The nexus between poverty and crime: evidence from India

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Abstract

This paper tests the theoretical relationship between poverty and crime in India. The motivation is the U.S. diplomatic reports on crime that indicated violent crime rates in India increased by 15.1% even though poverty rate decreased by 0.625% within the same period. To explore the relationship between crime and poverty the standard time series techniques are applied. India is taken as a case study. The results indicate that there is a co-integration between crime and poverty. However, crime is found to be more exogenous than poverty. This finding corroborates with earlier studies in the literature that poverty plays insignificant role in driving crime but crime may keep people in poverty due to factors such as, crime record and education. The implication of the result is that the Indian government needs to strengthen the criminal justice system to fight crime while ensuring a fair distribution of wealth.

Keywords: Crime, Poverty, VECM, VDC, India

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Introduction

The study of poverty and crime has been a major tenet in the field of social economics. India has shown strong economic growth in recent times, which was followed by bilateral agreements and strategic alliances, such as the Brazil, Russia, India, and China (the BRIC economies) alliance. The March 2017 economic growth performance in India shows that the national economy expanded by 7.1 percent between January 2016 to March 2017 and 0.625% reduction in poverty rate (Singh, 2017). However, serious crime rates, which include kidnapping, counterfeiting, robberies, and motor vehicle threats increased by 15.1% (U.S. Bureau of Diplomatic Security, 2016). The negative trend between poverty rate and crime rate in India seems to challenge conventional thinking regarding crime causation.

For instance, Harris & Shaw (2000) stated that social class bias produces anger, frustration, and economic need that influence the likelihood to resort to anti-social behavior. Hence, it is important to determine the connection between poverty and crime, and whether poverty is a factor for high crime. To understand the association between poverty and crime, this paper will apply standard time-series techniques of vector error correction and variance decomposition methods. The findings will help policymakers determine whether to invest more in the criminal justice system in order to reduce crime or address macro and micro economic factors that lead to poverty in attempt to reduce crime rates in society.

Theoretical Underpinning

Strain theory states that society puts pressure on individuals to achieve socially accepted goals, such as material wealth and socially relevant status. Angew (2010) stated that the feelings of unjust and anger due to negative experience could lead to strains on the individual. Strainful events and conditions make people feel bad. These bad feelings, in turn, create pressure for

corrective action. Those who lack access to relevant skills or earn the same income as others may resort to anti-social behavior in attempt to let out their anger and frustration.

Conflict theory in Marxism school of thought emphasized on the perpetual conflict among people due to competition for limited resources. The poor individuals see the rich as a competitor rather than complementary, while the wealthy sees conflict through economic materials and social class (Zembroski, 2011). In addition, there is also a human inherent need for power and this need may be threatened by the lack of economic power and access to resources. The weak may respond by engaging in activities that would frustrate and harm the powerful. Hence, the presence of conflict among social class could lead those at the bottom to criminal conduct.

Jacob (2011) introduced the cost-benefit model that enables the individual to resort to antisocial behavior. People respond to incentive, an individual may pursue the greater conduct of such would give him or her the desired outcome. A rational person would engage in antisocial behavior if the act would yield greater benefits than cost of such act (Jacob, 2011). The expectation is that all other factors held constant, a socially and economically deprived person would engage in crime because of his or her conditions, as well as the relatively low cost on engaging in crime.

The strain theory, conflict theory, and cost-benefit theory of crime and delinquency underscores the inherent economic factors that may lead an individual to delinquent behaviors.. The general theme in the theory of crime and delinquency is that poverty could lead to the feelings of anger and frustration, which ultimately cause the individual to resort to delinquent behavior. However, it is important to note that these theories are holding constant other factors, such as religious values, moral and ethical construct, as well as the individual's social network

(Coster, & Kort-Butler, 2006). The theories are focused on economic assumptions and not generalized into moral and ethical values.

Literature Review

The recurring theme in the poverty and crime literature can be grouped into three categories: unequal distribution of wealth, socioeconomic class residential segregation, and access to opportunities. The findings in the literature have differing perspectives with some literature agreeing that people have reasonable control of their future while others emphasized on the importance of creating enable environment to earn sufficient living wage.

Scorzafave and Soares (2009) employed the time-series and cross-sectional techniques to explore the relationship between income inequality and pecuniary crimes. The study concludes that pecuniary crimes are likely to increase by 46 basis point more than income inequality. This seems to suggest that pecuniary crime responds to income inequality, and even with more impact. On the contrary, Chintrakarn and Herzer (2010) addressed the topic of income inequality and crime with state-level panel data in the United States. The findings show that income inequality do not have significant impact in motivating crime. However, as income inequality increases, people may demand for protection from crime, thus reducing the return to crime (Chintrakarn & Herzer, 2010). Hence, it is inconclusive whether income inequality leads to more crime in society due to the differing findings in the literature.

