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DETERMINANTS OF UNEMPLOYMENT
Empirical Evidences from Pakistan

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Abstract. This study analyzes the determinants of unemployment in Pakistan over a period of 1976-2012 by examining the empirical relationship among the unemployment, population, foreign direct investment, gross domestic product, inflation, and external debt. It is hypothesized that these factors exert a strong impact on unemployment rate in the economy of Pakistan. Autoregressive Distributed Lag (ARDL) approach has been applied to test determinants of unemployment. Empirical results reveal that gross domestic product, population, inflation, and foreign direct investment are significant determinants of unemployment in Pakistan in short-run as well as long-run. The CUSUM and CUSUMSQ are showing that the model is structurally stable within the 5% of critical bounds. The Phillips curve exists in Pakistan both in short- and long-run.

Keywords: Unemployment, ARDL, Population, Gross domestic product, Foreign direct investment

JEL classification: C12, E01, E24, E31

I. INTRODUCTION

In general, the word 'employment' means working of different individuals in order to earn some wages which are used to meet their daily needs. On the

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other hand, before employment, unemployment is a stage during which individuals actively work in search of jobs and mentally prepare themselves to work at any level of wage which already exists in the competitive market. Based on the need and importance of the subject matter, it has various issues. Firstly, the international conference of labour statisticians (1954) provides a very restrictive standard definition about unemployment that was not applicable in developing countries since it has some controversial issues regarding the nature of unemployment. Secondly, with the relaxing the "*conventional means of criterion of seeking work*" and more coverage of unemployment has become possible. Based on that, it is argued that in the absence of any standard definition of unemployment, which would remove measurement problems, the statistical records of unemployment in various developing countries are still related to only visible unemployment which are allied to formal sector of higher opportunities and urban areas.

Like many other developing countries, due to lack of absorption capacity, unemployment has been one of the major problems. The high unemployment rate in South Asian countries is one of the most important issues that distinguish them from those of the developed countries. The excessive rate of unemployment negatively impacts on economy which causes unstable economic conditions. This is troublesome because when workers are unemployed, there is an under-utilization of resources. So the total production of a country is less than its potential level of output because resources are not fully utilized in these countries.

The focus of every government must be to create employment opportunities through various productive activities by using all available factors of production. High population is associated with alarming issue in developing countries including Pakistan. A rapid increase in population raises many socio-economic problems in the economy. It not only increases unemployment, but also accumulates the backlog of unemployment. If people cannot find jobs in their home country, they may be tempted to relocate to another country for getting jobs. This can be dangerous for the future of a nation, particularly if other nations are attracting its brain drain. Therefore, if this problem continuously persists in any economy, it could be a major factor in deteriorating the economic growth. Additionally, persistent unemployment not only affects the status of a nation in comparison to other nations, but it also leads to cruel home country problems. Long-term unemployment always results in creating financial hardships, poverty, homelessness, crime, frustration and many other problems like breakdown and family tension, social isolation, loss of confidence and self-esteem. All these lead to the erosion of a healthy society.

The unemployment rate in Pakistan was 5.7 percent in 1990s on the average which increased to 6.80 percent in 2000s on the average. The unemployment rate remained at 6 percent in last three years. The unemployment rose in the last decades of 1990s due to low economic growth as well as the result of fiscal tightening in Pakistan. Global recession, law and order situation, energy crisis and other macroeconomic variables are also responsible for high and persistent unemployment rate in 2000s. The privatization and restructuring of public sector enterprises carried out under the WB/IMF structural adjustment programmes resulted in layoffs of extra stop furniture and enhancing the situation of unemployment in period of depressed economic growth in Pakistan. The focus of this study is to explore and highlight various aspects and issues which are responsible for creation of unemployment in Pakistan.

