

IMPACT OF ECONOMIC, POLITICAL AND
INSTITUTIONAL VARIABLES ON CRIME RATE IN
SELECTED SAARC COUNTRIES



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DECLARATION

I Muhammad Mohsin Saleem solemnly declare and affirm on oath that I myself have authored this M.Phil Thesis with my own work and means, and I have not used any further means except those I have explicitly mentioned in this report. All items copied from internet or other written sources have been properly mentioned in quotation marks and with a reference to the source of citation.

Muhammad Mohsin Saleem

DEDICATION

This thesis is dedicated to my loving Parents, Teachers, all Friends and my beloved brother Muhammad Ahsan Saleem

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ABSTRACT

Present study is conducted to examine the impact of various economic, political and institutional factors on crime rates for six SAARC countries namely Pakistan, India, Bangladesh, Srilanka, Bhutan and Maldives from 1998-2012. For this purpose this study has estimated determinants of crime for total crime and its sub-categories; property crime and violent crime using panel data model and Generalized Method of Moments (GMM) estimation technique to deal with endogeneity. Empirical findings suggest that unemployment rate, per capita income, political factor and institutional quality all have the significant positive impact on all the categories of crime. While the age dependency ratio has a significant positive impact for two of the three crimes. Both inflation rate and education level has a positive influence on total and property crimes but for violent crimes the study finds a negative impact for both of these variables. As for as concerned with the population density it has a significant positive impact on total and violent crimes and significant negative impact on property crimes. The implications emerge from these findings are that unemployment and inflation rate are the important determinants to increase crime rates and political stability play important role to control crimes in SAARC region.

Keywords: Total crime, Property crime, Violent crime, Political factor, Institutional quality, Population density

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CHAPTER 1

INTRODUCTION

1.1 Background

In human history crime always remain a hot subject because in every society crime is a major source of insecurity and discomfort. Regarding the causes and consequences the nature of crime is very complex due to which various academic disciplines such as criminology, sociology, geography, psychology and demography study it from their own perspective. It is hard to find the single universal definition and even determinants of crime due to the cultural, religious, and socio economic disparities but in broader sense crime relates to all those activities and actions that deliberately threatens, or that actually causes physical harm, freedom harm, property harm or the violation of state law. The economics of crime is relatively a new emerging field which tries to identify the socio-economic causes and consequences of criminal activities in a society.

An individual produces criminal behavior due to many reasons. Sometimes a person commits crime because of mental stress and sometimes crime is committed because a person can't find any legal employment in labor market because of high unemployment and sometimes crime is committed without any reason because some people are habitual to do so. There is no permanent definition of crime exist anywhere because it depends on different time period and different regions. According to the Marshal and Clark (1952): "any action that is not allowed to commit by prevailing public law of some country/state for the sake of protection of the public and some prohibitions by some state having judicial proceedings in their own name." Similarly Tappan (1960) wrote "A crime is an instrumental act or omission in violation of criminal law, committed without justification and sanctioned by the state as felony or misdemeanor".

Crime inflicts enormous monetary and psychological cost on the societies where criminal activities are very high so it is a major source of insecurity and discomfort in every society. Different aspects of criminal activities are discussed by different disciplines such as sociology, criminology and law and economics, however these different dimensions are by no means mutually exclusive. A high crime rate prevails as a pain in some society it has a negative externality because it not only harms the potential victims but also has a loss of society, economic and mental wellbeing of other people of the society (Cornaglia and Leigh, 2011). Sometimes crime is adopted by a person after analyzing the possible cost and benefit of their criminal activities and sometimes crime is taken by a person cause of mental illness. Crime is an activity with great economic importance because it produce negative effects on economic activity. On the basis of different assumptions there are few studies exist on the cost of crimes which basically attempts to find the socio-economic cost of crime.¹

SAARC² region is an underdeveloped region and all countries in the region are almost at the same stage of economic development. The area under the SAARC region is about 3% of world's total area and total population of the region is about 21% of world's total population.³ The countries in the region are facing different economic and socio-economic problems and thus increase the criminal activities in the region. Especially countries like India and Maldives they are high population density countries and unemployment in these countries is also high as compare to other countries which results in comparability high crime rate per 100,000 individuals in these two countries. Like other SAARC countries Pakistan is also an emerging economy where crime rate is increasing over time and also it has to face with many economic problems and thus it requires economist's considerable attention to contribute in the discipline of economics and crime in suggesting some preventive measures to control high criminal

¹ Studies like Ehrlich (1973) and Becsi (1999).

² South Asian Association for Regional Cooperation

³ Source is Wikipedia

activities in the society. Institutions also have to play an important role in detection and prevention of crime in these countries so that if institutional quality is good then crimes in these countries are also under control.

The literature on economics of crime has sprang from the main contribution of Becker (1968) and then followed by Ehrlich (1973). In 1968, a paper presented by Becker has changed the way of thinking about the criminal behavior. He has built the first model of criminal choice by stressing that “some individuals become criminal because of the financial and economic rewards from crime compared to the legal work, taking account of the severity of punishment and the likelihood of apprehension and conviction.” The paper of Becker’s has opened the door to a new field of empirical research where the primary purpose was to verify and study those socioeconomic variables that affect crimes. After the modern idea by Becker (1968) some theoretical and empirical studies have started to find out the facts due to which crime rate differs among the societies. In this regard some outstanding work has been done by Ehrlich (1973) and Freeman (1996) in America, while in Spain Buonanno and Montolio (2010) have attempted to explore the socio-economic and demographic reasoning behind crime. In India, Dutta and Husain (2009) investigate the determinants of crime by using state level data from the year 1999 to 2005. Their results show that demographic and socio-economic variables have significant impact on crime.

The impact of unemployment on crime is determined in US by Winter-Ebmer et al. (2001) on the rates of seven felony offenses and find significant positive effects of unemployment on crime rates. However some of the economists of the country Gillani et al. (2009) and Jalil et al. (2010) have also contributed in this discipline to highlight the potential socioeconomic and demographic determinants of crimes in Pakistan.

1.2 Objectives of the Study

Although crime is a global scenario but it gained too much importance in SAARC region. All countries in the region are in the way of progress towards development so it is important to examine that which factors are actually involved in promoting criminal activities in Pakistan and Selected SAARC Countries⁴. More specifically the objectives of the study are:

- To determine the possible effects of economic, political and institutional factors on total crime rates in the sample countries.
- To examine the economic, political and institutional determinants of disaggregated crimes such as property and violent crimes in the sample countries.

1.3 Significance of the Study

The present study covers the SAARC region where the people are already facing severe problems like unemployment, poverty and law and order situation etc. and these factors are a major hurdle in the way of development for these countries. Most studies on crime are done on the time series data that involve economic and socio-economic factors but this study is one step forward it also incorporates political and institutional factors⁵ by using the panel data set of Six SAARC countries. In this study not only the determinants of total crimes but disaggregated crimes like property and violent crimes⁶ are also investigated in the separate models that keeps the significance of the study alive.

⁴ Pakistan, India, Maldives, Srilanka, Bangladesh and Bhutan.

⁵ For Institutions indicators like law and order, voice and accountability and corruption are considered.

⁶ Crimes specifically related to property like robbery, dacoity and cattle theft while violent crimes related to persons like murder, rape, hurt and assault.

1.4 Motivation of the Study

The study focuses on economic, political, and institutional factors that affect total crimes as well as property and violent crimes. The motivation behind the present study is the fact that during the last two decades the overall crimes has been increasing worldwide. Crimes are also considered to be the main hurdle in the process of development for the developing countries as one of the sayings has correctly pointed that the 21st century is going to be the Asia specific in terms of growth so it is need of the time to analysis those factors which promotes criminal activities in SAARC region. Thus the understanding of all these factors at aggregated and also at disaggregated level empowers the authorities to control these crimes.

1.5 Plan of the Study

The study consists of six chapters after giving the introduction in first chapter the chapter 2 is based on theoretical and empirical review of economics and crime literature. Chapter 3 gives the theoretical and empirical specification of the model and chapter 4 is about the methodological framework, variables description and their sources. The empirical results and interpretation is discussed in chapter 5 and last chapter concludes the study and give some policy implications.

CHAPTER 2

LITERATURE REVIEW

A large number of studies have been conducted to study the relationship of crimes with different socio-economic and demographic variables. William Paley (1785)⁷ concentrated on the factors like the probability of arrest and the severity of punishment due to which crimes rate diverge among the societies. Dostoevsky (1866) provide another source of interest in economics of crime from his famous novel “Crime and Punishment”.

After the contribution by above two economists then some economists re-concentrated on economics and crime discipline and after that the remarkable work done by Becker (1968) under the title “ crime and punishment”. Furthermore Fleisher (1966), Landes and Posnars (1974) and Stigler (1974) also contributed a lot in crime and economics discipline to reconnect economists. This session of the study review the empirical work done by different economists in different regions of the world.

2.1 Theoretical Review of Economics and Crime Literature

It is widely accepted that theoretical foundations of human behavior and crime have been focused by Becker (1968), Friedman (1995) and Ehrlich (1973). Becker has presented a model in which he argued that every criminal is in fact an economic agent who commits crime only when he anticipates increase in his expected utility. He has favored to private execution of law rather the public execution in prevention of crime because public enforcement has awkward incentives. Finally the basic analysis of Becker was about the possibility of arresting the criminal and the cost of conviction.

⁷ William Paley wrote a book in 1785 entitled “The Principles of Moral and Political Philosophy” in which one chapter is also about the different factors behind the crimes.

Landes et al. (1974) have criticized the idea of Becker of turning public enforcement in to the private enforcement of law. They believe that private enforcement of law has some drawbacks like it can not only lead us towards under enforcement but over enforcement is also possible. They are of the view that only in civil offenses private enforcement is favorable because these can be easily perceived and can also be penalized at zero cost in term of monetary fines.