Residential segregation and concentration of people is another aspect of crime nexus poverty that has been explored in social economic literature. Cortes, Santamaria, and Vargas (2016) studied the effect of economic shocks, such as the crash of Ponzi schemes on crime exacerbation with panel data techniques. The findings in their study indicated that economically-

motivated felonies such as robbery is likely to be very high in lower class residential areas perhaps due to the greater impact of economic shocks on the community. A similar study by Iceland and Hernandez (2016) focused on concentrated poverty and geographically imbalanced occurrence of crime. Iceland and Hernandez's (2016) concluded that poor-on-poor crime is higher in high-poverty communities than poor-on-wealthy class crime. The themes seem to suggest that the poor people are more likely to experience antisocial behavior by other poor individuals, which may indicate the economic power to secure personal properties. The density of neighborhood could heighten occurrence of economically-motivated crime and petty crimes (Hovel, 2014).

Access to economic opportunities include an individual's ability to gain high paying job or able to get a job at all. Enamorado and Winkler (2016) applied time series techniques to determine the relationship between drugs trafficking in Mexico versus employment level in the country. The findings indicate that drugs trafficking is higher during low employment level period while there is low drugs trafficking situations during high employment cycle. However, the potential gains from crime and the opportunity costs may limit the influence of unemployment on crime level. Increasing incarceration period and penalties would increase the cost of crime, which would then serve as deterrent and compel would-be criminals to engage in other socially desirable conducts (Fajnzylber, Lederman, & Loayza, 2002).

The general themes covered in the literature review are income inequality, crime and poverty concentration based on geographic location, and access to economic opportunities. Specifically, there is confounding variable between income inequality and crime in society. The poor living in densely populated communities are more likely to experience pecuniary crimes

than middle class and upper class individuals. The gap in the literature is whether crime leads poverty or vice versa.

Data, Empirical Results, and Discussions

Based on the review of literature, there is no findings as regard whether the presence of poverty leads to crime or crime continues to keep people in poverty. Crime could cause poverty in the sense that someone of criminal record would find it difficult to gain access to economically relevant opportunities, such as securing credits and/or occupying highly sensitive positions. To explore this study, the variables used are crime rate (CR), unemployment (UR), poverty rate (PV), and gross domestic product (GD). It is expected that the GDP growth would be a reasonable indicator of wealth in the economy, which would have relative value to poverty rate if income distribution is relatively equal in the economy.

The variables have been transformed into log form to ensure that there is uniformity in the model. The unit roots test is performed to determine the stationarity of the variables. The null hypothesis is nonstationary. To perform the unit roots test, two approaches were used to test stationarity: ADF and PP test. The results of the unit roots test are show below:

	Variable	ADF	Value	T-Stat	C.V.	Result
Log Form	LCR	ADF(1)=SBC	36.2547	-2.6839	-3.4987	Non-Stationary
		ADF(4)=AIC	40.6820	-2.6839	-3.4987	Non-Stationary
	LUE	ADF(1)=SBC	25.8500	-3.5825	-3.4987	Stationary
		ADF(1)=AIC	29.7136	-3.5825	-3.4987	Stationary
	LPV	ADF(1)=SBC	85.3766	-3.0719	-3.4987	Non-Stationary
		ADF(1)=AIC	89.2402	-3.0719	-3.4987	Non-Stationary
	LGD	ADF(1)=SBC	121.7455	0.34141	-3.4987	Non-Stationary
		ADF(1)=AIC	125.6092	0.34141	-3.4987	Non-Stationary

Table 1.0 Log Form ADF Test

The ADF test helps to eliminate autocorrelation problem in the variables. The Table 1.0 shows that only LUE variable is stationary. To further conduct additional unit roots test, PP is used:

PP	T-Stat	C.V	Result
LCR	-3.5438	-3.4064	Stationary
LUE	-1.9539	-3.4064	Non-Stationary
LPV	-3.1850	-3.4064	Non-Stationary
LGD	0.79006	-3.4064	Non-Stationary

Table 2.0 Log Form of PP Test

The PP test corrects autocorrelation problem as well as heteroscedasticity problem in the data set. Similarly, the log form of the PP shows that only LCR is stationary while other variables are not stationary. This leads us to use the differenced variables of both ADF and PP tests.

