Trade-off between Inflation, Interest and Unemployment Rate of Pakistan: Revisited

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Abstract
This study analyses the interrelationship of unemployment rate, interest rate and inflation rate in Pakistan over the period from 1974 to 2013. Autoregressive Distributed Lag (ARDL) model has been employed to find co-integration among variables of the models. Vector Error-Correction model is utilized for analysing short run dynamics of the models. The results do not provide significance trade-off between unemployment rate and inflation rate. Trade off exists in interest rate analysis over short run with inflation rate and unemployment rate. The empirical results show population growth and exchange rate have negative whereas external debt plays a positive role in determining unemployment rate in Pakistan. Money supply is revealed as major cause of inflation while exchange rate and imports have contributed negatively in inflation. The rate of interest has positive impact on domestic credit to private sector whereas it is negatively related to exchange rate.

Keywords: Inflation Rate, Unemployment Rate, Interest Rate
JEL Codes: E31, J6, E40

I. Introduction

Inflation rate, interest rate and unemployment rate are considered main indicators of macroeconomic situations. Normally, inflation refers to a situation where supply of money exceeds to its demand or prices of commodities rise persistently. Inflation lowers currency value and decreases purchasing power. Which mean real income declines, people buy fewer commodities with same amount of money (Mahmood et al., 2013). Inflation also decreases real level of savings. Rising prices provide advantage to lenders and give loss to donors of wealth. Sustainable inflation is considered essential for economic growth especially for developing countries, whereas high rate of inflation may reduce economic growth (Khan and Gill, 2010). In high inflation individuals may buy less of commodities and goods remain unsold which reduces the profits of the firms. This further raises unemployment level in economy. Inflation can be due to domestic factors or it may be due to imported factors. Increase in import prices in the world market or the devaluation of domestic currency causes hick in inflation (Kamin, 1997). Actually high inflation is harmful either domestic or imported. Choudhri and Khan (2002) observe that devaluation in Pakistan does not significantly increase the consumer prices.

Appropriate level of inflation is essential for economic growth of a country. Inflation and unemployment can be used to control each other. Increasing rate of inflation will reduce the level of unemployment, this is shown by Philipse curve. Philipse curve advocates negative relationship between unemployment and inflation rate and economy must bear specific inflation to reduce unemployment. Rate of exchange can also be use as a policy variable to control inflation. Unemployment refers to a situation where people are willing to work, but are unable to get. Raphael and Winter-Ebmer (2001) refer unemployment increase many social evils like property violence, corruption, murder etc. Increasing unemployment is undesirable for all economies. New employment opportunities can be used to increase availability of jobs which can be done through investment. Increasing investment both public and private sector can play their role in determining unemployment rate. Unemployment may be classified into rural and urban unemployment. The unemployment in urban areas is found more than rural areas (Akhtar and Shahnaz, 2006). Both types of unemployment have strong relationship with inflation and interest rate.

Interest rate is the remuneration of asset lends to borrower or it may be the payment against the saving certificates of banks. Rate of interest directly affect the behaviour of consumers and producers. The consumers attempt to save more wealth by reducing consumption expenditures when rate of interest is at higher level. Increase in savings allows more credit availability for investment on one hand, while the reduction in consumption has negative effects on the sales of producers which in turn may increase the unemployment (Mahmood et al., 2013). The rate of interest can be used as a policy variable to control exchange rate volatility and provides future expectations regarding inflation (Asari et al., 2011). Increase in interest rate provides less incentive to investors which lead low investment and increase unemployment that can cause recession, while increasing the rate of interest causes decrease in inflation rate (McCallum, 1989).

Pakistan economy is facing high rate of unemployment and inflation since the decade of 1990. Amjad (2005), Akhtar and Shahnaz (2006) and Aqil et al., (2014) suggest foreign direct investment, GDP growth rate, population growth rate, domestic investment, education are major determinants of unemployment and inflation. Policy makers are worried to devise such policies that can effectively reduce unemployment without bringing more inflationary pressure. Mahmood et al., (2013) attempted to investigate the relationship of unemployment, inflation and rate of interest. This study will increase the choices of control variables for policy makers regarding unemployment and inflation which make this study a healthy contribution towards the respective literature. The main objective of present study is to reinvestigate the trade-off among unemployment rate, inflation rate and interest rate in Pakistan, economy by incorporating some more policy variables.

II. Literature Review

The rate of interest and inflation rate got much importance after Friedman (1959) findings that the rate of interest influence money demand by individuals in which major role is played by assets demand. Moreover, an increase in money stock increases the income level through velocity of money. Number of studies elaborate the relationship of inflation, rate of interest and unemployment. The results vary from economy to economy due to change in structure and other economic conditions. Some of most relevant studies are presented here as literature review. Tobin (1965) mentions that technology and savings influence factor productivity, this in turn impacts the rate of interest. Moreover, the behaviour of monetary factors affects the equilibrium rate of interest. Bilquees (1988) analyses monetarist and structuralist point of view while explaining the inflation in Pakistan. The study concludes that inflationary process in Pakistan is determined by both monetary and structural factors.

Khan and Qasim (1996) estimate determinants of inflation in Pakistan. The study concludes massive borrowing from banking system made higher monetary expansion which accelerates inflation. While, expansionary fiscal

policy deteriorates balance of payments and causes increase in overall price level. The study suggests a combination of moderate fiscal and monetary policy is necessary for stabilise economy. Shabbir and Ahmed (1994) analyse determinants of inflation in Pakistan over the period 1971-72 to 1987-88. The study finds that fiscal deficit becomes a cause of inflation, while the monetary effects on inflation are negligible. Barr and Campbell (1996) estimate the interaction between expected future real interest rate and inflation rate for United Kingdom. The study decomposes interest rate into expected nominal rate and expected real rate which give significantly better inflation forecast. The study finds real interest rate is highly vulnerable in short run as compare to nominal interest.

Nickell (1997) investigates relationship of unemployment and labour market rigidities for Europe and North American regions. The study concludes that unemployment allowances, lack of coordinations between unions and employers and higher level of taxes become the major causes of rising unemployment. Whereas, the impact of labour institutions on unemployment is found to be negligible in European countries. Kamin (1997) finds that real exchange rate is influencing inflation in Latin America and Asian countries. The devaluation of currency increases inflation in Latin America. Asian economies experienced inflation as compare to Latin America due to their economic and structural roots. The study suggests inflation and real exchange rate control each other effectively. Mishkin and Posen (1997) examine inflation targeting in New Zealand, Canada, United Kingdom and Germany. The study finds that appropriate balancing of transparency and flexibility in monetary policy plays a major role in effective implementation of inflation targeting. The study concludes that inflation targeting seems successful in Germany, Canada and United Kingdom but case is opposite in case of New Zealand.