Friedman (1984) has defended the above idea of Becker (1968) of private enforcement of law. He has mentioned the historical example of Ireland in his article “an efficient enforcement of law” where the private enforcement conquered for almost three hundred years not only in civil felonies but also in severe immoral offenses like murder. He has concluded that the effectiveness of private enforcement of law in civil offenses is the only reason of Ireland sound formal and informal institutions during this period. Finally he suggests that if some minor changes are made in some of the informal and formal institutions that have a role in crime prevention of some state than the deficiencies regarding to private enforcement of law in criminal offenses can easily be removed.

Friedman (1995) contributed again in economics and crime discipline and supports the Becker idea of private execution of law with his new idea of turning the criminal law in to the civil law. He has used a simple assumption in his paper that all criminals, crime control institutions and potential victims all are rational by their own sides. He has stated that before committing a crime both the criminals and the crime prevention authorities make their cost and benefit analysis in that way for the crime prevention authorities the punishment for the crime deterrence in term of imprisonment or implementation owns some sort of cost. He concludes that to lead the society towards the optimum enforcement of law it is necessary to convert criminal law in to the civil law that will enable us to penalize the criminals in term of monetary fines at zero cost.

2.2 Empirical Review of Economics and Crime Literature

Empirical background of crime and economics discipline helps us to empirically identify several determinants of crime. Since multi-disciplines are involved in criminal activities but current study focuses only on those national and international studies which are related to detecting those economic and socio-economic variables that can possibly affect the crime rate in a society.

Fleisher (1966) has observed the possible impact of income on criminal activities and argued that there are two possible effects of income on the criminal behavior. First one is demand side effect which is positive and other one is supply side effect which is negative. He has reported that in demand side effect when people have higher incomes then in case of arrest they have more to lose so they hesitate to take part in criminal activities. While discussing supply side effect he claims that when there is more income in the economy then people interested to get it from some criminal activities. He shows that 1% increase in income decrease criminal activities by 2.5% so demand side effect is more than the supply side effect.

Bechdolt et al. (1975) empirically examine different socio-economic variables and their possible impact on crimes in the two big US cities, Chicago and Los Angeles. He first decomposes total crimes in to violent and property crimes and then determines the effect of population density, income level, crowding and unemployment on crime rate. In his empirical work he concludes that not only the unemployment rate but population density and income level also have a strong impact on crime rate in these cities. While discussing the violent crime rate both population density and unemployment rate plays a dynamic role to motivate these sort of crimes. Finally in case of property crime he claims that unemployment rate has strong positive impact on property crimes as compare to poverty.

Fajnzylber et al. (1999) have conducted a study to investigate the determinants of crime rates for a sample of both developed and developing nations for the time period 1970-1994. Deterrent and economic variables like GDP growth, income level, average years of schooling of adult population, income inequality and severity of punishment are examined for their possible impact on crimes. GMM technique has been used and the results indicate that income inequality and GDP growth had significant coefficients with positive and negative signs while income level, education and severity of punishment all have insignificant effect on crimes.

Meloni et al. (2000) have conducted a study in Argentina to find out the determinants of crime rate for the period 1990-1999. The study considers different economic and deterrent variables like probability of imprisonment, unemployment rate, income inequality and GDP per capita as explanatory variables while total crime rate taken as dependent variable. Co relational technique has been used to find out the results. After regressing the result obtained indicates that both unemployment and GDP per capita has a positive significant effect on crime rates.

Commer (2003) has examined the possible effect of different macroeconomic factors on crime rates in US from the year 1967 to 1998. The study takes each variable separately and then checked the possible influence on crime rates in US state. The variables considered in the study are poverty, higher education, unemployment rate, prison population and inflation rate. OLS, and Durban Watson test are applied to find the results. There is a positive and significant impact of inflation, unemployment and poverty on crimes while education having unexpected positive relation with crimes.

The relationship between property crimes and rate of unemployment has been discussed by Edmark (2003) uses a panel data set of Swedish countries from the year 1988 to 1999. The study has incorporated other different economic and demographic variables like population density, education, average income and social allowance to more deeply analysis. The results

indicated that there is a positive and significant impact of unemployment on most of the property crimes like car theft, bike theft and burglary.

The effect of different economic, demographic and socio-economic variables on crime rates was discussed by Gumus (2004) by using the data set of 75 US cities. His study has primarily focused on two types of urban crimes violent crime and property crime. He takes unemployment rate, poverty and per capita income as economic determinants of crime whereas black population, city government police expenditure and high school dropouts as socioeconomic and demographic variables. By using the OLS method he concludes that income inequality, per capita income, unemployment rate, presence of black population and expenditures on police are important determinants of crimes in urban area.

Montolio et al. (2005) examine the effect of different socio-economic and demographic variables on the crime rates in Spain for the time period 1993 to 1999. In the study he has incorporated total crimes as well as property and violent crimes. Different variables like unemployment rate, GDP per capita, higher education and percentage of young men are investigated to check the possible impact on total, property and violent crime rates. The study employs Generalized method of moments (GMM) and the results indicate that socioeconomic variables had more significant positive impact on property crime rates while demographic variables expose important and significant impacts in particular for violent crimes.

Hartung et al. (2007) determine the impact of different demographic factors on both property and violent crime rate in Sao Paulo for the time period 1975 to 1985. The variables like education, urbanization, youth unemployment, teenager mother, per capita GDP and single mother are considered. The authors use the co relational technique and the results indicate that portion of children that are born from the teenager mothers and portion of children upraised without their mothers or fathers both have a significant effect on property and violent crimes.

The relationship of education and crimes is analyzed by Lochner (2007) in US using the time period spanning from 1960 to 1990. Arrest rates for different crimes like rape, robbery, murder, assault and burglary are considered while other variables include educational level, arrested males and age group. The study applies OLS technique to find out the impact of independent variables on crime rates. After regressing the results indicate that education attainment has a significant negative impact on crimes. Author suggested that in order to reduce criminal behavior government should provide education to beware its citizens.

Dutta and Hussain (2009) have analyzed the effect of different socio-economic and demographic variables on crime rates in India for the time period 1999 to 2005. Income inequality, urbanization, education, load on police force, quick disposal of case and conviction rate variables are considered. Sure model technique has been employed by the study to find out the results. After regressing their results show that demographic as well as socio-economic variables has significant impact on crime rates in India.

Tang (2009) has studied the impact of different economic factors on crime rates in Malaysia for the time period 1970 to 2006. Johansen cointegration technique has been used to examine the long run relationship between inflation, unemployment and crimes rate. The results obtained indicate that both unemployment and inflation has positive significant impact on crime rates in the long run while in the short run only unemployment has significant impact on crime rates. Inflation rate does not have any impact on crime rate in Malaysia and elucidates that inflation has not a direct effect and it takes time for inflation to steadily decrease the purchasing power of individuals and force them to commit crimes.

The determinants of crime rate in Greece is examined by Gkanas et al (2009) by using the data set from 1971-2006. Variables like total crime rate, conviction rate, unemployment and migration were incorporated in the study. To examine the long run relationship between

crime rates and other explanatory variables the study employed Johansen cointegration technique. Results explain that the unemployment rate has significant positive impact on crime rates while the other variables has insignificant impact on crime rates in Greece.

Gillani et al (2009) empirically examine the effect of various economic indicators like inflation, poverty and unemployment on crime rate for the period 1975 to 2007 in Pakistan. By using Johansen cointegration approach and Granger causality test they conclude that crime is positively related to unemployment, inflation and poverty. The authors further recommend that in order to control the increasing trend of crimes in Pakistan income inequalities, inflation, GDP growth and unemployment problems should be properly addressed by the policy makers.

The determinants of crime in England and Walves are analyzed by Han (2009) using the empirical analysis from year 1971 to 2000. Detection rate, unemployment rate and severity of punishment are considered as the explanatory variables. To test cointegration the study uses Engle granger the two step procedure and Phillips-Person test is used as a unit root test. Detection rate and severity of punishment both had a negative impact on crimes. The author suggested that increased employment and severity of punishment can be helpful to eliminate the chances of committing crimes.

Gonzalez et al. (2010) have analyzed the impact of different economic and deterrent variables on crime rates in Uruguay for the period 1986-2006. He examines the impact of explanatory variables on total, property and violent crimes. Population density, real per capita income, youth unemployment, head of household's education and conviction rate variables are considered. GMM estimation technique has been used to find out the results. Population density and youth unemployment both have positive impact on crime rates while there is no significant effect of socio-economic variables on crimes and also conviction rate is significant to decrease crime rates in Uruguay.

Omotor (2010) has conducted a panel data study to find out the determinants of crime rates for 28 states of Nigeria for the period 2002 to 2005. The study takes total, property and violent crimes and also incorporate different demographic and socio-economic variables like population density, per capita income, unemployment and education to examine their possible impact on increasing criminal activities. The study has employed Ordinary least square technique and the results explain that both per capita income and population density has positive significant impact on all forms of crime while unemployment has negative impact on all crimes. The author also highlighted the poor performance of law execution agencies in detection and prevention of crimes.

The pragmatic connections between education and crime is deeply analyzed by Machin et al. (2010) using numerous data sources. The study is conducted in Britain from period 1984 to 2002 in order to examine the possible effect of education on crime. The study uses quasi-experimental approach and two stage least square (2SLS). The relationship between crime and education is found negative and significance because as in a society ratio of highly educated persons increase this can produce significant social benefits in shape of increase in employment which increase families income and thus in turn reduce the crime rate.

Kadri et al. (2011) have examined the relationship between crime and different economic and socio-economic variables in Pakistan for the time period ranging from 1980 to 2007. The variables considered are unemployment, inflation, investment, education and Govt. health expenditures. To examine the long run relationship between independent and dependent variables study used Cointegrating regression technique. The results indicate that education and health both have a positive significant impact on crimes while inflation and unemployment has insignificant relationship with crime and investment is found to be significant and negative impact on crimes.