	Variable	ADF	Value	T-STAT.	C.V.	Result
Diff. Form	DCR	ADF(1)=SBC	31.2411	-5.6558	-3.5005	Stationary
		ADF(4)=AIC	35.0652	-5.6558	-3.5005	Stationary
	DUE	ADF(1)=SBC	22.8387	-5.7559	-3.5005	Stationary
		ADF(1)=AIC	26.6628	-5.7559	-3.5005	Stationary
	DPV	ADF(1)=SBC	79.1971	-3.9682	-3.5005	Stationary
		ADF(1)=AIC	83.0212	-3.9682	-3.5005	Stationary
	DGD	ADF(1)=SBC	118.6974	-3.95332	-3.5005	Stationary
		ADF(1)=AIC	122.5214	-3.9532	-3.5005	Stationary

Table 3.0: Diff. Form ADF Test

The differenced form of the ADF test in table 3.0 shows stationarity of the variables. Given that the ADF test does not correct for heteroscedasticity, we have to use the differenced form of the PP method, which is show below:

PP	T-Stat	C.V	Result
DCR	-14.6013	-3.5486	Stationary
DUE	-4.9725	-3.5486	Stationary
DPV	-4.2457	-3.5486	Stationary
DGD	-4.8336	-3.5486	Stationary

Table 4.0: Diff. Form PP Test

In complementary of the differenced form, the differenced form of the PP test shows that all the variables are stationary. This leads to us to identify the order of the VAR. The order of the VAR helps to select the lag length of the VAR using the AIC and SBC techniques. The table below shows the lag order based on the suggestions of the AIC and SBC.

Order	AIC	SBC	p-value	CV
1	-292.5729	273.4527	[0.963]	5%

Table 5.0: Lag Order

The lag order of 1 has been selected for the VAR model. However, the VAR order cannot tell us whether the variables move together in together in the long-term. However, it is important

to test for co-integration in the variable to understand the theoretical relationships among variables. Two tests can be applied to test for co-integration of variables: Engle-Granger and Johansen. However, Engle-Granger is limited in that it uses residual approach and would identify only one co-integration. On the other hand, Johansen uses maximum likelihood it order to identify more than one co-integration. The Johansen results for co-integration is show below:

Co-integration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix					
Null	Alternate	Statistic	95% CV	90% CV	Result
r = 0	r = 1	41.7006	31.7900	29.1300	1 Co-integration
r <= 1	r = 2	30.7591	25.4200	23.1000	2 Co-integration
r <= 2	r = 3	17.9630	19.2200	17.1800	
Co-integration Based on Trace Statistic					
Null	Alternate	Statistic	95% CV	90% CV	Result
r = 0	r = 1	97.3011	63.0000	59.1600	1 Co-integration
r <= 1	r = 2	55.60006	42.3400	39.3400	2 Co-integration
r <= 2	r = 3	24.8414	25.7700	23.0800	

Table 6.0 Co-Integration Johansen

In the co-integration test, we need at least one co-integration among the variables. There is higher test statistics than the critical value at 95 percent. This shows that there is theoretical relationship among the variables observed. The variables are in equilibrium at some point in the long term. The India government may be interested in knowing that the economic growth in the crime, the crime rate, and poverty rate have some degree of theoretical relationship in the long run. There is common factor issues that may influence all the variables to move together/

The co-integration do not tell us the statistical significance of the variables in the long-run. Given that the purpose of this study is to identify causal relationships between poverty and crime, the LRSM technique will be applied.

The two approaches under LRSM are exact identification and over-identification. Exact identification was imposed on crime (LCR) and then imposed over-identification on unemployment (LUE) and poverty (LPV). In Panel A with exact identification, only GD growth is significant and the same occurrence is observed after over-identifying in Panel B. When the restriction is imposed on poverty rate, the coefficient of GDP remains significant.

Variable	Panel A	Panel B	Panel C
LCR	1.0000	1.0000	1.0000
	(*NONE*)	(*NONE*)	(*NONE*)
LUE	-0.47017	0.00	-0.094094
	(-0.3397)	(*NONE*)	(-0.26234)
LPV	1.5237	0.65549	0.0000
	(-0.9201)	(-0.69094)	(*NONE*)
LGD	-1.2094	-1.1558	-1.0725
	(-0.24456)	(-0.25901)	(-0.27695
Trend	0.092426	-1.1558	0.070932
	(-0.01919)	(-0.25901)	(-0.01525)
CHSQ	None	2.2163(0.137)	2.9762(0.084)
S.E in parentheses			

Table 7.0 LRSM

The purpose of this study is not to test the coefficient but to identify the direction of granger causality in the variables of interest. The co-integration test that has been performed do not have the power to identify the exogenous or endogenous variable in the dataset. That is, to determine the independent and dependent variable in the dataset. To be able to indicate the granger causality, VECM approach could indicate the granger causality among variables to determine the leader and the follower.