Gali and Gertler (1999) analyse dynamics of inflation by incorporating firms behaviour. The study concludes that price is determined by current and future expectations more than past experiences. Rigid wages are found major cause of rise in prices. Moreover, the deflation can cause reduction in the output. Mankiw (2000) investigates trade-off between inflation and unemployment. The study concludes that in short run the monetary controls increase the unemployment in an economy. However, the long run relationship between inflation and unemployment cannot be determined accurately. Mishkin (2000) examines inflation targeting in Chile, Brazil, Czech Republic, Poland and South Africa. The study concludes that transparency of policy and exchange rate control is necessary for successful inflation targeting. However, inflation targeting is not an appropriate policy for many emerging market countries.

Mallik and Chowdhury (2001) investigate the relationship of inflation and GDP growth for Pakistan, India, Sri Lanka and Bangladesh economies. The study finds that increase in inflation brings the economic growth and vice versa. On the other side inflation controlling policies may reduce growth rate. The study suggests that policy makers to devise such policies which can keep inflation and growth rate side by side. Choudhri and Khan (2002) investigate relationship between exchange rate and consumer prices over the period of 1982 to 2001. The empirics show that there is no significant impact of the devaluation of Pakistani rupee on inflation. However, in long run inflation does cause depreciation of rupee in Pakistan. Amisano and Serati (2003) analyse determinants of unemployment for USA, Italy, UK, and Sweden economy from 1975 to 1995. The study finds that shocks in aggregate demand put long lasting variations in unemployment. Burden of taxes on firms is shifted toward users in US economy. Labour tax affects unemployment level directly in USA and Italy. The labour unions are considered a main cause of rising in unemployment in Italy. Increase in real wages leads to increase the productivity in all economies. However, real wages are found insensitive to shocks in labour supply.

Amjad (2005) points out that government policies are increasing employment level in developing countries. The study finds gaps in required education and labour skills are main causes of unemployment. The study suggests that flexible public sectors planning retaining employment level in agriculture sector, increase in agriculture productivity, active labour market policies, necessary skills to labours and better labour administration system can increase level of employment in developing countries.

Agha and Khan (2006) examine the persistent fiscal deficit in Pakistan. Fiscal deficit is fulfilled by deficit financing or interest having debts that increase the rate of inflation in the economy. The expansionary fiscal policy is made which aims at increasing the growth rate of economy. However, it made indirect restrictions in formulation of monetary policy. Ribba (2006) studies the US economy and finds that positive shocks in productivity leads to reduce inflation and unemployment. Moreover, in recession period rise in inflation be a cause of decrease in unemployment. Monetary policy shocks plays significant role in determining inflation and unemployment in short run as well as in long run. Chaudhry and Choudhary (2006) find that the monetary policy has statistically insignificant impact on inflation. The study concludes that major cause of inflation in Pakistan is not the mismanagement of monetary policy, but increase in prices of imported inputs. Moreover, the economy is working at the horizontal path of the supply curve, any inflation targeting by monetary controls can

cause the severe recession. Khan and Schimmelpfennig (2006) compare the role of wheat support prices and money supply for inflation in Pakistan. Empirical analysis shows that money growth and private sector credit growth determine inflation. Whereas the wheat support prices do not impact inflation in long run. The study recommends price stability and exchange rate control for economic growth in Pakistan. Akhtar and Shahnaz (2006) investigate the youth unemployment in Pakistan over the period of 1990 to 2004. Vocational trainings are not found helpful in decreasing unemployment significantly. The study suggests GDP growth must be 4.25 percent to control youth unemployment. Further services sector and private investment are helpful in decreasing unemployment rate. Kemal (2006) concludes that growing supply of money in a long time period cause inrease in the rate of inflation. The study finds that change in money supply takes about 9 months to impact the rate of inflation. Benati and Vitale (2007) finds that natural rate of interest is significantly different for the countries of Euro area, United States, Sweden, Australia and United Kingdom.

Khan et al., (2007) compare fiscal and monetary policy in determining rate of inflation for Pakistan over the period of 1972 to 2006. The study concludes that monetary variables like adaptive expectations, private sector credit and rising import prices determines inflation as compare to fiscal policy. The expansionary monetary policy leads to increase in GDP but it also increase inflation. Rafiq et al., (2008) find that population growth rate significantly increases unemployment. Whereas increase of foreign direct investment and inflation can decrease unemployment rate in Pakistan. The estimates approve close link between unemployment and inflation.

Subhan and Hayat (2009) analyse the effects of price instability on unemployment and economic growth in Pakistan. The study finds significant negative relationship between inflation and GDP. The study concludes indirect and negative relationship between unemployment and economic growth. Analysing the economy of Pakistan over the period 1964 to 2007, Hussain (2009) estimates the relative importance of interest rate, exchange rate, government expenditures and credit channels using vector auto regression approach (VAR). The results show that inflation effects on exchange rate and government spending. Moreover, rate of exchange can influence the inflation and output. The study considers exchange rate as policy variable in case of Pakistan.

Achsani et al., (2010) find that rate of exchange significantly effect inflation in Asaian countries. Asian economies are found more responsive to the financial crisis than EU and North American economies. This shows that inflation targeting is difficult task and cosiders exchange rate as important variable for inflation targeting in Asian economies. Khan and Gill (2010) find that budgetary deficit have non-inflationary pressure in Pakistan. Govt finance as loans from banks does not play significant role in increasing inflation. The study finds that depreciation of currency increases prices of imports which in turn increase the rate of inflation. Empirical analysis finds that wheat support prices are not responsible for changes in rate of inflation in long run. The study finds that monetary variables are passive in Pakistan due to imperfection in markets, while future expectations contribute towards inflation. Chen et al., (2010) examine the trade-off between inflation and unemployment for United Kingdom over the period of 1961 to 2005. The study emphasis to include real interest rate and real wage as policy variables for empirical analysis. Wald test results suggest that if real rate of interest is excluded it leads to misspecification of the model. Gentle and Chen (2013) found the same results for the Canadian economy over the period of 1935 to 2010. The study concludes that real rate of interest is important while Phillips curve analysis.

Zaman et al., (2011) empirically examine the relationship of inflation and unemployment. The results confirm the existence of Phillips curve both in short and long run for Pakistan over the period of 1975 to 2009. Inflation and unemployment has negative relationship which is transitory in short run and act as a permanent shock in long run analysis. Analysing the trade off among inflation, interest and unemployment rate of Pakistan, Mahmood et al., (2013) find interest and unemployment rate have negative impact on the rate of inflation. The study finds that increase in inflation also raise the level of interest rate. The unemployment rate is impacting on interest rate and inflation rate. However, a significant trade off is existed among these variables in the long run.

