International Journal of Business, Human and Social Sciences
ISSN: 2517-9411
Vol:4, No:3, 2010

A Coherent Relationship between Economic Growth and Unemployment: An Empirical Evidence from Pakistan

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***Abstract*—**The study is aimed to test causal relationship between growth and unemployment, using time series data for Pakistan from 1972 to 2006. Growth is considered to be a pathway to decrease the level of unemployment. Unemployment is a social and political issue. It is a phenomenon where human resources are wasted leading to deacceleration in growth. Johanson Cointegration shows that there is long run relationship between growth and unemployment. For short run dynamics and causality, the study utilizes Vector Error Correction Model (VECM). The results of VECM indicate that there is short and long run causal relation between growth and unemployment including capital, labor and human capital as explanatory variables.

***Keywords*—**Economic Growth, Unemployment, Cointegration and Causality.

I. Introduction

GROWTH is a matter of extreme importance for the countries of developed and developing world. Sustained growth with employment generating policies eventually trims down the critical problem of unemployment. Growth is an essential component for the progress and prosperity of mankind. Growth helps in upgrading the living standard of people. Developing economies want to achieve higher growth rate at an accelerated pace. Generally these economies are characterized by poor infrastructure, low literacy rate, lack of investment and unstable governments with major reliance on agriculture sector. In the initial theories of growth, unemployment was not given due importance.

In classical and neoclassical economics, unemployment is due to rigidities imposed on the labor market from the outside, such as wage laws, taxes, and other regulations that may be the reason of hiring of minimum workers. Keynesian economics focuses unemployment due to insufficient effective demand for goods and service in the economy.

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Blanchard [1] elaborated in conventional theories of growth and unemployment that neither unemployment influence growth nor that long run growth effects equilibrium unemployment. These thoughts were redefined in the theory of endogenous growth.

Romer [2] found that growth brought the inter-sector change, a change occurred within the sectoral structure of the economy. This change brought structural unemployment. Technological innovation changed the modes of production. Laborers are unemployed when new technological innovations are introduced. The structural change destroyed job in one firm and created in another [3]. High job turnover is the consequence of new techniques of production. Faster economic growth will create job destruction through skills obsolescence and new machines. Unemployment becomes consistent and critical matter.

It is caused by different factors. Pigou [4] elaborated that unemployment was not a sum of separate causes, but a system of interconnected factors jointly responsible for the whole of it. In developing countries unemployment is serious issue and caused by various reasons. Developing countries aimed to achieve high growth rate in minimum period. These countries benefited from the technological progress of western nations but adopted inappropriate policies for higher growth and unemployment is increased sharply.

Lin [5] found that developing countries adopted inappropriate capital intensive policies. This put firms in top priority sector, nonviable in competitive market. It became the main cause for policy distortion and failure in achieving high growth.

Like developing nations, Pakistan growth experience is somewhat similar with that of emerging economies. Amjad and Ahmad [6] found that at the time of independence in 1947, Pakistan had primarily agrarian economy, exporting prime commodities (mainly jute and cotton) and importing manufactured commodities (mainly consumer goods). The country was underdeveloped according to the classical meaning. Pakistan's economic performance since 1947 can be considered neither stable nor subtle. GDP is oscillating and staggering in the history of Pakistan. This course in growth of Pakistan's economic performance is due to the government's different unbalanced policies. Despite the several turn-around, Pakistan's economic performance is really inspiring in the

early decades. The performance of real GDP growth rates in percent is shown in the table I.

TABLE I
REAL GDP GROWTH RATES

Years	GDP Growth Rates	Years	GDP Growth Rates
1950s	3.4	2001	3.1
1960s	6.7	2002	4.7
1970s	5.0	2003	7.5
1980s	6.1	2004	9.0
1990s	4.6	2005	6.6
2000	2.0	2006	7.0

Sources: Economic Survey of Pakistan 2006-07 and Handbook of Statistics on Pakistan's Economy 2005, State Bank of Pakistan.

Pakistan's gross domestic product (GDP) increased well in the decades of 1960s and 1980s. Growth fell in 1990s and touched the lowest level in 2000. The performance of major sectors like agriculture and manufacture was very low and this made the problem of unemployment severe. Unemployment has been serious issue in the history of Pakistan. Pakistan mainly focused on production policy in all the decades of her life except 1970-77 eras. The job creation and distribution of income has been at the secondary preference of all policies.

