

## Relationship between Crimes and Economic Conditions in Pakistan: A Time Series Approach.

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### *Abstract*

*Using the time series data from 1990-2011, this paper is an attempt to explore the relationship between economic conditions and criminal activities in Pakistan. Three variables are being used for economic conditions like increasing female employment in labor market, CPI which denotes inflation and income inequality. We check their relationship with total reported crime with reference to Pakistan. The Augmented Dicky Fuller test is used for unit root process which suggested that all the variables are stationary at the 1<sup>st</sup> level. For the long run relationship Johanson-Cointegration technique has been applied. After statistical procedure results suggested that female employment, inflation and the Gini index are strongly related with crime. Coefficient of Gini index is high which means that in long-run income inequality affects the crime more than other two because income inequality is a long-run phenomenon so it affect the criminal activities with great magnitude. Vector Correction Model (VCM) has been applied to check the short-run relationship between variables. VCM results suggested that the model we estimate is divergent. Divergent model mean that there is no adjustment from long-run to short-run between variables as they are going away from equilibrium. If we increase the lag length, the model can become divergent but due to crime data unavailability it was difficult to increase the observations and the lags as well. Research paper gives evidence that economic conditions have significant impact on crimes and increasing female employment which is considered as labor market improvement is positively related with crime in Pakistan. This relationship may be the result of market imperfections. Moreover inflation by decreasing purchasing power and income inequality by increasing the gap between social classes is also the cause of increasing crime and they contribute significantly in crime situation of country.*

**Key words:** Crimes, female employment, inflation, income inequality, Gini index

### **Introduction**

Crime is a major social concern. Every country whether developed or developing wants to keep the criminal activities under strict observation with the help of law enforcement authorities by root out the actual causes of these illegal activities. Many studies have been conducted in this regard in different social and economic fields to find the causes of crime. If we talk about the effect of economic conditions on crime then economy and crimes are linked with each other. Decreasing economic incentives automatically increase the incentives of illegitimate (criminal) activities for individuals (Machin, 1998). Economic and crime relation was first elaborated by Becker in 1968. Becker's paper since the beginning of 80's opens the door to a new field of empirical research whose main purpose was to verify and study the economic variables that determine criminal choices and behaviors of individual. According to Becker criminal acts result from a rational decision based on a cost benefit analysis. Becker

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argued that a criminal should be viewed, not as a helpless victim of social oppression, but a rational economic agent.

Different model has been developed to check the relationship of economic variables like poverty, inflation, unemployment with increasing crime (Machin, 1998). Labor market and crimes are linked. Unemployment increases the incentives for criminal activities as low income or no income makes the cost benefit analysis easy for individuals (Fleisher, 1963). This paper is the first attempt to explore the effect of increasing female employment in labor market instead of unemployment on the increasing crimes with reference to Pakistan. In this paper we will investigate the effect of increasing female employment in labor market on increasing crimes. The economic models of crime predicts that increasing labor market participation of females decrease the incentives for male workers and increase the incentives for males to participate in illegitimate (criminal) activities (Hansen, 1991). Increased female entries into job market affects the low skilled workers and change the wages at bottom end. This Change in the wages of bottom end is positively related with crime. This paper will investigate this relationship, by examining that to what extent increasing crimes are related to the bad labor market conditions. Further we will examine the impact of inflation and income inequality on increasing crimes. These are the economic conditions which may affect the society (Gillani, 2009).

Crimes and economic variables have a significant relation. As many studies has given evidence that worse economic conditions may increase the crime rates (Machin, 2000). This phenomenon is also present in Pakistan. The economic recession of 2007/08 gave boom to the crimes in country as on the start of 2007 total reported crimes were 5,38,048 but in 2008 they were increased to record 5,92,503. Pakistan is a developing country facing bad economic conditions and these conditions are contributing significantly in increasing crimes (Gillani, 2009).