Aurangzeb and Asif (2013) analyse factors affecting unemployment rate in Pakistan, India and China. The study concludes that GDP, inflation and exchange rate have significant impact on unemployment. The relation of GDP and unemployment is found positive in case of Pakistan. Umair and Ullah (2013) use longitudinal study to find the impact of inflation on GDP and unemployment rate in Pakistan. The study finds insignificant influence of inflation on GDP and unemployment rate. Habib and Sarwar (2013) investigate the impact of foreign direct investment on employment level in Pakistan over the period of 1970 to 2011. The results of Granger Causality test reveal that increase in FDI increases employment level by increasing the job opportunities but increase in exchange rate can reduce the employment level. Maqbool et al., (2013) finds that rise in inflation reduces unemployment in Pakistan but this adjustment depends from previous period equilibrium. The study suggests that by enhancing domestic industrial support policies may attract FDI as well.

Jaradat and AI-Hhosban (2014) analyse inflation and interest rate for Jordan over the period of 1990 to 2012. Granger causality test results show bidirectional causality between inflation and unemployment, economic growth and budget deficit. The results show a weak positive relationship between inflation and interest rate, due to unfavourable economic conditions of Jordan over the estimated period. Aqil et al., (2014) analyse the determinants of unemployment in Pakistan from 1983 to 2010. The study finds GDP growth and inflation has insignificant effects on unemployment. While population growth rate and FDI can reduce unemployment in economy. Ebiringa and Anyaogu (2014) investigate the relationship among exchange rate, inflation rate and interest rate for Nigeria over the period of 1971 to 2010. The study finds that lagged exchange rate and inflation rate determine exchange rate, however the role of interest rate is insignificant. Ali et al., (2015) analyse the relationship of interest rate and investment in Pakistan over the period 2000 to 2009. The results of the study reveal that an increase in interest rate leads to increase output and investment which in turn leads to increase inflation. The study concludes that controlling interest rate can put inflation a control that decreases volatility in exchange rate.

III. Economic Theory and Econometric Methodology

The construction of economic models enables individuals to explain the economic behaviour as well as the basic task of economic theory. All factors cannot be treated in same model so assumptions and abstractions are made. These assumptions and restrictions allow to choose factors to contribute in explaining the economic phenomena. The core purpose of building economic model is making analysis and predictions. The economic models which provide information, predictions, reality, simplicity and general behaviour are considered valid models. This study focuses on analysing the trade-off among unemployment, interest rate and inflation which are three main indicators of macroeconomic stability in Pakistan economy. This study uses dummy variable for differentiating the political and military rule in Pakistan. Many studies including Maqbool et al., (2013), Aurangzeb and Asif (2013), Khan and Gill (2010), Ali and Rehman (2015) and Aqil et al., (2014) have focused the impacts of different economic and social factors in determining the unemployment, interest rate and inflation. This study is following their methodology hence present models become as:

$UNE_t = f(POP_t, ED_t, EXR_t, IR_t, INF_t, PINS)$
$INF_t = f(IR_t, EXR_t, UNE_t, IMP_t, M2_t, PINS)$
$IR_t = f(DCP_t, UNE_t, INF_t, EXR_t, PINS)$

Where
UNE = unemployment rate (%)
POP = population growth (annual percent)
ED   = external debt (Debt disbursed excluding grants, $ Million)
EXR = exchange rate (LCU per US$, period average)
IR   = interest rate
INF   = inflation (consumer prices annual %)
DCP = domestic credit to private sector (% of GDP)
IMP = imports of goods and services (% of GDP)
M2   = broad Money (% of GDP)
PINS= political instability

Political instability is a dummy variable which is defined as:
     PINS = 1, for dictatorship
     PINS = 0, otherwise

The impact of independent variables on dependent variable can be shown in equation form as follows:
$UNE_t = \alpha_0 \, POP_t^{\alpha_1} \, ED_t^{\alpha_2} \, EXR_t^{\alpha_3} \, IR_t^{\alpha_4} \, INF_t^{\alpha_5} \, PINS_t^{\alpha_6} \, e_{t1}^{\alpha_7}$ (1)
$INF_t = \beta_0 \, IR_t^{\beta_1} \, EXR_t^{\beta_2} \, UNE_t^{\beta_3} \, IMP_t^{\beta_4} \, M2_t^{\beta_5} \, PINS_t^{\beta_6} \, e_{t2}^{\beta_7}$ (2)
$IR_t = \gamma_0 \, DCP_t^{\gamma_1} \, UNE_t^{\gamma_2} \, INF_t^{\gamma_3} \, EXR_t^{\gamma_4} \, PINS_t^{\gamma_5} \, e_{t3}^{\gamma_6}$ (3)
e = represent for the base of log
The log linear forms of the models can be stated as:
$LUNE_t = \alpha_0 + \alpha_1 LPOP_t + \alpha_2 LED_t + \alpha_3 LEXR_t + \alpha_4 LIR_t + \alpha_5 LINF_t + \alpha_6 PINS_t + e_{t1}$ (4)
$LINF_t = \beta_0 + \beta_1 LIR_t + \beta_2 LEXR_t + \beta_3 LUNE_t + \beta_4 LIMP_t^{\alpha_4} + \beta_5 LM2_t + \beta_6 PINS_t + e_{t2}$ (5)
$LIR_t = \gamma_0 + \gamma_1 LDCP_t + \gamma_2 LUNE_t + \gamma_3 LINF_t + \gamma_4 LEXR_t + \gamma_5 PINS_t + e_{t3}$ (6)

In this study data on unemployment rate and external debt is taken from various issues of economic surveys of Pakistan. Data regarding population growth, exchange rate and inflation is taken from World Bank online database.

III.I. Econometric Methodology

The econometric tools can be extensively helpful in quantifying the economic phenomena. They provide base for quantitative analysis of economic theory. Most of macroeconomic factors include time trend which make it non stationary which leads to unreliable regression results. Nelson and Plosser (1982) revealed that macroeconomic variables possess unit root problem when data is time series. They conclude that existence or non-existence of unit root helps to check the authenticity of data generating process. Stationary and non-stationary data have some different features. The stationary time series data have temporary shocks which disappear over the time and series move back to their long-run means values. However, shocks are permanent in non-stationary time series data. As a result, the variance and mean of a nonstationary time series depend upon time trend and series has: (a) no long-run mean to which the series returns, and (b) variance will depend on time and approach infinity as time goes to infinity. In case if the time series data has only negative or positive shocks, the time series data is nonstationary (Dickey and Fuller, 1979). In literature, several unit root tests are available for making data stationary. For this purpose, the study uses Augmented Dickey-Fuller (ADF) unit root test (1981).