Employment expansion interestingly chases a conflicting pattern, being at its highest at three per cent over the 1970s and fell to two per cent over the 1980s and the 1990s [7]. The serious situation of total labor force, employed and unemployed is shown in table II.

TABLE II
AVERAGE GROWTH RATE OF LABOR FORCE, EMPLOYED AND UNEMPLOYED (MILLION)

Decades	Labor force	Employed labor force	Unemployment
1970s	21.41	20.89	0.52
1980s	27.78	26.79	0.98
1990s	34.85	32.97	1.88
2006	44.63	41.2	3.41

Source: Hand Book of Statistics of Pakistan's Economy 2005

The increase in labour force is significant. Unemployment ratio was quite high in the years 2000-06. Section 2 presents literature review. Data sources and methodology are presented in Section 3. Section 4 presents empirical results of Growth and unemployment. Conclusion and policy implication is presented in Section 5.

I. LITERATURE REVIEW

There has been extensive literature on the issue of growth and unemployment. Kurz and Salavdori [8] exposited that Classical economists focused on the long period growth and paid a little attention to short period; Neoclassical economists also started with the same style but soon realized the problems and focused on inter-temporal analysis. Neoclassical economists focused on investment in physical and human capital. Grossman and Helpman [9] elaborated two main characteristics of Growth theory. First, output expansion had outpaced the population growth in the two hundred years since the industrial revolution. Second, different countries had remained on seemingly different growth paths for relatively long periods of time. One strand of theory continues to see capital accumulation. Jones and Manuelli [10], King and Rebelo [11] and Rebelo [12] elucidated that the firms frequently add to their stocks of capital in a perfectly competitive background with constant returns to scale. A second approach casts outer economies in a leading role in the growth process. When firms gather new capital, they unwillingly contribute to the productivity of capital seized by others. Such spillovers may take place in the course of investment in physical capital [13] or human capital [14]. Factors of growth in transition economies appeared in 1990s.

Campos [15] and Staehr [16] found that traditional factors of growth had no significant role in growth of transition economies. However, Fischer [17] found efficiency and allocation of sources, in the short run, had major role in the growth process. In transitional and emerging economies unemployment is critical problem. Influential work is done by Harrod [18] and Domar [19] about growth and unemployment. Technological innovation had dual effects on the economy. Two different types of effects were elaborated by economists. Pissarides [20] Postel Vinay [21] found that technological progress helped to reduce unemployment due to capitalization effect. Rapid growth raised the return of firms and new firms were launched to share the profit and in turn more jobs were created. Quick innovation made the laborers unemployed. Growth and technological progress had significant role in minimizing unemployment but this growth remain limited to a few areas and regional disparities emerged. There are a lot of theories to elaborate the issue of unemployment. Different aspects are involved in this issue. Rational theories of unemployment have to take account of mechanisms that sooner or later bring the economy back towards ordinary rates of unemployment [22].

Thirwall [23] and Martin [24] had concentrated on regional unemployment. It was evaluated that how regional unemployment disparities vary over the business cycle. Mohlo [25] found the impact of regional disparities on unemployment. Simple regression method was applied. The variables non-demographic labor market, industry product variable, regional factor endowments and demographic variables were used. The industry variable had significant impact in creating regional unemployment. Different factors had been evaluated to examine the reason of unemployment. Institutions had been used to reduce unemployment. Burno and Sachs [26] and Hicks and kenworthy [27] found that institution had significant role in minimizing the unemployment. Real wage and unemployment relation had been analyzed; rise in real wage increased the natural rate of unemployment.

Pissarides [28] found unemployment causes and relation in the framework of macroeconomics model of U.K. A framework was designed to analyze the rise in Britain unemployment. Three main blocks were developed to study the relation. A wage equation was constructed from a bargain between the firm and its workers. Supply of jobs and the job

search decision of the unemployed was the second and third block of the model respectively. Unemployment increased rapidly. Gradualism policy was not adopted in early 1980s to check the unemployment. Unemployment was due to demand side shock and remains high due to the persistence of supply side shock. Supply side policies like income policy and tax system would be implemented to reduce unemployment.

Kemal [29] found that growth rate in Pakistan was really good but the employment generation was not so high. Unemployment increased at high rate and manpower planning experience did not produce significant result to minimize unemployment in Pakistan.