Recently, the phenomenon of crime wave has received an increasing attention and the criminal activity has been given wide coverage in the newspaper and media. Murder, robbery, assault, rape, burglary and theft are common criminal offences. Since the global financial crisis of 2007/08, crime has increased significantly in every part of world. Without any doubt, there is a deep sense of social alarm that has called for urgent measures from the policy makers and government to reduce the levels of criminality. Despite this alarming event, criminal activity has received little attention and remains largely neglected by the economics of crime (Habibullah, 2004).

Since crime is one of the major social evil and requires immediate attention to reduce the severity of its impacts. However to tackle this evil, it is important to understand the philosophy of crime and reasoning behind committing it in a concrete manner. Only then, authorities will be able to cure this evil. This paper is an attempt to help the authorities about understanding the crime and its reasons.

The paper will follow in the following sequence. The second part explains the public perception about crime, its causes and relationship between crimes and economic variables which we got through survey. The 3<sup>rd</sup> part is about the theoretical background of variables which we are going to use in paper that how changing in these variables affect the crime. The scenario of Pakistan explained in 4<sup>th</sup> part. Literature of selected studies is given in 5<sup>th</sup> part. The 6<sup>th</sup> and 7<sup>th</sup> part is about data, variable and methodology. In 8<sup>th</sup> part the results of regression has been discussed. The conclusion comes at the end of the paper.

## Public Perception about Crimes

Before using the variables we have chosen for research there was a need to check the public perception about crimes. It was necessary to know that what they think about crime, how crime affect their daily life, what are the possible reasons of crime according to them and how economic conditions contribute in crimes. For this purpose we conducted a survey to find the general perception of people about crime and its possible causes especially to check the reliability and significance of our selected variables which are increasing female employment in labor market, inflation denoted by CPI and the income inequality (Gini index) as they are used for economic conditions. Stakeholder's of the survey were the staff from District Jail Gujrat, the Punjab Police constables, the daily wagers from different regions of Gujrat, the general public and the prisoner's in the lock ups of police stations. These stakeholders's were taken as they have direct relation and interaction with crime and criminals. Law enforcement agencies, low skilled labor and the common public these three were taken as respondents. No sample restrictions were applied because of time constraint; we just randomly picked the respondents. By asking them following simple question we tried to find their opinion:

1. What you think why crimes are increasing at rapid speed in present time period. What are the possible causes for these increasing crimes?
2. To what extent crimes effect the life in society?
3. Do you think economic variables like inflation, poverty and unemployment etc. contribute in promoting crimes?
4. Female employment which is taken as improvement in labor market pushes low wage workers towards crime by decreasing their incentives in legal job market. What is your opinion on this issue?

The response from Police Department and Prison Department was very good as they contribute in research in a positive way by giving their honest views. During survey we got different opinions. According to common public the social factors like low education, bad character, company of bad friends, family culture, living standard and bad government policies are the main causes of crime in society. The daily wages were in favor that economic variables are the main cause of crime. Low earning and living standard gives incentives for criminal activities. Law enforcement authorities who are directly connected with crimes and criminals also said that these are the economic variables which are the cause of crime. Economic scenario of country contributes at large scale in promoting crimes. If we sum these all finding we got two different opinions. One who thinks that economic factors are the reason for increasing crimes? People are helpless before economic variable fluctuations and to counter from these they adopt the illegal activities to fulfill their living expenditures. In short according to their views people are helpless in front of economic downturn and rapidly changing social conditions. So they are not responsible for their doings but it's the economic conditions which urge them to do so.

The second group opposed the first one opinion. He argues that economics is not responsible. These are some social factors which push some toward crime like lake of education, family background, government policies, and low punishment of crimes. According to them poverty is not new in the world. It is as old as the history of man so it can't be a strong reason.

The main and interesting point during survey in the light of research question and literature review was the discussion about increasing female employment in labor market. Large proportion of population was against the increasing entry of women into labor market.