Hamid et al. (2012) examine the impact of different economic and socio-economic variables on crime rates in the panel data study of 21 countries for the time period 1961-2001. Variables like unemployment, interest rate, inflation and income are taken as explanatory variables. To analyze the model the study employed panel-error-correction based cointegration and the results obtained indicate that inflation, unemployment and interest rate these variables effected crime rates positively while income has negative impact on crime rates.

The determinants of crime rate in Pakistan is analyzed by Aurangzeb (2012) from 1980-2010. By using the regression analysis the results showed that GDP, literacy rate, house hold consumption, wage rate and population all have strong positive and significant effect on crime, while electricity crisis and migration in and out have weak positive relation with crime. The study suggested that Government should have proper control over electricity crisis, population growth and should also take proper steps to provide more employment opportunities to reduce the criminal activities in Pakistan.

2.3 Conclusion and Literature Gap

The above literature on study of crimes is comprised of both time series and panel data studies in which different economic, socio-economic, demographic and deterrent variables are incorporated. We have observed that in the existing literature economic variables like unemployment, inflation and income inequality all have positive impact on crime rates while other factors have mixed influence on criminal activities. There is no empirical study that is specifically conducted to examine the determinants of increased crime rates with a focus on the countries of SAARC region. The present study also incorporates property and violence crimes along with the total crimes in order to make more inclusive study of crimes in the SAARC region so the present study fills this research gap.

CHAPTER 3

THEORETICAL FRAMEWORK

In this chapter first the study briefly discusses the economic rationale behind the crimes and then in the later part study will discuss different theories on crimes.

3.1 Theoretical Specification of the Model

In modern economics criminal behavior can be discussed in various ways. Most of the economists in their empirical studies focuses on rational economic theory⁸ to explore the criminal behavior of the society. Some individuals become criminals due to the economic and financial reward from the criminal activities as compared to legal work [Becker (1968)]. Mathur in 1978 states that in rational economic theory economists believe that a person who commits crime is an economic agent because by doing so he increase his expected utility.

Thus the choice to commit or not to commit crime depends on the net payoff ($\$_i$) of some criminal activity. The decision to participate in an illegal activity (D_i) is a decreasing function of expected loss (L_i) and increasing function of its expected gain (G_i) i.e.

$$D_i = f(L_i, G_i)$$

Whereas;

$$L_i = f(Mw_i, P_i, F_i)$$

$$G_i = f(A_i)$$

⁸ Becker (1968) presents the rational economic theory in which he argues that every criminal, victims and crime control authorities are rational by their own means.

Where L_i is the total cost or loss faced by a criminal while committing a crime, mw_i represents the labor market wages that are foregone in case of arrest of criminal, p_i is the probability of being arrested and finally f_i represents the penalties or fines.

G_i is the gross gain and it is positively related to A_i , whereas A_i is something that is achieved from the criminal activity. Finally the net payoff ($\$_i$) is the difference between the total gain and the total loss.

$$\$ _i = G_i - L_i \quad \text{Or} \quad \$ _i = A_i - mw_i - p_i - f_i$$

So the net payoff ($\$_i$) is declared as the expected utility of committing a crime and the criminal activity only takes place if,

$$\$ _i > 0$$

$$\text{Or} \quad E [G_i] > E [L_i]$$

Thus from the above discussion, it can be concluded that the person who will commit crime his main objective is only the maximization of utility.

3.2 Theories on Crimes

Many theories on criminal behavior have been developed to classify several factors that cause in increased crime rates. The Classical criminology theory in which Siegel (2001), Barkan (2006) and Williams & McShane (1999) all believe that individuals have free will either to commit or to avoid crimes.

Shaw and Mackey (1942) have developed the theory called “Social disorganization theory” in which they argue that societies with disorganization discriminated by poverty, residential mobility and population heterogeneity deteriorated the practicality of social controls. These weaken social controls thus lead to the failure of societies to resolve problems which subsequently lead to crimes. Social disorganization theory mainly focuses on the effects of geographic and situation specific characteristics associated to crimes. Thus the absence of public provisions combined with the problematic characteristics of disorganized systems like heterogeneity population and poverty are the strong analysts of high crime rates.

Another theory named as “Containment theory” originated by Walter Reckless in which he has stated that all humans are subject to criminal behavior. He further explain that there are two forces of containment i.e. Inner and Outer containment that detain a person from committing a crime. Inner forces involve moral and religious beliefs, social controls over behavior and personal sense of right and wrong while the outer forces dealt with the family members, social environment or from the others who effect the individual to some degree. According to reckless we all are put throughout pushes and pulls that push or pull an entity in to deviant manners. We can perceive such pushes when kids are exposed by other group to join a gang. As for as concern for the pull factor reckless mentioned that those children in sort to get money they joined a bunch of criminals and reach their purpose.

Marx has developed theory called “Conflict theory” in which he has stated that only power is the core of all social relationships. According to Marx the systems of stratification derive from the relationship of the social groups to the forces of production. In all the stratified societies, there are two major social groups, a ruling class and a subject class. The power of the ruling class derives from its ownership and control of the forces of production. The ruling class exploits the subject class and fight over the scarce resources of society and that leads them in crime and violence. Marx further explains that the competition puts the society off-balance until dominant group gains control and stability through power and that will create discrepancy which will stimulate crime.

Another theory entitled “Criminal culture theory” is first revealed in a book written by Albert Cohen (1955) with the title *Delinquent boys*. He has thought that the disruptive behavior from the young people is a conflict against what the middle class culture supposed a distinctive society should be. For the purpose that these conditions make them incapable of accomplishing achievements rightfully thus the lower class people exercise a structure of society argument that Albert tags status worsening. He further mention that because of lower class young people do not fix themselves in the situation they form groups to preserve themselves and are differing the social order. Albert Cohen concludes the criminal culture theory and maintained that these criminal subcultures are not formed by the person himself but by the reasons that will force the individual in to these shapes.

Ronald Aker (1973) and Albert Bandura (1977) both are of the view that individuals mostly learn how to act and adopt the behavior by watching others. Individual particularly a children who live in such a neighborhood which is surrounded by criminals then he must be at a high risk because he also adopts the same behavior that he sees every day. This process is known as the behavior modelling in which sometimes behavior may be indirectly reinforced and sometimes lifting the behavior that has been purely observed. They further revealed that in

societies where family members and friends steal then the young generation will ultimately model that behavior and originate their new life of theft.

Some researchers linked indirectly crime and poverty and stated that it is widely believed that more of the crimes are generally committed by poor people. However poverty is more linked to property crime not to violent crime (Chester, 1976). By discussing this Adolphe Quetelet (1987) has found that property crime rates are more in wealthy societies because there is more to steal and similarly less number of property crimes occur in poor societies and concludes poverty to be a major determinant of crimes.

Finally from the above discussion on different theories it can be concluded that there may be various reasons that affects crime rates such as poverty, residential mobility, unemployment, poor friends, racial and ethnic mix and inflation.

CHAPTER 4

METHODOLOGY AND DATA

This chapter covers the empirical specification of model and estimation techniques as given in section 4.1 and 4.2 respectively while in section 4.3 sample countries, sources of data and variable construction are discussed. The last section of chapter is about the crime trends in SAARC region.

4.1 Empirical Specification of Model

To determine the possible factors that have an influence on crimes the study has estimated the following model as suggested by Meloni et al.(2000), Hussain et al. (2009), Omotor (2010) and Hamid et al. (2012):

$$Cr = f(Une, Pop, Inc, Edu, Pol, Age, Inf, Ins) \dots\dots\dots (4.1)$$

Where as

- *Cr* = *Crime Rate*
- *Une* = *Unemployment Rate*
- *Pop* = *Population Density*
- *Inc* = *Income Level*
- *Edu* = *Higher Education*
- *Pol* = *Political Situation*
- *Age* = *Age Dependency Ratio*
- *Inf* = *Inflation Rate*
- *Ins* = *Institutional Quality*

The above crime function involves economic, socio-economic, political and institutional factors and now following is the complete specification of all the three models of crime.⁹

⁹ Total crime, Property crime and Violent crime.

$$\ln (TC_{it}) = \alpha_i + \beta_1 Une_{it} + \beta_2 \ln(pci)_{it} + \beta_3 \ln(pop)_{it} + \beta_4 Ins_{it} + \beta_5 Age_{it} \\ + \beta_6 \ln(edu)_{it} + \beta_7 Pol_{it} + \beta_8 Inf_{it} + \epsilon_{it} \dots \dots \dots (4.2)$$

In the above equation Ln (TC_{it}) represents logarithm of Total crimes taken as dependent variable, while i = 1, 2, 3..., N represent countries and t = 1, 2, 3..., T represents time period. β₁, β₂, β₃, β₄, β₅, β₆, β₇, and β₈ are the coefficients to be estimated whereas ln (pci)_{it}, ln (pop)_{it} and ln (edu)_{it} are logarithm of income, population density and education respectively and ε_{it} is the error term.

It is expected that B₁ is positive which means that more unemployment will be the reason of high crime rates in the society. In the study of Meloni et al. (2000) conducted in Argentina they argues that unemployment is directly affecting the crime rates. B₂ is the coefficient of Income, is expected to be a negative determinant of crimes as Hamid et al. (2012) also concludes that an increase in income level has the tendency of reducing criminal activities in the society. B₃ is the coefficient for population density, expectedly positive sign which means it has a direct relation with crimes. Bechdolt et al. (1975) reported that more populated density areas also have more incidence of crimes. B₄ is the coefficient of Institutional quality and it is expected to be negative which means increase in good quality of institutions will decrease the crime levels in the society. B₅, the coefficient of Age dependency ratio with expected positive sign indicates that higher the age dependency ratio there will be more crimes in the society. B₆ is coefficient for Education and it is also expected to be negative, Montolio et al. (2005) have conducted a study in Spain and argues that more education results in less crime in the society. B₇ is the coefficient of Political factor with expected positive sign which means that political instability guide towards the increase in number of crimes. B₈ is the coefficient of Inflation rate with expectedly positive sign, Coomer (2003) has conducted a study in US and explain that

high inflation rate decrease the purchasing power of individuals and force them to commit crimes.