Holden and Nymoen [30] elaborated that the non-accelerating wage rate (NAWRU) as a tool of measurement in structural unemployment for Nordic countries for the period of 1964 to 1994. Structural unemployment had risen. In Nordic countries and most of the European countries, the NAWRU indicator had risen with the rise of actual unemployment. Malfunctioning of labor market would be given importance to see the unemployment horizon.

Zagler [31] investigated the link between growth and unemployment of U.K. for the period of 1982-1999. Structural change played significant role in job creation and job destruction of an economy. Fixed effects panel regression method was used. The result showed a robust and negative relation between unemployment and growth. Rapid growing economies would face structural unemployment though for a shorter period. Unemployment could be minimized through efficient planning and improvement in human capital.

II. Data Sources, Specification of Model and Methodology

A. Data Sources

The data employed in this study are time series data covering the period 1972-2006. The study is aimed to investigate the causal relationship between Growth, unemployment, openness of trade, capital and labor. The data is collected from the Hand book of Statistics of Pakistan's Economy 2005 published by State Bank of Pakistan. The data about poverty and human capital is taken from Jamal [32] and by Iqbal [33] respectively. The variables capital and labour had been used by the classical and the neo-classical economists to measure economic growth. Mankiw *et al*. [34] found that human capital played significant role in neoclassical model and endogenous growth theory. Abbas and Foreman-Peck [35] elaborated the role of human capital in the economic growth of Pakistan. There is a huge literature on investigating the relationship between openness and growth as Dollar [36], Sachs and Warner [37] and Vamvakidis [38].

B. Specification Of Model

A VAR approach is applied to estimate the effects of Unemployment, capital, labour, openness of trade and human capital on growth. This method permits us to recognize long run aggregate effects by considering the dynamic effects between these variables. For conintegration assessment, we use the following multivariable VAR model.

$$Y_t = f(UN_t, K_t, L_t, OP_t, HC_t) \quad (1)$$

where t is time subscript, Y_t, UN_t, K_t, L_t, OP_t and HC_t are growth, unemployment, physical capital stock, labour, openness of trade and human capital respectively. GDP is used as a proxy variable for economic growth. Total volume of import and export is taken as a proxy variable for OP. Gross fixed capital formation is taken as proxy variable for physical capital and HC is weighted index of enrolment at different schooling level to use it as a proxy variable for human capital stock. All variables are in logarithmic form.

C. Methodology

Unit Root Test

In order to avoid spurious regression, there is a need to confirm the stationarity of the series. The stationarity could be achieved by appropriate differencing and this appropriate number of differencing is called the order of integration. The study uses Augmented Dickey Fuller (ADF) [39] test to check the stationarity of time series variables. The ADF assumes the following equations for unit root test:

$$(1-L)X_t = \phi_0 + \phi_1 X_{t-1} + \sum_{j-1}^{k} \alpha_j (1-L)X_{t-j} + \varepsilon_{1t} \quad (2)$$

$$(1-L)X_t = \phi_0 + \phi_1 X_{t-1} + \phi_2 t + \sum_{j-1}^{k} \alpha_j (1-L)X_{t-j} + \varepsilon_{2t} \quad (3)$$

where L is lag operator and $(1-L)X_t = X_t - X_{t-1}$, k is the total number of lags and ε_{1t}, ε_{2t} are stochastic error terms. ADF assumes the following hypothesis:

H_0: $\phi_1 = 0$; (X_t is Non-Stationary)

H_a: $\phi_1 < 0$; (X_t is Stationary)

Johanson Cointegration and Vector Error Correction Model (Vecm)

Having tested the stationarity of each time series, and confirmed that each series have the same order of homogeneity (d), the next step is to search for cointegration. In this step, this study would investigate whether there is a long run relationship between the stochastic trends of variables included in the models. In order to find out any type of causality between under investing variables, they must be cointegrated. This precondition can be confirmed by using Johansen-Juselius cointegration test.

Johansen [40], and Johansen and Juselius [41] have developed a maximum likelihood testing procedure on the number of cointegrating vectors within the Vector Autoregressive (VAR) framework, which also includes testing procedures for linear restrictions on the cointegrating parameters, for any set of variables.