According to them females are given priority in job market as compared to males. With this practice male unemployment is increasing and making criminal activities more attractive especially for low skilled workers. Female entry into labor market is making the labor market tough for males. Survey provides answer to the question that what kind of relationships exist in the minds of public about crime and economic conditions? According to survey findings major reasons of crime are inflation, inequality, unemployment (male) and illiteracy rate but there are the some other factors too like lawlessness, fundamentalism, backwardness and double standard prevailing in the society. Next part of paper will explain the main three variables like female employment, CPI and income inequality relation with crimes.

### **How female employment, income inequality and inflation can affect crime?**

During the last 30 to 40 years labor market has been changing tremendously. The portion of female employment in labor market is increasing so rapidly in the developed and developing countries around the globe. A number of studies in the UK and elsewhere (Braithwaite et al, 1992; Hale, 1999; Hansen, 2003 and Witt and Witte, 1998) found that rising female employment which is considered as improvement in the labor market is actually positively associated with crime. As female employment goes up so does the crime.

Great work has been done whether you talk about empirically or theoretically to explain that increasing female employment or improvement of female labor market may be positively associated with crime (Adler 1975 and Hagan 1990). Rising female employment, which generally in people's perception is considered as the improvement in legitimate labor market is actually positively associated with increasing crimes. Increased entry of women into employment increases the overall supply of workers into labor market which in turn lowers the wages. Low wages and crime are related to each other so low wages and increasing female employment may increase the crime. Women has less labor market experience so they enter in the market at low wages which in turn lowers the wages of males as well by putting downward pressure on the wages in labor market especially the wages of less skilled jobs which are more sensitive to crime increase (Hansen, 1991).

Female employment has a positive strong relationship with crime rate. If female employment increasing in labor market in turn it will increase the crime rate because your males are being neglected (Hansen, 1991). If your males are getting less from females it will change the mind set of males and they will join the crime as industry because of cost benefit analysis. (Wilson and Herrnstein, 1985), (Gottfredson and Hirschi, 1990) explain both unemployment and crime. Unemployment and crime are only correlated cross sectionally because they are effects of a common cause. Changes in unemployment across time will not affect the crime rate since it is only changes in causally antecedent levels of impulse control that have such an effect. But if you check the female employment with crime rate over time it has a positive strong relationship with crime industry.

Family factors are the main reason for becoming a person an offender. Poor parenting is a factor which increases the chances of crime in locality. Female are considered as the care taker of home and men as the bread earners in our society. But when female join the labor market she has less time for home, for children's and for her husband. Here the situation which ultimately takes place is the "weak parent-child attachment". According to research the weak parent-child attachment is the main reason for increasing crime. (Weatherburn, 2001).

According to the feminist theory which led to the prediction that adding female employment to time-series models will cause male and female unemployment to have a positive effect on crime (Braithwaite et al, 1992).

Increasing employment opportunities for women will affect the society in three ways:

- (a) Reduces female unemployment (reducing crime),
- (b) Increases female employment (increasing crime),
- (c) Attacks patriarchy (the condition which, according to the theory, makes it true that both unemployment and female employment will increase crime).

Kapuscinski et al (1998), postulate three separate effects of rising female employment in the context of a patriarchal society are posited. First, rising female employment may increase criminal opportunities (for men and women). For example, when two cars are being driven home from work each day, the probability of car theft may double. Second, rising female employment was hypothesized to increase women's vulnerabilities as victims of a variety of crime in public space, at work, and in the home from fraud to violence. Third, it may increase vulnerabilities of other members of their families to being both victims and offenders because the traditional female guardianship responsibilities are not taken up by men.

The income inequality has its effects on crime as well. The leading sociological paradigm about crime is the theory of "relative deprivation". Which states that income inequality breeds tension, frustration and sense of deprivation for those who "have not's" when they compared themselves with those who "have's" (Baharom, 2009). Term "have not's" is for those who have less share of national income than others and the "have's" for those who has greater portion of national income. These feeling of unfairness and frustration lead the poor to seek compensation and satisfaction by all means, including committing crimes against both poor and rich (Stack, 1984). When people see that some portion of society has lot of resources while they are living in extreme miserable conditions this situation urges them to do something for balance. This situation leads them towards cost benefit analysis of legal and illegal activities (Bourguignon, 1999).

