

# Long Term Effect of Economic Growth on Unemployment Level: In Case of Pakistan

*Shujaat Abbas<sup>1</sup>*

## ABSTRACT

This study investigates the long term impact of economic growth on unemployment of Pakistan, from 1990 to 2006, using ARDL bounds testing approach to cointegration. The estimated result shows the existence of significant long run negative effect of economic growth on unemployment levels, whereas, in short run no relationship is observed. A one percent increase in economic growth is associated with reduction in the unemployment level by 1.665 percent in the long run. The coefficient of short run parameters is insignificant. The ECM term shows high speed of adjustment as 83 percent short run disequilibrium adjusts in a year. Pakistan should attempt to increase its economic growth, which will reduce its unemployment in the long run.

**Key word:** Unemployment, Economic Growth, Okuns' Law, ARDL approach to cointegration, Pakistan

*JEL classification codes:* E24, E23, C22

## 1. INTRODUCTION

Unemployment is one of the gravest problems faced by world economies, both developed and developing countries are facing it with slight difference in its nature and intensity. The recent economic meltdown in developed economies (European crises) results in significant increase in unemployment level. Economists are persistently facing this problem since the great depression of 1930s. The early classical and neoclassical economist considers imperfection in labour market responsible for unemployment. They argued in favour of flexibility of real wages for the solution of this grave economic curse<sup>2</sup>. The Keynesian economists gave greater role to effective demand for economic growth and the level of unemployment. They argue infavor of higher economic growth to control the problem of unemployment. Arthur Okun (1962) investigated the relationship between unemployment and economic growth, and observe that level of unemployment is negatively related to real growth in output level. He argues in favour of output expansion policies for the reduction of unemployment and poverty level<sup>3</sup>.

Pakistan is home of 176.2 million people with 57.8 million active work force, among which 3.44 million workforce are unemployed (Govt. of Pakistan, 2011). The economic growth pattern shows persistently showing a decreasing trend. The figure in Appendix 1 shows the stable, long run relationship between unemployment and economic growth of Pakistan as unemployment decrease when growth increases and increase when growth distort. Previously, several economists attempted to investigate the relationship between economic growth and unemployment level of Pakistan. The outcome of these studies created ambiguities as few economists found stable, long run relationship (Hussain and Iqbal, 2010) whereas others failed to validate (Ahmed et al, 2011).

The present study aim to re investigates whether there is a significant long run relationship between economic growth and the level of unemployment level in Pakistan. ARDL bounds testing approach proposed by Pesaran et al. (2001) is used to determine short and long run impact of economic growth on unemployment for the period of 1990 to 2009.

The rest of this study is organized as follows: After introduction in section 1, section 2 reviews some empirical literature on unemployment and economic growth. Section 3 presents Methodology and data. Section 4 discusses empirical results obtained from estimation of the model, whereas section 5 conclude the study with policy recommendations.

## 2. LITERATURE REVIEW

The effect of economic growth on the level of employment and poverty reduction has been a topic of interest for economic research for decades. The problem of unemployment remains a major problem for economist to handle.

---

<sup>1</sup> PhD student, Department of Economics, University of Karachi, 75270 Karachi Pakistan, [shujaat.abbass@gmail.com](mailto:shujaat.abbass@gmail.com)

Author is thankful to **Dr. Abdul Waheed**, for his comments and suggestions, Latif Ibrahim Jamal (LEJ) National Science Information Center, University of Karachi, for providing excellent research facilities and two anonymous referees for their suggestions and recommendations.

<sup>2</sup> The classical theory of labor market is based on marginal productivity of resource price, the flexibility of real wages determine level of full employment. The real wages are flexible only in upward direction. The rigidity of real wages on downward direction results in unemployment level. See Farsio and Quade (2003) for detail study.