The general VAR framework in the present study is as under:

$$\begin{bmatrix} LnY_t \\ LnUN_t \\ LnOP_t \\ LnK_t \\ LnL_t \\ LnHC_t \end{bmatrix} = \begin{bmatrix} \psi_1 \\ \psi_2 \\ \psi_3 \\ \psi_4 \\ \psi_5 \\ \psi_6 \end{bmatrix} + \sum_{i=1}^{k} \begin{bmatrix} \rho_{11i} & \delta_{11i} & \lambda_{11i} & \omega_{11i} & \eta_{11i} & \varphi_{11i} \\ \rho_{21i} & \delta_{21i} & \lambda_{21i} & \omega_{21i} & \eta_{21i} & \varphi_{21i} \\ \rho_{31} & \delta_{31i} & \lambda_{31i} & \omega_{31i} & \eta_{31i} & \varphi_{31i} \\ \rho_{41i} & \delta_{41i} & \lambda_{41i} & \omega_{41i} & \eta_{41i} & \varphi_{41i} \\ \rho_{51i} & \delta_{51i} & \lambda_{51i} & \omega_{51i} & \eta_{51i} & \varphi_{51i} \\ \rho_{61i} & \delta_{61i} & \lambda_{61i} & \omega_{61i} & \eta_{61i} & \varphi_{11i} \end{bmatrix}$$

$$\begin{bmatrix} LnY_{t-i} \\ LnUN_{t-i} \\ LnOP_{t-i} \\ LnK_{t-i} \\ LnL_{t-i} \\ LnHC_{t-i} \end{bmatrix} + \begin{bmatrix} \varepsilon_{3t} \\ \varepsilon_{4t} \\ \varepsilon_{5t} \\ \varepsilon_{6t} \\ \varepsilon_{7t} \\ \varepsilon_{8t} \end{bmatrix} \quad (4)$$

where LnY_t, $LnUN_t$, LnK_t, LnL_t, $LnOP_t$ and $LnHC_t$ are economic growth, unemployment, capital and labor force, openness of trade and human capital respectively in logarithmic form.

k = Optimal lag order of VAR

ψ's are the intercepts. ρ's, δ's γ's. ω's, η's and φ's are the coefficients of economic growth, unemployment, capital, labor force, openness of trade and human capital respectively. LnY_{t-i} , $LnUNt$ -i,Ln*Kt-i*, $LnL_{t-i,,}$*LnOPt-i and LnHCt-I are time lags.*

$\varepsilon_{1t}, \varepsilon_{2t}, \varepsilon_{3t}$ ε_{4t}, ε 5t, ε 6t are error terms.

According to Granger [42], the ECMs produce better short-run forecasts and provide the short-run dynamics necessary to obtain long-run equilibrium. The general VAR model can be reformulated alternatively in the following form of ECM:

$$(1-L)\begin{bmatrix} LnY_t \\ LnUN_t \\ LnOP_t \\ LnK_t \\ LnL_t \\ LnHC_t \end{bmatrix} = \begin{bmatrix} \psi_1 \\ \psi_2 \\ \psi_3 \\ \psi_4 \\ \psi_5 \\ \psi_6 \end{bmatrix} +$$

$$\sum_{i=1}^{k}(1-L)\begin{bmatrix} \rho_{12} & \delta_{12i} & \lambda_{12t} & \omega_{12i} & \eta_{12i} & \varphi_{12i} \\ \rho_{22i} & \delta_{22i} & \lambda_{22i} & \omega_{22i} & \eta_{221i} & \varphi_{22i} \\ \rho_{32i} & \delta_{32i} & \lambda_{32i} & \omega_{32i} & \eta_{32i} & \varphi_{3i} \\ \rho_{42i} & \delta_{42i} & \lambda_{42i} & \omega_{42i} & \eta_{42i} & \varphi_{42i} \\ \rho_{52i} & \delta_{52i} & \lambda_{52i} & \omega_{52i} & \eta_{52i} & \varphi_{52i} \\ \rho_{62i} & \delta_{62i} & \lambda_{62i} & \omega_{62i} & \eta_{62i} & \varphi_{12i} \end{bmatrix} \times$$

