

Working Paper Series

■
**Exploring Relationship
between Police Presence and
Crime Rates**

Do the Police in India control crimes?

■
Shashank Deora
Sanjiv J Phansalkar

Download this paper from www.vikasanvesh.in



1. Introduction

India has a population of 1.21 billion as per the census of 2011. Against this population, it had police (civil and district armed police) strength of 1545771 as on January 1, 2017. During 2016, the total incidents of crime in India - cognizable IPC and SLL crimes – was 4831515. While thinking of crimes and their relationship with the police presence, *ceteris paribus* the police presence must reduce the crime rate. The economic theory suggests the same (Becker, 1968).

This study is an attempt to explore this relationship between the police strength and crime rate in India. Introduction section does a review of the existing theories and studies having explored the relationship between police strength and crime incidence through different perspectives. Through this review, it also attempts to determine the motivations to a criminal for committing a crime. Second section comes up with a set of hypotheses based on the literature. Third section explains the results from a set of correlations to validate the proposed hypotheses. Discussion and conclusion follow the results.

Becker (1968) came up with this theory that a criminal commits a particular crime only if its opportunity cost is lowest among all the available alternatives. According to his proposed model, the number of offences a criminal will commit depends upon her/his probability of conviction, punishment if convicted and on other influencing factors – such as potential income from other livelihood activities both legal and illegal, her/his willingness to commit. As per this model, an increase in the police presence lowers down the expected gains and increases the expected losses for criminals. Hence, an increase in police presence leads to a reduction in crimes. This conclusion finds support in empirical studies.

One longitudinal study in the United States, comparing crime rates with police officer staffing throughout 12 years, finds out a negative correlation between the two (Guffey, Larson, & Kelso, 2010). Several studies analysis this relationship across different categories of crime. Few of these have found an increased police presence to be followed by significant reduction in violent as well as property-related crimes, specifically murder, robbery, burglary, larceny and auto theft (Levitt S. D., 2002; Lin, 2009). One study in London finds an immediate reduction in violence and sexual offences, theft and handling and robbery, post an increase in the police presence in the study area after 2005 terrorist attack (Draca, Machin, & Witt, 2011). Vollaard & Koning (2009) use a victimisation survey across Netherlands to find out that an increased police presence negatively affects public order related crimes along with violent and property related crimes. A World Bank study looking at crime-related losses to the private

firms across 27 developing countries finds that an increase in the strength of police by 1 per cent leads to a reduction in crime losses by 0.43 per cent (Islam, 2016).

However, evidences from several studies are not exactly in line with this rational approach. One study, from US, finds that while an increased police strength is associated with reduced robberies and burglaries, it does not affect murder and motor-vehicle theft (Corman & Mocan, 2000). Sherman et. al. (1997) in their review study discuss the complex ways in which policing affects crimes. They find evidences, across studies, of an increase in the crime rates post police strikes; they also highlight the absence of correlation, again across studies, between reactive arrests by police and subsequent crime rates. Levitt (1998) finds that the official reporting of crimes increases with an increase in the number of police personals per capita. He cites reporting of hitherto unreported crimes as the reason which causes a surge in the number of reported crimes with an increase in the police strength. A 2016 report sponsored by BPRD identifies the political economy of crime statistics, impact of crime statistics on performance appraisals of the police functionaries, as one of the reasons for non-reporting of crimes in India (Rao, 2016).

Then there are studies which attribute a simultaneous measurement of crimes and police presence for a positive relationship between the crimes and police presence. Swimmer (1974) proposed an alternative model to measure the two-way relationship between police and crime, suggesting a solution to the simultaneous measurement of crimes and police. He applied his model on the crime and police data; study found that while an increase in the police presence causes a reduction in crimes on one hand, an increase in crimes leads to an increase in the police presence for violent and property related crimes on the other (Swimmer, 1974). Increase in the police strength has been found to help in deterring crimes significantly while a rise in the crime rate leads to a nominal increase in the police strength (Marvell & Moody, 1996).

