The Impact of Urbanization and Unemployment on Crime: A Case Study of Pakistan

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A THESIS SUBMITTED IN THE PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE

IN

ECONOMICS

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Dedication

To my Beloved Parents who are my only source of encouragement at every moment of my life

Acknowledgement

It is boundless and infinite mercy of Allah and his prophet Muhammad (PBUH) that I have been able to complete this project. I have no words to describe my sensation of respect about my parents, sisters and brother because without their support, kindness and encouragement it could not be possible for me to attain this target, I am grateful to my supervisor Dr. Faiz ur Rahim, whose sincere and comprehensive guidance have fully added in completion of my research and give me a lot of trust and flexibility on the project. I have gained a learning experience from my supervisor and it will help me a lot in my future studies.

Sincere thanks to all my friends for their kindness and moral support during my research.

Abstract

The following research make a detail analysis, to determine the socio-economic factors which are playing an important role in determining the crime rate. The objective of the research is to see the impact of urbanization and unemployment on total number of crimes, including theft, robbery, burglary, cattle theft, murder, attempted murder, kidnapping, child lifting, dacoity and other thefts. The two variables urbanization and unemployment are used as a control variables in may studies, the present study has make use of the two variables as main independent variables. The following research has also seen the impact of urbanization and unemployment on major and minor crimes separately in Pakistan over the period 1980 to 2014. Augmented Dickey Fuller (ADF) test is used to analyse the stationary properties of the data. In order to determine the long- run relationship among the variables of interest, Johansen Co-integration and the Vector Error Correction Model (VECM) are applied. The main findings of the research reveals that there exist a negative but insignificant relationship between urbanization and crime rate. Unemployment, inflation and real GDP are positively and significantly associated with the crime rate. While a negative and a significant relationship is found between education and the crime rate, in case of Pakistan.

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Chapter 1

1. Introduction

Crime rate have always created problems and distortions in every community throughout the history of mankind. The history of crime is considered to be as old as the history of humanity. This can be illustrated from the point that, Cain the first son of Adim and Eve was considered to be as the first person to commit crime when he murder his brother Abel because of jealousy. Crime rate is responsible for creating a feeling of insecurity and discomfort for the people living in a specific society because of the distortions created by crime. Crime rate is simply the misbehavior or offence, as it is an employment of an act which is totally forbidden by law or other law enforcement agencies (Gillani *et al*, 2008). There are different socio economic factors which are responsible for the increase in the crime rate, economics of crime is relatively new emerging field in order to determine the causes and consequences of criminal activities in a specific society.

According to Curzen, "A crime as an act or omission of human conduct harmful to others which the state is bound to prevent. It renders the deviant person liable to punishment as a result of proceedings initiated by the state organs assigned to ascertain the nature, the extent and the legal consequences of that person's wrongness" Clark and Marshal (1952) wrote, "A crime is any act or omission prohibited by public law for the protection of the public and punishable by state in a judicial proceeding in its own name." Another definition was given by Tappan (1960), "A crime is an instrumental act or omission in violation of the

criminal law, committed without justification and sanctioned by the state as felony or misdemeanor". Different theories have used the cost benefit analysis in order to explain the trends in the criminal activities. The cost for the criminal activities includes the imposition of penalty as retribution for an offence and also the time which the criminal is going to spend in jail. Victims, on the other hand may also face some cost in the form of security expenditures or sometime may also loss the property

Different approaches were used to determine the economics of crime, which may differ from one country to another. According to Alexandro's and Nikloaos (2010), there is a continuous increase in the criminal or immoral activities in the western world as well as the developed nations throughout the globe. Keeping in view the cost and benefits of a person, economist consider them as a rational person, who make the best possible decision keeping in mind their cost and benefits. They choose the best possible ways by doing the "cost and benefit analysis" proposed by Becker (1968) of both the legal and the illegal activities open to them. The major focused of economist is to determine, main economic factors that determine the crime in societies (Kustepli and Onel, 2006). The appropriate action for the reduction and stopping crimes rate have become a major issue foe every country (Nabila, 2015).

There are significant difference in crime types, formation and crime rates of all developing and developed countries. There are different factors which are responsible for the difference in the crime types, formation and rates like economic, social, regional, demographic features of the country are responsible for the difference in crime types. These difference in crime types and crime rates lead policy makers and different disciples to focuses on this area in order to resolve this issue. As a result of developing world and globalization trends and advance information technologies, crime types and especially economic crime types are getting more diversified. In this scope, crime

does not inevitably mean causing damage or using violence against human. Economic crime should be remembered as they cause damage to property rather than human life. Accordingly, theft, forgery, embezzlement, extortion, fraud, check and bond crimes, bribery, and online fraud are the types of economic crime which are committed to property. (Tekeli and Gunsoy, 2013).

These significant social cost indicate that investigation and exploration on crime is considered among the most relevant and valuable area in economics. Furthermore, the economics addresses issues beyond what is generally believed, work on economics of crime is generally consider among the beneficial and valuable area of research. Becker (1968) and Ehrlich (1973) were considered to be as the founder of the economics of crime. The work of Becker (1968) is considered as very important for the economics of crime, and the main contribution and addition to understand the economics is normally related to the work of Becker (1968). He has given a model and proposed that the individual is more likely to involve in the criminal activity if the expected utility or the benefits attain from the unlawful activates exceed the benefits or utility from the lawful activities. Every criminal who involve himself in the criminal activities may face some benefits but at the same time cost in terms of peace enforcement. The two main determinants of cost are chances of being caught and the torture faced if arrested. Similarly, there are number of other factors which are responsible for the increase in the criminal activities in the society, out of all those factors unemployment is considered as the most important. Ehrlich (1973) observed a positive association between unemployment and crime. He reveled that unemployment is an indicator or it signals the income opportunities from the lawful activities. When there is an increase is the unemployment rate, people have now less opportunities in the legal sector and a person will involve himself more in the illegal activities rather than legal sector activities.

According to the Becker (1968), a potential criminal is a person who make decision keeping in mind the cost and benefit of the specific activity.

"some individuals become criminals because of the financial and other rewards from crime compared to legal work, taking account of the likelihood of apprehension and conviction, and the severity of punishment" (Becker, 1968: 176).

Urbanization may be considered as the process of growth in the urban areas. Urbanization is a word for becoming more like a city. When population grow, the population of a place may spillover from city to nearby area. Theories of urbanization are generally related to industrialization, speculation and economic development. Urbanization may consider as the reason of increase in the industrial improvement or expansion in the economy. Urbanization on the other hand is also providing different labor market opportunities, increase the market of different goods and services, advancement in the knowledge and also the high level of economic growth. This type of development and improvement of the economy is helpful for creating new better opportunities for the people living in urban areas. Different economist have proposed, that for the development of the economy and promoting the industrial growth urbanization is very important (Jalil, 2010). Urbanization may have several advantages but still it has a drawback that is the encouragement of crime, since the rate of crime is high in large urban areas (Krivon & Pelerson, 1996). In small farm and simple areas, people know each other because of the lower population so criminals have more chances of hiding themselves. The reversed is true for the urban areas. There are different factors which are responsible for the increase in the crime rate, including social, economic, demographic political and others. The main factors of crime are considered as the fewer and less chance of conviction and recognition. (Glarser & Sacerdole, 1996) therefore it is generally believed that as there is an expansion in the urbanization rate, crime rate in the economy also tends to increase

(Galvin 2002, Gaviriz, 2012). Because of the substantial industrial development, throughout the universe the rate of development of urban areas is increasing. Like many other countries in the world, there is a speedy increase in the criminal activities in Pakistan, and this is because of the increase in the urbanization and many other socio-economic factors.

The economic research on crime examined that illegal activities are primary motivated by the net relative benefits of unlawful activities. Along with different other researchers, Becker (1968) pointed out that the criminals compares both the cost and benefit of the legal and the illegal activities. An individual can produce or create income both from the legal sector activities and the illegal sector activities. Consequently, the income earned from the legal sector activities is the cost of participating in the illegal sector activities. (Block & Heineke, 1975; Ehrlich, 1973). Those individuals have better opportunities in the legal sector activities are less likely to involve themselves in the illegal sector activities. One of the main factor of these opportunities in the legal sector activities is unemployment, which may change or fluctuate over the business cycle. The changes in the unemployment rate effect the crime rate which is simply the addition of the different criminal activities. When the rate of unemployment is high in the economy, the net relative benefits of the individuals working in the legal sector activities may go down on the margin.

In order to achieve the objective of the study Johansen Co-integration technique is used. In order to empirically analyze the objective the data set that is used in the research covers the period of 1980 to 2014. The results of the empirical analysis shows that there exist a negative but insignificant relationship between urbanization and crime. A positive and a significant relationship is found between unemployment, real GDP, inflation and the crime rate. While a negative and significant relationship is found between education and crime. As education enhances the

opportunities of the individual in the legal sector activities, which results in the decline of the crime rate.

1.1 Objectives of the Research

The main and foremost objectives of the study are as follows

- To investigate the impact of urbanization and unemployment on total number of crimes in case of Pakistan.
- To investigate the impact of urbanization and unemployment on major crimes in case of Pakistan.
- To investigate the impact of urbanization ad unemployment on minor crimes in case of Pakistan.