Dickey and Fuller (1981) propose the Augmented Dickey-Fuller (ADF). The general forms of the ADF can be written as:

$$\Delta X_t = \delta X_{t-1} + \sum_{j=1}^{q} \phi_j \Delta X_{t-j} + e_{1t}$$

$$\Delta X_t = \alpha + \delta X_{t-1} + \sum_{j=1}^{q} \phi_j \Delta X_{t-j} + e_{2t}$$

$$\Delta X_t = \alpha + \beta t + \delta X_{t-1} + \sum_{j=1}^{q} \phi_j \Delta X_{t-j} + e_{3t}$$

X_t is a time series for testing unit root problem, t is the time trend and e_t is error term having white noise properties. If $j = 0$, it represents the simple DF test. The lagged dependent variables in the ADF regression equation are included until the error term becomes white noise. For checking the serial correlation of error terms LM test is used. The null and alternative hypotheses of ADF unit roots are:
H0: $\delta = 0$ non-stationary time series; so it has unit root problem.
Ha: $\delta < 0$ stationary time series.
Applying OLS and computing τ statistic of the estimated coefficient of X_{t-1} and comparing it with the Dickey Fuller (1979) critical τ values, if the calculated value of τ statistic is greater than the critical value then reject the H0. In this case the time series data is stationary. On the other hand, if we fail to reject H0, the series is non-stationary. In this way by applying this procedure on all variables, we can easily find their respective orders of integration.

In literature, a number of cointegration tests are available for econometric analysis. Most famous and traditional cointegration tests are the residual based Engle-Granger (1987) test, Maximum Likelihood based on Johansen (1991/1992) and Johansen-Juselius (1990) tests. One thing is common in these tests is that they require same order of integration for their analysis. These cointegration tests become invalid and inefficient when the variables of the model have different level of integration. Moreover, the analysis based on these tests of cointegration do not provide information about the structural breaks of time series data and also have low power of prediction. With the passage of time structural changes have occurred in time series such as economic crises, new institutional arrangements and changes in policy regime. The problem with these traditional methods is that the testing of the null hypothesis of structural stability against the alternative of a one-time structural break only. If such structural changes are present in the data generating process, but not allowed for in the specification of an econometric model, results may be biased. ARDL bound testing approach presented by Pesaran and Pesaran (1997), Pesaran and Shin (1999), and Pesaran, Shin and Smith (2001) has numerous advantages over traditional methods of cointegration. Firstly, ARDL can be applied regardless of the order of integration. Secondly, ARDL bounds testing approach to cointegration can be used for small sample size (Mah, 2000). Thirdly, this approach allows taking sufficient number of lags for capturing the data generating process in a general to specific modeling framework (Laurenceson et al., 2003). Lastly, ARDL gives efficient and valid detailed information about the structural breaks in data. This technique is based on Unrestricted Vector Error Correction Model (UVECM) which have better properties for short and long-run equilibrium as compared to traditional techniques

(Pattichis, 1999). Pesaran and Shin (1999) and later on Pesaran et al. (2001) mention that under certain environment long-run correlation among macroeconomic variables can be found with the help of Autoregressive Distributive Lag Model (ARDL). After lag order selection for ARDL procedure, simply OLS can be used for identification and estimation. Valid estimates and inferences can be drawn through the presence of unique long-run alliance that is crucial for cointegration.

$$\Delta lnY_t = \beta_1 + \beta_2 t + \beta_3 lnY_{t-1} + \beta_4 lnX_{t-1} + \beta_5 lnZ_{t-1} + \cdots + \sum_{h=1}^{p} \beta_h \, \Delta lnY_{t-h} + \sum_{j=0}^{p} \gamma_j \, \Delta lnX_{t-j}$$

$$+ \sum_{k=0}^{p} \phi_k \Delta lnZ_{t-k} + \cdots + u_{it}$$

First this study will find the direction of relationship among the variables in case of Pakistan by applying the bounds test using F-Test test.

H0: β3 = β4 = β5 = 0   (no cointegration among the variables)

HA: β3 ≠ β4 ≠ β5 ≠ 0   (cointegration among variables)

If there exits long-run cointegration relationship among the variables, then for finding short-run relationship the study uses the Vector Error Correction Model (VECM). The VECM is explained as under:

$$\Delta lnY_{it} = \beta_1 + \beta_2 t + \sum_{h=1}^{p} \beta_h \, \Delta lnY_{it-h} + \sum_{j=0}^{p} \gamma_j \, \Delta lnX_{t-j} + \sum_{k=0}^{p} \phi_k \Delta lnZ_{it-k} + \omega ECT_{t-1} + u_t$$

IV. Empirical Results and Discussion

To check normality in the data which is used for approximation descriptive statistics is used. Results of this analysis are shown in table 1. All variables advocate negative skewness except interest rate. Empirics show the positive kurtosis for all the variables of the study. The estimates of skewness and kurtosis are insignificant for all variables. Null hypothesis of non normality is rejected. The estimates of Jarque-Bera provide evidence of zero mean and finite covariance of the variables which ensures the existence of normal distribution in data set.

TABLE 1: Descriptive Statistics of Unemployment Model

	LUNE	LPOP	LED	LEXR	LIR	LINF	PINS
Mean	0.429925	0.414110	4.233888	1.459228	1.041297	0.914063	0.525000
Median	0.724238	0.406809	4.293862	1.467032	1.000000	0.931851	1.000000
Maximum	0.917506	0.524283	4.668777	2.007017	1.301030	1.425910	1.000000
Minimum	-0.468521	0.307027	3.646110	0.995635	0.875061	0.464510	0.000000
Std. Dev.	0.452617	0.080662	0.295540	0.343950	0.102848	0.221612	0.505736
Skewness	-0.557675	-0.019644	-0.255072	-0.031063	0.741773	-0.079273	-0.100125
Kurtosis	1.722505	1.425193	1.966317	1.564787	2.961222	2.871401	1.010025
Jarque-Bera	4.793334	4.135932	2.214580	3.439495	3.670687	0.069457	6.666834
Probability	0.091021	0.126443	0.330453	0.179111	0.159559	0.965867	0.035671
Sum	17.19700	16.56441	169.3555	58.36912	41.65190	36.56252	21.00000
Sum Sq. Dev.	7.989620	0.253750	3.406410	4.613766	0.412532	1.915367	9.975000
Observations	40	40	40	40	40	40	40

Table 2 shows the results of correlation matrix. These results reveal that unemployment rate contains positive and significant correlation with external debt, interest rate and exchange rate. The correlation of unemployment and population is revealed negative and significant. Unemployment shows negative and insignificant correlation with inflation and political instability. Population reveals positive and insignificant correlation with inflation and political instability. The empirics provide the negative and significant correlation of population with external debt and exchange rate, however this correlation is insignificant in case of interest rate. External debt shows positive correlation with interest rate, exchange rate and negative for inflation and political instability but it is significant for interest rate and exchange rate and insignificant for political instability and inflation. Interest rate shows positive and significant correlation with inflation, exchange rate while it is negative and significant in case of political instability. Inflation reports negative and significant correlation with political instability however this correlation is negative and insignificant for exchange rate. The correlation of exchange rate and political instability is negative and insignificant.