<sup>3</sup> See, Bin-Obaid (1997) for details discussion on classical, Keynesian and Monetarist theories of unemployment

The aim of every economy is to achieve higher economic growth rate to reduce its level of unemployment level. Arthur Okun (1962) investigated the relationship between unemployment and economic growth of USA and observes significant negative long run relationship. He argued in favour of the increase in output level for achievement of full employment level (see, Prachowney, 1993). This law is severally investigated to test causal long run link between output growth and level of unemployment in cross country studies. The outcome of these studies shows mix response.

Seyfried (2005) investigates the relationship between economic growth and employment level for ten selected, developed economies for the period of 1990 to 2003. His results conform significant negative relationship between economic growth and unemployment level of selected developed economies. He found that the unemployment level reduces from 0.30 to 0.61 percent as a result of one percent increase in economic growth. Noor et al., (2007) investigated the impact of economic growth on the unemployment level of Bangladesh, for the period of 1970 to 2004, using ordinary least squares. His estimated result shows significant negative impact of economic growth on the level of unemployment. Eita and Ashipala (2010) investigated causes of unemployment in Namibia, for the period of 1971 to 2007, using Engle-Granger two step estimation techniques. Their estimated results conform significant negative effect of economic growth on unemployment of Namibia. The above empirical studies conformed significant negative impact of unemployment on economic growth. Various other studies investigated the impact of economic growth on unemployment levels and failed to validate negative relationship.

Moosa (2008) investigated validity of Okuns' negative long run impact of unemployment and output growth for selected Arab countries using traditional approaches to cointegration. He failed to validate the significant long run relationship between unemployment and economic growth. Kreishan (2011) determines the relationship between unemployment and growth of Jordan from 1970 to 2008, using Johansen and Juselius (1990) approach to cointegration and ordinary least square estimation technique. The estimation result of this study failed to determine the significant long run relationship between economic growth and unemployment level. Hussain, at al. (2010) examine relationship between growth and unemployment in Pakistan from 1972 to 2006 using Johansen cointegration and VECM. Their results conform long run and the short run equilibrium relationship between unemployment and economic growth. Similarly, Ahmed at al. (2011) investigates the equilibrium relationship between economic growth and unemployment in Pakistan from 1974 to 2009 using ordinary least square estimation technique. Their results failed to determine any relationship between economic growth and unemployment level.

The review of above empirical studies, based on traditional estimation techniques of cointegration, shows mix impacts of economic growth on unemployment levels. The present study, therefore aims to investigate long term relationship using an advance approach to cointegration, proposed by Pesaran et al (2001), known as Auto regressive distributed lag (ARDL) bounds testing approach.

### 3. METHODOLOGY AND DATA

This study investigated the long term effect of economic growth on the level of unemployment in Pakistan using annual time series data for 1990 to 2009. The basic regression equation between unemployment and economic growth is presented as follows:

$$Um_t = \beta_0 + \beta_1 GDP_t + \mu_t \quad (1)$$

Where: Um is unemployment in millions, GDP presents economic growth, whereas  $\mu$  is the error term.

The time series data have a non sationarity issue and regression analysis of two non stationary time series may results spurious results. If regression of two non stationary time series results in stationary residual then both time series are said to be cointegrated (having a long run relationship). This study used unit root test proposed by Dickey & Fuller (1979) and Phillips & Perron (1988) to check the stationarity issue. Result in table 3.1 shows that both the variables are integrated at I (1) i.e. non stationary at level and become stationary at first difference.

**Table3.1: Results of order of integration**

Variable	ADF		PP	
	Level	1st difference	Level	1st difference
LGDP	-2.78	-5.52**	-2.78	-5.75**
UEMP	-2.708	-6.37*	-2.708	-9.46*

\* and \*\* present significance at 5 and 10 percent respectively

Source: Authors' estimation

There are various methods of cointegration i.e. Engle and Granger (1987) and Johansen and Juselius (1990) approach to cointegration. These traditional approaches results inconsistent estimates if sample size is small (Johansen and Juselius, 1990). The sample size of present study is small, due to lack of unemployment data prior

to 1990s. Pesaran et al. (2001) proposed more efficient approach to cointegration which provides efficient estimates if sample size is small widely known as Auto regressive distributed lag ARDL bounds testing approach to cointegration.