The on determinants of unemployment shows that there are internal and external factors that determine unemployment. The internal forces are labour market fundamentals affecting labour supply and demand. These include workers and trade unions preferences, bargaining powers, firms, technology and market power. The external forces are macroeconomic policies and institutional changes related to fiscal and monetary policies and goods market. A number of the studies have been conducted so far to access the determinants of unemployment. Kalim (2003) worked on determinants of unemployment in Pakistan. She considered population and gross domestic product as determinants of unemployment She analyzed the statistical relationship between unemployment, population and GDP using dataset for 13 years from 1986-1999. It has been found that both GDP and population are major contributors to unemployment in the economy. Akhtar and Shahnaz (2005) examined the determinants of youth unemployment. They used the data from 1991-2004. The results reveal that the growth rate of GDP, growth rate of services sector and private sector investment have greater impact than the public sector investment to reduce youth unemployment. These studies have not incorporated key macroeconomic variables in model that may be responsible for change in unemployment. So it is important to identify the variables that are responsible for unemployment. This study incorporate population, gross domestic product, private investment, foreign direct investment, and external debt as determinants of unemployment and extend the time span of analysis using dataset from 1976 to 2012. The present study also examines the existence of the Phillips curve in Pakistan.

After a brief introduction in previous section, section II reviews existing literature. Section III describes empirical methodology and data description

and section IV elaborates the empirical results. Finally, conclusion and policy recommendations are presented in section V.

II. REVIEW OF LITERATURE

Since unemployment has become an important issue in Pakistan, which directly or indirectly creates economic problems. If, however, resources are properly utilized in Pakistan, this issue can be eradicated. A lot of literature is available on the subject matter, highlighting various causes and consequences regarding increasing rate of unemployment. Many studies investigated determinants of unemployment. Some studies used Microeconomic prospective and others used Macroeconomic factors of unemployment. These studies worked on developed, underdeveloped and developing countries. Different theoretical models are used for assessing the determinants of unemployment. The job search model was presented by Mortensen (1970) and Lippman and McCall (1976). According to this model, the unemployment depends on job offer and job acceptance. The job offer depends on skills of labour, education, work experience and the demand condition of local area.

Acero (1993) suggested some factors of unemployment. She stated that many elements could not be pointed out by a neoclassical perspective. Some of these factors are related to actual job search. She said that the job market keeps on changing itself as workers change job. But when these changes take a long time due to the heterogeneity of work force and the job opportunities, lack of perfect information or the cost of training, we have to face problems. When we leave people unemployed for a long time, it also creates problems. Other factors are wage rigidity, the influence of labour union and labour legislation.

Assaad *et al*. (2000) empirically examined various determinants of unemployment in Egypt. The labour market of Egypt is starving from a span of high overall unemployment, where unemployment is flourishing with constant rate. Analysis reveals that the educated female sector is being affected than that of male counterparts by the transition to a private sector economy. The female have some problem to enter in the job market, especially in private sector. They suggest that there is good policy atmosphere that is appropriate for labour-intensive techniques, experts oriented industries would help to absorb the new applicants into the labour market.

Kalim (2003) worked on determinants of unemployment in Pakistan. She analyzes the statistical relationship between unemployment, population

growth and real growth rate of GDP. There is a positive relationship between unemployment and population and an inverse relationship between unemployment and GDP over a period of 1986-1999. A simple regression is used to find out the results. She concluded that population growth rate in Pakistan is extremely high as compared to other developing countries. On the employment front, it has been found that a large number of labour force remain unemployed. Both GDP and population are major contributors to unemployment in the economy.

Echebiri (2005) worked on determinants of unemployment in Umuahia and Nigeria. Umuahia has a faster population growth rate so most of labour force is not employed. The sample of 220 youths was drawn from areas with varying residential configurations and found that youth unemployment in the town shared common characteristics with that studied in many other cities in the developing world. Education and job preference have a direct relation with unemployment. It was particularly found that majority of the unemployed and first time job seekers preferred salaried employment to self-employment. The youths showed that they dislike the rural residency because there is lack of employment opportunities and poor social and physical infrastructures.