TABLE 2: Pairwise Correlation

NOTE:

	LUNE	LPOP	LED	LIR	LINF	LEXR	PINS
LUNE	1.000000						
LPOP	-0.838696 (-9.49)***	1.000000					
LED	0.914228 (13.91)***	-0.880484 (-11.4)***	1.000000				
LIR	0.322929 (2.10)**	-0.211316 -1.33	0.380278 (2.53)***	1.000000			
LINF	-0.178725 -1.12	0.001004 0.01	-0.093946 -0.58	0.410726 (2.78)***	1.000000		
LEXR	0.897720 (12.56)***	-0.934678 (-16.2)***	0.977329 (28.45)***	0.294357 (1.90)*	-0.108654 -0.67	1.000000	
PINS	-0.098321 -0.61	0.110808 0.69	-0.074263 -0.46	-0.455079 (-3.15)***	-0.552505 (-4.09)***	-0.102874 -0.64	1.000000
	LUNE	LPOP	LED	LIR	LINF	LEXR	PINS

The

asterisks ***, ** and * presents significance at 1%, 5% and 10% levels, respectively.

Table 3 shows, the descriptive statistic of inflation model. Results of estimation reveal the positive skewness of interest rate and broad money. The other variables of data show the negative skewness. The kurtosis of all variables appears positive. The results provide empirical evidence regarding insignificance and non zero skewness and kurtosis. Jarque-Bera values indicate that all variables of the model have finite covariance and zero mean that shows the data set is normally distributed.

TABLE 3: Descriptive Statistics of Inflation Model

	LINF	LIR	LEXR	LUNE	LIMP	LM2	PINS
Mean	0.914063	1.041297	1.459228	0.429925	1.300846	1.644264	0.525000
Median	0.931851	1.000000	1.467032	0.724238	1.311088	1.637891	1.000000
Maximum	1.425910	1.301030	2.007017	0.917506	1.382016	1.769877	1.000000
Minimum	0.464510	0.875061	0.995635	-0.468521	1.165340	1.527216	0.000000
Std. Dev.	0.221612	0.102848	0.343950	0.452617	0.057556	0.055071	0.505736
Skewness	-0.079273	0.741773	-0.031063	-0.557675	-0.862578	0.287915	-0.100125
Kurtosis	2.871401	2.961222	1.564787	1.722505	2.973032	2.577665	1.010025
Jarque-Bera	0.069457	3.670687	3.439495	4.793334	4.961487	0.849910	6.666834
Probability	0.965867	0.159559	0.179111	0.091021	0.083681	0.653799	0.035671
Sum	36.56252	41.65190	58.36912	17.19700	52.03385	65.77057	21.00000
Sum Sq. Dev.	1.915367	0.412532	4.613766	7.989620	0.129197	0.118280	9.975000
Observations	40	40	40	40	40	40	40

Correlation matrix of inflation model is presented in table 4. Estimates reveal that inflation has positive and significant correlation with interest rate and imports, this is positive and insignificant for broad money. The correlation of inflation with exchange rate is negative and insignificant however, this correlation is negative and significant in case of political instability. Interest rate provides positive and significant correlation with exchange rate, unemployment and broad money while it is positive and insignificant for imports. The correlation of interest rate and political instability is negative and significant. Exchange rate has shown negative and significant correlation with imports and insignificant with political instability however this correlation is positive and significant in case of unemployment and broad money. The results emphasis on significant negative correlation of unemployment with imports and it is negative and insignificant for political instability while unemployment posses positive and significant correlation with broad money. Imports reveal negative and insignificant correlation with both broad money and political instability. Broad money has shown positive and insignificant correlation with political instability.

TABLE 4: Pairwise Correlation of Inflation Model

	LINF	LIR	LEXR	LUNE	LIMP	LM2	PINS
LINF	1.000000						
LIR	0.410726 (2.78)***	1.000000					
LEXR	-0.108654 -0.67	0.294357 (1.90)*	1.000000				
LUNE	-0.178725 -1.12	0.322929 (2.10)**	0.897720 (12.56)***	1.000000			
LIMP	0.447445 (3.08)***	0.173370 1.08	-0.490582 (-3.47)***	-0.527168 (-3.82)***	1.000000		
LM2	0.023054 0.14	0.463575 (3.22)***	0.750002 (6.99)***	0.631740 (5.02)***	-0.065275 -0.40	1.000000	
PINS	-0.552505 (-4.07)***	-0.455079 (-3.15)***	-0.102874 -0.64	-0.098321 -0.61	-0.076766 -0.47	0.051187 0.31	1.000000
	LINF	LIR	LEXR	LUNE	LIMP	LM2	PINS

NOTE: The asterisks ***, **and * indicates the significant at 1%, 5% and 10% levels, respectively.

The results of descriptive statistics of interest rate model are shown in table 5. The results show that interest rate has positive skewness. Other variables have negative skewness. Estimates of kurtosis are positive for all variables. The results reveal that estimates of kurtosis and skewness are insignificant. On the basis of results we reject no normality hypothesis. The values of Jarque-Bera have zero mean and finite covariance which proves the normality of data sets.