Ecm1(-1)	Coefficient	Standard error	T-Ratio[Prob.]	C.V.	Result
dLCR	-0.018685	0.11143	-0.16767[.868]	5%	Exogenous
dLUE	-0..32904	0.12493	-2.6338[.011]	5%	Endogenous
dLPV	0.55614	0.37293	1.4913[0.142]	5%	Exogenous
LGD	1.0571	0.61754	1.7119[0.093]	5%	Exogenous

Table 8.0: ECM

The crime (LCR) and poverty (LPV) are exogenous, which shows that poverty do not impact crime as the socioeconomic and criminology theories seem to suggest. The findings here support the literature that crime may be affect by other factors, such as density and segregation among social class and not directly because of poverty level. The exogenous nature of crime and poverty aligns with Chintrakarn and Herzer (2010) that poverty do not impact crime as widely suggested in criminology theory. At least, poverty do not cause crime at the highest level as would be generally believed. In addition, economic growth, as measured by GDP, do not seem to impact crime rate as GDP is independent of other variables in the model.

Error correction model helps us to identify the exogenous and endogenous variables but it does not us the relative degree of the independence or dependence of each variable in the model. To identify the relative degree of endogenous and exogenous, the variance decomposition technique is applied.

Table 9.0 VDC

Orthogonalized						
	Horizon	LCR	LUE	LPV	LGD	Ranking
LCR	5	**64.06%**	1.88%	24.66%	9.40%	2
LUE	5	3.34%	**34.27%**	0.24%	62.15%	3
LPV	5	11.57%	1.42%	**54.67%**	32.34%	4
LGD	5	2.19%	0.11%	0.16%	**97.54%**	1

Orthogonalized						
	Horizon	LCR	LUE	LPV	LGD	Ranking
LCR	15	**55.05%**	2.07%	30.08%	12.80%	3
LUE	15	2.78%	**64.30%**	32.46%	0.46%	2
LPV	15	10.76%	5.95%	**52.33%**	30.97%	4
LGD	15	2.43%	0.06%	0.08%	**97.44%**	1

Generalized VDC						
	Horizon	LCR	LUE	LPV	LGD	Ranking
LCR	5	**95.50%**	0.12%	4.38%	0.00%	2
LUE	5	5.35%	**43.33%**	50.42%	0.90%	3
LPV	5	89.51%	0.28%	**10.21%**	0.00%	4
LGD	5	0.00%	2.25%	0.04%	**97.72%**	1

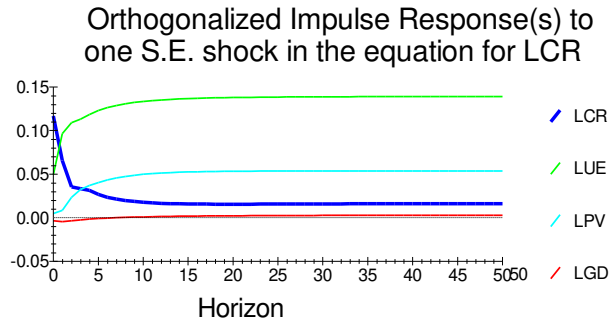| Generalized VDC						
	Horizon	LCR	LUE	LPV	LGD	Ranking
LCR	15	**89.51%**	0.28%	10.21%	0.000%	2
LUE	15	4.25%	**48.13%**	46.36%	1.25%	4
LPV	15	18.69%	12.47%	**68.85%**	0.00%	3
LGD	15	2.49%	0.00%	0.10%	**97.41%**	1

Table 9.0: VDC

Table 9.0 shows Orthogonalized and Generalized VDC analysis in 5 and 15 horizon. In the Orthogonalized variable, crime level depends on its own shock by more than 50%. In Horizon 5, crime can be explained by 64.04% of its past shock while this drops to 55.05% in Horizon 15. However, GDP relies more on its own past shock, which indicates that GDP depends less on other variables in the dataset, making GDP the leading variable. This results indicate the economic growth in India is the most leading variable because it does not rely excessively on others.

The impulse response approach is applied to see the impact on shocking one variable on others. This helps to provide graphical representation of the endogenous and exogenous variable

in the model. The graphical representation show that GDP maintains a relatively stronger path

and likely to stay independent of other variables in the dataset.