Inflation is a general phenomenon of increasing price level. While living in an economic environment with unstable prices the individuals have additional incentive to bypass legal exchange and obtain material goods by illicit means. Periods with increasing prices makes the value of money low, which should make property crime more economically attractive, particularly for the lower income segment of society (Nuley, 2007). So inflation is also a cause of increasing crime. The downward pressure on purchasing power associated with periods of rising inflation affect low-income households more adversely (Wilson, 1987). Since low-income groups commit a high proportion of crimes one would expect periods of higher inflation to be concomitant with higher rates of crime. The low-income segment of society should find crime more attractive during inflationary periods, as wages generally do not adjust as freely as other prices (Levitt, 1999). In periods of high inflation, one would expect society's propensity for property crime to increase because of the reduced purchasing power of the currency. Despite the significant macroeconomic implications of monetary policy, most studies neglect the role of inflation on the aggregate level of property crime (Devine et al, 1988).

## **Pakistan Scenario**

In Pakistan Crime is present in various forms like robbery, bribery, drug trafficking, money laundering, murder, kidnapping, theft and street crime, *dacoity* etc. Today crime in every province is increasing. Government is taking significant steps to get rid from this problem. Pakistani government is pathetic in checking this crime rate and not only increasing the

expenditures on police, army and securities to reduce crimes but also working on reducing the criminal behavior by minimizing the causes which generate criminal behavior.

Throughout the history of country crime is increasing. This situation can be seen by table.

**Crime Statistics 1990-2011 in Pakistan**

Year	All reported crimes	murders	Dacoity	Robbery
1990	310779	8685	573	2047
1993	290255	7258	724	4159
1996	330493	9062	1188	6107
1997	370350	9304	1428	7793
1999	417846	9336	1316	6337
2000	388909	8906	1297	7513
2002	399568	9396	1631	8235
2004	440578	9719	2338	11851
2006	537866	10048	2895	14630
2008	592503	12039	4529	19943
2010	652383	13208	4727	21907
2011	673750	13860	4980	20632

*Source: Pakistan Beaurue of statistics*

Female are covering the greater portion of labor market these days in Pakistan. Female employment is increasing significantly in labor market. Literature tells that when you increase the female employment in labor market while living in a patriarchal society it will become positively correlated with crime (Braithwaite, 1992). In Pakistan there is male dominated society. Males are considered as bread winners while women are the caretaker of houses and the children. But with the changing scenario and economic transforming now female employment is increasing and low skilled male labor getting neglected and earning low wages. Low wages and crime are positively correlated so it may increase crime (Hansen, 1991).

The graph of female employment in labor market of Pakistan is given below:



## Literature Review

Crime and economic variables has strong relationship and this relationship was first explored by Becker in his paper “Crime and Punishment”. Becker gave the idea of cost benefit analysis through which individuals decide to take part in criminal activities or not. His paper was motivated by the spending of U.S government on securities in 1965 about 3 million U.S \$.

Gray S. Becker (1968), in his article “crime and punishment” perhaps the seminal work in this direction interlinks the crime with economic conditions, according to Becker the word “crime” is used to minimize the terminological innovations, instead of just focusing on real crime which everyone know he also focused on white collar crimes like tax evasion. Becker used five (5) variables for analysis. He used the Becker model for analysis. According to Becker “crime” is an economically important activity or “industry” notwithstanding the almost total neglected by economists. Becker analysis was based on cost of crime.

Fleisher (1966) was a pioneer in studying the role of income on the decision to commit criminal acts by individuals, and stated that “the principal theoretical reason for believing that low income increases the tendency to commit crime is that it raises the relative cost of engaging illegitimate activity” and that “the probable cost of getting caught is relatively low, since they (low-income individuals) view their legitimate lifetime earnings prospects dimly they may expect to lose relatively little earning potential by acquiring criminal records; furthermore, if legitimate earnings are low, the opportunity cost of time actually spent in delinquent activity, or in jail, is also low”. Fleisher’s econometric results showed that higher average family incomes across 101 U.S. cities in 1960 were actually associated with lower court appearances by young males, and with lower numbers of arrests of young males for the crimes of robbery, burglary, larceny, and auto theft. The author also found that the difference between the average income of the second lowest quartile and the highest quartile of households tended to increase city arrest and court-appearance rates, but the coefficient was small in magnitude, and became statistically insignificant when the regressions were run for high-income communities alone.