1.2 Significance of the Research

Crime is act which is forbidden by law and is punishable by the state. Different researcher's tried to point out the main determinants of crime and also tried to examine the relationship between crime and other socio-economic variables which are important determinant of crime. Urbanization, unemployment, education, inflation, GDP, political instability, law and order, income inequality are some of the factors which are effecting the crime rate. The significant impact of urbanization and unemployment have been visualized separately as a control variable in many studies but the present study has taken the two variables as main independent variables. So the present study will take urbanization and unemployment as the main and major contributive independent variables towards crime. One of the objective of the research is to see the long-term relationship between urbanization, unemployment and the total number of crimes including theft, robbery, murder, cattle theft, attempted murder, kidnapping, child lifting, burglary, dacoity and other crimes . As

the crime can be broadly divided into two main categories major and minor crimes depending on the severity of the crime. Major crime includes the murder, attempted murder, kidnapping and the minor crime include robbery, theft, cattle theft and other. After seeing the impact of urbanization and unemployment on total number of crime, the present study then see the impact of urbanization and unemployment on major and minor crime separately which has yet not been visualized in the previous studies. Present study will make use of the latest data set from 1980-2014.

1.3 Organization of the Research

The research will be further organized in the following manner. Chapter 2 includes the review of the previous studies, chapter 3 will discuss the crime scenario in Pakistan, that what is the situation of crime in Pakistan in past years. Chapter 4 will focus on the data and methodology that will be used in the research, chapter 5 will be about the findings and the empirical results and finally chapter 6 will discuss the conclusion and recommendation.

Chapter 2

2. Literature Review

2.1Introduction

A detail and complete literature on the different and important factor that lead the economy towards crime are formally mention in this section. The following section reflects the important issues that are related to the theoretical and empirical work in the area of the economics of crime, deterrence and punishment. The models of rational behavior started appearing in 1960's, the first and the foremost model was of Becker (1968). These models attempt at describing and predicting human behavior concerning the issues related to the offence and crime. The first effort to study crime from the economic point of view dated back to the Eighteenth and Nineteen century.

2.2Review of the Empirical Studies

The relationship between income and the criminal activities was examined by Fleisher (1966). There are two possible ways by which income may affect the illegal activities, one is the positive demand side effect and the other is the negative supply side effect. According to the demand side effect there is a decrease in the criminal activities when people have high income. The negative supply side effect indicate that when there is increase in the income of the people, and people want to get that money through illegal activities.

The socio-economic determinants of crime in Pakistan were examined by Khan *et al*, (2011). The main aim and objective of the study was to investigate the impact of different economic, social and other factors which are responsible for the increase in the crime rate including education, unemployment, poverty and the economic growth in Pakistan over the period 1972-2011.

Augmented Dickey Fuller (ADF) test was used to empirically analyze the objective of the study. The results of the empirical investigation shows a positive relationship between unemployment and crime. High rate of unemployment is responsible for the decrease in the returns in the legal sector activities and it will increase the return in the unlawful activities. A negative and a significant relationship was found between education and the crime rate. GDP per capita shows positive association with the crime rate in the long run while a negative relationship was found in the short run. Affluent areas have more opportunities in the form education, employment so more criminals are attracted to these areas.

Torrum *et al*, (2014) tried to examine the relationship between two economic variables including unemployment and inflation and the crime rate over the period 1980-2014 in Nigeria. In order to empirically analyze the objective of the study and to check the stationery properties of the data "Augmented Dickey Fuller" test was used. In order to determine the long run relationship among the variables of interest Johansen Co-integration test was applied. The empirical results shows that there is found to be a long run relationship between unemployment, inflation and crime. Therefore, the study concludes that unemployment in Nigeria is responsible for the increase in the crime rate. This was due to the fact that unemployment in Nigeria is an important factor that is responsible for the income opportunities in the legal sector activities. Therefore, when the rate of unemployment goes up income opportunities for the individuals in the legal sector goes down which indicate the individual to involve in the unlawful activity.

Unemployment is considered as a very important determinant of crime. The relationship between unemployment and crime was examined by Blomuist & Wasterland (2013). Different researches of the economics of crime focused solely on the determinants, and do not consider the dynamic and cross sectional properties of their data. As a response to this, they tried to offer an in-depth

analysis of the issue using data covering 21 Swedish countries from 1975-2010. The PANIC methodology of Bai and Ng (2004) was employed, which helps first to estimate and then to test for unit root in both the idiosyncratic and common components of the data. This decomposition is appropriate, because crime rate usually exhibits both high variability without each region over time. The results of the empirical analysis shows that unemployment is a very important determinant of crime, with the increase in the unemployment crime rate also tends to increase.

The relationship between education and crime was investigates by Tekeli and Gunsoy (2013) in Turkey. The main goal of the study is to explain the association between crime and crime types and educational level of people due to economic crime between the years of 1990-2011. Descriptive analysis was used in this study to investigate the relationship between age, material statues, educational level and occupation and the crime types. They showed that crime rate had been considered as a distortion in the society since people had started living as a community. For that reason, societies have been trying to specify the reason that make people involved in criminal activities and to estimate those reasons. According to the empirical results a negative association was found between education and the crime rate.

Tamayo *et al.* (2013) investigated the relationship between inflation and crime rate in the Philippines over the period 2003-2007. In order to check the stationary properties of the data, unit root test was conducted, then for co-integration Granger Causality test was conducted. Empirical findings reveal that the high rate of inflation was considered to be as one of the important factor of the increase in the crime rate. Crime rate and the increasing price level are found to be co-integrated.

The relationship between unemployment and theft crime was examined by Maddah (2013) in Iran over the period 1997-2006. To empirically analyze the results, Generalize Method of Moment

(GMM) estimator was used. According to the empirical results there was found to be a positive and a significant relationship between unemployment and crime in different categories. There are also different others factors such as poverty and demographic characteristic which have influence on peoples motivation to crime commitment of theft.

The relationship between crime, deterrence and unemployment over the period 1991-1998 was examined by Saraidakis and Spengler (2012). In order to empirically analyze the results GMM estimator was used. According to the empirical results property crime are significantly deterred by high clear up rates and there is also found to be positive relationship between unemployment and the crime rate.

Izadi &Piraee (2012) tried to determine the link between the income inequality and the crime rate in Iran over the period 1984-2008. In order to empirically analyze the objective of the study Unrestricted Error Correlation Model was employed. In order to examine the causality relationship Multi Rank F-test was used. The results of the empirical analysis shows a long run and a significant relationship between income inequality and the property crime in Iran.

Nunley *et al.* (2011) tried to explore the relationship between inflation, unemployment and the stock market and the rate of burglary over the period 1980-2009. Different macroeconomic factors are responsible for the increase in the criminal activities. Three macroeconomic variables including inflation, employment rate and the rate of return in the "Dow Jones Stock price index" are used for the investigation. The four property crime which are used for the investigation are the larceny, burglary, motor vehicle theft and the robbery. According to the empirical results there was found to be a positive association between the three macroeconomic variables and the property crime.

According to some of the researchers unemployment was considered to be as the key factor which was responsible for the increase in the crime rate. Atlingdag (2011) tried to examine this relationship. In order to achieve the objective of the study country level panel data from Europe over the period 1995-2003 was used. Data on the crime and police officers are obtained from different sources. According to the empirical results there was found to be a positive association between crime and unemployment. By using the OLS empirical results shows that when the unemployment increase by one percent point the rate of crime increase by two per cent point. The overall rate of unemployment may be divided into people employed with the primer education and the people employed with the higher education. Unemployment of the individual with the low level of the education is a significant determinant of crime.

Gillani *et al*, (2009) investigated the macro economic factors which are responsible for the increase in the criminal activities in Pakistan over the period 1975-2007. The macro-economic factors which are responsible for the increase in the crime rate include unemployment, poverty and inflation. In order to check the stationary properties of the data "Augmented Dickey Fuller" test was used. In order to determine the long-run relationship among the variables of interest Johansen Co-integration approach was used. According to the empirical results there was found to be a positive and a significant relationship between unemployment, poverty, inflation and the crime rate.

The demographic and socioeconomic determinants of crime were investigate by Omotor (2009) in Nigeria over the period 2002-2005 by using pooled dataset of Nigerian states. In order to empirically analyze the results pooled ordinary least square and pooled EGLS was employed. Crime and unemployment are considered as the most mention socioeconomic problems in recent times. The major and main findings of the paper are as follows. First, most of the Nigerians live

below the poverty line which is US$1 per day. Second, Concentration of crime is mixed in two regions of Nigeria (North and South) and crime were more prevalent during the military authorization regimes then civilian democracy. Third, there was found to be a significant and positive relation between income per capita and crime. Fourth, unemployment was negatively related to all forms of crime only statistically significant with crime against property.

The policy makers and the criminologist have now focused on the policies to prevent crime. Tang (2009) use two macroeconomic variables including inflation and unemployment to examine the relationship with crime in Malaysia over the period 1970-2006. Barlett Corrected trace test proposed by Johansen (2002) was used for the small sample size. According to the empirical results there was found to be a positive relationship between crime and the other macroeconomic variables including unemployment and the inflation. This means that the two macroeconomic variables unemployment and inflation are very important determinant of crime in Malaysia. The empirical evidence shows that policy makers in Malaysia can reduce the crime rate by controlling these macroeconomic factors- inflation and unemployment.

Along with macroeconomic variables there are different other factors which are responsible for the increase in the crime rate. Urbanization is one of the demographic factor, which is an important determinant of crime. Jalil and Iqbal (2008) tried to examine the relationship between urbanization and crime in Pakistan over the period 1963-2008. In order to achieve the objective of the study Johansen Co-integration approach was used. According to the empirical results long run relationship was found between urbanization and crime. There are different other macroeconomic factors which are effecting the crime rate. The other main determinants of crime are inflation, unemployment, education and the income inequality in Pakistan.