The ARDL bounds testing approach to cointegration proposed by Pesaran et al. (2001) has several advantages over traditional methods of Co integrations i.e. 1- It does not require a unique order of integration for estimation of cointegration<sup>1</sup> and 2<sup>nd</sup> it provides efficient and consistent estimator if sample size is small<sup>2</sup>.

This approach to cointegration comprise of two steps. In first step long run relationship is investigated using extreme values of bounds test<sup>3</sup>, whereas, in second step short and long run elasticity's are estimated using ARDL model. The error correction version of ARDL bound testing approach is presented as follows:

$$\Delta Um_t = \beta_1 + \sum_{i=0}^n \beta_2 \Delta Um_{t-1} + \sum_{i=0}^n \beta_3 \Delta GDP_{t-1} + \delta_1 Um_{t-1} + \delta_2 lGDP_{t-1} + ECM_{t-1} + \mu_t \quad (2)$$

Where:  $\Delta$  is difference operator and ECM is an error correction model

The optimal lag length is selected based on minimum Akaike's Information Criterion (AIC). In first step, null hypothesis of no cointegration that is  $\delta_1 = \delta_2 = 0$  is tested against althe alternative hypothesisf co-integration  $\delta_1 \neq \delta_2 \neq 0$ . Calculated F-statistic values are compared with critical bounds values provided by Pesaran et al (2001) for determination of the long run relationship. There are two sets of critical values: the lower bound which assumes I (0) and upper bounds assuming I (1).

If the calculated value of F-statistics are greater than upper-critical bound values, we reject the null hypothesis of no cointegration in favour of alternative hypotheses of cointegration. If the calculated value of the F - statistic is smaller than the lower critical bound value than we accept the null hypothesis of no cointegration. If values of the calculated F - statistic lies within upper and lower critical bound values than we neither reject nor accept the null hypothesis.

The Annual time series data on unemployment in the millions are collected from various issues of Pakistan statistical yearbooks published by the government of Pakistan. The annual data of GDP in million of constant 2000-01 US\$ is taken from world development indicator (2011) published by 'The World Bank', and growth rate is determined from obtained data.

#### 4. RESULTS

The result of the ARDL bound testing approach for a long run relationship is presented in table 4.1 below. The estimated result validates the existence of the long run relationship between unemployment and GDP growth in case of Pakistan.

**Table 4.1: Result of Bounds Test for Long Run Relationship**

F-Statistics	Lower Bound I(0)	Upper Bound I(1)	Decision
$\rho = 2$ 4.871*	3.79	4.85	Reject Null

\* Significant at 5 Percent

The computed F-statistic is greater than upper bounds, limit values at 5 percent significant levels, which leads to rejection of the null hypothesis of no co-integration.

The long run Okun's coefficients are determined by ARDL (1, 1) bounds testing approach to cointegration is presented as follows

$$Um = \frac{22.436}{[0.019]} - \frac{1.665GDP}{[0.02]} + \omega$$

The value in parenthesis presents the corresponding probability value of estimates.

The long run income elasticity is negative (1.665) and is significant at 5 percent, it means that in the long run one percent increase in economic growth is associated with reduction in unemployment by 1.665 percent.

The speed of adjustment of short run disequilibrium towards equilibrium is determined by Error Correction Model (ECM), which is presented in table 4.2 below along with short run estimates.

<sup>1</sup> Traditional co-integration approaches are only applicable if order of integration of all the variables is I (1). If any variable is integrated at I (0) we cannot use these approaches.

<sup>2</sup> For small sample size ARDL bounds test is most appropriate then traditional models like Engle and Granger test and Johansen test because it does not push short run dynamics to residual term

<sup>3</sup> If calculated F-statistic value lies within critical bound values, decision is made based on order of integration.

