1-2), 207-225.

Zaykowski, H., Allain, E. C., & Campagna, L. M. (2019). Examining the paradox of crime reporting: Are disadvantaged victims more likely to report to the police?. *Law & Society Review*, 53(4), 1305-1340.

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