$$\begin{bmatrix} LnY_{t-i} \\ LnUN_{t-i} \\ LnOP_{t-i} \\ LnK_{t-i} \\ LnL_{t-i} \\ LnHC_{t-i} \end{bmatrix} + \left[ECT_{t-1}\right] \begin{bmatrix} \vartheta_1 \\ \vartheta_2 \\ \vartheta_3 \\ \vartheta_4 \\ \vartheta_5 \\ \vartheta_6 \end{bmatrix} + \begin{bmatrix} \upsilon_1 \\ \upsilon_2 \\ \upsilon_3 \\ \upsilon_4 \\ \upsilon_5 \\ \upsilon_6 \end{bmatrix} \quad (5)$$

where ψ's are the intercepts. ρ's, δ's γ's. ω's, η's, φ's and ϑ's are the coefficients of economic growth, unemployment, capital, labor force, openness of trade, human capital and *ECTi-1* respectively. LnY_{t-i}, $LnUN_{t-i}$, LnK_{t-i}, $LnL_{t-i,,}$ $LnOP_{t-i}$ *and* $LnHC_{t-i}$ are time lags. $\varepsilon_{1t}, \varepsilon_{2t}, \varepsilon_{3t}$ ε_{4t}, ε 5t, ε 6t are error terms.

To identify the number of cointegrating vectors, Johansen's methodology uses two different test statistics namely the trace test statistic and the maximum eigen-value test statistic. The trace statistic tests the null hypothesis that the number of distinct cointegrating relationships is less than or equal to 'r' against the alternative hypothesis of more than 'r' cointegrating relationships, and is defined as:

$$\lambda_{trace}(r) = -T\sum_{j=r+1}^{p}\ln(1-\hat{\lambda}_j) \quad (6)$$

where

$\hat{\lambda}_j$ = the eigenvalues.

T = total number of observations.

The maximum likelihood ratio or put another way, the maximum eigen-value statistic, for testing the null hypothesis of at most '*r'* cointegrating vectors against the alternative hypothesis of '*r+1'* cointegrating vectors, is given by:

$$\lambda_{\max}(r, r+1) = -T\ln(1-\hat{\lambda}_{r+1}) \quad (7)$$

Johansen [40] argues that, λ_{trace} and λ_{max} statistics have non-standard distributions under the null hypothesis, and provides approximate critical values for the statistic, generated by Monte Carlo methods.

III. Empirical Results

A. Unit Root Test

The data set consists of Growth, Unemployment, Capital, Labor, Openness of Trade and Human Capital variables. Augmented Dicky Fuller (ADF) test with intercept and trend and intercept suggests that all variables used in the study, are stationary at first difference. The results of ADF test are presented in table III.

TABLE III
ADF Test For Unit Root

Variables	At Level		At 1st Difference	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
LnYt	0.0145	0.0301	-3.594333**	-3.787132**
LnUnt	0.6948	0.3971	-4.371359*	-4.313067*
LnOpt	0.0809	0.0418	-4.587629*	-4.420198**
LnLt	0.9710	0.5978	-3.586313**	-3.455656***
LnKt	0.3117	0.2962	-3.350503**	-3.388516***
LnHct	0.9025	0.1664	-6.542699*	-6.439357*

Notes. *,** and *** indicate significance at 1%, 5% and 10% level respectively. Numbers reported in the table are t-values.

B. Cointegration

Starting with null hypothesis of no cointegration (r = 0 r < 1 and r < 2) among the variables, the trace statistic are 150.4942, 93.78452 and 56.35688 which exceeds the 95 per cent critical values, so we reject the null hypothesis The null hypothesis of r ≤ 3, r ≤ 4 and r ≤ 5 cannot be rejected at 5% level of significance. Consequently, we conclude that there are three cointegration relationships involving variables Growth, Unemployment, Labor, Capital, Openness of Trade and Human Capital.

TABLE IV
UNRESTRICTED COINTEGRATION RANK TEST (TRACE)

Hypothesis				
Ho	Ha	Trace Statistic	Critical Value 0.05	Prob.
r = 0	**r >1**	**150.4942**	**95.75366**	**0.0000**
r ≤ 1	**r > 2**	**93.78452**	**69.81889**	**0.0002**
r ≤ 2	**r > 3**	**56.35688**	**47.85613**	**0.0065**
r ≤ 3	r > 4	27.10127	29.79707	0.0992
r ≤ 4	r > 5	8.811033	15.49471	0.3832
r ≤ 5	r > 6	0.120884	3.841466	0.7281

TABLE V
UNRESTRICTED COINTEGRATION RANK TEST (MAXIMUM EIGNVALUE)