Brush (2007) examines the relationship between crime and one of the macroeconomic factor income inequality. The data set that was used in the study to analyze the objective of the study empirically covers the period 1994-2000. In order to determine the effect of income inequality on crime both the cross section and first difference approach are used in the United States. Results shows that in cross section analysis there was found to be a positive association between the income inequality and the crime rate, while in the time series analysis a negative relationship was found between the crime rate and income inequality.

Inflation is one of the important determinant of crime. When there is an increase in the price level, real purchasing power of the individual go down and the people involve themselves in the illegal sector activities in order to increase their earnings. Tang & Lean (2007) tried to investigate this relationship over the period 1960-2005. In order to empirically analyze the objective of the study modifies Wald (MALD) causality test was used. In order to determine the long run relationship among the variables of interest ARDL bound test was used. The results of the empirical analysis shows a positive relationship between inflation, unemployment and the crime rate. When the rate of unemployment and inflation tends to increase, crime rate also goes up.

Entorfand Spengler (2005) tried to investigate that what are the different socioeconomic and demographic factors which are responsible for the increase in the crime rate in Germany over the period 1975-1996. Data consist of the cross section of time derives from the German States to empirically analyze the results, Standard econometric technique was used to exploit both the time series and cross section variation of the data. Demographic factors are considered as the main determinant of crime. As found in the literature crime rate is high in highly urbanized areas. Moreover, unemployment is also consider to be as the main determinant of crime.

Comer (2003) investigated the relationship between Americans Underclass and crime. He tried to discuss the possible cost and benefit that a person may face when participating in the illegal activities. And to find the relationship between underclass and crime. More specifically the relationship between income disparity in term of standard deviation of income and crime. To empirically analyze the results data set was obtained from the US Census Bureau and different other sources. To determine the significant an ordinary least square time series analysis of the crime was employed. Unemployment, inflation and poverty all have a positive relationship with crime.

Lochner and Moretti (2001) examines the relationship between education and the crime arte.They estimate the effect of education on participation in criminal activity accounting for endogeneity of schooling. In order to determine the effect of education on the probability or the chances of arrest US Census data for men was used. In order to empirically analyze the objective of the study Ordinary Least Square was used. The empirical results shows that when there is an increase in the education level, it will increase the opportunities in the future. Education is the source of high earnings, so when there is an increase in the education level people are less likely to involve themselves in the illegal sector because the opportunity cost is now high.

Fajnzylber and Loayza (2000) examined what causes the violent crime over the period 1970-1994. The panel data of international robbery and Homicide rate was used to empirically analyze the results for a sample of developing and developed countries. To empirically analyze the results panel based GMM methodology was used. Empirical findings shows that there is found to be a positive association between crime and income inequality, increase in the income inequality is responsible for the increase in the crime rate.

Montolio and Buonanno (2008) examined the socio economic determinants of crime across the Spanish provinces over the period 1993-1999. To empirically analyze the results GMM-system was employed. Empirical results shows that there was found to be a positive relationship between lagged crime rate and cleared up rates and all types of reported crime. Both the socio economic and demographic variables are responsible for the increase in the crime rate. Property crime are better explained by socio-economic factors. While demographic variables are also important determinants of crime.

According to different researchers unemployment is a very important determinant of crime. With the increase in the unemployment, crime rate also tends to increase because with the high level of unemployment people have low earning opportunities. Carmichael and Ward (2001) tried to investigate this relationship over the period 1989-1996. In order to achieve the objective of the study country level data was employed. To empirically analyze the objective of the study OLS method was used. According to the empirical results both youth and adult unemployment is positively associated to the crime rate.

Lin (2008) tried to investigate the relationship between unemployment and the increasing number of crime over the period 1974-2000. The data used in the study include a panel of 49 U.S states. In order to empirically analyze the objective of the study Ordinary Least Square and the 2-SLS method was used. According to the results OLS may be helpful for understanding the effect of unemployment on Crime rate because of the problem of endogeneity. Results shows that under OLS, when the unemployment goes up by one per cent point the rate of property crime goes up by 1.8 per cent point. But under the method of 2-SLS the figure goes up by four per cent point.

Buonanno (2003) identify the effect of education on crime for the twenty Italian regions. The data set that was used in the study covers the period of 1980-1985. In order to empirically analyze the

objective of the study five econometric techniques were used including OLS, fixed effect estimator, random effect estimator, fixed effect estimator with time effect and the last technique that was used is the random effect estimator with time effect. The results of the study shows that there was found to be a strong relationship between education and crime. When there is an increase in the education level, crime rate tends to decline because people have now better opportunities in the legal sector activities.

Edmark (2005) examines the relationship between unemployment and the property crime rate. In order to empirically analyze the objective of the study a panel of Swedish countries were used over the period of 1988-1999. The econometric technique that was used in the research is the fixed effect estimator. The results of the empirical analysis shows a positive and a significance relationship between unemployment and the property crime rate including burglary, car theft and bank theft. As unemployment is a very important determinant of illegal activities. Increase in the unemployment rate is responsible for the increase in the criminal activities.

Goulas and Zervoyianni (2012) determines the relationship between economic growth and crime rate. The objective of the research is to see how the rate of crime effect the economic growth. In order to achieve the objective of the study panel of 25 countries over the period 1991-2007 were used. To empirically analyze the objective of the study pooled panel-GARCH model (Cermeno and Grier, 2006) was used. The results of the study shows that crime rate is responsible for creating hardships in the economy in bad economic times. The results of the empirical analysis also shows that the growth of annual per capita GDP reduce between 0.49 and 0.62 per cent when the crime rate increase by 10 per cent point.

Dutta and Husain (2009) tried to find out the key determinant of crime rate in case of India over the period 1999-2005. In order to empirically analyze the objective of the study the econometric

technique that was used in the study is the fixed effect and the random effect model. The results of the empirical analysis shows that high the level of conviction rate or the arrest rate results in the higher level of crime rate. This situation reveals the fact that there is a need of reform in the conviction system. Results of the empirical study shows that socio-economic determinants including urbanization, inequality, police force, education are all important determinants of crime rate in India.

Inflation is one of the important determinant of crime. When there is an increase in the price level, real purchasing power of the individual go down and the people involve themselves in the illegal sector activities in order to increase their earnings. Tang & Lean (2007) tried to investigate this relationship over the period 1960-2005. In order to empirically analyze the objective of the study modifies Wald (MALD) causality test was used. In order to determine the long run relationship among the variables of interest ARDL bound test was used. The results of the empirical analysis shows a positive relationship between inflation, unemployment and the crime rate. When the rate of unemployment and inflation tends to increase, crime rate also goes up.

2.3Conclusion

No single factor is responsible for high rate of crime rate in a specific society. There are number of different factors which are important determinant of the crime rate, including social, political, economic and demographic. Different researchers tried to investigate the relationship between crime and the other socio-economic factors which are important determinant of crime. As evident from the literature mention above urbanization, unemployment, education, real GDP, inflation are all important determinates of crime. From the above mention literature there is a strong evidence that unemployment, inflation, GDP and urbanization are positively related to the crime rate. While

there is found to be negative relationship between education and the crime rate. As education is source of income opportunities in the legal sector activities. With the high level of education they have high chance to get better employment opportunities.

Chapter 3

3. Crime Scenario in Pakistan

3.1Pakistan Status in the World in Crime

Throughout the world different researchers tried to study the determinants of crime. One can easily draw a clear picture that no part of the world is free from the illegal activities. Criminal or the illegal activities are creating distortions in all parts of the world, either developed or the developing countries no one is safe from the criminal activities. However, the issue of the criminal activities is becoming more problematic in the least developing countries especially in Pakistan. Where according to the crime statistics a large increase is reported in the criminal activities. Different social, economic, political and demographic factors are responsible for the vast increase in the criminal activities. Including the high rate of unemployment, increase in the price of basic necessities of life including food and raw material, when the income is not equally distributed between the rich and the poor, migration from scattered areas towards the highly populated areas and the low level of education. It is not morally good to say that only specific group of people having low levels of education or having low employment opportunities are involved in the criminal activities, but a large number of people having better living opportunities are also seen to be involved in the criminal activities.

The following section will give a detail picture of crime in Pakistan and the crime rate in the other countries of the world. Table 1 shows the crime rate of the developed and the developing countries of the world including Pakistan. Three countries which ranked at the top among the world are United States, Germany and the United Kingdom. Pakistan position in the ranking of crime among the world is 23rd. whereas India is at 10th number.

Table 3.1

Total Crime by Country

Rank	Country	Total Crime	Rank	Country	Total Crime
1	United States	23677801	10	India	1764629
2	Germany	6264723	19	Finland	530280
3	United Kingdom	5170830	20	Denmark	504240
4	France	3771849	22	New Zealand	427231
5	South Africa	3422740	23	Pakistan	417846*
6	Russia	2952371	37	Greece	102780
7	Canada	2475521	40	Ireland	81274
8	Japan	2443470	50	Moldova	38267
9	Italy	2205780	-	Pakistan	538048**
Note: The following table show the total number of crime in the different countries of the world.					

*1999 Figure, **2007

Source: seventh united nation survey of crime trends and operation of criminal justice system, Bureaue of police research, Ministry of interior Islamabad.