Total crimes¹⁰ is decomposed in to two sub categories i.e. property crime¹¹ and violent crime¹² in order to make deeper analysis of determinants of crimes. Following Becsi (1999) and other international literature it is stated that the violent crimes are the byproduct of property crimes because these crimes are to be committed for some economic gain. So violent crimes are committed not only for passion but are also committed for some economic benefit directly or indirectly.

$$\begin{aligned} \ln(PC_{it}) = & \alpha_i + \beta_1 Une_{it} + \beta_2 \ln(pci)_{it} + \beta_3 \ln(pop)_{it} + \beta_4 Ins_{it} + \beta_5 Age_{it} \\ & + \beta_6 \ln(edu)_{it} + \beta_7 Pol_{it} + \beta_8 Inf_{it} + \mathcal{E}_{it} \dots \dots \dots (4.3) \end{aligned}$$

$$\begin{aligned} \ln(VC_{it}) = & \alpha_i + \beta_1 Une_{it} + \beta_2 \ln(pci)_{it} + \beta_3 \ln(pop)_{it} + \beta_4 Ins_{it} + \beta_5 Age_{it} \\ & + \beta_6 \ln(edu)_{it} + \beta_7 Pol_{it} + \beta_8 Inf_{it} + \mathcal{E}_{it} \dots \dots \dots (4.4) \end{aligned}$$

¹⁰ Robbery, Theft, Burglary, Rape, Assault and Murder etc.

¹¹ Robbery, Cattle theft, Dacoity, Burglary and Theft.

¹² Rape, Kidnapping, Murder, Hurt and Assault.

4.2 Estimation Techniques

To estimate the determinants of crime rate panel data estimation technique is suitable as there is data of six counties for the period of 1998 to 2012. The econometric technique involves panel unit root test to examine that whether the problem of unit root exists in the data set or not. This study has applied Levin, Lin and Chu (LLC) test. After the unit root test correlation matrix is estimated to see that the multi-collinearity problem among the explanatory variables exists or not. To estimate all the three crime models study first applies fixed effect method and then robustness regression with this test will also apply to tackle the problem of heterogeneity and multi-collinearity in the data set. Finally the Generalized Method of Moments (GMM) technique has been used to conclude the results.

4.2.1 Panel Unit Root Test

When we are dealing with the panel data series it is necessary to first determine the order integration of variables by applying panel unit root test. According to Asteriou and Hall (2007)¹³ if data set is non stationary and those non stationary variables are used in econometric estimation than that may lead to bogus results. To check stationary of the variables, the study will apply Levin, Lin and Chu (LLC) test. The test was published in 2002 by Levin and Lin and co-author Chu. Levin et al. (2002) adopted a unit root test which is in fact be seen as the extension of the DF test. The LLC model takes the following form:

$$\Delta Y_{it} = \alpha_i + \rho Y_{it-1} + \sum_{k=1}^n \phi_k \Delta Y_{i,t-k} + \delta_i t + \theta_t + \mu_{it}$$

LLC test allows for the two way fixed effects one is coming from α_i and the second one is from the θ_t known as the unit specific fixed effects and unit specific time trends. The null hypothesis of this method is as follows:

¹³ Dimitrios Asteriou and Stephen G. Hall are the writers of Book entitled “Applied Econometrics a modern Approach”

$$H_o : \rho = 0$$

$$H_a : \rho = 0$$

The null hypothesis states that there is a problem of unit root in the series while the alternative hypothesis indicates that the series is stationary.

4.2.2 Correlation Matrix

The relationship between explanatory variables is usually determined by the correlation matrix approach. The correlation among the variables specifies the problem of multi-collinearity and the high multi-collinearity leads to the misleading results. To do any further analysis it is necessary to investigate that either the problem of multi-collinearity exists among the explanatory variables or not. To detect the level of correlation among variables correlation matrix approach is frequently used in the previous studies¹⁴. So in this case the study formed the correlation matrix to check that how much correlation exists among the variables.

4.2.3 Generalized Method of Moments (GMM)

Generalized Method of Moments (GMM) is a method for estimating the parameters in statistical models developed by Blundell and Bond (1998). It is the technique where suitable instruments are used and validity of instruments is generally tested by J-statistic as proposed by Hansen (1982). J-statistic has chi-square distribution in which the number of over identified restrictions are usually equal to number of restrictions and has a null hypothesis that instruments used are valid. To estimate all the three models of crime study finally decided to employ Generalized Method of Moments technique.¹⁵

¹⁴ Coomer (2003), Hussain et al. (2009), Jalil et al. (2010) and Gonzalez et al. (2010).

¹⁵ It is expected that there may exists a reverse causality problem between unemployment and crime rates that will lead to the endogeneity problem in the model.

4.3 Data

4.3.1 Sample Countries

The time period selected for the study is comprise of 15 year observations ranging from 1998 to 2012. The sample selection of countries is based on the availability of data, first it is decided to incorporate all the SAARC countries in the study but later non-availability of crime data for some countries¹⁶ restricts to work only on selected countries. The study has used the data set of six countries which are given below:

- Pakistan
- India
- Bangladesh
- Srilanka
- Bhutan
- Maldives

Whereas countries like Afghanistan and Nepal were also consider to include in the study but are not included because the data for these countries is not available for all years and also the source of data is not reliable.

¹⁶ Afghanistan and Nepal.

4.3.2 Variables Description and their Sources

Variables	Description	Sources
UNEMPLOYMENT	Unemployment rate	WDI
INCOME	GDP Per capita	WDI
EDUCATION ¹⁷	Higher school Enrollments	WDI
POPULATION DENSITY	People per sq. km of land area	WDI
AGE DEPENDENCY RATIO ¹⁸	Productive and Unproductive age group	WDI
INSTITUTIONAL QUALITY ¹⁹	WGI Governance Indicators	WGI
POLITICAL FACTOR ²⁰	Political situation	WGI
INFLATION	Consumer Prices (annual %)	WDI

Dependent variables used in the study are total crime, property crime and violent crimes and the description used for these variables is the annual number of total, property and violent crimes registered in the country. Crime data for each country is obtained from different sources which are given below:

¹⁷ Tertiary education is used as a proxy for higher education in which percentage of tertiary enrollment in total school enrollment is used.

¹⁸ It is the ratio of unproductive age population to productive age population where 0-14 and 65 and above are considered as unproductive and 15-64 are considered as productive age group.

¹⁹ WGI stands for Worldwide governance indicators in which six different governance indicators are considered. For the construction of Institutional quality index study used three institutional indicators e.g. voice and accountability, law and order and corruption. The data collection of WGI is based on 31 different data sources which include surveys of firms and household, non-governmental organizations, commercial business information providers and public sector organizations worldwide. To combine many individual data sources in to aggregate governance indicators WGI used a statistical methodology known as the unobserved component model (UCM).

²⁰ For political factor the WGI data set is used in which indicator of governance is measured through political situation of a country. For this WDI assigns value ranges from 2.5 to -2.5 which explains strong and weak political situation in a country.

1. Pakistan, India and Bhutan:

The data for Pakistan and Bhutan is collected from both countries respective Statistical year books published by their government. India data is collected from Indian national crime record bureau.

2. Srilanka, Bangladesh and Maldives:

The crime data for Srilanka is obtained from Srilanka Police Crime investigation Department. Data for Bangladesh is obtained from Bangladesh Police Service. Maldives data is obtained from different sources e.g. Maldives Statistical Year book, Maldives Police and (UNODC)²¹.

Unemployment

The first economic variable is unemployment and it is observed that when unemployment rate increases the conditions for earning legal money declined and the criminal activities tend to increase because the real cost to commit crime for an unemployed labor go down. So the crimes are affected with the worse labor market conditions [See Meloni et al. (2000), Gillani (2011)].

Income

The Second variable used in the study is per capita income of individuals. As GDP per capita in any country increases we expect that wealth of every individual in the country to increase thus on the base of per capita income the incentive for committing crime is reduced [Fleisher (1966), Hamid et al. (2012)].

²¹ United Nations office on Drugs and Crime

Population Density

The next variable is demographic in nature and termed as Population density. The relationship between crime rate and population density has been investigated by many National and International studies and declared population density to be a possible determinant of crime rate. For any society where population density is high this ultimately reduces the probability of arrest for the criminals and also to reduce the expected cost of crime and thus encourage the criminals to commit more crimes. [Bechdolt et al. (1975), Allison (1972)].

Institutional Quality

For any country the quality of institutions is very important in controlling crime related activities in societies. In SAARC region the arrangement of institutions are such that they are not suitable to control criminal activities. Institutions like law and order, corruption and bureaucracy quality are the important determinant of crime rates and crime in these countries is highly dependent on quality of these institutions. So if quality of these institutions is good then crimes are also under control.

Education

The next variable is the level of education and it also has a significant impact on crime rates. The cost of crime for a highly educated person is also high because attaining high education entails some financial and time investment which not only enhance the opportunity cost of crime but also promotes honesty, forward looking and vision to serve the society. Therefore educated person has very fewer chances to participate in illegal activities [Montolio et al. (2005), Usher (1997)].