Akhtar and Shahnaz (2005) also examined the determinants of youth unemployment using data from 1991 to 2004. In 1990 there is high unemployment due to low GDP and investment. They worked on both micro and macro determinants of youth unemployment issues in Pakistan. First, unemployment of youth only begins to decrease if the annual growth rate of GDP is greater than 4.25 percent per year. Second, the growth rate of services sector GDP has greater impact on decreasing female unemployment. Third, the private sector investment has greater impact than public sector investment to reduce youth unemployment. Household micro level data showed that skill acquisition and vocational training have no impact on employment.

Schoeman *et al.* (2008) reviewed the determinants of unemployment in South Africa. They used the macro economic variables, real exchange rate and unionsation as a percentage of formal employment, crude oil prices, capital stock and banker's acceptance rate. The results showed that there is an inverse relationship between investment and unemployment and the positive relation between unemployment and unionsation, crude oil prices, appreciation of real exchange rate and strict monetary policy.

Eita and Ashipala (2010) worked on determinants of unemployment in Namibia for the period of 1971-2007.They used macro economic variables

for unemployment model. They used Engle and Granger approach to estimate the model. The results showed that there is negative relationship between inflation and unemployment, positive between wage rate and unemployment and negative between investment and unemployment. The Philips curve held in Namibia. Kingdon and Knight (2001) worked on unemployment by using probit model for South Africa. Garcia (2004) reviewed on causes of unemployment in Spain. Valadkhani (2003) worked on unemployment in Iran. Monastiriotis (2006) worked on unemployment by using macroeconomic variables in UK. He used Keynesian and monetarist approach of unemployment. Kwabena (2011) reviewed determinants of unemployment in Limpopo.

We have reviewed different studies about determinants of unemployment. These studies have not considered the important macroeconomic variables which may influence unemployment rate. Kalim (2003) considers only two variables like population and GDP as determinants of unemployment in her analysis for Pakistan economy. For comprehensive analysis, this study incorporates foreign direct investment, external debt, population, inflation and GDP as determinants, which may contribute unemployment rate in Pakistan and uses a large dataset.

III. EMPIRICAL METHODOLOGY AND DATA DESCRIPTION

There are various techniques for conducting the cointegration analysis among variables. The approaches are: the residual based approach proposed by Engle and Granger (1987) and the maximum likelihood-based approach proposed by Johansen and Julius (1990) and Johansen (1992). When there are more than two I(1) variables in the system, the maximum likelihood approach of Johansen and Julius has the advantage over residual-based approach of Engle and Granger; both of the approaches require that the variables have the same order of integration. Autoregressive Distributed Lag (ARDL) for cointegration test has certain advantages over Johansen. This methodology does not require the classification of variables into I(0) or I(1). This study used ARDL approach to analyze cointegration among variables that was proposed by Pesaran and Shin (1999).

A simple model is used to examine the variations in unemployment rate in Pakistan. There are number of factors which influence the unemployment rate. The functional form of the model is as:

$$UN = f(GDP, POP, FDI, PINV, EXD)$$

Where

UN = Unemployment in millions

POP = Population in millions

GDP = Real Gross domestic product in US dollars (millions)

FDI = Foreign direct investment in US dollars (millions)

EXD = External debt in US dollars (millions)

PINV = Private investment in US dollars (millions)

Unemployment: The dependent variable is unemployment which is derived from labour force minus employed persons. Unemployment occurs when a person is able and willing to work but is currently without work.

Population: Population means total persons of the country. Population increase leads to increase in unemployment.

Gross Domestic Product: The total market value of all final goods and services produced annually within the boundaries of a country. The study assumes that there may negative relationship between GDP and unemployment.

Foreign Direct Investment: Foreign direct investment (FDI) in its classic form is defined as a company from one country making a physical investment into building a factory in another country. It is the establishment of an enterprise by a foreigner. The study supposes that FDI has a negative relationship with unemployment.

External Debt: External debt is that part of the total debt in a country that is owed to foreign citizens, firms and institutions. The debt includes money owed to private commercial banks, other governments, or international financial institutions such as the IMF and World Bank. External Debt leads to decrease in unemployment.