3.2Crime in Pakistan

According to the crime statistics of Pakistan, Pakistan has experienced a large increase in the crime rate like several other developed and developing countries in the world. It is not right to say that one cause or factor is responsible for the increase in the crime rate. Crime is complex in nature. Different cultures have different definition of crime, as the time changes the definition of crime also changes. There are number of factors which are contributing towards crime including the need or want for money, when people move from one place to another, sometimes having low level of education may also be the cause of the crime rate. From the economic point of view unemployment, inflation, income inequality, GDP are some of the main determinants of crime.

Criminal activities are not restricted to some specific group, having low level of resources or having low employment opportunities. But many well of people are also seen to be involved in the criminal activities. These people are exploiting others by misusing there powers with the intension to attain more money either through the legal or the illegal means.

Now a days criminals are using more systematic ways to involve themselves in the criminal activities and many of them also attain the support of elite class. The Government of Pakistan is taking different steps to overcome this issue. Different policy makers and many other law enforcement agencies are also contributing to resolve this issue. For example, different surveys are conducted in the areas where the rate of crime tends to be high then in order to completely remove or either reduce the rate of crime. Different crime prevention steps are taken in those areas in order to overcome the problem. (Gillani *et al*, 2008).

The situation of crime in Pakistan shows that the country is facing many disorders like there is no proper law and order situation, backwardness and different instabilities either economic or political. Pakistan is facing a large number of illegal activities like kidnapping, theft, child lifting and other street crimes. With the passage of time crime rate is increasing even different precautions are taken to control these illegal activities. The higher and increased level of criminal activities are creating stress, distortions and discomforts in the society. Due to such circumstances different investors either foreign or domestic are facing different problems (Gillani, 2009). In such circumstances it may be very difficult for the new investors to start a new project, because there is risk that they may not get the returns because of the criminal activities. The criminal and the unlawful activities are adversely affecting the interest of investors and businessman. Unlawful and illegal activities always attract the criminals. There may be number of factors which are

responsible for the increase in the criminal activities like social, economic, cultural and even the demographic factors are responsible for the criminal activities.

The following table shows the total population and the total number of crime in Pakistan from the period 1951. The total number of crimes that were reported in the year 1951 were 76519. As with the increase in the population the crime rate also tends to increase, and the total number of crime reached to 167032 in the period 1976. According to the figures mention in the table Pakistan experience a large increase in the crime rate with the change in the population, time and many other factors.

Table-3.2.

Crime change in Pakistan

Year	Population (Total)	Crime (Total)	Crime growth (%)	Crime (per 10,000 population)
1951	33.82	76519	-	226
1958	38.12	81124	6.02	212
1961	42.97	79900	-1.51	185
1966	51.98	93633	17.19	180
1971	62.88	129679	38.5	206
1976	72.12	167032	28.8	228
1981	83.84	152782	-8.53	215
1986	97.67	220035	44.02	248
1991	112.61	403078	83.19	257
1998	133.61	431854	7.14	323
2000	139.76	388909	-9.94	278
2003	149.03	400680	3.03	267
2005	153.96	453264	13.12	294
2007	158.17	538048	18.71	340
2009	162.34	616227	14.53	376
2011	165.87	673750	16.88	404

Note: The Following table shows the total population of Pakistan, and show that the rate of crime is increasing with the increase in the population and the unemployment rate. The table also shows the growth of the crime rate in different years of Pakistan.

Note: Bureau of Police Research and Development Islamabad, 2011.

The figures mention in table 3.2 give a clear picture of the fact that with the increase in the population level from 1960's the crime rate is also showing an increasing trend. Which is also mention in different literatures that increase in the population level is responsible for the increase in the criminal activities in both the developing and the developed countries. The situation is worse in case of Pakistan, where a larger number of people are moving from rural to urban areas in search of better opportunities, but there is a lack of planning. The above table shows that crime rate per 10,000 inhabitants in 1951 and 1986 was 248. And the situation become even worse in 2009 and 2011 when the crime rate goes to 376 and 404.

As from the above mention discussion it is clear that there is a need for different polices to reduce the problem of crime. Prevention of the criminal activities is very important for the development and expansion of the economy. There is a need to develop new employment opportunities not only in the urban areas but also in the small rural areas, to reduce the burden of high level of population in the large cities.

4. Data and Research Methodology

4.1 Introduction

The objective of the following research is to examine how the urbanization and unemployment are effecting the total number of crime. And also to see the impact of urbanization and unemployment on major and minor crimes separately in Pakistan. And to see what are the other factors which are responsible for the increase in the crime rate in Pakistan. In order to empirically analyze the objective of the study, Johansen Co-integration technique is used over the period 1980-2014. The following section will give a detail picture of the econometric model and the explanation of the econometric technique.

4.2 Model Specification

For understanding the objective of the research more clearly and to analyze the impact of urbanization which is a demographic variables and the other economic variable which is the unemployment on the total number of crimes and the major and minor crimes separately the study will make use of the general model of cost benefit analysis of Becker (1968).

4.2.1 Theoretical Framework

Beccaria (1767) laid the foundation of the economics of crime. After Beccaria (1767) essay of "crime and punishment" by Dostoevsky (1866) become the source of interest for many researchers for the economics of crime.

Becker (1968) and Ehrlich (1973) were considered as the founders of the economics of crime. The main and foremost contribution on the economics of crime and the illegal activities were normally

related to the two main known researchers Becker (1968) and Ehrlich (1973). Becker (1968) presented a model and cite evidence in support that a person will involve himself in the illegal activities if the utility or the benefit attain from the criminal or the illegal activities exceeds the benefit or the utility attain from the legal sector activities. Criminals who are taking an active part in the illegal activities face some benefits either physical or psychological but along with these benefit, they also face some cost in terms of peace enforcement. There are two main determinants of cost one is the probability or the chances of being caught or arrested and the other is the punishment or the torture face if arrested. No single factor is responsible for the increase in the crime rate, there are number of social-economic factor which are responsible for the increase in the crime rate. Unemployment is one of the macro-economic factor which is a very important determinant of crime. Ehrlich (1973) observed a positive relationship between crime and unemployment. He proposed that unemployment is a key factor which is responsible for the increase in the criminal activities because unemployment is responsible for the income opportunities in the lawful activities. So, when the rate of unemployment is high, individuals are more likely to involve themselves in the unlawful activities rather than the legal sector activities.

Theories about the determinants of the criminal activities may differ. People may involve themselves in the criminal activities either they are habitual of doing so or some other reasons like family upbringing or the disrespect to the society. Becker (1968) proposed that individual will involve himself in the criminal activities if the possibility of conviction is there. If the probability of convection or the amount of punishment increase for the criminals, keeping all other variables constant, it will decrease the amount of crime committed by the criminals. In order to understand the objective of the study more clearly, the approach here follows the usual analysis cost and benefit proposed by Becker (1968). Becker (1968) proposed that a person is more likely to involve

himself in any activity which is against the law when the utility attain from such activities are more than the utility attain from some legal sector activities. Similarly some individuals involve themselves in the criminal activities not because there motivation differ from that of the other individual, but because there is difference in the cost and benefit they attain.

The model presented by Becker (1968) include some social cost of crime, the cost of punishment or fear that something bad will happen and the supply of offence. According to the model of Becker (1968) amount of crime committed by an individual O_j is a function of chances or the probability of arrest, the amount of punishment that the individual may face if arrested that is f_j and the other variables u_j. This can be shown in the following equation.

$$O_j = O_j(p_j, f_j, u_j)$$

Since only those individual are punished who are arrested, because of this there is some discrimination as some criminals are punished and some are not, or some time they may face severe punishment if arrested and some are free from this. When the amount of punishment increase for the criminals this will discourage them to involve in the criminal activities because now the utility attain from the criminal activities decline, and the probability of paying the high price has now increased.

$$\text{Opj} = \frac{\partial Oj}{\partial Pj} < 0$$

$$\text{Ofj} = \frac{\partial Oj}{\partial Pj} < 0$$

The above two are the generally accepted restrictions. Changes in other factors which are included in the Uj can be predicted or anticipated. For example, when there is an increase in the income

which the individual can attain from the legal sector activities or there is an increase in the education level will cut the motivation to participate in the unlawful activities, and thus number of crime committed will decline. The number of crime committed by the criminals will also decline when there is a change in the form of punishment, like when the punishment is change from paying fine to imprisonment. Criminals are unable to take part in any illegal activities when they are in jail.

This approach can also be interpreted in some other way. When there is an increase in the probability of conviction but at the same time the amount of punishment face if arrested decline by the same amount, it will change the expected utility but will not change the expected income from an illegal activity. The total number of crime committed is simply the sum of all the amount of crime committed that is the sum of Oj and depend on the set of pj, fj and uj. Alternatively, because of the difference in the age, education, previous crime history, wealth and many other factors, variables may likely to differ from person to person. For simplicity we consider the average value of p, f and u for the market offence function.

$$O = O(p, f, u)$$

Both the market offence function and the individual offence function assume to have the same properties.