Hypothesis				
Ho	Ha	Max-Eigen Statistic	Critical Value 0.05	Prob.
r=0	**r >1**	**56.70965**	**40.07757**	**0.0003**
r ≤ 1	**r > 2**	**37.42764**	**33.87687**	**0.0180**
r ≤ 2	**r > 3**	**29.25561**	**27.58434**	**0.0302**
r ≤ 3	r > 4	18.29023	21.13162	0.1194
r ≤ 4	r > 5	8.690149	14.26460	0.3129
r ≤ 5	r > 6	0.120884	3.841466	0.7281

Unrestricted cointegration rank test of λ_{max} are reported in Table V. We start with the null hypothesis of no cointegration vector (r = 0 & r = 1) and null hypothesis cannot be accepted as the calculated value of λ_{max} (56.70965, 37.42764 and 29.25561) are greater than the 95 per cent critical value. Thus, on the basis of λ_{max} statistic. It can be concluded that there are three cointegration vector. The presence of cointegration vectors shows that there exists a long run relationship among Growth, Unemployment, Labor, Capital, Openness of Trade and Human Capital.

$$LnNY_t = 1.0 + 0.182LnUn_t - 0.921LnOp_t + 1.079LnL_t + 1.423LnK_t + 0.009LnHC_t \ldots\ldots \quad (8)$$

t-statistics (2.76406)(3.92232) (3.86940) (6.53940) (0.92473)

The normalized cointegrated vector is reported in equation (8). The estimates represent the long run elasticities of income with respect to unemployment, openness of trade, labor, physical capital and human capital. The significant positive coefficient of unemployment, labor and capital shows that these variables move in same direction with economic growth in long run.

C. Vector Error Correction Model (VECM)

The lagged error correction term (ECT_{t-1}) capture long run dynamics and also indicates long run causality. The significant t-statistic of Openness of Trade in ECT_{t-1} suggests the existence of short-run cointegration. While in first row growth is caused by unemployment and labor. Capital is caused by unemployment and labor. Labor is caused by Openness of Trade. Openness of Trade is caused by all variables except Human Capital.

TABLE VI
VECTOR ERROR CORRECTION MODEL (VECM)

Dept. Var.	ΔLnY_t	$\Delta LnUn_t$	ΔLnK_t	ΔLnL_t	$\Delta LnOp_t$	$\Delta LnHC_t$	ECT_{t-1}
ΔLnY_t	---	4.412 (0.035)	0.0331 (0.855)	6.7047 (0.009)	0.1929 (0.660)	0.2650 (0.606)	1.443
$\Delta LnUn_t$	0.1160 (0.733)	---	0.2527 (0.615)	2.0589 (0.151)	2.3368 (0.126)	0.2667 (0.605)	0.679
ΔLnK_t	1.7803 (0.182)	4.999 (0.025)	---	5.455 (0.019)	0.1613 (0.688)	0.5484 (0.459)	1.086
ΔLnL_t	1.4539 (0.227)	8.922 (0.992)	0.5330 (0.465)	---	4.3000 (0.038)	0.3860 (0.5344	0.354
$\Delta LnOp_t$	17.662 (0.000)	19.18 (0.000)	20.217 (0.000)	16.933 (0.000)	---	0.3297 (0.565)	-4.23
$\Delta LnHC_t$	1.0495 (0.305)	1.735 (0.187)	0.5788 (0.446)	0.2726 (0.601)	0.0035 (0.953)	---	0.099

D. Variance Decomposition

Variance decomposition gives information about the dynamic behaviour of the variables in the system. The forecast error of this analysis enables to make decision about the movement due to its own shocks vis-à-vis shocks to the other variables. Variance decomposition is used to understand the direction of which effects are greater and enables us to differentiate the importance of variables in the given model. The results suggest that in the second time period 69.5 percent variation of growth is accounted by pervious growth, while 7 percent, 12 percent and 10 percent is accounted by past openness of trade, labour and capital respectively and unemployment and human capital has no significant variation. In the second time period 77 percent variation of unemployment is accounted by the past total unemployment where as 5.7 percent, 7 percent and 8 percent is accounted by past total growth, labour and capital respectively, openness of trade and human capital has no significant change. In case of openness of trade, 41 percent variation is accounted by the past total of openness of trade, while 4 percent and 5 percent is accounted by the past total of growth and capital respectively. Unemployment, labour and human capital has no significant effect. Labour, in the second time period, 71 percent variation is accounted by the past total labour, while 13 percent, 9 percent and 4 percent is accounted by growth, unemployment and capital respectively. Human capital and openness has no significant variation. In case of capital, in second time period, 42 percent variation is accounted by the