TABLE 5: Descriptive Statistics of Interest Rate Model

	LIR	LDCP	LUNE	LINF	LEXR	PINS
Mean	1.041297	1.376891	0.429925	0.914063	1.459228	0.525000
Median	1.000000	1.384041	0.724238	0.931851	1.467032	1.000000
Maximum	1.301030	1.474013	0.917506	1.425910	2.007017	1.000000
Minimum	0.875061	1.216700	-0.468521	0.464510	0.995635	0.000000
Std. Dev.	0.102848	0.059179	0.452617	0.221612	0.343950	0.505736
Skewness	0.741773	-0.839161	-0.557675	-0.079273	-0.031063	-0.100125
Kurtosis	2.961222	3.731332	1.722505	2.871401	1.564787	1.010025
Jarque-Bera	3.670687	5.586013	4.793334	0.069457	3.439495	6.666834
Probability	0.159559	0.061237	0.091021	0.965867	0.179111	0.035671
Sum	41.65190	55.07563	17.19700	36.56252	58.36912	21.00000
Sum Sq. Dev.	0.412532	0.136583	7.989620	1.915367	4.613766	9.975000
Observations	40	40	40	40	40	40

Correlation matrix of the interest rate model is presented in table 6. The results show that interest rate have positive and significant correlation with the unemployment rate, inflation and exchange rate while it possess positive and insignificant correlation with domestic credit to private sector of Pakistan economy. The correlation of interest rate appears negative and significant with political instability. Domestic credit to private sector shows negative and insignificant correlation with unemployment rate, inflation and exchange rate whereas this correlation is positive and significant with political instability. The estimates of correlation of unemployment show positive and significant correlation with exchange rate while this becomes insignificant and negative in case of inflation and political instability. The results about inflation provide the negative correlation with exchange rate and political instability but it is significant for political instability and insignificant in case of exchange rate. Exchange rate provides the negative and insignificant correlation with political instability. The results have shown that all regressors have positive impact on interest rate while dummy variable contains negative correlation.

The results of unit root test of all variables of all models are presented in table 7. The results of Augmented Dickey-Fuler test show that inflation, interest rate and political instability are stationary at level. All other variables are stationary at first difference. The results provide mix order of integration. So ARDL techniques suits to this situation. While suggested orders of integration are **I**(0) and **I**(1) among them that order is chosen which suits best according to the model.

TABLE 6: Pairwise Correlation of Interest Rate Model

	LIR	LDCP	LUNE	LINF	LEXR	PINS
LIR	1.000000					
LDCP	0.028563 0.18	1.000000				
LUNE	0.322929 (2.10)**	-0.018441 -0.11	1.000000			
LINF	0.410726 (2.77)***	-0.240083 -1.52	-0.178725 -1.12	1.000000		
LEXR	0.294357 (1.90)*	-0.166112 -1.04	0.897720 (12.56)***	-0.108654 -0.673775	1.000000	
PINS	-0.455079 (-3.15)***	0.534409 (3.90)***	-0.098321 -0.61	-0.552505 (-4.09)***	-0.102874 -0.64	1.000000
	LIR	LDCP	LUNE	LINF	LEXR	PINS

NOTE: The asterisks ***, **and * indicates the significant at 1%, 5% and 10% levels, respectively.

Table 7: Unit Root Estimation

	At level	At First Difference
Variables	T-Statistic(Prob.*)	T-Statistic(Prob.*)
LINF	-3.297741(0.0218)	-6.661657(0.0000)
LIR	-3.357581(0.0192)	-5.044074(0.0002)
LEXR	0.620530(0.9886)	-4.306877(0.0016)
LUNE	-2.182690(0.2156)	-3.916251(0.0046)
LED	-2.878139(0.0571)	-4.064366(0.0031)
LPINS	-7.552195(0.0000)	-6.000000(0.0000)
LPOP	-2.761008(0.0735)	-3.631408(0.0097)
LDCP	-1.139937(0.6901)	-5.439563(0.0001)

*MacKinnon (1996) one-sided p-values.

The results of ARDL bounds test are presented in table 8. For the model (1) unemployment, inflation, population, interest rate, external debt, exchange rate and political instability shows that estimated value of F-statistic greater than upper bound value at 5 percent significance level. The results of ARDL bounds testing approach for model (2) are given in table 8-B which ensures co-integration among inflation, unemployment rate, interest rate, exchange rate, broad money and political instability at 10 percent significance level. Results of ARDL bounds test for model (3) are given in table 8-C, which investigates the cointegration among interest rate, inflation, unemployment, exchange rate, domestic credit to private sector and political instability. The results of ARDL bound test provide significant evidence for rejecting the null hypothesis of no cointegration among variables.

Table 8-A : ARDL Bound Testing Approach		
Dependent Variable LUNE, ARDL (1,1,1,1,1,0,0)		
Critical values	**F-Statistics (4.903)****	
	Lower Bound	Upper bond
95%	2.45	3.61
90%	2.12	3.23
Table 8-B: ARDL Bound Testing Approach		
Dependent Variable LINF,ARDL (1, 0, 0, 0, 1, 1,0)		
Critical values	**F-Statistics (3.422)***	
	Lower Bound	Upper bound
95%	2.45	3.61
90%	2.12	3.23
Table 8-C: ARDL Bound Testing Approach		
Dependent Variable LIR, ARDL (1, 1, 2, 0, 0, 1)		
Critical values	**F-Statistics (5.872)****	
	Lower Bound	Upper bound
95%	2.62	3.79
90%	2.26	3.35

NOTE: The asterisks ** and * represents significance at 5% and 10% levels respectively.

VI.I Unemployment Rate ARDL Model

The results of ARDL bounds test allows to estimate long run analysis. The results of long run relationship are shown in table 9. The coefficient of population is negative and significant at 1 percent level of significance. Estimated value of coefficient indicate that 1 percent increase in population growth creates (-6.7) percent decrease in unemployment rate. This situation seems contrary to economic theory (Rafiq et al., 2008). The reason behind this is the child labour, disguised unemployment and unreported employment services in Pakistan. External debt possesses the positive and significant (at 1 percent level) relationship with unemployment rate. 1 percent increase in external debt provides (2.83) percent increase in unemployment rate. The estimated coefficient of interest rate provides negatively insignificant relationship with unemployment rate. The coefficient of inflation rate indicates negative and insignificant relationship with unemployment rate this is similar finding with Umair and Ullah (2013). Exchange rate have negative and significant (at 1 percent level of significance) relationship with unemployment rate. The relationship of exchange rate to unemployment rate was significant and positive in the study of Aurangzeb and Asif (2013). 1 percent increase in exchange rate decreases (-3.1) percent increase in unemployment rate. The study reveals that political instability decreases unemployment rate in Pakistan significantly. Military leadership increases employment opportunities. The results of this study indicate that population growth, external debts, exchange rate and political instability plays the significant role in determining the unemployment rate in Pakistan. Inflation rate and interest rate has insignificant contribution in determining unemployment rate in Pakistan.