4.2.2 Econometric Model

Based on above theoretical discussion the following base line model should be empirically tested to achieve the objective of the study that is to see a long run relationship between urbanization, unemployment and total, major and minor crimes of Pakistan.

$$TC_t = \beta_0 + \beta_1 UNP_t + \beta_2 URB_t + \beta_3 INF_t + \beta_4 EDU_t + \beta_5 RGDP_t + \mu_t$$

$$MJC_t = \beta_0 + \beta_1 UNP_t + \beta_2 URB_t + \beta_3 INF_t + \beta_4 EDU_t + \beta_5 RGDP_t + \mu_t$$

$$MNC_t = \beta_0 + \beta_1 UNP_t + \beta_2 URB_t + \beta_3 INF_t + \beta_4 EDU_t + \beta_5 RGDP_t + \mu_t$$

- TCt = Total Crime (crime per 10,000 inhabitants)
- MJCt=Major Crime (crime per 10,000 inhabitants)
- MNCt=Minor Crime (crime per 10,000 inhabitants)
- UNP = Unemployment (% of total labor force)
- EDU = Education expenditures (as a percentage of government expenditures)
- INF= Inflation (CPI)
- RGDP = real GDP
- URB= population in the largest city (% of urban population)
- μ = Error Term
- t = time period 1980-2014

$\beta 0$ = Intercept term; $\beta 1, \beta 2, \ldots\ldots, \beta 5$ = Slope Coefficients

4.2.3 Justification of the Variables

All the variables that are used in the study are of great importance, and are important determinant of crime rate. All the variables are playing a vital role in order to achieve the objective of the study

that is to see the impact of urbanization and unemployment on total, major and minor crimes in case of Pakistan.

- **Crime**

The main dependent variables that is used in the research is the total number of crimes which is further divided into two categories major crime including murder, attempted murder, kidnapping and the minor crimes including robbery, burglary, cattle theft and other. In order to achieve the objective of the study, it covers the period 1980-2014. In our study we use the number of crime per 10,000 inhabitants.

$$\text{Crime per 10,000 persons} = \frac{total\ crimes}{total\ population} \times 10{,}000$$

The independent variable that are used in the study are urbanization, unemployment, GDP, inflation and education. The independent variables are also collected for the same time (1980-2014). Construction of these variables are given below.

- **Urbanization**

One of the independent variable that is used in the study is the Urbanization rate. The rate of urbanization indicate the population in the largest city (% of urban population). Different researchers suggest that urbanization is the key factor which is responsible for the development of the economy and increase in industrialization. Though urbanization is beneficial for the economy but it is also creating harm to the society like the increase in the crime rate, (Krivo& Peterson, 1996). Large number of people move from rural to urban areas for the search of better living opportunities, but due to the limited opportunities available in the urban areas it is impossible to make every one satisfied. Because of the limited opportunities people try to attain a better living

standard either through the legal or the illegal sector activities. In contrast to rural areas, there are less chances of criminal activities because of the low level of population, people know each other and there are less chances for the criminals to hide themselves. The main factors which are effecting the crime rate in urban areas are the possibilities of arrest (Glarser & Sacerdote, 1996).

- **Unemployment**

Becker (1968) proposed that potential criminal will compare the cost and benefit of committing crime. Individuals can generate income either from the legal sector activities or the illegal sector activities. Therefore, income that is earned in one of these sector either legal or illegal is the cost of participating in the other sector activities (Block, 2004: Heineke, 1975: Ehrlich, 1973). Individuals are less likely to involve themselves in the criminal activities, when they have better current and future labor market opportunities.

Unemployment is one of the determinant of these opportunities in the labor market, when the rate of unemployment goes up the opportunities in the legal sector actives diminishes, increasing the crime rate in the economy (Atlindag, 2012). The data set that is used in the study is the percentage of total labor force that is unemployed.

- **Inflation**

The high prices of goods and services are responsible for a decrease in the purchasing ability of the individual in the market. Camion (2008) proposed that some people might involve themselves in the unlawful activities just to survive that is, there is possible increase in the criminal activities due to combined increase of rice price or some other basic goods and services. Mark Easton proposed that crime increases by 0.026% when inflation increase by 1%. Real income of the individual decreases when there is an increase in the price level, which will reduce the purchasing

ability of the individuals living in the low income group. This situation force them to involve them in the unlawful activities to maintain their living standards either by legal or illegal activities. (Gillani et al, 2008). Consumer price index is used in the following research to see the relationship between inflation and the crime rate.

- **Education**

Higher level of the education and training increase the ability and skills of the people which help them to attain better job opportunities in the legal sector market. Higher level of education not only increase the return in the legal sector but also increase the opportunity cost of the illegal activities. Comer (2003) proposed that education enables the individuals to increase the resources in the legal sector activities. If a person is more educated, then the individual has more job opportunities in the legal sector activities. Hence, education enables the individual to earn more income from the lawful activities. There is found to be a close relationship between education and crime, as the educational level increases, crime rate significantly goes down. The variable set that is used in the study is the education expenditures that is the percentage of government expenditures,

- **Gross Domestic Product**

GDP represent the monetary value of all goods and services produced within a nations geographic borders over a specified period of time. Increase in the Gross Domestic Product (GDP) improves the wellbeing of the citizen, reduce the unemployment rate to some extent, reduce poverty rate and many other negative factors will experience a downward growth. But in case of less developed countries, where there is poor governance or other instabilities either economic, political or cultural increase in the GDP may also cause to increase the rate of crime. Because now people want to get that money through illegal means from the one who have high income.

Table 4.2.3

Expected relationship among variables

Dependent Variable: Crime

Independent Variable	Expected Relationship	Relevant Studies
Urbanization	(+)	Jalil (2008), Gumus (2008)
Unemployment	(+)	Saraidakis & Spemgler (2012), Blomquist & Wasterland (2013)
Inflation	(+)	Torrum et al. (2014), Tamayo et al. (2013)
GDP	(+)	Nunmey et al. (2011)
Education	(-)	Bell et al. (2015), Khan et al. (2011)
Note: The table shows the expected results of the he variables of interest, along with relevant studies.		

4.3 Data Sources

Total six (6) variables are being utilize as a part of the present study (Crime, urbanization, education, unemployment, inflation and GDP). The present study is based on time series data, for the period 1980-2014. Data for the above mention variables are taken from different sources. The data for all the reported crime are taken from the Pakistan Bureau of Statistics over the period 1980-2014 which include murders, kidnapping, robbery, theft, attempted murder, burglaries etc. Data set for the education expenditures, unemployment, urbanization and real GDP are taken from the various sources of economic survey.

4.4 Analytical Tools

The key objective of the research is to investigate a long run relationship between urbanization, unemployment and total number of crime. And also to see the impact of urbanization and unemployment on major and minor crime separately in case of Pakistan over the period 1980-2014. In order to accomplish the aim and objective of the study, the most helpful estimation technique in this regard are Johansen and Juselius co-integration and Vector Error Correlation model (VECM). In order to see the long run relationship among the variables of interest one should pass through different test required for the analysis.

4.4.1 Test of Stationary

In time series data stationary of the series of variables is a desirable property. In order to see the stationary of the variables of interest "Augmented Dickey Fuller (ADF) Unit root test" will be used, established by Dickey & Fuller in 1979. They proposed this test to check whether the variables are stationary or they follow a random walk. Stationary of series of variables is checked firstly at level, then at first difference.

ADF has the following hypotheses

Null hypotheses Ho: $\Upsilon = 0$; Variable x_t is Non-Stationary

Alternate Hypothesis H1: $\Upsilon < 0$; Variable x_t is Stationary

If the calculated value is less than the critical value we will reject the null hypotheses of non-stationary in data in favor of the alternative hypotheses of stationary of data. However, the acceptance of the null hypotheses, would mean that the series is non-stationary at level and

required to be different to make it stationary. The following equation shows the mathematical form of ADF.

$$\Delta Y_t = \alpha_0 + \beta T + (\rho - 1)Y_{t-1} + \varepsilon_t$$

Δ referred as first difference operator, Y_t show the variable whose stationary will be checked, α_0 referred as intercept term, linear time trend is shown by T, the lag value of the variable is shown by Y_{t-1} and $\varepsilon_t$depict the error term with mean zero and variance constant. The null hypothesis of ADF unit root test shows the non-stationary of the variable. If $\delta=0$ i-e $\rho=1$ then in this case series will be non-stationary depicting that null hypothesis is accepted.

4.4.2 Selection of Lag Length

After making all variables stationary we move forward to the second step of analysis of co-integration that is the selection of an appropriate lag length. The framework of the Unrestricted Vector Autoregressive (VAR) is used for the selection of the appropriate lag length. Two criteria in this regard will help in the lag length selection. One is the Akaike Information Criterion (AIC) and second is the Schwarz Information Criterion (SIC). Selection of lag length is based on the smallest value shown by AIC or SIC.

4.4.3 Test of Co-integration

The concept of co-integration was initially given by the Angel and Granger in 1987. This concept says that if variables are non-stationary at level, it is $I(0)$ it means it is stationary at first difference i-e $I(1)$ then stochastic trends will be shown by them and their linear combination will be stationary at level i-e $I(0)$ then variables are said to be co-integrated means movement of variables shows existence of long run relationship. Furthermore, if one non-stationary series is regressed on another

non-stationary series it will lead to the spurious regression. Based on the flaws or shortcomings in the Angel and Granger co-integration technique, the Johnson and Juselius put forward their co-integration technique in 1990 which is popular by their name Johnson and Juselius co-integration technique. Like every other time series estimation technique this estimation technique proposed by Johnson and Juselius has two pre-requites which are about the;

1. Stationary of the variable: all variables included in the study should be integrated of same order preferably one means all variable should be preferably stationary at first difference.
2. Lag Length Selection: lag length must be specified.

Johnson and Juselius co-integration technique is based on outline of Vector Autoregressive (VAR) model. This co-integration technique help to provide and figure out the number of co-integrating vectors in the present study and also provide the long term relationship between crime and other independent variables that are urbanization, unemployment, inflation, GDP and education. This technique work by two tests Trace Test and Maximum Eigen Value Test.