Private Investment: A private investment capital subscription, commonly referred to as PICS, is a financial tool that relies on a small pool of investors' money for real estate investments. The money managers of private investment capital subscriptions or PICS are experienced real estate investment experts, who also invest in related real estate products such as tax lien certificates, foreclosures, notes, as well as development projects on behalf of their subscribers and themselves. Private Investment leads to decrease in unemployment.

The ARDL approach to cointegration involves estimating the unrestricted error correction model version of the ARDL model for unemployment and its determinants:

$$\Delta \ln UN_t = \beta_0 + \Sigma \psi_i \Delta \ln UN_{t-1} + \Sigma \beta_i \Delta \ln POP_{t-i} + \Sigma \lambda_i \Delta \ln GDP_{t-i} + \Sigma \delta_i \Delta \ln FDI_{t-i} + \Sigma \varphi_i \Delta \ln EXD_{t-i} + \Sigma \eta_i \Delta \ln CPI_{t-i} + \alpha_1 \ln UN_{t-1} + \alpha_2 \ln POP_{t-i} + \alpha_3 \ln GDP_{t-i} + \alpha_4 \ln FDI_{t-i} + \alpha_5 \ln EXD_{t-i} + \alpha_6 \ln CPI_{t-i} + \mu_t$$

The null hypothesis that there is no cointegration is defined as:

$$H_0: \ \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = 0$$

against its alternative,

$$H_1: \ \alpha_1 \neq 0, \ \alpha_2 \neq 0, \ \alpha_3 \neq 0, \ \alpha_4 \neq 0, \ \alpha_5 \neq 0, \ \alpha_6 \neq 0$$

by computing F-statistic.

The error correction equation is used to find the adjustment speed to the equilibrium in the third stage. The ECM equation is as follows:

$$\Delta \ln UN_t = \beta_0 + \Sigma \beta_i \Delta \ln POP_{t-i} + \Sigma \lambda_i \Delta \ln GDP_{t-i} + \Sigma \delta_i \Delta \ln FDI_{t-i} + \Sigma \varphi_i \Delta \ln EXD_{t-i} + \Sigma \eta_i \Delta \ln CPI_{t-i} + ECM_{t-1} + \mu_t$$

Inflation, external debt, foreign direct investment and GDP are likely to have inverse impact on unemployment, so the values of the coefficients λ, φ, δ and η are expected to be negative $\lambda < 0$, $\varphi < 0$, $\delta < 0$ and $\eta < 0$.Population is expected to have a positive relation with unemployment so $\beta > 0$.

DATA SOURCES

The data sources used for the study are *International Financial Statistics* and *Government Finance Statistics Yearbook* published by International Monitory Fund (various issues and CDs), *World Development Indicators* published by World Bank and *Annual Report* published by State Bank of Pakistan. The time span to be covered in the study is 1976-2012.

IV. EMPIRICAL RESULTS

Table 1 shows the order of integration of the variables. We have applied unit root test to examine the order of integration. The ADF test has been used under the assumption of constant and trend.

Results show that the unemployment series are not stationary at level but the first differences of the series are stationary. This type of testing is useful

to avoid the chances of spurious regression as Quattara (2004) and shows that the bound testing is depending on the assumption of I(0) and I(1).[1] When we have some variables that I(2) then the F-statistic explained by Pesaran *et al.* (2001) is unacceptable. AIC is used to find optimum lag length. We have taken the optimal lag length as 1.

TABLE 1

Unit Root Analysis

	ADF (at level)	ADF (at 1st difference)
ln *UN*	–1.438	–7.1660
ln *POP*	–2.969	–2.3313
ln *GDP*	–0.156	–4.4944
ln *EXD*	–5.617	–9.1713
ln *CPI*	–2.4638	–6.3824
ln *FDI*	–0.889	–3.9075
1% Critical Value	–3.6267	–3.6329
5% Critical Value	–2.9458	–2.9484
10% Critical Value	–2.6115	–2.6128

In Table 2, the calculated F-statistic = 8.45 is higher than the upper bound critical value at 5% level of significance (7.30) by unrestricted intercept and no trend for the model. We reject the null hypothesis of no long-run relationship at 5% significance level. So, there exist a cointergration among the variables. Table 3 shows the results of ARDL Model based on Akaike Information Criterion.