Few studies suggest other methods of preventions than solely increasing the number of police personals. One study from United States determines that the way of working of police is more important than the number alone and that an increase in the number of police personal does not make a difference (Rouse, 1985). Sherman, et. al. (1997) suggest having different policing arrangements and actions in different situations, for different crimes and at different times. Back in India, one study suggests that the criminal behavior theory applicable in the developed countries may have limited application in the context of India. Through an econometric

analysis, the study argues that increasing the police strength is not the solution to control crimes and it suggests the need to work on the behavioral pattern of criminals (Dutta & Husain, 2009).

Few other studies identify other motivations to committing a crime. Fajnzylber et. al. (2002) analysed international homicide and robbery rates across a sample of developed and developing countries to find out that a lower GDP growth rate and a higher income inequality are associated with a higher crime rate. A study from Pakistan identifies that the economic factors including poverty and unemployment cause an increase in the crime rate (Gillan, Rehman, & Gill, 2009). One study in India, looking at the crime data from 2011 to 2012 in India, concludes that urban population as a per cent of the total population, GDP per capita PPP and unemployment rate determine significant variation in the overall crime rate (Mavi, 2014). Another study, based on crime data from 1991 to 2015, finds out that unemployment and inflation rate are directly related, and GDP per capita is inversely related to the total number of crimes (Hazra & Cui, 2018).

Another argument is of a significant role of people discouraging against a crime to check crime rates (Felson, 1995). However, all the alternatives offered do not absolve police of their role as guardians against crimes. Moreover, literature also shows evidences of an inverse relationship between proactive police action and crimes irrespective of the known crime determinants like unemployment (Sampson & Cohen, 1988).

Relationship of crime rate and the police strength shows mixed relationship in literature, however most of these results are not in the Indian context. Understanding relationship between the police strength and crimes is crucial to pressing the right triggers that can contribute in reducing crime incidence.

2. Methodology

This study attempts to understand this relationship in the India context. It looks at the state-wise data available for crime incidence and police presence of 2016 and compares it with similar data from 2011 and 2015. It uses data from the National Crime Records Bureau (NCRB) and the Bureau of Police Research and Development (BPRD) – crime incidence during the whole calendar year and police presence at the start of the next year. Study forms a few hypotheses based on the existing theories and findings of the previous studies. It checks the validity of these hypotheses using available data.

For analysis, study considers seven major heads of IPC crimes and SLL crimes. Literature lends support to an inverse relationship between the police strength and crime rates for few crimes across four crime categories namely, crimes against human body, other crimes against women and children, crimes related to property, documents and property marks and crimes against public tranquillity. For rest three categories also – crimes against the state, crimes against SCs and STs and drug and arms-related crimes – this study posits a negative relationship between the police strength and crime rates, in line with Becker's economic approach. Study puts forward two more hypotheses to determine if GDP per capita and unemployment are motivations to crimes as found in a few studies.

Proposed hypotheses are as follows.

1. Crime rates for all cognizable IPC and SLL crimes reduce as the strength of police increases
2. An increase in the crime rate causes an increase in the strength of police
3. Crime rate reduces with an increase in the NSDP per capita income
4. Crimes rate reduces with a reduction in the unemployment rate

This study analyses relate crime rates against two parameters – total strength of state police (civil) per lakh of population and total strength of state police (civil) per square kilometre. For analysis, it performs a correlation of crime rates with these two parameters.

Study analyses data across different crimes categories for 2016. Data includes different crime categories from both cognizable IPC (Indian Panel Code) and SLL (Special and Local Laws). Study also does a comparative analysis of the overall crime rates, both IPC and SLL, across 2015 and 2016. Additionally, this study attempts to establish a relationship between the changes in police strength and the overall crime rates over a five-year period from 2011 to 2016.

3. Results

3.1.Variation of crime rates with the strength of police

3.1.1. Overall crime rates

Analysis for years 2015 and 2016 shows that crime rates for different crime categories have different relationships with the police presence. Rate of the total cognizable IPC crimes shows a weak, almost negligible, negative correlation with the strength of state police per lakh of

population ($r = -0.18$). However, it shows a medium positive correlation with the police presence per square kilometre, $r = 0.53$ and $r = 0.48$ for 2015 and 2016 respectively.