past total capital, while 30 percent, 15 percent and 7 percent variation is accounted by growth, openness of trade and labour respectively, where as 2 percent and 1 percent variation is accounted by unemployment and human capital. In the second time period 38 percent variation is accounted by the past total human capital, while 26 percent, 20 percent and 11 percent variation is accounted by growth, openness of trade and labour respectively, and only 1 percent variation is accounted by capital and unemployment variables each.

IV. Conclusion

Growth is a major source to minimize unemployment. This paper has investigated the relationship between growth and unemployment for the period of 1972-2006. The ADF test shows that the variables have unit root problem at level but these variables are significant at first difference. There are three cointegrating vectors. The maximum eigen-value statistics also show a long run relationship among Growth, Unemployment, Capital, Labor, Openness of Trade and Human Capital. Easterly [43] found that Pakistan's experience as a picture of growth without development. The country's poor social indicators had lowered the productive potential of the economy and its ability to service its high debt. Growth policies had no significant impact to minimize unemployment. Nasir [44] found the malfunctioning of the labour market. It had affected the income level of the people and increased in both inequality and poverty. The reduction in output had affected the poor. The existing statistics showed that labour force was increasing whereas capacity of the economy was not expanding with the pace of labour force. Therefore unemployment was on rise and low wage in informal segment was expanding. There is need to accelerate economic growth. Sustained growth is the fundamental requirement to reduce unemployment. Macroeconomic stability, investment oriented policies and political stability will be the source to achieve handsome rate of growth. The industrial policy is needed to base on competitive strategy. Export oriented policies is the need of the hour. It is needed to establish industrial zones not only surrounding cities but also in remote areas to reduce unemployment. Labor intensive policies must be adopted to reduce unemployment in urban and especially in rural areas. ; More efforts are needed to improve the Human Capital and developing infrastructure for rapid growth and to minimize unemployment through labor intensive policies.

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APPENDIX

TABLE A-I
VARIANCE DECOMPOSITION OF Y_T

Period	S.E.	Y_t	OP_t	K_t	L_t	HC_t	UN_t
1	4801.72	100.00	0.0000	0.0000	0.0000	0.0000	0.000
2	5576.71	88.041	0.3823	7.8831	3.0009	0.3482	0.335
3	7041.20	77.122	4.7012	12.3912	1.8821	0.2451	3.650
4	7794.69	70.533	6.9611	13.2653	3.1382	0.2480	5.854
5	8152.46	64.542	8.6712	15.1212	4.6623	1.1363	5.867
6	8369.84	61.941	10.4731	14.3451	4.6781	1.2421	7.318
7	8576.67	59.113	10.2523	14.5252	4.9452	1.8170	9.335
8	9403.20	61.471	11.0652	12.4732	4.2193	1.6172	9.147
9	9763.44	57.771	10.4241	14.7191	5.6171	2.1911	9.271
10	10049.58	58.032	10.1673	13.9551	5.4092	2.1273	10.30

TABLE A-II
VARIANCE DECOMPOSITION OF OP_T

Period	S.E.	Y_t	OP_t	K_t	L_t	HC_t	UN_t
1	1248.92	33.8173	66.1821	0.0000	0.0000	0.0000	0.0000
2	3834.76	90.5552	7.19132	1.8218	0.1217	0.3034	0.0063
3	4754.65	66.2743	11.8064	18.659	2.9274	0.2090	0.1244
4	4884.56	63.1662	11.4671	18.740	4.8693	0.6655	1.0904
5	4927.16	62.1591	11.4622	19.548	4.8482	0.8253	1.1559
6	4976.64	61.3841	12.4654	19.163	4.8251	0.8113	1.3502
7	5180.07	61.9832	11.5173	18.793	4.6446	1.0713	1.9895
8	5511.13	61.4763	12.3022	18.622	4.1784	0.9478	2.4722
9	5622.43	59.0801	11.9531	19.827	5.2599	1.3696	2.5091
10	5742.34	59.7052	11.9522	19.099	5.0630	1.3143	2.8653