Hansen (1991), in her paper “Male Crime and Rising Female Employment” postulate that a number of studies have found that rising female employment, which is generally thought of as a labor market improvement, is actually positively associated with crime. Her paper examines a potential explanation for this: that the increased entry of women into employment

increases the overall supply of workers and thus subsequently lowers wages. As low wages and crime are generally found to be related, by lowering wages rising female employment may increase crime. Moreover, because women tend to have less labor market experience than men, or because they are discriminated against, they tend to enter the job market lower down the earnings distribution, putting downward wage pressure on males in lower skilled jobs who are more likely to be on the margins of crime. She used the four hypotheses about female employment, low wages, low male wages association with crime; the male tends to do crime with low wage. The regression results support her views that female employment is positively associated with crimes. When female employment increases in labor market as a result crime increases in society.

Weatherburn (2001), in his paper “what causes crime” published in “crime and justice bulletin” talked about the general reasons of crime. He writes that there are two types of crime reasons (1) the proximate reasons and (2) the distal reasons. Proximate reasons are those which immediately precede criminal behavior while the distal are those which are more remote. The main finding of paper was the weak parent-child attachment as a determinant of crime. According to weatherburn family factors are the main reason of increasing crime. Poor parenting is a cause which makes child the offenders. Parent neglect can lead to crime especially the working mother’s child face this problem.

Madden et al (1998), in paper “relationship between the levels of crime and the distribution of income” showed that the number of burglaries increases as the income distribution becomes more unequal. Paper provides a theoretical explanation for a relationship between income inequality and property crime, which has been empirically established. According to them, increases in relative differential inequality increase the level of crime. Moreover, “increases in income tax progressivity reduce the crime rate”. The use of the model by defining two terms first is “richer neighborhoods” and the second is “poor neighborhoods”. According to model “richer neighborhoods’ may have lower crime rates than poorer neighborhoods’ because they may have a lower relative differential income inequality or because the richest households in the richer neighborhoods’ adopt an effective defense technology against burglary and it is against in case of poor neighborhoods.

Piterson (2006), in his paper “poverty, income inequality and community crime rate” examines the relationship between crime rates and aggregate economic conditions for 57 small social areas. The principal analyses address a continuing controversy—are community crime rates associated with absolute poverty, relative poverty (i.e., income inequality), or both. Using victimization data from 57 small residential neighborhoods, the analyses examine the association between absolute and relative poverty and rates of violent crime and burglary. The findings indicate that absolute poverty is more strongly associated with neighborhood crime rates, although the relationship is conditional on the type of crime considered.

Fougère et al (2006), in his paper, “youth employment and crime in France” examined the relationship among youth employment and crime in France by using data from period 1990-2000. They used a classical Becker model for their modeling with reference to cost benefit analysis. They simply examined that increase in youth unemployment or decreasing youth employment results in an increase in crime in France.

Krohn (2005), in his paper “Inequality, Unemployment and Crime: A Cross-National Analysis” analyze the effect of unemployment and income inequality on crime rate by using cross-country data. By the correlational analyses he found a strong relationship between income inequality and unemployment.

Seals and Nunley (2007), their paper extends previous empirical research on the determinants of aggregate property crime rates in two dimensions. First, they examine the effect of inflation on property crime rates. Then, using a structural time series approach they show that it is possible to estimate consistently the effects of exogenous macroeconomic variables



on aggregate property crime rates without introducing endogenous deterrence to the model. Inflation is statistically significant, positive, and persistent for all property crime rates examined.