Inflation

The next variable used in the study is inflation rate which is generally considered as the increase in price level and thus decrease the purchasing power of individuals and force them to commit crime so it is an important determinant of crimes [Jalil (2010), Coomer (2003)].

Age Dependency Ratio

The next variable incorporated in the study is Age dependency ratio. It is the ratio of unproductive age group to productive age group. Crime rates in any society are very much dependent on age dependency ratio. If unproductive age group in any country is more than the productive age group then it is ultimately shift more burden on the productive age and it is hard for them to attain the basic living standard within the given resources and thus motivated themselves to engage in some kind of criminal activities.

Political Factor

The last variable is the political factor and it reflects the observations of the probability that in a country government is threatened or it can be overthrown by undemocratic or passionate means which also includes politically encouraged violence. So if country is not politically stable then politically encouraged citizens breach the rule of law and political party's workers create violence in the country which increases the overall criminal activities in the society.

4.3.3 Institutional Quality Index

To examine the impact of quality of different institutions on crime rates this study has used different measures based on the dataset developed by Worldwide Governance Indicators (WGI). For the construction of institutional quality index the study uses three indicators e.g. Rule of law, Control of corruption and Voice and Accountability. Each governance indicator is assigned values by WGI ranges from 2.5 to -2.5 which explains strong and weak performance of institutions. The indicators are briefly discussed below:

1. Rule of Law²²

It reflects the perceptions of the extent to which citizens have confidence in and abide by the rules of their domestic laws as well as the quality of various enforcements of contract. It also includes property rights and the systems operates in the courts and other law enforcement agencies are included in the definition of rule of law.

2. Control of Corruption:

Control of corruption reflects the perceptions to which extent public power is exercised for the private gain. It includes both petty and grand²³ forms of corruption as well as the imprisonment of the state by elites and private comforts.

3. Voice and Accountability:

It takes into account the freedom of expressions and speech, the liberty of association and an open media that are the reflection of the perception of the public in which they take part in the process of selection of the state authority.

²² Definition of components of Institutional quality are from WGI documentation section.

²³ Petty corruption usually occurs at a smaller scale generally pursued by junior and middle level officials while grand corruption occurs at the highest levels of government.

For the construction of Institutional quality index the study used Principal component analysis (PCA)²⁴. Principal component analysis is the technique used for accumulating the social indicators. Using PCA helps to lessen the dimensionality of a vast dataset that contain many interrelated variables, and convert the variables into a smaller number of representatives. A set of new variables is thus generated information retained as from the few early PCs which elucidate extreme variability in the data set, Bishoi (2009) concludes that those PCs explain more than 60% of variability in the composite index are recalled as rule of thumb. So each variable in the principal component analysis is written as the linear combination of PCs:

$$X_d = \sum_{i=1}^n a_{di}P_i, \quad (d = 1, 2, \dots, n)$$

Where X_d is the variable under consideration, P_i is the i^{th} principal component, a_{di} is the factor loading of the d^{th} variable on the i^{th} principal component. The principal components are given by:

$$p_i = \sum_{d=0}^n \frac{a_{di}X_d}{\pi_i}$$

Where π_i represents the Eigen-value associated with the p_i . Institutional quality index can be generated by using the principal components in the following formula:

$$IQ = \frac{\sum_{i=1}^n (p_i E_i)}{\sum_{i=1}^n E_i}$$

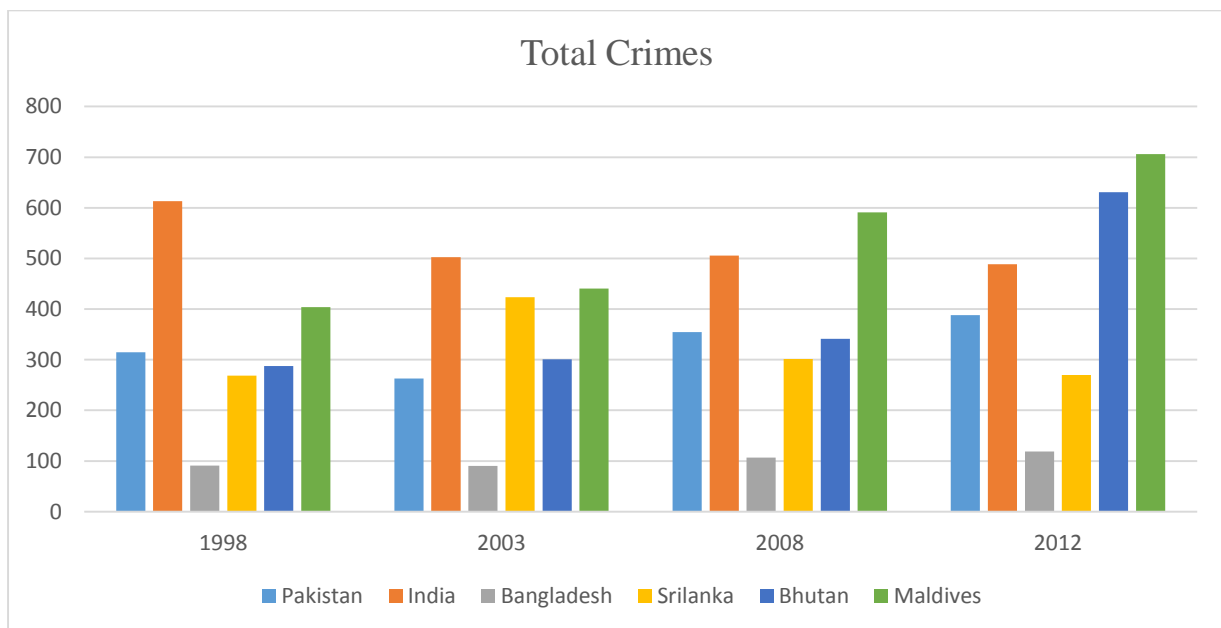
Where E_i are the Eigen-values and IQ is the institutional quality index. We have retained components with eigen-value ≥ 1 and accounts for more than 60% of variance.

²⁴ Principal component analysis is based on the frame work used by Bishoi et al (2009)

4.4 Crime Scene in SAARC Region

In modern times where every country has to face with many challenges like poverty, income inequality the increasing crimes all around the world also put additional burden on all economies of world. This study is particularly conducted for SAARC region where all member state countries are the developing economies and despite of other problems they are facing the rising crime rates in these countries is an alarming situation for the whole region. The South Asian Association for Regional Cooperation (SAARC) consists of eight member countries with a purpose to promote regional cooperation and welfare of the peoples. There are many reasons due to which crimes are increasing day by day in this region. Some statistics of different type of crime trends for SAARC countries are presented in the following graph:

Fig. 4.1 Total number of Crimes per 100,000 Individuals in SAARC Countries



The total crime rate for all countries presented above are as per 100,000 individuals. Countries of Maldives and India they have comparability more crime incidences per 100,000 individuals and also the problem of unemployment and inflation are more serious in these

countries which tend to increase criminal activities in these countries. Crimes trend for property and violent crimes are presented in the following graphs:

Fig. 4.2 Total number of Property Crimes per 100,000 Individuals in SAARC Countries

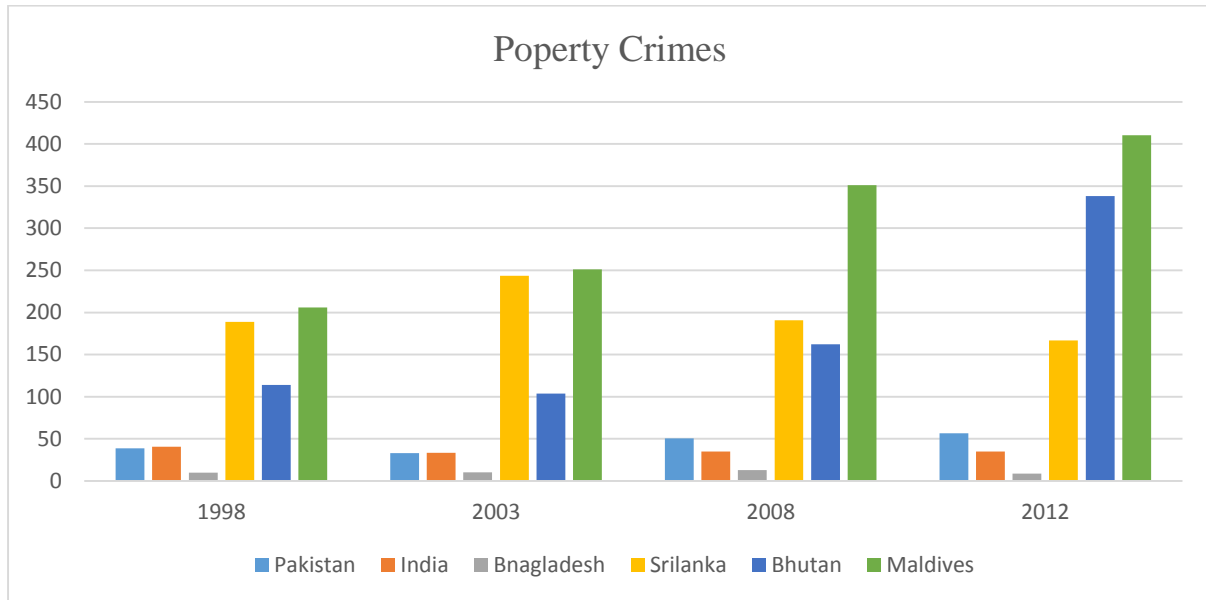
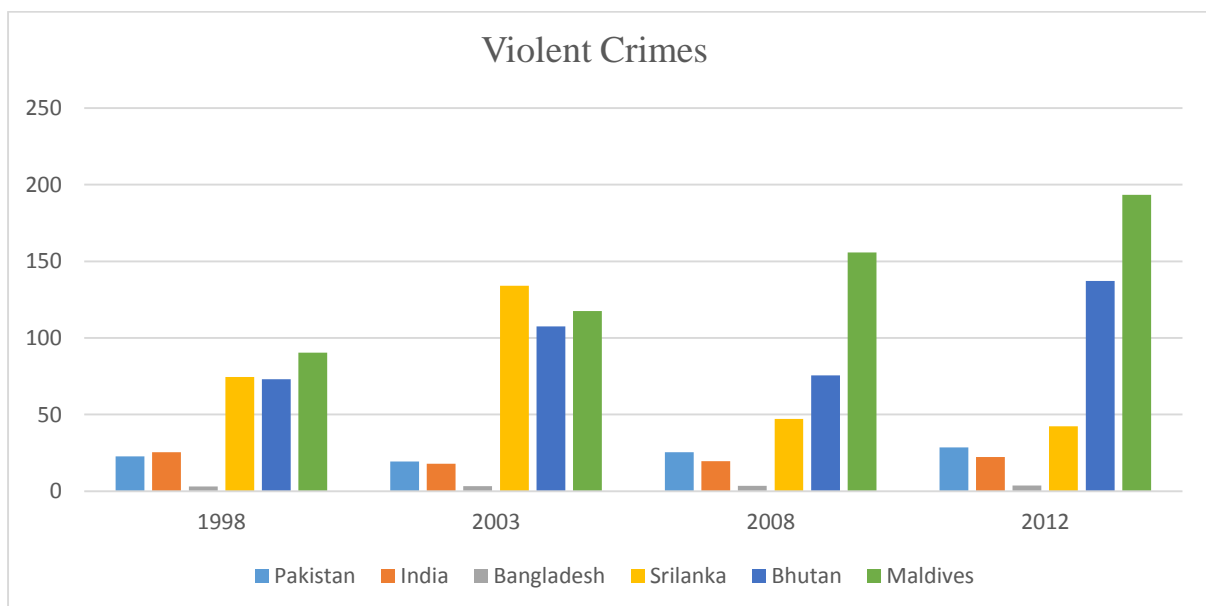