Trace test:

This test tells about the existence of co-integration in the model. It works with the acceptance and rejection of its null hypothesis. For Trace Test both null hypothesis and alternative hypothesis are as follows;

H_0: r = 0, shows no co-integrating vector

H_1: r ≠ 0, shows co-integrating vector

If the probability value is less than equal to 0.05 we reject the null hypothesis so it means there is co-integrating vector. Means if at "none" the probability value is less than 0.05 then it means there exists the co-integrating vector at 5% level of significance

Maximum Eigen Value Test:

For finding the number of co-integrating vector we move to Maximum Eigen Value Test.

H_0: r =1, there is zero co-integrating vector

H_1: r ≥ 1, there is one or more than one co-integrating vector

Criteria for acceptance and rejection of null hypothesis are same. If the probability value is less than equal to 0.05 we reject the null hypothesis. Suppose that at none if the probability value is less than 0.05 we will reject the null hypothesis so there will be one or more than one co-integrating vector at 5% level of significance.

It these two tests can give alternative results from each other than results of Maximum Eigen Value Test will be preferred over Trace Test.

4.4.4 Vector Error Correction Model (VECM)

After analyzing the existence of the co-integrating vector, the estimation will be further preceded by the Vector Error Correction Model (VECM). It depicts about the long term association between relevant variables. It is always run in difference form. To run the Vector Error Correction Model (VECM) two necessary conditions are required;

1. At least one co-integrating equation must exist among the relevant variables.
2. All variables must be integrated of same order preferably one.

Vector Error Correction Model (VECM) gives information about the stability of variables in long run. In this model the error correction term depicts the percentage of error correction each year due to the any kind of long term disequilibrium. It is used to correct the error each year means it shows that how much error is being corrected each year. In other words to eliminate the error completely, how much time it will take.

Vector Error Correction Model (VECM) must possess two most important properties for the t statistics of error correction term:

1. t statistics must be negative.
2. t statistics or t value must be significant i-e it must be greater than 1.65

VECM for the present study is expressed as follows for the total crime, major crimes and minor crimes in case of Pakistan.

$$\Delta LTC = \beta o + \sum_{k=1}^{n} \beta_1 \Delta LURB_{t-j} + \sum_{k=1}^{J} \beta_2 \Delta UNP_{t-j} + \sum_{k=1}^{K} \beta_3 \Delta LRGDP_{t-j} + \sum_{k=1}^{K} \beta_3 \Delta EDU + \sum_{k=1}^{K} \beta_3 \Delta CPI + \varepsilon_t$$

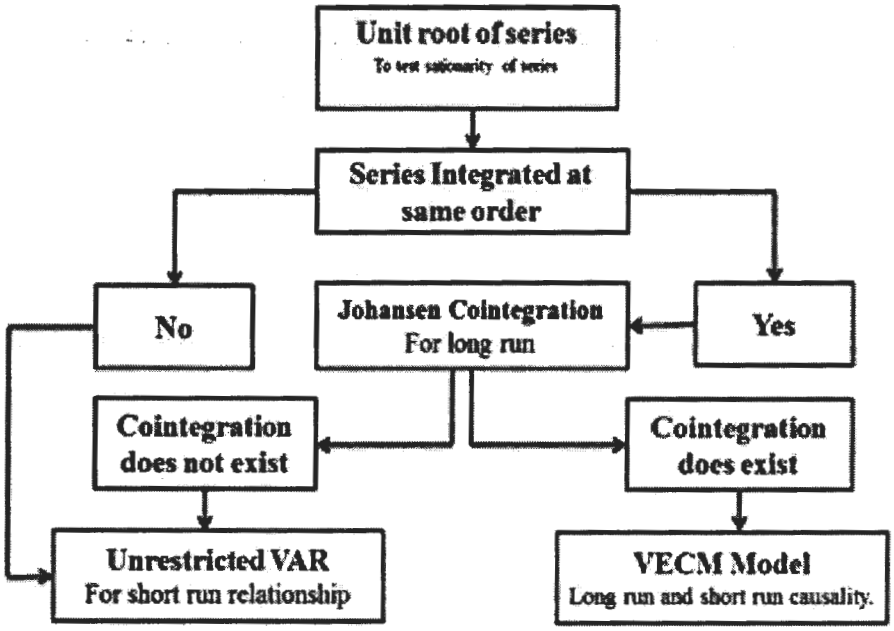
$$\Delta LMJC = \beta o + \sum_{k=1}^{n} \beta_1 \Delta LURB_{t-j} + \sum_{k=1}^{J} \beta_2 \Delta UNP_{t-j} + \sum_{k=1}^{K} \beta_3 \Delta LRGDP_{t-j} + \sum_{k=1}^{K} \beta_3 \Delta EDU + \sum_{k=1}^{K} \beta_3 \Delta CPI + \varepsilon_t$$

$$\Delta LMNC = \beta o + \sum_{k=1}^{n} \beta_1 \Delta LURB_{t-j} + \sum_{k=1}^{J} \beta_2 \Delta UNP_{t-j} + \sum_{k=1}^{K} \beta_3 \Delta LRGDP_{t-j} + \sum_{k=1}^{K} \beta_3 \Delta EDU + \sum_{k=1}^{K} \beta_3 \Delta CPI + \varepsilon_t$$

Whereas;

The first difference operator is shown by Δ. Natural log of Crime is LTC, natural log of major crime is LMJC, natural log of minor crime is LMNC, LURB shows the natural log of population in the largest city, EDU referred as the education expenditures as the percentage of government expenditures and LRGDP depict the natural log of real GDP, CPI represent price index and UNP referred to as unemployment that is percentage of the total labor force.

Methodology Section of the Current Study



The above mention chart help to summarize the econometric analysis of the research. Where the first step is to check the stationary of all the variables of interest, for this Augmented Dickey Fuller (ADF) test is applied. If all the variables are integrated at same order then we move to the next step that is the Johansen Co-integration approach, for the unique and long run relationship among the variables of interest. If the co-integration does exist then the appropriate econometric technique is Vector Error Correction Model (VECM), and if there is no co-integration among the variables of interest then we move towards the unrestricted VAR.

5. Results and Interpretations

5.1 Introduction

The following chapter of the study will deal with the interpretation and detail discussion of the results and possible justification of the computed results. The key objective of the research is to determine the impact of urbanization and unemployment on total number of crime, major crimes including the murder, attempted murder and minor crimes including the burglary, robbery, cattle theft and other theft and other socio economic variables in Pakistan over the period 1980-2014. Johnson and Juselius co-integration and Vector Error Correction Model (VECM) are used to determine the long run relationship among the variables of interest.

5.2 Descriptive Analysis

Table 5.2

Descriptive Analysis

Variables	Mean	Standard Deviation	Min.	Max.
CT	3.338747	0.183233	3.018227	3.658291
MJC	0.80968	0.112021	0.637005	1.040551
MNC	0.659543	0.221401	0.301932	1.020208
URB	3.10028	0.01956	3.0756	3.1371
UNP	5.024286	1.479486	2.6	7.8
INF	8.567386	3.777106	2.914135	20.28612
RGDP	24.95432	0.705349	23.88831	26.21892
EDU	2.363341	0.445941	1.06415	3.0223

Note: The table shows the descriptive analysis for the all the variables of interest. Both the Mean values and the standard deviation are given in the following table.

Before discussing the detail analysis of the actual results drawn from the application of the above suggested estimation technique the brief descriptive analysis would be demonstrated in the above table. The mean value of the crime rate per 10,000 inhabitants is 3.338747 with the standard deviation 0.183233 and having the maximum and minimum values 3.018227 and 3.658291. The mean value of major crimes per 10,000 inhabitants is 0.8096 with the standard deviation 0.1120 and the minimum and the maximum value 0.6370 and 1.0405. The mean value of minor crime per 10,000 inhabitants is 0.6595 having standard deviation 0.2214 and the minimum and the maximum value for the minor crimes are 0.301932 and 0.1022. Urbanization rate which is the main independent variable has the mean value of 3.10028 with the standard deviation of 0.01956 and minimum and maximum values 3.07560 and 3.137106. The other main independent variable is the unemployment rate where 5.024286 is the mean value of unemployment with the standard deviation 1.47948, and minimum and maximum values 2.60000 and 7.80000. The other control variable that are used in the study are inflation rate, real GDP and education that is the higher education. The mean value of inflation rate is 8.567386 with the standard deviation 3.777106 and the minimum and maximum values 2.914135 and 20.28612. The mean value of real GDP is 24.95432 with the standard deviation 0.705349 and the minimum and maximum values are 23.88831 and 26.21892. The other control variable is education having the mean value of 2.363341 with the standard deviation 0.445941 and the minimum and maximum values are 1.064150 and 3.022300.

5.3 Results of Stationary

The stationary test of Augmented dickey-fuller (ADF) unit root test for all variables incorporated in the study will be highlighted in table 5.3.

ADF has the following hypotheses

Ho: $\Upsilon = 0$; Variables are Non-Stationary

H1: $\Upsilon < 0$; Variables are Stationary

The null hypotheses of non-stationary in data will be rejected in favor of the alternative hypotheses that is the stationary of the data if the calculated value is less than the critical value. However, if the null hypotheses is accepted it would mean that the series is non-stationary at level and there is a need to make it stationary. The following table shows the results of the ADF test.

Furthermore, it is one of pre-requite for any time series estimation technique that all variables which are the part of the study must be integrated of same order in which preference is given to one.