Another category of crimes, the rate of total cognizable SLL crimes shows a weak negative correlation with the strength of state police per lakh population at $r = -0.24$ and $r = -0.16$ for 2015 and 2016 respectively. However, unlike IPC crime rate, it shows a weak, almost negligible, negative correlation with the police strength per square kilometre ($r = -0.11$ and $r = -0.07$ for 2015 and 2016 respectively).

Total cognizable crimes under both IPC and SLL crimes indicate a slight reduction with an increase in the police strength per lakh of population in both 2015 and 2016. A Positive correlation between the total cognizable IPC crimes and the police strength per sq. Km can be interpreted as an increase in the deployment of police personals in places where the crime rate is high. However, police strength per square Km shows almost no dependence on the total cognizable SLL crimes.

3.1.2. Crimes rates of different categories

Category-wise crime analysis below shows only the direction of the correlation – positive or negative correlation. Strengths of correlation coefficients have been omitted for the sake of convenience. A matrix form representation of different crime categories is facilitating communication of their relationship with the two parameters of the police strength simultaneously.

3.1.2.1. Crimes on human body

Study analyses a total of twenty-two types of crimes on human body (table 1). Of these, six crimes reduce with an increase in the police strength per Sq. Km and the police strength per lakh population. Five crimes are at the other extreme, showing an increase in the states where the strength of police per sq. Km as well as the strength of police per lakh population is high. Rest eleven crimes exhibit a jumbled relationship with the strength of police, reducing with only one of the two measures of the strength of police.

Table 1: Relationship of crimes against human body with the change in the police strength

Strength of police Per Sq. Km Strength of police per lakh population	Increasing crimes	Reducing crimes
Increasing crimes	Culpable homicide not amounting to murder, assault on women with intent to outrage her modesty, voyeurism, kidnapping and abduction (Sec 363 IPC), rape	Kidnapping and abduction in order to murder, kidnapping and abduction for ransom
Reducing crimes	attempt to commit culpable homicide, acid attack and attempt to acid attack, causing simple/grievous injuries by rash driving/act, sexual harassment, assault or use of criminal force with intent to disrobe, stalking, kidnapping and abduction for other reasons (Sec 363A, 365, 366A, 366B, 367, 368, 369 IPC), human trafficking, dowry deaths	Murder, causing death by negligence, attempt to commit murder, grievous hurt, kidnapping and abduction of women to compel her for marriage etc, attempt to commit rape

3.1.2.2. Other crimes against women and children

There is a total of nine crimes under this category analysed under this study (table 2). Of these nine crimes, five crimes exhibit a reduced crime rate with an increase in the strength of police per sq — Km as well as the strength of police per lakh of population. However, of the remaining four crimes, two reduce as the police strength per lakh population increases and when the police strength per sq. Km increases. One crime, *prohibition of child marriage* reduces with the police strength per lakh of population, however it increases with an increase in the police strength per sq. Km. whereas, *insult to the modesty of women* tends to be higher when the strength of police increases.

Table 1: Relationship of other crimes against women and children with the change in the police strength

<p>Strength of police Per Sq. Km</p> <p>Strength of police per lakh population</p>	<p>Increasing crimes</p>	<p>Reducing crimes</p>
<p>Increasing crimes</p>	<p>Insult to the modesty of women</p>	<p>Prohibition of child marriage</p>
<p>Reducing crimes</p>	<p>Juvenile justice (care and protection) act, cruelty by husband or his relatives</p>	<p>Dowry prohibition act, Immoral traffic act, protection of women from domestic violence act, indecent representation of women (prohibition) act, pre-natal diagnostic techniques (reg and prevention of misuse)</p>

3.1.2.3. Crimes against scheduled castes and scheduled tribes

Study analyses three crimes against SC and ST (table 3). These three crimes fall under different cells of the two-by-two matrix and therefore there is no apparent reduction in the crime rates with an increase in the strength of police.

Table 2: Relationship of crimes against scheduled castes and scheduled tribes with the change in the police strength

Strength of police Per Sq. Km Strength of police per lakh population	Increasing crimes	Reducing crimes
	Prevention of atrocities act for crimes/atrocities against STs	Protection of civil rights act
Increasing crimes		Prevention of atrocities act for crimes/atrocities against SCs
Reducing crimes	-	

3.1.2.4. Crimes against state

Crimes against state (table 4) reduce as the police strength per sq. Km increases. However, these crimes do not reduce as the police strength per lakh of population increases. Crime rates for these crimes are higher in states with a higher police strength per lakh of population.