Table 4.2: Results of short run estimates and ECM

Explanatory Variables	Coefficients	T-Ratio (P-Value)
$\Delta LGDP$	3.009	1.37(0.0193)
$\Delta LGDP_{t-1}$	0.21	0.086(0.932)
$\Delta Um_{t-1}$	0.12	0.45(0.65)
ECM <sub>t-1</sub>	-0.83	-2.64 [0.0203]
<b>Diagnostic Test</b>	<b>Lm Version</b>	<b>F Version</b>
1 Serial Correlation	0.5369[0.599]	0.17[0.97]
2 Heteroskedasticity	1.579[0.238]	1.57[0.238]
3 Normality	5.20[0.141]	
R-Square	0.467	
F-Statistics	2.726[0.0702]	

Source: Authors' Estimation

The result of short run estimates shows that there is no significant impact of economic growth on unemployment level in Pakistan, as short run elasticities are showing insignificant impact. The error correction model (ECM) shows high rate of convergence toward equilibrium. The ECM value of 0.83 indicates that 83 percent of short run disequilibrium adjusts in a year.

The estimated model stability is checked through various diagnostic tests i.e. ARCH test to heteroskedasticity and Lagrange multiplier test for serial correlation in the model, Jarque-Bera test to check the normality of residuals. The result shows that residuals are normally distributed and there is no sign of heteroskedasticity and serial correlation in estimated model.

## 5. CONCLUSION

This study aims to investigate long term effects of economic growth on the unemployment level in Pakistan from 1990 to 2006, using ARDL bounds testing approach to cointegration. Previous empirical literature based on tradition estimation techniques concluded the mixed impact. Few studies conformed significant negative relationship between unemployment and economic growth, whereas, others failed to validate.

The present study using advance approach for cointegration proposed by peseran et al., (2001) estimated long term effect of economic growth on the level of unemployment. The estimated results of the present study conformed existence of stable, long run negative effect, whereas, in short run no relationship is observed. A one percent increase in economic growth is associated with reduction in the unemployment level by 1.665 percent in the long run. The ECM indicates high speed of adjustment of short run fluctuation as 83 percent short disequilibrium adjusts in a year.

The sluggish economic performance of Pakistan is responsible for high level of poverty and unemployment. Domestic production sectors are facing various macroeconomic challenges which distort its economic performance and it failed to create employment opportunities for increasing workforce. Attempts should be taken to make domestic environment, trade and investment friendly to increase domestic production level. The achievement of higher economic growth will address the cause of unemployment level in the long run.

## References:

- Ahmad, K., Khalil, S., & Saeed, A. D. Does There Exist Okun's Law in Pakistan? *International Journal of Humanities and Social Science*, 1 (12), 1-7.
- Bin-Obaid, A. S. (1997). Classical, Keynesian and Monetarist theories of unemployment: Arte they adequate to LCDs. *Journal of Economics and Administrative Sciences*, 13, 151-172.
- Christopoulos, D. (2004). the relationship between output and unemployment: Evidence from greek region. *Stid Regional Sciences*, 611-628.
- Dicky, D. A., & Fuller, W. A. (1997). Distribution of the Estimators for Autoregressive time seris with unit root. *Journal of American Statistics Association*, 74, 427-431.
- Eita, J. H., & Ashipala, J. M. (2010). Determinants of Unemployment in Namibia. *International Journal of Business and Management*, 5 (10), 1-13.
- Engle, R., & Granger, C. W. (1987). Cointegration and error-correction:Representation, estimation, and testing. *Econometrica*, 55, 251-276.
- Farsio, F., & Quade, S. (2003). An Emperical Analysis of relationship between GDP and Unemployment. *Homanomics*, 19, 1-6.
- Fischer, S. (1993). The role of macroeconomic factors in Economic Growth. *Journal of Monetary Economics*, 32, 485-512.
- Gilbert, R. D. (1973). Okun's Law: Some Additional Evidence. *Nebraska Journal of Economics and Business*, 12 (1), 51-60.