Fig. 4.3 Total number of Violent Crimes per 100,000 Individuals in SAARC Countries



CHAPTER 5

RESULTS AND DISCUSSION

The estimated results and their interpretation is provided in this chapter. The section 5.1 comprises on the results of Unit root test and in section 5.2 results about total, property and violent crimes are discussed.

5.1. Panel Unit Root Test

The analysis about the presence of unit roots is a pre-requisite for employing time series or a panel data analysis. This type of exercise is done as a very first step in econometric analysis in order to evade the spurious regression results. The results of the LLC unit root test for all the variables which are to be used in the study are presented in below table²⁵. P-value of the LLC test reveals that all the variables are stationary at level and free from the unit root.

Table 5.1 Panel Unit Root Results

Variables	LLC Test	Prob.	Test Status	Conclusion
Log TC	-5.2456	0.0000	Level	Stationary
Log PC	-3.3259	0.0004	Level	Stationary
Log VC	-3.0104	0.0013	Level	Stationary
Une	-1.4577	0.0725	Level	Stationary
Log Pop	-7.0716	0.0000	Level	Stationary
Log Inc	-2.8765	0.0020	Level	Stationary
Inst Quality	-3.5551	0.0002	Level	Stationary
Age dep	-7.7424	0.0000	Level	Stationary
Log edu	-1.2831	0.0997	Level	Stationary
Pol	-3.7586	0.0001	Level	Stationary
Inf	-1.7485	0.0402	Level	Stationary

Note:

- Log TC, Log PC and Log VC represents Log of total crimes, property and violent crimes respectively.
- Unemployment rate, population density, income, institutional quality, age dependency ratio, education, political situation and inflation are symbolized by Une, Pop, Inc, Inst, Age dep, edu, Pol and Inf respectively.

²⁵ Results for Fixed effect and Correlation matrix are given in Appendix.

5.2. Regression Result of Determinants of Crimes

The relationship between crimes and different economic and socioeconomic factors is still remain equivocal because previous studies on economics and crime behavior also report different results on both theoretical and empirical grounds. At both national and international levels different studies use different variables and by employing different techniques some find desired significant results while some studies got insignificant results. To catch up this problem present study also incorporate political and institutional factors in order to get detailed analysis of the behavior of individuals toward criminal activities. In this section the results on all the three models of crime are discussed.

5.2.1 Results of Determinants of Total Crimes

The first model of total crimes is estimated by taking different economic, political and institutional factors. All the reported factors have different impact on crimes and most of the variables have significant positive impact on crimes. The estimated results for the total crimes model are presented in the following table:

Table 5.2 Results of Determinants of Total Crime

Explanatory Variables	Coefficient	Standard Error
Une	0.032 ^{***}	0.0080
Log pop	0.038 ^{***}	0.0105
Log Inc	0.119 ^{***}	0.0359
Age dep	1.499 ^{***}	0.2292
Pol	0.083 ^{**}	0.0372
Log edu	0.205 ^{***}	0.0348
Inst	0.196 ^{***}	0.0514
Inf	0.001	0.0024
Hansen Test (P- value)	0.3633	

Note:

- Une, Log pop, Log inc, Age dep, Pol, Log edu, Inst and Inf represents Unemployment rate, Log of population density, Log of income, age dependency ratio, political situation, log of education, institutional quality and inflation respectively.
- Hansen test is used to check for the validity of instruments under the null hypothesis of instruments are valid asymptotically distributed as chi square distribution.
- Significant level at 1%, 5% and 10% respectively and is denoted by ***, ** and *.

The first economic variable is unemployment and it is assumed to be a very strong determinant in increasing criminal behavior among the individuals. A lot of studies at both national and international level are conducted to analysis unemployment and crimes relation. Some studies mentioned that there is a positive relationship between unemployment and crimes while some other studies found unemployment to be a negative determinant of crime rates.

In the current study unemployment has significant positive impact on total crimes which indicates that there is a strong role of unemployed persons in increasing criminal activities in the society. The finding is supported by many national and international studies where Coomer

et al (2003) and Meloni et al (2000) also found a positive significant impact of unemployment on total crimes while at national level the findings of Jalil (2010) and Maqsood (2015) are also in line with the findings of the study. Unemployed person is more attractive towards crime because for an unemployed person there is no source of income and it becomes harder for him to accommodate to the needs of a normal life. Therefore unemployment in any economy gives the indication of income opportunities from the legal market. So societies with increased unemployment rates decrease the legal income opportunities and force individuals to join some illegal ways of earning.

For population density the findings of the study also reveals the same impact as for the unemployment and crimes relation. Population density has significant positive impact on total crimes which indicates that high populated density areas also have high incidence of crimes. Many other studies, Jabar (2010) and Gonzalez (2010) also find population density to be a positive determinant of total crimes. The areas with high population density also attract more criminals because high populated areas reduces the expected cost of illegal activities by minimizing the probability of arrest in high populated areas.

The next variable is GDP per capita income and it also has a significant positive impact for increasing the crime rates in the society. As for as concern with the nature of this variable it has multiple effects on total crimes some studies get positive and negative results while some studies also get ambiguous results. Studies like Meloni (2000) and Montolio et al (2005) also find such type of relation. GDP per capita income doesn't reflect the true picture of income levels in the society in a way that the share of total GDP goes unequally among the different class group's people. As a result the higher class become significantly more richer as compare to the middle and under class group and creates income inequality in the economy and force the lower class people to do some criminal activities in the society.

The next variable is demographic in nature that is age dependency ratio. It is the ratio of unproductive age group to productive age group. The findings for this factor also explain significant positive impact on crimes which means that age dependency ratio also has positive influence on crime rates. There is no other study in the previous literature who have used this variable and examine its impact on crimes. The rationale behind this positive relation is simple i.e. when age dependency ratio increases then it puts more burden on productive age group people because they have to feed more people and it becomes harsh for them to maintain their living standards within the given resources. These conditions force the productive age group to find out some other ways of survival and most of people intentionally involved in some kind of criminal activities. So one can conclude that more age dependency ratio also the causes for more crimes in the society.

Political situation in a country is also an important determinant of crime rates. If political situation becomes worse day by day and the country is considered as a political instable country then it gives birth to many other factors in the society. The findings of the study reveals that there is positive significant relationship between political instability and criminal activities. There is no study in the literature who examines impact of political situation on crimes. All types of illegal activities are directly linked with country's political situation and with the performance of crime prevention authorities but if country is not politically stable then it might also influence on the performance of other institutions like law and order condition and also crime prevention authorities might not have full control over the criminal activities in that situation. So it becomes easier for criminals to do illegal activities in the society.

The findings of education and total crimes relationship also reveals that education level has significant positive impact on total crimes. Those economies with more highly qualified persons also have more incidence of crimes. These findings of positive relationship between education and crimes is also supported by many other studies conducted all around the world.

Coomer (2003) and Kadri et al (2011) after analyzing positive impact of education on crimes stated that in those economies where governments are unable to provide timely employment to their citizens then this creates problem of unemployment in society. Making it becomes harder for newly graduates to search for legal market earnings and as a result of not getting employed they forcefully push themselves in to some illegal activities.

The next variable used in the study is institutional quality. The quality and the good performance of different institutions plays an important role in the development of any country. Performance of institutions like law and order, voice and accountability and corruption all have very much influence on the behavior of citizens. In the present study the relationship between quality of institutions and total crimes is found positive and significant and it is against our hypothesis but it doesn't means that the better performance of institutions promote criminal activities in the society. Beside this there are some other factors that can influence the behavior of individual and force them to commit crimes. In the study all sample countries are developing countries and mostly these countries face political instability in their countries which weakened the overall performance of these institutions and make it bit harder for them to perform their functions properly. Thus due to this overall situation it becomes easier for criminals to do criminal activities in the society.