Table 9: Estimated Long Run Coefficients of Unemployment Rate Model ARDL (1,1,1,1,1,0,0) Dependent variable is LUNE Time Period 1974-2013			
Regressor	**Co-efficients**	**Standard-Error**	**T-Ratio (Prob)**
LPOP	6.786860	1.367285	-4.963749(0.0000)
LED	2.835045	0.733295	3.866171(0.0006)
LEXR	-3.099978	0.830054	-3.734671(0.0009)
LIR	-0.070665	0.426711	-0.165603(0.8697)
LINF	-0.240607	0.195879	-1.228341(0.2299)
PINS	-0.187301	0.089413	-2.094780(0.0457)
C	-3.823038	1.654771	-2.310312(0.0287)

The short run analyses of unemployment rate model are presented in table 10. Population growth coefficient is found negative and significant at 1 percent level of significance. The results show that 1 percent increase in population growth decreases (-11.14) percent the unemployment rate. The coefficient of external debt, inflation rate and exchange rate appears negative and insignificant. 1 percent increase in external debt, inflation rate and exchange rate reduces (-0.03, -0.10 and -0.63 respectively) percent unemployment rate. Interest rate contributes negative and significant (at 5 percent significance level) in determining the unemployment rate. 1 percent increase in interest rate provides (-0.52) percent decrease in unemployment rate. The coefficient of political instability indicates negative and significant (at 5 percent level of significance) relationship with unemployment rate. This shows that political instability increases employment opportunities. The coefficient of ECT is negative and significant (at 1 percent significance level) is according to theory which ensures co-integration among the variables of the model.

Table 10: Vector Error-Correction Model (VECM) of Unemployment Rate Model ARDL (1,1,1,1,1,0,0) Dependent variable is LUNE Time Period 1974-2013			
Regressor	**Co-efficients**	**Standard-Error**	**T-Ratio (Prob)**
LPOP	-11.146757	2.664200	-4.183903(0.0003)
LED	-0.030419	0.651984	-0.046656(0.9631)
LEXR	-0.628593	0.568657	-1.105399(0.2787)
LIR	-0.525022	0.234175	-2.242003(0.0334)
LINF	-0.103379	0.087852	-1.176739(0.2496)
PINS	-0.080476	0.031116	-2.586315(0.0154)
ECM$_{t-1}$	-0.429658	0.103774	-4.140313(0.0003)

VI.II. Inflation Rate ARDL Model

The results of long run inflation rate model are shown in table 11. The estimated coefficient of interest rate shows that increase in rate of interest decreases inflation rate. 1 percent increase in interest rate brings (-0.62) percent decrease in inflation rate. However, the coefficient is found insignificant. Our finding is according to Mahmood et al., (2013). Thus increase in interest rate is taken as a measure to reduce inflation rate level in economy. Exchange rate coefficient depicts negative and significant relationship with inflation rate at 5 percent level. Increase in rate of exchange by 1 percent brings (-0.93) percent decrease in inflation rate. This finding can be expressed as the devaluation of rupee is non inflationary in Pakistan which is similar to Choudhri and Khan (2002). This result states that depreciation of currency is non inflationary in Pakistan. Observing unemployment rate, it possesses positive relationship with inflation rate which is insignificant and contrary to Zaman et al., (2011). According to the results increase in rate of unemployment rate by 1 percent brings (0.24) percent increase in relative inflation rate level. Imports possess the negative and significant (at 5 percent level of significance) relationship with inflation rate in our model which is contrary to Khan and Gill (2010). 1 percent increase in imports takes (-0.22) percent decrease in consumer prices. Broad money provides positive and significant relationship with inflation rate at 5 percent this is similar to the study of Khan and Schimmelpfennig (2006). 1 unit percent increase in broad money gives an increase of (5.22) percent in inflation rate. The political instability shows negative and significant impact on inflation rate. The existence of military government decreases inflation rate by (-0.34) percent and it is significant at 1 percent.

Table 11: Estimated Long Run Coefficient of Inflation Rate Model			
ARDL (1, 0, 0, 0, 1, 1, 0)			
Dependent variable LINF			
Time Period 1974-2013			
Regressor	**Co-efficients**	**Standard-Error**	**T-Ratio (Prob)**
LIR	-0.629382	0.576464	-1.091799(0.2839)
LEXR	-0.930346	0.435206	-2.137714(0.0411)
LUNE	0.240524	0.213256	1.127868(0.2686)
LIMP	-0.223580	1.021943	-0.218780(0.8284)
LM2	5.219113	2.029456	2.571681(0.0155)
PINS	-0.341809	0.097823	-3.494155(0.0015)
C	-5.281586	1.966181	-2.686216(0.0118)

The short run results of inflation rate model are given in the table 12. The estimate of interest rate shows negative and insignificant relationship with inflation rate. Unemployment rate possesses positive and insignificant relationship with inflation rate. Imports have positive relationship with inflation rate which is significant at 10 percent significance level. Although finding does not match with the long run analysis however it is according to the economic theory. Estimate of broad money shows the insignificant negative relationship with inflation rate. Political instability contributes negatively to inflation rate which is significant at 1 percent level. The existence of political instability lowers inflation rate by 0.22 percent. The coefficient of error correction term is statistically significant and posses the negative sign which ensures the co-integration among variables of the model.

Table 12: Vector Error-Correction Model (VECM) of Inflation Rate Model			
ARDL (1, 0, 0, 0, 1, 1, 0)			
Dependent variable LINF			
Time Period 1974-2013			
Regressor	**Co-efficients**	**Standard-Error**	**T-Ratio (Prob)**
LIR	-0.407384	0.347471	-1.172425(0.2506)
LEXR	-0.602191	0.231637	-2.599722(0.0145)
LUNE	0.155686	0.124138	1.254129(0.2198)
LIMP	1.014281	0.553079	1.833880(0.0770)
LM2	-0.732879	0.802552	-0.913186(0.3687)
PINS	-0.221244	0.073029	-3.029558(0.0051)
ECM$_{t-1}$	-0.647276	0.143786	-4.501660(0.0001)

VI.III. Interest Rate ARDL Model

The results of F-Statistic are statistically significant which allow researcher to estimate further long run and short run analysis among interest rate, inflation rate, unemployment rate, exchange rate, domestic credit to private sector and political instability in the model. Results of inflation rate model are given in table 13. The coefficient of domestic credit to private sector shows positive relationship with the rate of interest. 1 percent increase in domestic credit availability creates (0.75) percent increase in rate of interest, its coefficient is statistically significant at 5 percent level. Interest rate and investment possess the positive relationship which is also depicted by Ali et al., (2015). Unemployment rate also possesses positive and insignificant relationship with rate of interest which is similar to Mahmood et al., (2013). Increase in unemployment rate by 1 percent brought (0.14) percent increase in interest rate. The increase in unemployment rate increases the debtors in the economy. Consequently, the demand for money increases which in turn increases the rate of interest. The coefficient of exchange rate is negative and significant at 10 percent. An increase of 1 percent in exchange rate causes (-0.21) percent decrease in rate of interest. 1 percent increase in inflation rate contributes (0.18) percent increase in interest rate. The coefficient of inflation rate is significant at 5 percent this finding is similar to Jaradat and AI-Hhosban (2014). Political instability decreases the rate of interest significantly. All coefficients of long run except unemployment rate are found significant. The results shows that interest rate in Pakistan can be affected by inflation rate, unemployment rate, exchange rate, domestic credit to private sector and political instability. However, increase in inflation rate, unemployment rate and domestic credit to private sector have positive impact on interest rate. Exchange rate and political instability have shown negative effect on interest rate.