Table 5.3

Augmented Dickey Fuller (ADF) Unit Root Tests

Variables	Level	1st Difference	Conclusion
TC	-1.46378	-5.33606	I(1)
	-0.5395	0.0001	
MJC	-1.816684	-5.158602	I(1)
	-0.3664	-0.0002	
MNC	-1.315891	-6.370816	I(1)
	-0.6108	0.0000	
URB	-1.8764	-3.3402	I(1)
	-0.3383	-0.0215	
UNP	-1.56621	-5.34687	I(1)
	-0.4885	-0.0001	
RGDP	0.54987	-5.49554	I(1)
	-0.986	-0.0001	
EDU	0.1084	-6.31097	I(1)
	-0.9618	0.0000	
INF	-2.79724	-7.010462	I(1)
	-0.0692	0.0000	

Note: The following table shows the all the variables including the dependent and the independent are stationary at first difference, which satisfies the first step of the econometric analysis.

In order to empirically analyze the objective of the research, the first step is to check the stationary of all the variables. For this Augmented Dickey Fuller (ADF) test is employed. The above mention results of the ADF test shows that all the variables that are used in the research are non-stationary at level that is in favor of the null hypotheses that unit root problem exist in these variables. Similarly, all the variables are *I(1)* which mean that all the variables of interest are stationary at first difference. This satisfy the first step of the econometric analysis. After checking the unit root

in the variables the next step is the selection of the most suitable econometric technique. The application of the co-integration or the Autoregressive (VAR) depends on the results of the Johansen (1988) co-integration test. If according to the estimated results there is found to be a unique long run relationship among the variables of interest, co-integration will the appropriate technique. On the other hand, if there is no unique long run relationship among the variables of interest, then the application of VAR is appropriate. So in order to achieve the underline objective, we apply the Johansen Co-integration test in order to detect the unique long run relationship among the variables (crime, urbanization, unemployment, education, GDP).

5.4Johnson and Juselius co-integration

After the fulfillment of necessary conditions required for the accomplishment of the co-integration, variables are ready to pass through the co-integration test prosed by Johnson. This test will suggest the existence of long term relationship between crime and other explanatory variables that are urbanization, unemployment, inflation, real GDP and education and along that specify the existence of number of co-integrating vectors.

The first objective of the research is to determine the unique long run relationship between total number of crimes (murder, attempted murder, kidnapping, child lifting, dacoity, robbery, burglary, cattle theft and other theft) and urbanization and unemployment. And the other socio-economic variables including the inflation, education and GDP. The table 5.4 demonstrates the results of Johnson and Juselius co-integration which is based on two tests "Trace Test" and "Maximum Eigen Value Test".

Table 5.4a

Total Crime
Johnson and Juselius Co-integration

Hypothesized No. of CE(s)	Trace Statistics	0.05 Critical Value	Prob**	Max-Eigen Statistic	0.05 Critical Value	Prob**
None *	159.4476	95.75366	0	95.73689	40.07757	0
At most 1	63.71074	69.81889	0.1394	22.92058	33.87687	0.5365
At most 2	40.79017	47.85613	0.1954	18.17505	27.58434	0.4806
At most 3	22.61511	29.70707	0.2655	14.30896	21.13162	0.3402
At most 4	8.306147	15.49471	0.4332	7.750571	14.2646	0.4046
At most 5	0.555576	3.841466	0.456	0.555576	3.841466	0.456

Note: The table shows that according to the Trace statistic and the Max-Eigen statistic, there exist a unique and long run relationship among the variable of interest at 5 per cent level of significance.

Table 5.4b

Major Crime
Johnson and Juselius Co-integration

Hypothesized No. of CE(s)	Trace Statistics	0.05 Critical Value	Prob**	Max-Eigen Statistic	0.05 Critical Value	Prob**
None *	174.0962	95.7537	0	105.6	40.0889	0
At most 1	68.50682	69.8189	0.0633	25.01	33.8886	0.385
At most 2	43.5009	47.8561	0.1208	21.12	27.5856	0.269
At most 3	22.37692	29.7071	0.278	12.51	21.1378	0.498
At most 4	9.86558	15.4947	0.2912	9.74	14.2690	0.23
At most 5	0.125723	3.84147	0.7229	0.126	3.84156	0.723

Note: Both the Trace statistic and the Max-Eigen statistic shows that there exist a unique and long run relationship between the major crime and the other independent variables at 5 per cent level of significance.

Table 5.4c
Minor Crime
Johnson and Juselius Co-integration

Hypothesized No. of CE(s)	Trace Statistics	0.05 Critical Value	Prob**	Max-Eigen Statistic	0.05 Critical Value	Prob**
None *	191.9974	95.75366	0	103.233	40.0776	0
At most 1*	88.76437	69.81889	0.0008	41.94712	33.8769	0.0044
At most 2	46.81724	47.85613	0.0624	22.97314	27.5843	0.1746
At most 3	23.84411	29.79707	0.2071	15.24358	21.1316	0.2722
At most 4	8.600525	15.49471	0.4036	7.803764	14.2646	0.399
At most 5	0.796761	3.841466	0.3721	0.796761	3.84147	0.3721
Note: The above mention results of the Trace Statistic and Max-Eigen Value Statistic shows there exist two co-integration equations at 5 per cent level of significance.						

The above mention tables shows the results of the Johansen and Juselius co-integration for the total, major and minor crime in case of Pakistan. For the total number of crime, both the trace statistic and max-Eigen value statistics shows that there exist a unique and long run relationship among the variables of interest at five per cent level of significance. For the total and major crime there exist one co-integrating equation at five per cent level of significance. For the case of minor crime, according to the results of the trace statistic and the max-Eigen values statistic there exist two co-integrating equation at five per cent level of significance. This satisfies the second step of the empirical analysis, we now move to vector error correction model (VECM) to interpret the results of the coefficient.

5.5 Vector Error Correction Model (VECM)

As the results gathered from the Johnson and Juselius co-integration demonstrates about the co-integrating vector. Further analysis will be conducted by taking the help of Vector Error Correction Model (VECM) which illustrate about the long term stability of the incorporated variables. This will express that for how long the variables keep on showing the long term relationship with each other. The significance of t-statistics and the sings of coefficients articulate about the stability of variables encompassed in the present study. When error correction term shows the negative coefficient and significant value of t-statistics then it will depict that error in the model will take time to eliminate and with time the series show convergence toward equilibrium. VECM highlights the impact of all independent variables which in current study are urbanization, unemployment, education, inflation and real GDP on the dependent variable which is crime. The results of the VECM are presented as follows

Table 5.5

Vector Error Correction Model (VECM)

	Total Crime		Major Crime		Minor Crime	
Variables	**Coefficient**	**t-statistics**	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
URB	-0.5	-1	-0.68	-1.5	-0.47	-0.723
UNP	0.13	3.9	0.216	8.64	0.12	5.5854
INF	0.02	2.8	0.033	6.58	0.02	2.6023
GDP	0.71	7.3	0.86	10.2	0.97	13.564
EDU	-0.1	-3	-0.22	-6.3	-0.17	-3.49
R-Square	0.57		0.56		0.52	
F-Stat	≈ 2		≈ 2		≈ 2	
Note: The following table shows the results of the Vector Error Correction Model for total, major and minor crimes of Pakistan						

Results of the Vector Error correlation model shows that there exist a long run relationship among the total number of crime (murder, attempted murder, robbery, theft, child lifting, cattle theft and other theft), major crime (kidnaping, murder, attempted murder) and minor crime (theft, robbery, cattle theft and others) which are the dependent variable and the other explanatory variables that are urbanization, unemployment, education, inflation and the real GDP. The results of the VECM shows similar results for the total, major and minor crime in case of Pakistan.

The relationship between urbanization and crime is found to be negative and insignificant. Here the opposing impact of URB on crime is subdued or depressed by the insignificant association between the two. There is large number of literature, which shows that urbanization is responsible for the increase in the crime rate. As the probability of arrest is low in cities, it might lower the

cost of crime. A natural hypotheses is that police might work well in a small stable town or in rural areas because they are more likely to know the residents of the community. Since, in the urban areas as the population rate goes up enforcement becomes difficult. (Glaeser and Sacerdote, 1996). Our results in the results are contradictory with the results mention in the literature. Pakistan being a developing country is also facing the problem of corruption, terrorism, and other violent crimes especially in the large cites. People now are losing confidence to live in large cities, as they believe that they are not safe. So, because of the increase in the terrorism a large number of people are now moving from large cities to nearby areas and trying to find the means of living. This is reducing the burden of urbanization to some extent, and so does the crime rate.

The second main independent variables which is responsible for the increase in the crime rate is the unemployment rate. Empirical results shows that unemployment has a positive and significant impact on crime. Our results are consistent with the work of Becker (1968), Ehrlich (1973) and Wong (1995). They conclude that unemployment is an important indicator of the income opportunities in the legal sector activities. Unemployment of a country play a very important and key role in determining the overall health of the economy. If the economy is facing problems like unemployment it not only effect the health of the economy but is also responsible for increasing other issues like there may be an increase in the crime rate. Economies usually experience increase in the growth level or other benefits before there is an increase in the unemployment rate. Hence, when there is an increase in the unemployment rate income opportunities in the legal sector opportunities diminishes and thereby increase the possibility of committing crime.