Table 3: Relationship of crimes against the state with the change in the police strength

Strength of police Per Sq. Km Strength of police per lakh population	Increasing crimes	Reducing crimes
		IPC offences against state, Prevention of damage to public property act, unlawful activities act
Increasing crimes	-	
Reducing crimes	-	-

3.1.2.5. Crimes against public tranquillity

Of the three types of crimes against public tranquillity (table 5), two reduce as the police strength per sq. Km and the police strength per lakh of population increases. However, one of the crimes, *offences promoting enmity between different groups*, increases as the police strength per sq. Km and the police strength per lakh of population increases.

Table 4: Relationship of crimes against public tranquillity with the change in the police strength

Strength of police Per Sq. Km Strength of police per lakh population	Increasing crimes	Reducing crimes
	Increasing crimes	Offences promoting enmity between different groups
Reducing crimes	-	Unlawful assembly, rioting

3.1.2.6. Crimes against property, documents and property marks

Out of eleven crime types against property, documents and property marks (table 6) five crimes have a higher crime rate and two crimes have a lower crime rate in states with higher police presence both per sq. Km and per lakh of population whereas rest of the crimes show a mixed relationship with the two parameters of police strength.

Table 5: Relationship of crimes against property, documents and property marks with the change in the police strength

Strength of police Per Sq. Km Strength of police per lakh population	Increasing crimes	Reducing crimes
	Increasing crimes Theft, auto theft, criminal trespass and burglary, robbery, counterfeiting	Reducing crimes Extortion, arson
Reducing crimes	Increasing crimes Criminal breach of trust, cheating	Reducing crimes Dacoity, forgery

3.1.2.7. Drugs and arms-related crimes

This study analyses five drugs and arms-related crimes (table 7). Out of these, crimes rates of three crimes reduce with an increase in the strength of police per sq — Km and per lakh population. However, two crimes increase with an increase in the strength of police.

Table 6: Relationship of drugs and arms-related crimes with the change in the police strength

Strength of police Per Sq. Km Strength of police per lakh population	Increasing crimes	Reducing crimes
	Increasing crimes Excise Act, NDPS act	Reducing crimes -
Reducing crimes	Increasing crimes -	Reducing crimes Arms act, explosives act and the explosive substances act, prohibition act

3.2. Dependence of police presence on the crime rates

One possible source of a confused relationship between the crime rates and the police presence has been found to be the simultaneous measurement of change in the police presence and the crime rate. To validate this and to find out the impact of change in the crime rates on the change in the police strength, study performs a regression between the two.

It takes the change in the total cognizable IPC and SLL crime rates from 2011 to 2016 as independent variables and change in the police strength during the same period as a dependent variable. Period of five years has been considered to measure the change to account for the lag in the police recruitment following an increase in the crime rate.

Results from the regression analysis explains that there is weak relationship between the two sets of variables (Multiple R = 0.21). Percentage of variation in the dependent variable explained by the independent variables is also meagre (Adjusted R Square = -0.01). Thus, results show that the crime rate is not an essential determinant to the change in the police strength over time.

3.3. Crime rates and unemployment

Fifth annual employment-unemployment survey (2015-16) published by the Labour Bureau consists of unemployment data collected between April 2015 and December 2015 (Labour Bureau, 2016). Correlation of total cognizable IPC crimes with unemployment rates (UPS approach based) for 2016 yields very weak, almost negligible, negative correlation ($r = -0.15$). On the other hand, correlation of total cognizable SLL crimes with unemployment rates yields an equally weak, but positive correlation ($r = 0.11$).

Thus, neither the crime rate of total cognizable SLL crimes nor the total cognizable IPC crime rate shows any dependence on the unemployment rate.

3.4. Crime rates and NSDP per capita income

GDP per capita data available is for different financial years (April to March), whereas crime data is available for a calendar year (January to December). Therefore, to avoid errors of measurement, study uses GDP per capita data for two financial years 2015-16 and 2014-15 (Economic and Statistical Organization, 2018). It performs correlation of such available state-wise data with crime rates of the total cognizable IPC and SLL crimes during 2016.