Gillani *et al* (2009), in his paper “unemployment, inflation and crime nexus” examined the relationship between crime, unemployment and inflation by long run cointegration. By using the Johansson cointegration he finds that there is significant relationship exists between crime, unemployment and inflation in long run. Through granger causality test he finds that crime is granger caused by unemployment and inflation.

Baharom *et al* (2009), paper examines the causality between income inequality and crime in Malaysia for the period 1973-2003. Autoregressive Distributed Lag (ARDL) bounds testing procedure is employed to (1) analyze the impact of income inequality on various categories of criminal activities as well as to (2) analyze the impact of various categories of criminal activities on income inequality. Interestingly results indicate that income inequality has no meaningful relationship with any of the various categories of crime selected, such as total crime, violent crime, property crime, theft and burglary. Crime exhibits neither long-run nor short run relationships with income inequality and they are not cointegrated.

## Data Sources

Time series data on all reported crimes in Pakistan from 1990-2011 is taken from various statistical year books of Pakistan and from the state bank of Pakistan library by Bashir Ahmad Zia (librarian). The data on inflation CPI is taken from Statistical handbook of Pakistan economy, the data on female employment is taken from ILO (International Labor Organization) and from the world development indicator. The data of Gini Index is taken from the book of Akbar Zaidi, WDI and from different research papers on issue of income inequality in Pakistan.

## Variable and Methodology

Central theme of above discussions is the question that what is the Short-run and long run relationship between crime, increasing female employment in labor market, CPI and Income inequality. Do these economic variables have significance effect on increasing crime? For this purpose we will check the following question:

### Research question:

*How is crime related with inflation, income inequality and female employment in the long run?*

Johanson-Cointegration is used to find the long-run relationship among variables. Trace test and Max eigenvalue test being used under Johanson-Cointegration.

Augmented dickey fuller test will be used before johanson-cointegration for stationarity process because it can be applied if some of your variables are of I(1).

To short-run speed of adjustment of variables Vector Correction Model (VCM) has been applied which shows that whether your model is divergent or convergent means your variables are coming close to equilibrium from long-run to short-run or not.

## Findings and Discussion

Using time series variables crimes, CPI, female employment in labor market an income inequality, we first check the stationarity of variables with help of Augmented Dicky fuller test. The results and findings are given below:

### Unit-Root test

For long-run analysis first step is to check the stationarity of variable. For this purpose Augmented Dickey Fuller test will be used. The Johanson-cointegration can applied on variables if some variables are of I (1) or I(0).The augmented Dickey Fuller test indicates in (table.1) that all variables are stationary at 1st difference.

The results are given below which explain the difference at level and at 1<sup>st</sup> level.

**Table 1: Augmented Dickey Fuller Test Statistics**

Variable	At level		Variable	At 1 <sup>st</sup> level		Decision
	t.stat	Critical value		t.stat	Critical value	
Lcrime	0.38	3.78	Lcrime	5.02	3.81	I(1)
ICPI	2.03	3.81	ICPI	4.33	3.83	I(1)
Lfemale employment	0.18	3.78	Lfemale employment	4.26	3.80	I(1)
Lgini	2.45	3.81	Lgini	3.99	3.81	I(1)

Augmented dicky fuller test statistics shows that all variables are stationarity at 1st difference. All variables are integrated of order I(1) ) so johanson-cointegration technique can be applied to find out the long-run relationship among variables. We precede this test as follows:

### Johanson-cointegration results

Johanson-cointegration used for long-run relationship. The hypothesis of johanson-cointegration test is:

*HO : there is no co integration*

*H1 : there is co integraion*

Two tests are being used for testing of this hypothesis. The results of these tests are as below:

### Results from trace test

Trace test suggest that there is long-run relationship between variables. (In table.2) The trace statistics is greater than the critical value so it enables us to reject the null hypothesis that there is no cointegration and accept the alternative that there is at least 1 integration relation. Similarly trace test also rejects the null hypothesis at most 1 which means that there are at least 2 cointegration relations that exist among the variables. At most 2 no of CE's trace test are unable to reject the null hypothesis that there are at least 3 cointegration relations. So trace test indicates that there exist 2 cointegration relations among variables.