The last variable used in the study is inflation rate and it is expect inflation to be a positive determinant of crimes. In societies where inflation rates are high then this will ultimately arise many other problems in the society. The study finds positive insignificant impact of inflation rate on total crimes. These findings are also in the line with many other studies like Gillani et al (2009) and Hamid et al (2012) also find positive impact of inflation on total crimes. In societies where inflation rate is continuously increasing then this decreases the purchasing power of individuals and makes it more difficult for individuals to lead their normal life within

the current resources. So people in order to enjoy same kind of lifestyle that they have before they find some different ways and most of them involved themselves in criminal activities.

5.2.2 Results of Determinants of Property Crimes

In the above explanation of the estimated results regarding to total crimes the results show strong positive impact of explanatory variables on total crimes. Now in case for property crimes study incorporates the same explanatory variables as for the total crime model. The study include different categories of property crimes like robbery, theft and burglary etc. in order to more deeply analyze the relationship between property crimes and other explanatory variables. The estimated results for property crimes are presented in following table:

Table 5.3 Results of Determinants of Property Crime

Explanatory Variables	Coefficients	Standard Error
Une	0.069***	0.0158
Log pop	-0.168***	0.0222
Log Inc	0.268***	0.0754
Age dep	0.689*	0.3620
Pol	0.086**	0.0341
Log edu	0.103	0.0718
Inst	0.452***	0.0745
Inf	0.023**	0.0112
Hansen Test (P- value)	0.2111	

Note:

- Une, Log pop, Log inc, Age dep, Pol, Log edu, Inst and Inf represents Unemployment rate, Log of population density, Log of income, age dependency ratio, political situation, log of education, institutional quality and inflation respectively.
- Hansen test is used to check for the validity of instruments under the null hypothesis of instruments are valid asymptotically distributed as chi square distribution.
- Significant level at 1%, 5% and 10% respectively and is denoted by ***, ** and *.

For Property crimes unemployment also has a positive and significant effect for increasing crime rates in the society. In societies where high unemployment persistently exists for a longer period then it creates many problems in the society. Many other studies also found such type of relation, Ember et al (2001) concluded that in order to decrease property crime rates it is essential for governments to provide timely employment opportunities to their citizens. The cost of committing a crime for an unemployed person is also very low and a rational criminal after comparing the returns from time spend in both legal and illegal activities will surely divert towards illegal activities because of having no legal market earnings.

The next variable incorporated in the study is population density. For property crimes the coefficient of population density is negative which explains that more population dense areas have less incidence of property crimes. These findings are opposite to that of total crimes but these findings are not surprised as many other studies like Bechdolt et al. (1975) and Edmark (2003) also find and concluded population density to be a negative determinant of property crime rates. The reason behind this relation may be that some kind of property crimes in fact get more benefit from less populated areas i.e. burglary in remote areas and bank robberies in areas where the distance between the police stations is great. So study concludes that those areas with more population density also have less incidence of property crimes.

For income and property crimes relation the findings are same like for the total crimes and the study finds positive impact of income on property crimes which explains that increase in income level also educates property crimes in the society. As mentioned earlier in total crimes section that increase in income of individuals has direct influence on crime rates. These findings of the study are according to many other previous studies in which Zhang (1997) and Gumus (2004) also finds such type of relation and concludes that societies with higher income levels also have high rates of robberies and thefts. Different property crimes like car theft,

burglary and dacoity rates are relatively higher in areas with high income people thus one can conclude that areas with high income people also attract more criminals.

The impact of age dependency ratio on property crime rates is same like for the total crimes. The study finds positive impact of age dependency ratio on property crimes. In societies where ratio of unproductive age group is increased then this increase also affects the rate of property crimes. The productive age group people tend to find some illegal ways of earning and to lead their normal life most of them involved in some kind of property crimes like dacoity, mobile snatching and cattle theft etc and that will ultimately increase property crimes in the society.

The next variable used in the study is political situation in a country and the impact of this factor on property crimes is found to be positive and significant. These findings are same like for the total crimes because crimes of all kind are affected by the political situation in the country. Whenever country is suffering from political instability then it might also influence on the performance of government and on crime prevention authorities and thus they can't work on their full potential and it becomes easier for individuals to commit crimes because the opportunity cost for them to commit crimes is bit reduced.

The impact of education level on property crimes is also found positive and insignificant. Societies with more property crime rates also have a major involvement of educated persons in such type of crimes. Studies like Fajnzylber et al. (1999) also find positive relationship between education and property crimes. There are many factors that forces an educated persons to join illegal activities e.g. sometimes because of not getting any legal employment due to corrupt officers or by not having any reference then the person has no choice and prefer to become a part of such illegal activities.

The role and the performance of any institution is very important for any sector. For property crimes the impact of institutional quality is same like for the total crimes. The positive relation between these two variables explains that the better performance of institutions resulted in more property crimes in the society. This doesn't mean that institutions promote criminal activities in the society but maybe there are some other factors that promote this behavior among the individuals. However, the structure of institutions in these countries is not well developed because these countries are not the developed countries so it becomes difficult for institutions to perform their functions properly.

The last variable used in the study is inflation rate. For property crimes the impact of inflation is also positive and significant. Inflation rate also has a positive impact on total crimes which means that higher the inflation rate there is more property crimes in the society. Recently the findings of Maqsood (2015) explain that there is a positive relationship between property crimes and inflation rate. High inflation increases the cost of living and makes it difficult for individuals to attain their needs within current resources. This type of frustration among the individuals forces some individuals to divert their attention towards some illegal activities.

5.2.3 Results of Determinant of Violent Crimes

The above results are for the total and property crimes and as discussed earlier that total crimes comprise of both property crimes and violent crimes. So in last section of this chapter factors effecting violent crimes are discussed. To study more deeply like property crimes study also incorporate different types of violent crimes like murder, attempted murder, hurt, rape and assault. The results for violent crimes are given in the following table:

Table 5.4 Results of Determinants of Violent Crime

Explanatory Variables	Coefficients	Standard Error
Une	0.055***	0.0148
Log pop	0.220***	0.0181
Log Inc	0.508***	0.1042
Age dep	0.305	0.2965
Pol	0.186***	0.0562
Log edu	-0.009	0.0575
Inst	0.408***	0.0949
Inf	-0.013	0.0149
Hansen Test (P-value)	0.2958	

Note:

- Une, Log pop, Log inc, Age dep, Pol, Log edu, Inst and Inf represents Unemployment rate, Log of population density, Log of income, age dependency ratio, political situation, log of education, institutional quality and inflation respectively.
- Hansen test is used to check for the validity of instruments under the null hypothesis of instruments are valid asymptotically distributed as chi square distribution.
- Significant level at 1%, 5% and 10% respectively and is denoted by ***, ** and *.

Like total and property crimes unemployment also has the same effect on violent crimes.

The nature of relationship between violent crime and unemployment is found ambiguous by

many studies where Winter-Ember et al (2001) also conclude that the relationship between unemployment and violent crimes is uncertain. Previous literature on violent crime also give mixed impact of unemployment both in negative and positive directions. The current study finds positive relation which indicates that unemployment is the main reason for creating frustration and dislikeness among the individuals which force them to adopt criminal behavior and create distortion in the society.

The impact of population density on violent crime rate is significantly positive. Before violent crime the study also found positive relationship between these two variables for total and property crimes. More populated areas also have more incidence of violent crimes and it is generally observed that some of the violent crimes like rape, murder and hurt are mostly occurred in metropolitan cities. In the study most of the sample countries are the high populated countries and thus increase in population results in increased violent crime. Many other studies like Bechdolt et al. (1975) also find population density to be a positive determinant of violent crimes and concludes that this increase in population density further divide the current resources which leads to the chances of committing a crime for an individual.

The findings for income and violent crime relationship are also same like for the total and property crimes which indicates that societies with high per capita income also have many incidence of violent crimes. The effect of income on violent crime is analyzed by many other studies in which different conclusions are drawn by different studies. Hartung et al (2007) have studied the impact of income on different violent crimes and found that income has a negative impact on violent crimes. The nature of violent crimes is different from total and property crimes and the relation of income and violent crime still remains unclear. Some of violent crimes like rape, murder and hurt are committed by both upper and lower-class group people so it means that there are some other factors along with income levels that are involved in promoting violence behavior in the society.

The next variable used in the study is age dependency ratio and as expected it has also a positive but insignificant impact on violent crimes. There are many factors that can influence the thinking of productive age group and divert them to commit crimes. When a productive age group people can't find any legal employment for a longer period then they get frustrated of being unemployed and as a result of such frustration they intentionally do some kind of violence crimes like murder, hurt and suicide. So in societies where there is persistence increase in age dependency ratio then this ultimately results in more violent crimes.

Political factor have very much influence on violent crime rates. For violent crimes the findings are same like for the total and property crimes which means that if country is politically instable then there occurs more incidence of violent crimes like murder, rape and suicide attacks etc. Sometimes a situation is being created in the country in which some political parties deliberately encouraged violence in the country to achieve their political purposes. In this situation it becomes difficult to control such violence in the shape of regular strikes, attack on public property and police. So all these factors promote violence in the country and overall incidence of violent crimes increases in the country.

The next variable is socio-economic in nature and it has a negative insignificant impact on violent crime rates. The findings are supported by many other studies whereas Montolio et al (2005) also found a negative relationship between education level and violent crimes. As compared to total and property crimes the nature of violent crimes is very complex and also the relation between education level and violent crime is undefined. It is not necessary that only uneducated persons are involved in violent crimes but there are some kind of crimes like rape, murder and hurt in which both educated and uneducated persons is equally involved. So in case of violent crimes the impact of education level is indeterminate and the study finds insignificant results.