Correlation shows a consistency in results for GDP per capita data of both the years. Total cognizable IPC crimes show a medium positive correlation at $r = 0.34$ for GDP per capita of 2015-16 and $r = 0.35$ for GDP per capita of 2014-15. Moreover, the total cognizable SLL crimes show a negligible positive correlation at $r = 0.11$ for GDP per capita data of 2015-16 and $r = 0.12$ for GDP per capita data of 2014-15.

Thus, while crime rate of total cognizable IPC crimes shows a slight increase with an increase in the GDP per capita; SLL crimes have no relationship with the GDP per capita.

4. Discussion

Results obtained above do not provide explicit support to proposed hypotheses. The total cognizable IPC and SLL crimes show a weak to negligible reduction with an increase in the police strength per lakh of population. This result is similar to the result found by Guffey, Larson, & Kelso (2010). However, no such relationship exists with the police strength per square Km.

Interpretation of crime rates of different crime categories also yields similar relationship. Strength of the direct as well as the inverse relationship also varies from weak to strong across crime categories. However, for none of the seven crime categories under analysis, crime rates are in a clear inverse relationship with the strength of the police per square Km and the strength of the police per lakh of population. This result is only partially similar to the results obtained by earlier studies (Levitt S. D., 2002; Draca, Machin, & Witt, 2011; Vollaard & Koning, 2009; Lin, 2009). Literature from other countries also discusses a lack of clarity on this subject (Sherman L. , 1992). Previous studies have also found lack of a clear relationship due to reasons such as a underreporting of crimes, policing strategy rather than numbers determining the crime rates and simultaneous measurements of crime rates and police strength (Corman & Mocan, 2000; Levitt S. D., 1998; Rao, 2016; Sherman, et al., 1997; Marvell & Moody, 1996). However, results also show that crime rate is not an essential determinant of the police presence over a period, at variance with the results obtained in the previous studies by Marvell & Moody (1996) and Swimmer (1974).

Analysis of relationship of crime rates with external factors is also at variance from the results obtained by Mavi (2014) and Hazra & Cui (2018). Crime rates for neither of the two crime categories show any dependence on the unemployment rate. GDP per capita also does not exhibit any association with the total cognizable SLL crimes; instead, it is showing a positive correlation with the total cognizable IPC crimes. Delhi has among the lower unemployment

rates and higher per capita income; however, Delhi has highest crime rate of the total cognizable IPC crimes in 2016.

One possible explanation for variation in the relationship of crimes with GDP per capita and unemployment rate is the migration across states. People from economically impoverished states migrate to work in economically prosperous states; they are not accounted for in the GDP data of the host state, however this population is part of the crime data for the state.

These results give a blurred picture of the relationship between police strength and crime. They show a variance from the results obtained by earlier studies. They also flag the need for further research for an in-depth understanding of this relationship in India. Another aspect which merits further research is on the motivations to commit a crime which defy the presence of police, again in the Indian context.

This study has a few limitations. First of these is its reliance on only correlation as a measure of relationship between crime rate and other parameters. Also, the study relies entirely on the government data, which may have few errors of reporting. Another limitation of this study is the comparison of crimes with other police presence over the same period – causal effect of police presence on crime rates can manifest with some time lag. Reliance of this study on a short-term data – one to two years – for analysis is another limitation of the study; considering an extensive time series data may yield a different result. However, literature also has evidence of a reduced crime rate immediately after increasing police presence (Draca, Machin, & Witt, 2011).

References

- Becker, G. S. (1968, Mar-Apr). Crime and Punishment: An Economic Approach. *The Journal of Political Economy*, 76(2), 169-217.
- Corman, H., & Mocan, H. (2000, June). A Time-Series Analysis of Crime, Deterrence, and Drug Abuse in New York City. *The American Economic Review*, 90(3), 584-604.
- Draca, M., Machin, S., & Witt, R. (2011). Panic on the Streets of London: Police, Crime and the July 2005 Terror Attacks. *American Economic Review*, 101(5), 2157-81.
- Dutta, M., & Husain, Z. (2009, January). Determinants of crime rates: Crime Deterrence and Growth in post-liberalized India. *Munich Personal RePEc Archive*.
- Economic and Statistical Organization. (2018). *State wise data*. Government of Punjab.
- Fajnzylber, P., Lederman, D., & Loayza, N. (2002). What causes violent crime? *European economic review*, 46, 1323-1357.
- Felson, M. (1995). Those who discourage crime. *Crime Prevention Studies*, 4.