TABLE A-III
VARIANCE DECOMPOSITION OF K_T

Period	S.E.	Y_t	OP_t	K_t	L_t	HC_t	UN_t
1	1128.03	7.58936	63.1673	29.2432	0.0000	0.0000	0.0000
2	2804.27	75.2378	11.5061	11.2877	0.49552	1.0087	0.4639
3	3604.09	59.9256	11.6107	24.1478	3.16688	0.8680	0.2808
4	3752.41	55.3776	10.7197	25.5895	5.13812	1.7257	1.4491
5	3798.38	54.8128	10.4836	26.0587	5.11049	2.0671	1.4670
6	4080.02	56.2046	12.3542	23.8540	4.43298	1.8558	1.2982
7	4486.99	57.3338	10.7523	24.1599	4.55984	1.9659	1.2280
8	4794.30	56.2449	10.7307	24.9739	4.62486	1.8409	1.5845
9	4895.48	54.2800	10.2918	26.3330	5.36985	2.1895	1.5356
10	5037.61	55.2767	10.3965	25.5373	5.08530	2.1026	1.6014

TABLE A-IV
VARIANCE DECOMPOSITION OF L_T

Period	S.E.	Y_t	OP_t	K_t	L_t	HC_t	UN_t
1	0.5558	15.4479	5.0430	13.8514	65.6575	0.0000	0.0000
2	0.6409	12.4252	5.0801	10.6042	66.7124	0.0874	5.0904
3	1.1682	61.8771	6.9268	3.2896	24.7223	0.1078	3.0761
4	1.3286	51.3259	5.5288	14.2060	25.7589	0.1228	3.0571
5	1.3749	48.5065	5.6445	15.6163	24.2279	0.1158	5.8887
6	1.4356	44.6053	6.6869	16.4686	22.3210	0.2701	9.6478
7	1.5242	40.7502	11.4650	14.6789	19.9303	0.5676	12.6077
8	1.6225	36.3800	14.6021	13.7855	18.6201	1.5421	15.0699
9	1.7446	35.1924	16.7759	12.002	16.8719	2.0018	17.1551
10	1.8627	34.6319	16.8033	11.4045	16.0821	2.7143	18.3636

TABLE A-V
VARIANCE DECOMPOSITION OF HC_T

Period	S.E.	Y_t	OP_t	K_t	L_t	HC_t	UN_t
1	0.0772	4.05455	16.2538	0.7304	2.07224	76.8889	0.0000
2	0.0978	19.3644	10.1399	0.8606	8.0894	48.3484	13.1970
3	0.1398	26.6835	29.1329	4.9680	5.0268	27.0102	7.1782
4	0.3414	79.8059	7.28529	6.1617	0.9062	4.5902	1.2505
5	0.4075	61.3896	9.8113	19.9383	4.4254	3.4217	1.0135
6	0.4181	58.8234	10.019	20.3916	5.7907	3.6726	1.3019
7	0.4210	58.0294	10.1412	21.1116	5.7308	3.6913	1.2954
8	0.4285	58.6410	10.2391	20.6763	5.5342	3.6578	1.2513
9	0.4477	59.1526	9.8290	20.9540	5.3269	3.5337	1.2034
10	0.4626	58.4577	9.8691	21.5970	5.3022	3.4151	1.3585

TABLE A-VI
VARIANCE DECOMPOSITION OF UN_T

Period	S.E.	Y_t	OP_t	K_t	L_t	HC_t	UN_t
1	0.2152	13.6801	0.04643	2.2313	26.2792	0.1596	57.6031
2	0.2610	16.9972	1.91245	3.3659	21.6026	0.2335	55.8881
3	0.3070	12.3724	19.2579	2.7796	17.6921	5.4863	42.4114
4	0.3460	11.0499	29.5423	2.1973	14.4824	6.3287	36.3991
5	0.3915	22.9287	23.0777	2.5898	11.9404	6.8863	32.5769
6	0.5015	42.0899	17.5258	7.03042	7.35025	4.5852	21.4181
7	0.5479	43.7433	14.7515	9.1663	9.6787	4.6314	18.0286
8	0.5608	43.7931	14.6782	9.7507	9.6095	4.4650	17.7032
9	0.5709	42.8757	15.0815	10.5126	9.2891	4.3950	17.8458
10	0.5886	45.7710	14.2054	9.9451	8.7476	4.1359	17.1947