[1] I(1) and I(0) represent the integration process of order 1 and 0 respectively. Pesaran and Pesaran (1997) explains that the residual-based cointegration are inefficient and can lead to contradictory results, especially when there are more than two I(1) variables under consideration.

TABLE 2

Bound Testing for Cointegration

Dependent variable			F-statistic		
Unemployment			8.45*		0.0001
Critical Value	Pesaran *et al.* (2001)**		Narayan (2005)***		
	Lower Bound Value	Upper Bound Value	Lower Bound Value	Upper Bound Value	
1%	8.74	9.63	10.150	11.230	
5%	6.56	7.30	7.080	7.910	
10%	5.59	6.26	5.915	6.630	

* Significant at 5% level of significance from to Pesaran *et al.* (2001); ** Critical values are obtained from Pesaran *et al.* (2001), Table CI (V): Unrestricted Intercept and Unrestricted Trend; *** Critical values are obtained from Narayan (2005), Table CI (V): Unrestricted Intercept and Unrestricted Trend.

TABLE 3

ARDL Based on AIC

Regressors	Coefficient	S. Error	T Ratio	Prob.
ln *UN*(–1)	0.56297	0.13223	4.25	0.000
ln *POP*	2.9199	1.22	2.38	0.024
ln *GDP*	–0.73308	0.338	–2.165	0.038
ln *FDI*	–0.0692	0.03443	–2.0103	0.030
ln *EXD*	–0.2342	0.3703	–0.6325	0.532
ln *CPI*	–0.1708	0.0633	–2.69	0.011
C	-6.6533	2.2620	–2.9413	0.006
R^2	0.92	Adjusted R^2		0.9058
AIC	6.8613	SBC		1.22
F-statistic	58.74			
Prob (F-statistic)	0.000			
DW Statistic	2.13			

Table 4 shows that many econometric problems like autocorrelation, heteroscedasticity and conflict to normal distribution has not been found. In the same way, no model specification error exists with reference to functional form. Results reveal that external debt and private sector investment are not statistically significant while population, foreign direct investment and gross domestic production have significant impact on unemployment.

TABLE 4

The Diagnostic Tests

Item	Test Applied	CHSQ (χ^2)	Prob.
Serial Correlation	Lagrange Multiplier Test	.43805	0.507
Normality	Test of Skew ness and Kurtosis	7.68	0.203
Functional Form	Ramsey's reset test	1.1954	0.274
Heteroscedasticity	White Test	3.16	0.075

An analysis of Table 3 indicates that macroeconomic variables significantly explain unemployment. The value of $\overline{R}^2$ is 0.9058 that shows that 90% variation in the dependent variable is due to the independent variables. The value of F statistic is also significant at 5% level of significance, which shows the model is good fit as a whole.

TABLE 5

Estimated Long-Run Coefficients for selected ARDL Model

Regressors	Coefficient	S. Error	T Ratio	Prob.
ln *POP*	6.6812	2.4586	2.7174	0.011
ln *GDP*	–1.6774	0.8501	–1.97	0.05
ln *FDI*	–0.091	0.0399	–2.3000	0.030
ln *EXD*	–0.5359	0.8067	–0.6644	0.512
ln *CPI*	–0.345	0.1222	–2.8279	0.008
C	–15.22	4.09	–3.71	.001

Table 5 shows the results of long-run coefficients under ARDL method. Results reveal that external debt is not statistically significant while population, gross domestic product, inflation and foreign direct investment have significant and long-run effect on unemployment.

According to economic theory gross domestic product is negatively related to unemployment which is logical as rise in GDP will lead to decrease in unemployment. The relationship is significant too. FDI is significantly related to unemployment. A increase in FDI leads to decrease in unemployment. Population growth has a positive effect on unemployment that is in line with results drawn by Kalim (2003).