Table 13: Estimated Long Run Coefficient of Interest Rate Model
ARDL (1, 1, 2, 0, 0, 1)
Dependent variable LIR
Time Period 1974-2013

Regressor	Co-efficients	Standard-Error	T-Ratio (Prob)
LDCP	0.751671	0.332114	2.263294(0.0319)
LUNEM	0.142535	0.086062	1.656195(0.1093)
LINF	0.183956	0.080672	2.280289(0.0307)
LEXR	-0.211884	0.121490	-1.744039(0.0925)
PINS	-0.185062	0.040986	-4.515254(0.0001)
C	0.229690	0.511036	0.449460(0.6567)

The short run results of interest rate model are presented in the table 14. In this study the estimated coefficient of inflation rate provides positive and significant relationship with interest rate. This advocates that a relative increase in inflation rate (by 1 percent) increases (0.09 percent) rate of interest. Coefficient of unemployment rate shows negative and insignificant relationship with interest rate. This relationship becomes negative and significant (at 1 percent) at the lag of one period. Thus estimates shows that increase in unemployment rate causes decrease in interest rate and its impact is more with the passage of time. This finding is contrary to the long run analysis. This study finds the negative and significant coefficient of exchange rate which shows that an increase in exchange rate by 1 percent causes 0.11 percent decrease in rate of interest. Domestic credit to private sector appears with positive and insignificant relationship with interest rate. An increase in availability of domestic credit by 1 percent is estimated to bring 0.03 percent increase in rate of interest. Political instability estimate indicates negative and significant relationship with interest rate. The presence of political instability decreases the rate of interest by 0.04 percent. The coefficient of ECT shows negative and significant estimate which proves the co-integration among the variables of the model. The estimates of this study show significant impact of lagged unemployment rate, exchange rate, inflation rate and political instability in bringing changes in rate of interest.

Table 14: Vector Error-Correction Model (VECM) of Interest Rate Model
ARDL (1, 1, 2, 0, 0, 1)
Dependent variable LIR
Time Period 1974-2013

Regressor	Co-efficients	Standard-Error	T-Ratio (Prob)
LDCP	0.037736	0.239819	0.157353(0.8761)
LUNE	-0.158292	0.097751	-1.619349(0.1170)
LUNE(-1)	-0.356819	0.103590	-3.444525(0.0019)
LINF	0.097808	0.043113	2.268650(0.0315)

LEXR	-0.112657	0.061954	-1.818394(0.0801)
PINS	-0.049878	0.026460	-1.885068(0.0702)
ECM$_{t-1}$	-0.531693	0.094262	-5.640600(0.0000)

The estimates of diagnostic tests are shown in table 15-A, 15-B for models of inflation rate, unemployment rate and interest rate. The results provide evidence of non-existence of problem of hetroskedasticity and serial correlation in estimated models. This ensures the reliability of the estimated results. The normality test is also applied to check residuals distribution (attached in appendix). The results of Jarque-Bera test ensure the normal distribution of all model residuals.

Table 15-A : Heteroskedasticity Test:White				
Unemployment rate Model	F-statistic	1.360	Prob. F(26,13)	0.286
	Obs*R-squared	29.245	Prob. Chi-Square(26)	0.300
	Scaled explained SS	20.211	Prob. Chi-Square(26)	0.782
Inflation rate Model	F-statistic	1.123	Prob. F(26,13)	0.427
	Obs*R-squared	27.681	Prob. Chi-Square(26)	0.374
	Scaled explained SS	19.785	Prob. Chi-Square(26)	0.802
Interest rate model	F-statistic	2.140	Prob. F(19,20)	0.050
	Obs*R-squared	26.811	Prob. Chi-Square(19)	0.109
	Scaled explained SS	11.020	Prob. Chi-Square(19)	0.923
Table 15-B : VAR Residual Serial Correlation LM Test				
Unemployment rate Model	LM-Statistic	59.585	Prob. (3,30)	0.143
Inflation rate Model	LM-Statistic	54.201	Prob. (3,30)	0.283
Interest rate model	LM-Statistic	19.756	Prob. (3,30)	0.987

V. Conclusions

This study has investigated the trade-off among unemployment rate, interest rate and inflation rate in Pakistan over the period of 1974 to 2013. This study used Augmented Dicky Fuller test to check data stationarity, ARDL technique is used to find cointegration among variables, Jarque-Bera estimates are used for checking normality of data and residuals, White test is used for examining hetroskedasticity and VAR Residual test is used to revealing serial correlation. This study results reveal that population growth, exchange rate and political instability has negative and significant impact on unemployment rate. External debt is positively and significantly related to unemployment rate while interest rate and inflation rate have negative and insignificant impact on unemployment rate. The results mentioned that exchange rate and political instability have significant inverse impact on inflation rate. Results for inflation rate conclude broad money contribution direct and significant while the role of unemployment rate is positive and insignificant. Imports and interest rate effects inflation rate negatively and insignificantly. The empirical analysis reveal positive and significant impact of domestic credit to private sector and inflation rate on interest rate. Political instability and exchange rate have shown negative and significant while unemployment rate have positive and insignificant effect on interest rate. The value of ECM is negative and significant for all models which show speed of adjustment from short-run to long-run equilibrium. The estimated ECM shows that short-run takes approximately two and half year for unemployment rate, one and half year for inflation rate and two years for interest rate to converge in long run equilibrium. This study reveals that unemployment rate and inflation rate have no significant impact on each other. Interest rate effects unemployment rate in short-run. Interest rate is significantly determined by both inflation rate and unemployment rate in short-run whereas only inflation rate has significant long run relationship. This study reveals that government of Pakistan should emphasis on controlling population growth, external debt and exchange rate to reduce the unemployment rate. Inflation rate can be controlled by controlling exchange rate, imports of goods and services and supply of money. The rate of interest could be affected by effective control over domestic credit to private sector, inflation and exchange rate. Dictatorship is revealed fruitful in decreasing interest rate, unemployment and inflation rate which may be due to safety. These all factors may help in bringing macroeconomic stability in Pakistan economy.

Appendixes Can Be Provided upon request directly from Author.

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