Generalized Impulse Response(s) to one S.E. shock in the equation for LCR

Generalized Impulse Response(s) to one S.E. shock in the equation for LGD

Orthogonalized Impulse Response(s) to one S.E. shock in the equation for LCR

**Orthogonalized Impulse Response(s) to
one S.E. shock in the equation for LCR**
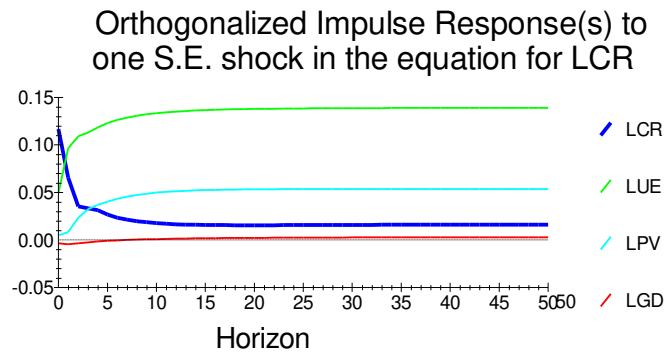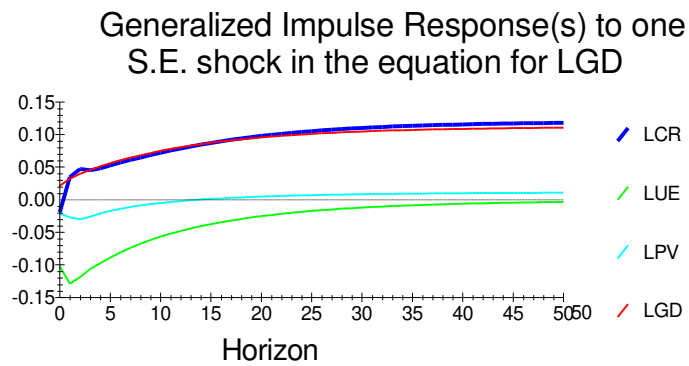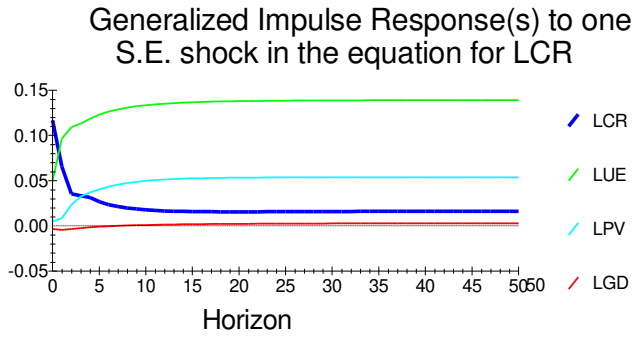
The persistence profile helps to evaluate the system-wide shock whereby the shock comes from external sources. This then plots the time it takes for the variables to come back to equilibrium after being shocked by an external variable. At Horizon 5, the variables start to get back to equilibrium.

**Persistence Profile of the effect
of a system-wide shock to CV'(s)**
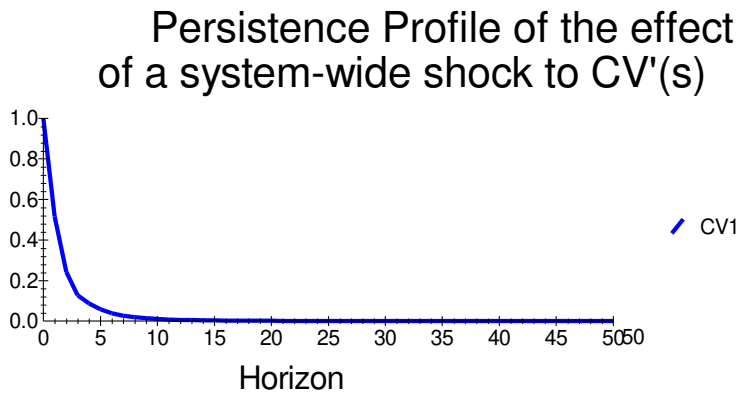
Conclusion

The time-series techniques have been applied to identify the connection between crime and poverty in India. The data shows that there is no significantly identifiable connection between crime and poverty rate. This finding is in line with the work of Chintarkan and Herzer

(2010) that crime rate cannot be linked to poverty because they are not as connected to have significant impact. Crime relies more on its own past than poverty, and crime and poverty both remain independent in the model. However, GDP appears to have the greatest relevance and the most exogenous variable.

The government of India may reinforce the criminal justice system in order to deal with the increasing crime rates in the country. However, the government needs to ensure that the economic growth reaches the lower social class so that the impact can reduce poverty in the country. As more people are able to afford better living, they would have the financial power to afford better security to protect their personal properties against thefts and robberies.

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