For institutional quality the findings of the study also reveals that there is a significant positive impact of institutions on violent crimes. The role of institutions is very important in either to increase or to deter crime rates so those societies in which crime rates are high it reflects the poor performance of institutions. Sometimes even if institutions performed well but there is no proper decrease in violent crimes so it doesn't mean that institutions are failed to control such crimes but the reason may be that some of violent crimes like rape, suicide and hurt these crimes are the result of frustration, mental illness and greed among the individuals which increased the overall violent crimes in the society. So one can conclude that there is no direct impact of institutional quality on violent crime rates.

The last variable used in the study is inflation rate and it has a negative insignificant impact on violent crime rates. The relationship of inflation and violent crimes remained uncertain because sometimes there occurs such incidence of violent crimes where there is no involvement of inflation. Many other studies also find such type of relation e.g. Gale et al. (2002) concluded that violent crimes are usually the outcome of revenge and hate and such type of crimes may not be related to any economic determinants. So it can be concluded that instead of inflation there are some other factors that diverts individual towards crimes.

From the above findings the main conclusion drawn by the study is that the social disorganization in the SAARC region is the cause of promoting many other factors that will create criminal behavior among the people, becoming victims of poor social and environmental situations in a society. Most of the SAARC countries are developing countries so this particular lose control of the authorities over economic, environmental and social affairs cause the individuals to involve in criminal activities. So all these results indicate that the theory of Shaw and Mackey "Social disorganization theory" is more validate in case of SAARC region.

CHAPTER 6

CONCLUSION

This study has pursued to quantify empirically those factors that can affect crime rates in SAARC region. For this purpose various well known economic, socio-economic, political and institutional factors are considered for the analysis. The time period selected for the study is from 1998 to 2012. The study applied Generalized Method of Moments (GMM) approach to report the possible relationship between dependent and independent variables in all the three empirical crime equations.

The study finds that the unemployment rate and GDP per capita both have the most significant effect on the increase in all the three categories of crime. Societies with high unemployment rate also have more incidence of all kind of crimes and for GDP per capita it may conclude that along with income level there may be some other factors that diverts an individual towards crime. Secondly population density has positive and significant impact on total and violent crimes while for property crimes the study found negative relationship between population density and such type of crimes. The findings for age dependency ratio also reveals that there is a positive significant impact of age dependency ratio on both total and property crimes but for violent crimes the study finds positive insignificant results.

Third the main conclusion drawn by the study is for the impact of Political and Institutional factors. Politically stable countries have everything under their control and if country becomes politically instable then it will give birth too many factors that destroy the peace and humanity in the country. In the study all the categorizes of crime has significant positive relation with the political situation which means that if political instability arises in the country then it also increases all type of criminal activities in the society. The empirical findings

for the role of institutions also exposes a positive impact of institutional quality on all kinds of crime. In all the sample countries the structure of institutions is not well developed and also these countries face worse political situation after few intervals of time which affects the performance of these institutions and allow some criminals to do criminal activities in the society.

The results for both inflation rate and education level elucidates the mixed impact for all categorizes of crime. Education has significant positive impact on both total and property crimes while it effect negatively on violent crimes. If timely employment opportunities are not generated then it becomes harsh for educated persons to sustain their survival in such conditions and as a result these frustrated youth join some criminal activities. Like for education inflation rate also have mixed impact on all crimes, it has a positive insignificant impact on total crimes while for property crimes the study got significant positive results and in violent crimes it has negative insignificant impact. The nature of violent crimes is very complex and the relation of inflation rate with violent crimes is still remain uncertain which means that there are some other factors along with inflation rate that will divert individuals attention toward such type of crimes.

6.1 Policy Implications

On the behalf of above findings the study conveys some important policy recommendations which are suitable to avoid and reduce crimes in the long run for the SAARC region.

- ❖ First enhancing the education level is good for the economy however care should be taken by the government to provide timely employment opportunities to these young educated people to avoid their involvement in any kind of criminal activities.

- ❖ Next priority should be given to the inflation rate because it can decrease the purchasing power of individuals and due to low wage rate they are not able to lead their normal life. So it is necessary for government to control either the inflation rate or increase the wages accordingly.
- ❖ The role of institutions is very important for any state, in most of the sample countries the structure of institutions is not well developed. Sometimes one rule is formed but there is no proper implementation of that rule which reflects the weak performance of institutions. Despite of this political factor also has very much influence on increased criminal activities so it is necessary for all the political parties to contribute their part to make country politically stable.
- ❖ Population growth rate should also be under control to make a society less dense and there is a need to keep check and balance on the migrants which makes the areas more denser.

6.2 Limitations of the Study

The study is first intended to cover all countries in the SAARC region but later the non-availability of crime data for Afghanistan and Nepal restricts to incorporate only six countries of the region. The study is also planned to incorporate some other factors in the analysis like conviction rate, women employment, role of electronic media, wage rate and severity of punishment but the non-availability of data for these variables restricts the study to work only on available number of variables.

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APPENDIX: 1

```

Fixed-effects (within) regression      Number of obs      =      90
Group variable: code                  Number of groups   =       6

R-sq:  within = 0.7002                Obs per group: min =      15
      between = 0.0142                avg =              15.0
      overall  = 0.0123                max =              15

                                          F(5,5)            =      .
corr(u_i, Xb) = -0.9877                Prob > F          =      .

```

(Std. Err. adjusted for 6 clusters in code)

logtotalcr~e	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
une	-.0615232	.056286	-1.09	0.324	-.2062111	.0831647
logpopde	-4.65108	2.07347	-2.24	0.075	-9.981104	.6789446
loginc	.1934244	.3085804	0.63	0.558	-.5998068	.9866556
agedep	-6.779376	2.624728	-2.58	0.049	-13.52645	-.0322969
inf	.0057666	.0060329	0.96	0.383	-.0097415	.0212747
logedu	-.0831914	.1899206	-0.44	0.680	-.5713978	.405015
pol	.0237516	.0986462	0.24	0.819	-.2298266	.2773299
ins	-.022672	.1574554	-0.14	0.891	-.4274239	.38208
_cons	35.58603	11.90997	2.99	0.031	4.970481	66.20157
sigma_u	7.4338649					
sigma_e	.13856375					
rho	.99965269	(fraction of variance due to u_i)				

Full name of variables are given in chapter 4.

APPENDIX: 2

```

Fixed-effects (within) regression      Number of obs      =      90
Group variable: code                  Number of groups   =       6

R-sq:  within = 0.6928                Obs per group: min =      15
      between = 0.0128                avg =                15.0
      overall = 0.0140                max =                15

                                          F(5,5)             =      .
corr(u_i, Xb) = -0.9634              Prob > F           =      .

```

(Std. Err. adjusted for 6 clusters in code)

logpropt~e	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
une	-.0318293	.0419283	-0.76	0.482	-.1396095	.0759509
logpopde	-3.868512	1.488282	-2.60	0.048	-7.694263	-.042762
loginc	-.0718607	.4719726	-0.15	0.885	-1.285105	1.141384
agedep	-6.17902	1.698415	-3.64	0.015	-10.54494	-1.813104
inf	.0078672	.007989	0.98	0.370	-.0126693	.0284037
logedu	.0549894	.0848956	0.65	0.546	-.1632418	.2732206
pol	.0470445	.0657231	0.72	0.506	-.121902	.215991
ins	.0725108	.0937564	0.77	0.474	-.1684978	.3135193
_cons	30.63313	8.930192	3.43	0.019	7.677339	53.58892
sigma_u	5.9878954					
sigma_e	.17811577					
rho	.99911596	(fraction of variance due to u_i)				

APPENDIX: 3

```

Fixed-effects (within) regression      Number of obs      =      90
Group variable: code                  Number of groups   =       6

R-sq:  within = 0.6679                Obs per group: min =      15
      between = 0.0963                avg =                15.0
      overall = 0.0930                max =                15

                                          F(5,5)             =      .
corr(u_i, Xb) = -0.9946              Prob > F           =      .

```

(Std. Err. adjusted for 6 clusters in code)

logviolent~e	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
une	-.0853572	.0956107	-0.89	0.413	-.3311323	.1604179
logpopde	-9.53659	2.733343	-3.49	0.017	-16.56287	-2.510308
loginc	.1093484	.3943384	0.28	0.793	-.9043307	1.123028
agedep	-12.28484	4.213505	-2.92	0.033	-23.116	-1.453685
inf	-.0018059	.0063014	-0.29	0.786	-.0180042	.0143923
logedu	-.1767636	.2742636	-0.64	0.548	-.8817807	.5282535
pol	-.1243803	.1466602	-0.85	0.435	-.5013823	.2526217
ins	-.1169709	.3319696	-0.35	0.739	-.970326	.7363843
_cons	64.9022	18.00363	3.60	0.015	18.6224	111.182
sigma_u	14.231688					
sigma_e	.22336432					
rho	.99975373	(fraction of variance due to u_i)				

APPENDIX 4: Correlation Matrix

	log TC	log PC	log VC	logpop	loginc	logedu	Une	Age	Inf	Pol	Ins
log TC	1										
log PC	0.85	1									
log VC	0.83	0.96	1								
log pop	0.11	-0.11	-0.30	1							
log inc	0.88	0.95	0.89	-0.0	1						
log edu	-0.07	-0.07	-0.08	0.17	-0.01	1					
Une	0.72	0.67	0.54	0.51	0.66	-0.17	1				
Age	-0.01	-0.17	-0.13	-0.10	-0.20	-0.85	0.01	1			
Inf	0.14	0.18	0.12	0.14	0.18	0.24	0.13	-0.26	1		
Pol	0.48	0.56	0.58	-0.37	0.5	-0.41	0.16	0.19	-0.25	1	
Ins	0.34	0.44	0.42	-0.11	0.43	0.17	0.03	-0.35	0.15	0.43	1

Full name of variables are given in chapter 4.