Govt of Pakistan, (2012). *Economic survey of Pakistan*. Ministry of Finance

Hussain, T., Siddiqi, M. W., & Iqbal, A. (2010). A Coherent Relationship between Economic Growth and Unemployment: An Empirical Evidence from Pakistan. *International Journal of Human and Social Sciences* , 1-8.

Johamen, S., & Jtiselius, K. (1990). Maximum Likelihood estimation and inference on cointegration- with application to the demand of money for. *Oxford Bulletin of Economics and Statistics* , 52 (2), 169-210.

Kreishan, F. M. (2011). Economic Growth and Unemployment: An Empirical Analysis. *Journal of Social Sciences* , 7 (2), 228-231.

Moosa, I. (2008). Economic Growth and Unemployment in Arab Countries: Is okun's law Valid? *International Conference on Unemployment crises in Arab Countries*.

Noor, Z. M., Nor, N. M., & Ghani, J. A. (2007). The Relationship between Output and Unemployment in Malaysia: Does Okun's Law exist? *Int. Journal of Economics and Management* , 1 (3), 337-344.

Okun, Arthur M. (1962) "Potential GNP: Its Measurement and Significance." In *Proceedings, Business and Economic Statistics Section of the American Statistical Association*, pp. 89-104

Pesaran, S., & Smith, P. (2001). "Bounds Testing Approaches to the Analysis of Level Relationships. *J. Appl. Econometrics* (16), 289-326.

Phillips, P. C. (1988). Testing for a unit root in time series regression. *Biometrika* , 75 (2), 335-46.

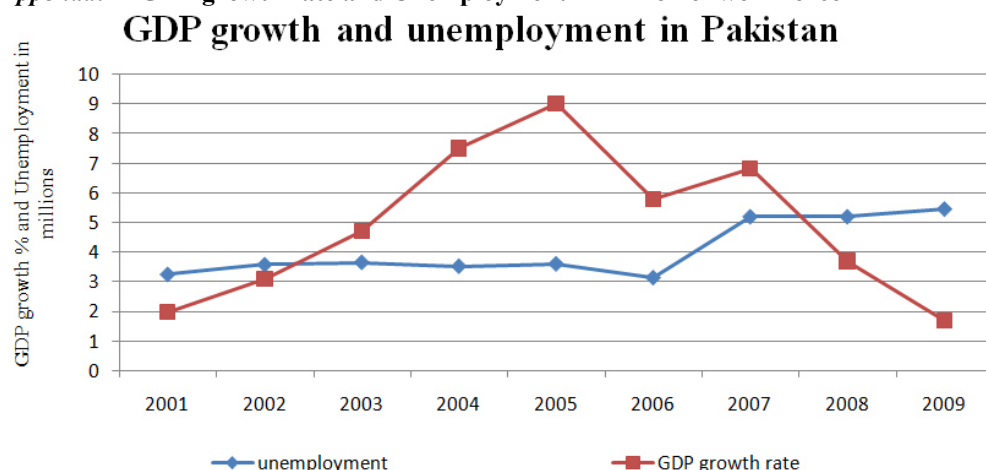
Prachowny, M. F. (1993). Okun's Law: Theoretical Foundations and Revised Estimates. *The Review of Economics and Statistics* , 75 (2), 331-336.

Rahman, M., Mustafa, M., Islam, A., & Guru-Gharana, K. K. (2006). Growth and Employment Empirics of Bangladesh. *The Journal of Developing Areas* , 41 (1), 99-114.

Seyfried, W. (2004). Examining the relationship between employment and economic growth in ten largest states. *Southwestern Economic Review* , 1-12.

World Development Indicator, (2012). The World Bank

**Appendix 1 GDP growth rate and Unemployment in million of work force**



Source: Authors' construction



The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:  
<http://www.iiste.org>

## CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

**Prospective authors of journals can find the submission instruction on the following page:** <http://www.iiste.org/journals/> All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

## MORE RESOURCES

Book publication information: <http://www.iiste.org/book/>

## IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digital Library, NewJour, Google Scholar