External debt is not reducing unemployment. The government of Pakistan got loans from World Bank and IMF since 1947. These loans were not utilized appropriately. The current external debt of Pakistan is more than $ 50 billion. The government of Pakistan allocates a huge amount for debt servicing. So there is unemployment primarily due to fewer resources for the development projects. There exists inverse and significant relationship between unemployment and inflation both in short- and long-run. A one percent rise in inflation leads to 0.34 percent decrease unemployment. This situation shows the existence of Phillips curve both in short- and long-run for Pakistan. The existence of Philips curve in Pakistan has already been proved by Qazi *et al.* (2010), Khalid *et al.* (2011), Sagar *et al.* (2012) and Hamid *et al.* (2012).

TABLE 6

Error Correction Representation for the Selected ARDL Model

Regressors	Coefficient	S. Error	T Ratio	Prob.
Δ ln *POP*	2.9199	1.2244	2.3846	0.024
Δ ln *GDP*	–0.7303	0.3384	–2.1658	0.038
Δ ln *FDI*	–0.0692	0.0344	–2.0103	0.030
Δ ln *EXD*	–0.2342	0.3703	–0.6325	0.532
Δ ln *CPI*	–0.1708	0.0633	–2-69	0.011
$ECM_{(-1)}$	–0.43703	0.1322	–3.30	0.002
R^2	0.3593	Adjusted R^2		0.2312
AIC	6.86	SBC		1.2231
F-statistic	2.805			
F-significance	0.027			
DW-statistic	2.13			

Error correction representation of above long-run relationship is shown in Table 6 which captures the short-run dynamics of relationship among

macro-economic variables and unemployment. The error correction model depends upon ARDL method establishes that changes in population, foreign direct investment, inflation, gross domestic production are statistically significant, while changes in external debt have no significant short term effect.

$$ECM = \ln UN - 6.6812 * \ln POP + 1.6774 * \ln GDP + 0.0919 * \ln FDI + 0.5359 * \ln EXD + 0.34 * \ln CPI + 15.2239c$$

According to the results, the short-term elasticities of population, gross domestic product, inflation and foreign direct investment are 2.9199, –0.7330, –0.1708 and –0.069217 respectively. The short-run elasticities are smaller than the long-run elasticites. The $ECM_{(-1)}$ is the lag value of one period of error terms that find out from the long-run relationship. The value of ECM shows that the disequilibrium of short-run will be fixed long period of time. The $ECM_{(-1)}$ has a negative value and it is statistically significant. The value of ECM term shows that the process of adjustment is not quick and 43% of the last year disequilibrium in unemployment from its equilibrium path will be corrected in present year.

Figures 1 and 2 are showing the cumulative sum of recursive residuals the cumulative sum of squares of recursive residuals respectively. Both CUSUM and CUSUMSQ are within critical bounds of 5%, so it reveals that the model is structurally stable.