**Table 2: Unrestricted Cointegration Rank Test (Trace)**

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.99	122.09	47.86	0.00
At most 1 *	0.72	38.20	29.79	0.01
At most 2	0.55	15.01	15.49	0.06
At most 3	0.029	0.53	3.84	0.46

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

### Results from maxeign value test:

Second test for the long-run relationship checking is the maxeign value test. In table .2 trace test show that 2 equations are cointegrated at most 1 number of CE(s) but Eigen value test (in table.3) suggests that 3 equations are cointegrated at most 2 numbers of CE(s). Max-eign value at none CE(s) is greater than critical value so we reject null hypothesis and accept the alternative hypothesis that there is cointegration.

**Table 3: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)**

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.99	83.89	27.58	0.00
At most 1 *	0.72	23.19	21.13	0.03
At most 2 *	0.55	14.47	14.26	0.05
At most 3	0.029	0.54	3.84	0.46

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

### Coefficients in the long run

Trace test and max eign value test both shows cointegration among variables. The long run coefficients show that there is positive and significant relationship between variables in long-run. Gini coefficient which was not significant in short-run becomes significant in long run. The positive relationship of gini with crime is because that income inequality is not a short run phenomena. Income inequality takes time to respond towards crime.

The long run model and coefficients of variables are as follows.

$$\begin{aligned}
 LCRIME = & 0.27 LCPI + 0.98LFEMALE + 1.42LGINI \\
 & (0.01365) \qquad (0.01803) \qquad (0.04992)
 \end{aligned}$$

This equation is taken from Johanson-Cointegration test. Lgini has a positive a strong relation with crime than other variables. Female employment in labor market which was strongly

significant in short run also affects the crime in long run. 1% increase in LCPI leads to 0.27% increase in crimes. Whereas 1% increases in female employment in labor market results 0.98% increase in crimes.

### Vector Correction Model

Vector correction model explains the speed of adjustment with every short-run. The findings (table.4) suggested that model is divergent as coefficients are positive. Means the variables are diverging from equilibrium with time and there is no adjustment from long-run to short-run. By increasing the lag length the model may become convergent. The model is divergent because the observations are not enough to increase the lag length. The data unavailability is the main reason for this.

We include the Error correction term:

$$\xi_t = \log(\text{crime})_t - (\beta_1 \log(\text{CPI})_t + \beta_2 \log(\text{female})_t + \beta_3 \log(\text{gini})_t)$$

$$\xi_t = \log(\text{crime})_t - \beta_1 \log(\text{CPI})_t - \beta_2 \log(\text{female})_t - \beta_3 \log(\text{gini})_t$$

Here  $\beta$  are cointegrating coefficients.  $\xi_t$  Is the error from a regression of  $\log(\text{crime})_t$  on  $(\text{economic conditions})_t$ .  $\log(\text{CPI})$  Shows the log of CPI,  $\log(\text{female})$  for log female employment in labor market and  $\log(\text{gini})$  for log of Gini index and combine all these are said economic conditions in this paper.

Then an ECM is simply defined as

### Error correction model:

$$\Delta(\text{crime})_t = \alpha \xi_{t-1} + \gamma \Delta \log(\text{cpi})_t + \lambda \Delta \log(\text{female})_t + \pi \Delta \log(\text{gini})_t + \mu_t$$

The ECM equation simply says that  $\Delta(\text{crime})_t$  can be explained by the lagged  $\xi_{t-1}$  and  $\Delta(\text{economic conditions})_t$ . If  $\xi_{t-1}$  is non-zero, the model is out of equilibrium and vice versa.

Notice that  $\beta$  is called the long-run parameter and  $\alpha$  and  $\gamma, \lambda, \pi$  are called short-run parameters. Thus the ECM has both long-run and short-run properties built in it. All the variables in the ECM are stationary, and therefore, the ECM has no spurious regression problem.