The other economic variable which is effecting the crime rate is inflation. The empirical results shows that there is a positive and significant relationship between inflation and the crime rate. When there is an increase in the price level it has adverse effect on the real income of the

individuals, and will reduce the purchasing power of the individual. Consequently, if that individual want to maintain the better standards of living he will have to increase his real income either from the legal or the illegal sector activities. (Allen, 1996 and Omotor, 2009).

Another important variable which is effecting crime rate is education. Education shows a negative and significant effect on crime. There are different reasons to convince, that education will affect the crime rate. First, high level of schooling increase the return in the legal sector activities, increasing the opportunity cost of the unlawful activities. Education may change the decision of the individual to indulge himself in the criminal activities. For example, education may increase one's patience or risk aversion. Similarly, we expect most of the channels discussed above may lead to a negative relationship between education and crime (Lochner & Moretti, 2003).

The results of the GDP shows that there is a positive and a significant relationship between crime and GDP. When there is an increase in the level of income the benefits for criminals goes up for theft and robberies. It is generally observed that because of the existence of the alternative opportunities rich areas attract more criminals. In addition to that, high income provide more opportunities for the criminal's offence due to huge amount of stolen goods, which is known as the opportunity effect (Levitt, 1999).

5.6 Estimation of Error Correction Model

An error correction model belongs to a category of multiple time series models most commonly used for data where the underlying variables have a long-run stochastic trend, also known as co-integration. ECMs are a theoretically-driven approach useful for estimating both short-term and long-term effects of one time series on another. The term error-correction relates to the fact that last-periods deviation from a long-run equilibrium, the *error*, influences its short-run dynamics.

Thus ECMs directly estimate the speed at which a dependent variable returns to equilibrium after a change in other variables.

Error-correction Model for Total, major and minor crime

Table 5.6a

Error Correction Term (Total Crime)

Independent Variable	Coefficient	t-statistics	Independent variable	Coefficient	t-statistic
Constant	0.03244	1.10624	$\Delta RGDP_{t-1}$	-0.4411	-2.2925
ΔC_{t-1}	0.11293	0.39708	$\Delta RGDP_{t-2}$	0.07651	0.3706
ΔC_{t-2}	-0.0551	0.01179	ΔCPI_{t-1}	0.00301	0.66258
ΔEDU_{t-1}	-0.0476	-1.071	ΔCPI_{t-2}	0.00222	0.57138
ΔEDU_{t-2}	0.11526	2.28139	$\Delta POPU_{t-1}$	-0.5796	-1.6594
ΔUNP_{t-1}	-0.0201	-0.9396	$\Delta POPU_{t-2}$	0.06293	0.00551
ΔUNP_{t-2}	-0.02	-0.9783	ϵ_{t-1}	-0.2963	-1.9916
Note: The following table shows the value of the ECM, which the speed of adjustment towards the equilibrium for total crime.					

The above table shows the results of the Vector Error Correction Model for the total number of crime. As from the above results, the size of the error correction term is -0.29633 which shows that 29 per cent adjustment on one year will take place towards equilibrium.

After estimating the error correction for the total number of crime, we now move to see the results of the error correction for the major crime including murder and attempted murder. The following table will highlight the results for the major crime.

Table 5.6b

Error Correction Term (Major Crime)

Independent variable	Coefficient	t-statistic
Constant	0.002193	0.11988
ΔMJ_{t-1}	-0.149992	-0.59935
ΔCPI_{t-1}	0.004538	1.13164
ΔEDU_{t-1}	-0.002887	-0.06766
ΔUNP_{t-1}	-0.02898	-1.48351
$\Delta RGDP_{t-1}$	0.090854	0.50928
$\Delta POPU_{t-1}$	-2.510348	-0.31157
ϵ_{t-1}	-0.018339	-2.27392
Note: The table shows the value of the ECM term for the Major crime in Pakistan		

According to the results mention above, the results of the error correction shows that about 2 per cent adjustment will take place towards the equilibrium in one year.

Now in the last we see the results of the error correction for the minor crimes in case of Pakistan.

Table 5.6c

Error Correction Term (Minor Crime)

Independent variable	Coefficient	t-statistic
Constant	0.02549	0.87695
ΔMN_{t-1}	-0.3007	-1.5445
ΔCPI_{t-1}	0.07275	1.25529
ΔEDU_{t-1}	0.05475	0.68251
ΔUNP_{t-1}	-0.0561	-1.9975
$\Delta RGDP_{t-1}$	-0.3033	-1.0719
$\Delta POPU_{t-1}$	-0.7942	-2.0404
ϵ_{t-1}	-0.2159	-2.6699
Note: The following table shows the value of the ECM for the minor crime is case of Pakistan		

The results mention above shows that the ECM term correct the disequilibrium of system. ECM term which measures the speed of adjustment towards equilibrium is negative and significant which shows convergence towards equilibrium level in long run. Loading factor (error correction term), indicates that convergence process would converge each year for 21.5 per cent.

Chapter 6

6. Conclusion and Recommendation

6.1 Conclusion

Residents of the country play a vital role in the development and expansion of the country and the entire economy. It is the permanent duty of every state organization to take care of the due rights of the citizens, and provide them the basic necessities of life. Food, clothing and shelter are the basic rights of every citizen. When the state authorities are unable to fulfill these basic rights, this results in different socio-economic problems. No country in the world is free from theses socio-economic problem either developed or the developing. The problem is more severe in least developed country especially in case of Pakistan. The main issue is not this that these problems exists in the society, but the issue is whether any attention is paid to these problems or not. If a country is facing socio-economic problems and these problems are not are not solved, they results in different other problems in the society. When basic necessities of the people are not fulfilled, they move toward the illegal means in order to attain the basic need. With these problem, country is unable to attract new investment and the low level of investment results in economic problems.

For the past ten years, Pakistan has been facing severe problems like terrorism, corruption, increase in violent crimes and sense of insecurity among people over time. It exerts adverse impact on the smooth functioning of Pakistan economy. Crime rate have always created problems and distortions in every community of people in human history. The history of crime is considered to be as old as the history of humanity. The first son of Adim and Eve, Cain was considered to be as the first person who commits crime in the human history, when he murder his brother Abel out of jealousy. Crime results in the feeling of insecurity among people of specific society because of the

distortions and discomforts of crime. Crime is simply the misbehavior or offence, as it is a struggle to get something for nothing, or the employment of act forbidden by law

There are number of factors including social, political, demographic and economic which are responsible for the increase in the criminal activities. Crime rate is considered as the dependent variable and the other independent variables that are effecting crime are urbanization, unemployment, inflation, real GDP and education. The objective of the research here is to see the impact of urbanization and unemployment on total number of crimes including robbery, theft, murder, attempted murder, cattle theft, car lifting and others over the period 1980-2014. The other objective of the research is also to see the impact of urbanization and unemployment on major and minor crimes separately in case of Pakistan. Johansen co-integration technique is used to investigate the long run relationship among the variables over the period 1980-2014.

The first and foremost conclusion of the study is that Urbanization is a very important variable that is effecting the crime rate. There is found a long term relationship between crime and urbanization in case of Pakistan. The results mention in the research, that urbanization is positively and significantly contributing to crime are logical because urbanization in Pakistan is a serious issue and motivating many individuals to involve themselves in the unlawful activities because of the opportunity available in the highly populated areas.

Pakistan is facing the problem unemployment. The problem of unemployment is always creating distortions in the economy. The most fearful part is that it is rising every year, and is creating problems and hardships for the economy. The high rate of unemployment is creating negative impact on the society. Unemployment is considered to be as the key factor which is responsible for the increasing level of illegal activities. As unemployment is an indicator of the income

opportunities from the legal sector activities. Hence, high level of unemployment means that people have now low level of income opportunities in the legal sector thereby increasing the possibility of entering in the illegal activities.

The other socio-economic factors which are effecting the crime rate are education, inflation and the real GDP. All these factors are important, there is found to be negative association between education and crime. Education enables the individual to earn income from the legal sector activities, hence, increase the opportunities for the individual. Similarly, when there is an increase in the price level it will reduce the purchasing ability of the individual, and in order to fulfill their needs they indulge themselves either in the legal or illegal activities. The empirical results shows that there is found to be a positive association between GDP and the crime rate. The results mention in the research are logical because when the income of the people increase, people want to get that money through illegal means.

6.2Recommendation

In the light of the results mention in the following research, it is clear to understand that crime rate is causing serious problems and damage to the society, and there is a need to remove or at least reduce the problem. Different policy makers and government institution have proposed a vast number of policies that may be helpful to minimize the problem of crime. Following are some of the recommendations proposed by different policy makers to overcome the problem of crime in case of Pakistan.

- Urbanization is playing a key factors in either positive or a negative way in determining the level of crimes. The policy makers and different government organizations should design, polices in a way to reduce the number of illegal activities.

- The policy makers should design the policies in such a way to create the employment opportunities for the students and other who have qualifies degree. This will reduce the burden of crime because now the cost will be high.
- The government should try to provide free education at least to the primary level. Education enables the individual to increase the earnings in the legal sector and crime rate tends to decline.
- The government should give incentives to the farmers, as large part of the population is linked to the agriculture sector. This will make them satisfied with the resources just like the people in the urban areas and the burden of crime can be reduced to some extent because of the opportunity effect.

6.3Future Research

The following research take into account different socio-economic factors, which are effecting crime rate. Urbanization, unemployment, GDP, inflation and education are considered to be as the important determinant of crime. Moreover, the researcher can focus not only on these factors but there are several other factors which are effecting the crime rate. Future researchers can include different political factor, law and order. Researchers can also make comparison between different countries to see the determinants of crime.

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