FIGURE 1

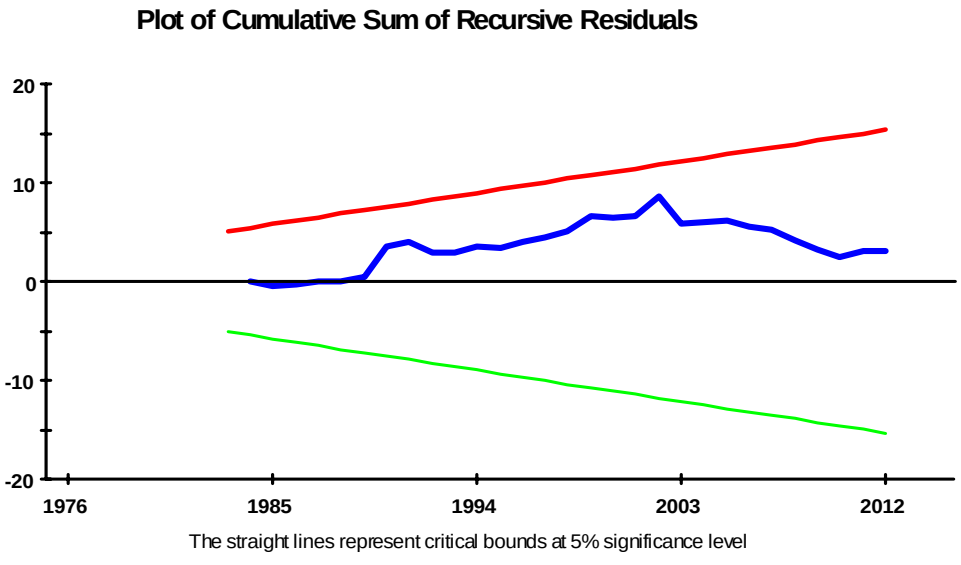
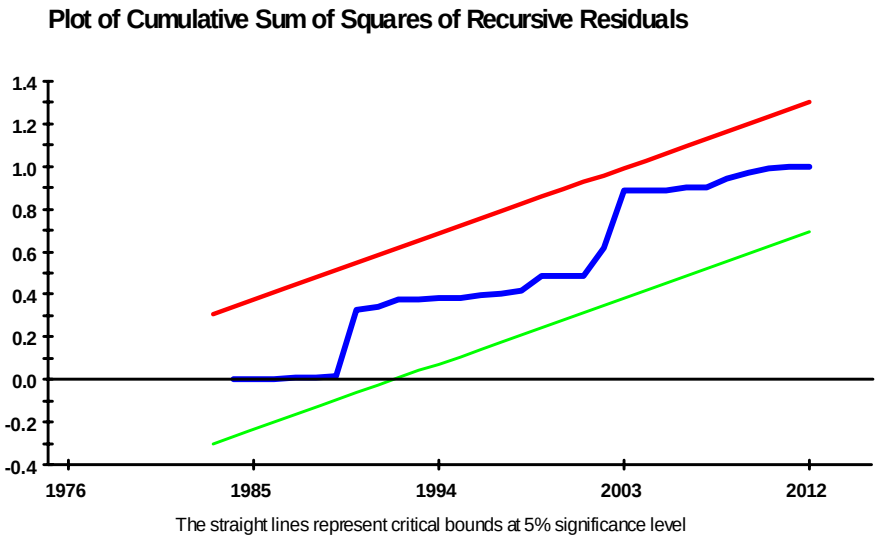


FIGURE 2



VI. CONCLUSION

The objective of this study is to explore the determinants of unemployment in Pakistan. The study examines the relationship among the population, foreign direct investment, gross domestic product, inflation, external debt and unemployment. It is hypothesized that these factors exert a strong impact on unemployment in the economy of Pakistan over a period of 1976-2012. Autoregressive Distributive lag approach has been applied as it yields consistent estimates of the long term relationship that are asymptotically normal irrespective of whether the underlying repressors are I(0) or I(1).

Results reveal that population; gross domestic product, inflation and foreign direct investment have significant long-run effect on unemployment. There exists inverse and significant relationship between unemployment and inflation both in short- and long-run. A one percent rise in inflation causes unemployment decrease by 0.34 percent. This situation shows the existence of Phillips curve both in the short and long-run for Pakistan. The $ECM_{(-1)}$ is the lag value of one period of error terms that find out from the long-run relationship. The value of ECM shows that the disequilibrium of short-run will be fixed long period of time. The $ECM_{(-1)}$ has a negative value and it is statistically significant. The value of ECM term shows that the process of adjustment is not quick and 43% of the last year disequilibrium in unemployment from its equilibrium path will be corrected in present year.

CUSUM and CUSUMSQ plots is showing that the model is structurally stability within the 5% critical bound.

The focus of policy should be to attract local investment which would attract FDI to follow. Improving the local environmental conditions so that the quality of local products may be improved not only for local consumption but also for exports that will result in improving investment in other sectors subordinates to those ones, *e.g.* agriculture sector helps to improve the agro-industrial sector because it provides raw material to industry. It is important to provide the local producers with incentives and technical know-how on the one hand, and provide the private investors with government guarantee that their investment is in good hands. The government should control population growth and use debt for productive purpose. It is need of the day to improve the Law and order condition and to control the corruption to enhance the local as well as foreign investment to reduce the unemployment.

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