- Gillan, S. Y., Rehman, H. U., & Gill, A. R. (2009). Unemployment, poverty, inflation and crime nexus: cointegration and causality analysis of Pakistan. *Pakistan Economic and Social Review*, 47(1), 79-98.
- Guffey, J. E., Larson, J. G., & Kelso, C. (2010). Police Officer Staffing: Analyzing the Commonly Held Belief that More Cops Equals Less Crime. *Professional Issues in Criminal Justice*, 5(2 & 3), 29-41.
- Hazra, D., & Cui, Z. (2018, March 15). Macroeconomic Determinants of Crime: Evidence from India. *Journal of Quantitative Economics*, 1-12.
- Islam, A. (2016). *An Exploration of the Relationship between Police Presence, Crime, and Business in Developing Countries*. Global Indicators Group, Development Economics. World bank Group.
- Labour Bureau. (2016). *Report on fifth annual employment - unemployment survey (2015-16) Volume - I*. Government of India, Ministry of labour and employment, Chandigarh.
- Levitt, S. (2002, September). Using Electoral Cycles in Police Hiring to Estimate the Effect of Police on Crime: Reply. *The American Economic Review*, 92(4), 1244-1250.
- Levitt, S. D. (1998). The Relationship Between Crime Reporting and Police: Implications for the Use of Uniform Crime Reports. *Journal of Quantitative Criminology*, 14(1), 61-81.
- Lin, M.-J. (2009). More police, less crime: Evidence from US state data. *International Review of Law and Economics*, 29(2), 73-80.
- Marvell, T. B., & Moody, C. E. (1996, November). Specification problems, police levels, and crime rates. *Criminology*, 34(4), 609-646.
- Mavi, A. K. (2014). An Economic Analysis of IPC Crimes And SLL Crimes In India. *International Journal Of Scientific Research And Education*, 2166-2190.
- Rao, U. T. (2016). *Revised and Final Report, A Study on Non-Registration of Crimes: Problems & Solutions*. Mumbai: Tata Institute of Social Science.
- Rouse, J. J. (1985). Relationship Between Police Presence and Crime Deterrence. *Police Journal*, 58(2), 118-131.
- Sampson, R. J., & Cohen, J. (1988). Deterrent effects of the police on crime: a replication and theoretical extension. *Law and Society review*, 22(1), 163-190.
- Sherman, L. (1992). Attacking crime: police and crime control. *Crime and Justice*, 15, 159-230.
- Sherman, L. W., Gottfredson, D., MacKenzie, D., Eck, J., Reuter, P., & Bushway, S. (1997). *Preventing crime: what works, what doesn't, what's promising*. National Institute of Justice. Department of Criminology and Criminal Justice, University of Maryland.
- Swimmer, G. (1974, November). The relationship of police and crime, Some methodological and empirical results. *Criminology*, 12(3), 293-314.
- Vollaard, B., & Koning, P. (2009). The effect of police on crime, disorder and victim precaution. Evidence from a Dutch victimization survey. *International Review of Law and Economics*, 29(4), 336-348.

About VikasAnvesh Foundation

The Vikasanvesh Foundation (VAF) is an initiative of Tata Trusts which was launched in 2017 as a research organization. The Foundation demystifies the processes of development in the Indian context by undertaking high quality research. In addition to working on themes pertaining to health, education, livelihoods and water in the rural areas, the research at the foundation aims at exploring the interstices of these disciplines. The Foundation engages with a range of partners across India for both problem identification and conducting research on otherwise unexplored themes. Its objective is to assist policy makers and development practitioners by providing practical policy recommendations based on empirical research findings.



VAF

VikasAnvesh Foundation
An Initiative of TATA TRUSTS

Mailing Address:

VikasAnvesh Foundation,
6th Floor, Galore Tech Lohia- Jain,
LMD Chowk, Bavdhan,
Pune - 411021

Email: info@vikasanvesh.in

Website: www.vikasanvesh.in