In general  $\xi_{t-1}$  is unknown a priori, and needs to be estimated. In this paper we draw all the results of ECM with the help of E-views. This statistical software run this procedure by default and gives the results.

**Table 4: Results**

Error Correction:	D(LCRIME)	D(LCPI)	D(LFEMALE)	D(LGINI)
CointEq1	0.162256 (0.12426) [ 1.30581]	1.612559 (0.38511) [ 4.18726]	0.268857 (0.15266) [ 1.76119]	0.129762 (0.15843) [ 0.81905]
D(LCRIME(-1))	-0.407095 (0.26640) [-1.52812]	-0.823587 (0.82567) [-0.99748]	-0.567290 (0.32729) [-1.73329]	0.348915 (0.33967) [ 1.02723]
D(LCPI(-1))	0.129041 (0.05650) [ 2.28394]	0.007636 (0.17511) [ 0.04361]	-0.015527 (0.06941) [-0.22369]	-0.016443 (0.07204) [-0.22826]
D(LFEMALE(-1))	0.322746 (0.19968) [ 1.61630]	0.637599 (0.61888) [ 1.03025]	0.050589 (0.24532) [ 0.20621]	0.180585 (0.25460) [ 0.70930]

D(LGINI(-1))	-0.381694 (0.20958) [-1.82120]	1.377479 (0.64957) [ 2.12062]	-0.056745 (0.25749) [-0.22038]	0.312249 (0.26722) [ 1.16850]
C	0.047718 (0.01629) [ 2.92972]	0.017158 (0.05048) [ 0.33990]	0.048920 (0.02001) [ 2.44474]	-0.022026 (0.02077) [-1.06062]

Results from VECM shows that model is 0.16% divergent annually. The second equation values ( ) are standard errors. Standard errors are not high except CPI. The third equation [ ] is showing t-statistics. The t-statistics is 1.31 we can say that this is just significant at 10 %.

## Conclusion

Crimes are becoming an industry during these days. Developed and developing countries both are facing the problem of increasing crimes and it is becoming severe with every passing day. This research paper is an attempt to find some causes of crime such as rising female employment in labor market which is considered as improvement in labor market but in fact it is positively related with crime especially in developing countries where markets are imperfect and depend on each other. While living in a patriarchal society you can't increase female employment in labor market without any policy for neglected male's (Braithwaite 1992). Increasing female employment has positive and significant relationship with crime in short run and also in long-run. Positive relation of female employment with crime does not mean that you should not promote the female employment but the purpose of research is to divert the attention of policy makers towards market imperfections. Authorities should focus on the improvement of both market the female labor market and male labor market. Both gender in the labor market should be taken as homogenous not as substitutes.

Inflation is also a cause of crime because it decreases the purchasing power (Seals, 2007). So individual's find incentives in criminal activities to earn their necessities. Income inequality is not a short-run phenomena it takes time to broaden the income gap between rich and poor. But when it comes at the stage when people start realizing that gap this stage promote the criminal activities as people want to snatch their right instead of a legal way. So it does not affect the crimes in short-run but it has a strong and significant relation with crimes in long run (Fajzylber, 2002). So government should take steps to make the distribution of assets fair and equal to reduce crimes.

It is important to control crime rate in developing countries where large sum of amount are spent on establishing and maintain police force, securities and judicial system without knowing the root cause of crime and criminal behavior. Government should focus on root causes of increasing crime rate and the criminal behavior.

The question is that what is the difference between crime and the criminal behavior? When the act has been done, the rights of others have been disturbed by an individual then this is the crime but the time when someone was thinking to disturb those rights this is the 1<sup>st</sup> stage of crime known as criminal behavior (Pratt, 2000). Authorities should focus on this point that why one is thinking to disturb the rights of others, what is wrong with that individual? When authorities will focus on this point then they will be able to stop the crime from its origin. And it is only possible when authorities will try to root out the causes of crime instead of just eliminating the criminals.

Society can't afford criminals in lock ups as society has to bear a greater cost for this mostly in form of criminal's own capabilities (Becker, 1968).

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