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# Relationship Between Unemployment and Human Capital

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**Abstract**
This study investigates the Impact of determinants of Human capital such as health, education, population and life expectancy on unemployment in case of Pakistan over the period 1981-2010. The prime objective of the study is to identify and establish a link between human capital and unemployment. The Johansen co-integration approach is used to determine the long-run relationship among variables. Further it applied VECM for short run adjustments to achieve equilibrium in long-run. The results show that our independent variables have significant and strong impact on the dependent variables in long run. The research also provides some suggestions for the policy purpose to reduce the unemployment in the country.
**Keywords**: Unemployment, Human capital

## 1. Introduction

Unemployment is one of the major problems in approximately all countries of the world. It has been the most constant problem which is facing by all developed as well as developing countries. Unemployment is defined as the situation of being out of labor or having no job. It is also define as number of people searching work but they are not able to find the job but they are able to work. Those People are not included in unemployed group who willingly do not work. For developing countries striking increase in the level of unemployment is a particular problem and but in advance countries its general problem. A number of social evils are link with high growth of unemployment, for example unemployment increases suicides, crimes, and poverty rates. Unemployment suffers employee, employee's families and even countries due to loss of job means loss of income both at individual level and countrywide level.

Human capital is the most important determinant of economic structure. It determines the productivity of the economic growth and development of the different sectors. It also exposes the development of social norms. The defining projection of the human capital can portrays in different scenario, but the most projected scenario of the human can be said that the abilities and skill of the masses are called human capital. It has very positive effect on economic growth and economic development. Increase in the human capital will leads to reduce in the mistakes and to improve plans and modalities of the peoples. It also orients effects on the unemployment. Human capital is a best instrument to reduce the unemployment.

There are some determinants of human capital like education, health, Expected life, and population. Education is a key factor to promote the efficiency and capabilities of the masses. It is that factor which affects the whole sector of the economy.

Education is one of the main determinants for the youth unemployment rate. There is strong link between the education level and unemployment rate. Youth unemployment has an important role in pursuing educational investments. When people invest in their educations as a result they decrease their unemployment opportunity cost. Rate of return to education and youth unemployment have positive relation. Educated workers are more efficient than non educated people in seeking new jobs and gaining more wages. There is a lower risk of unemployment at higher educational levels. Educated workers can find new jobs or adjust to the workforce market easily because of job training and market demands. Declining standard of education in the educational organizations and literacy rate putting a large amount in rising unemployment rate. Our instructive structure is also liable for growing unemployment rate among the skilled people. Schooling organism is divided into different groups students reading in government organization will be less attentive about the new ideas and technologies for existing in this aggressive world and unemployment rate is superior among such students. As well education the thoughts of our youth towards the selection of a profession is not viable and infertile. Speedy mechanization and computer technology also causing unemployment. High will be education; more productive will be the labors. If the projection is given about the developed societies, so education or literacy is most prominent factor about their social and economic norm. Developed societies spends maximum budget on education sector. Israel is supposed to be deemed the country where 8 percent budget spends on education sector. In Pakistan it is regret to say that just 1.56 percent budget spends on education sector in 2010.

Population is major factor to impact unemployment rate. It indicates the number of people in country if more education and health expense made on population it will leads to build strong human capital that can work and produce more and reduces the unemployment rate on the other hand increase in population will demand more finance, resources and if not provided that putt positive to unemployment rate. Population growth rate of Pakistan increasing at very rapid speed. According to the world report there is 3 million newborn born in Pakistan, but unemployment rate in the country in also increasing in Pakistan. There is half of population are unemployed due to lack of health and education facilities.

Health is also has significant impact on employment level. Healthy worker are more efficient and more productive. Unemployment increases due to less efficient workers because they are likely to produce less so they remain unemployed which effect the whole economy negatively.

Expected life of the people has also massive impact on unemployment. High life expectancy indicates the health, physical fitness and experience of the people which is the imperative factor of human capital. High rate of expected life indicates the superior health and maximum experience of the people which shrink the unemployment rate in the economy. According to the World Bank report the current expected life in Pakistan is 66 years. The more will be the life of people less will be the unemployment in the country.

### 1.2 Significance of the study

Study aims to shed light on unemployment condition due to change in human capital of the country, thirty years data (1981-2010) have been taken for the analysis. Study not only includes the health and education as human capital it also includes population growth rate and life expectancy rate as human capital factor to determine the unemployment condition in Pakistan.

### 1.3 Objective of the Study

The basic purpose of study is to find out the long run impact of factors of human capital on unemployment. Mainly human capital comprises the education, health, population and life expectancy. So objective of study is to find out how the education expenditures, health expenditures, life expectancy and population are related with the unemployment.

### 1.4 Research Question

Research question is to investigate the relationship of unemployment with health, education, population and life expectancy rate.

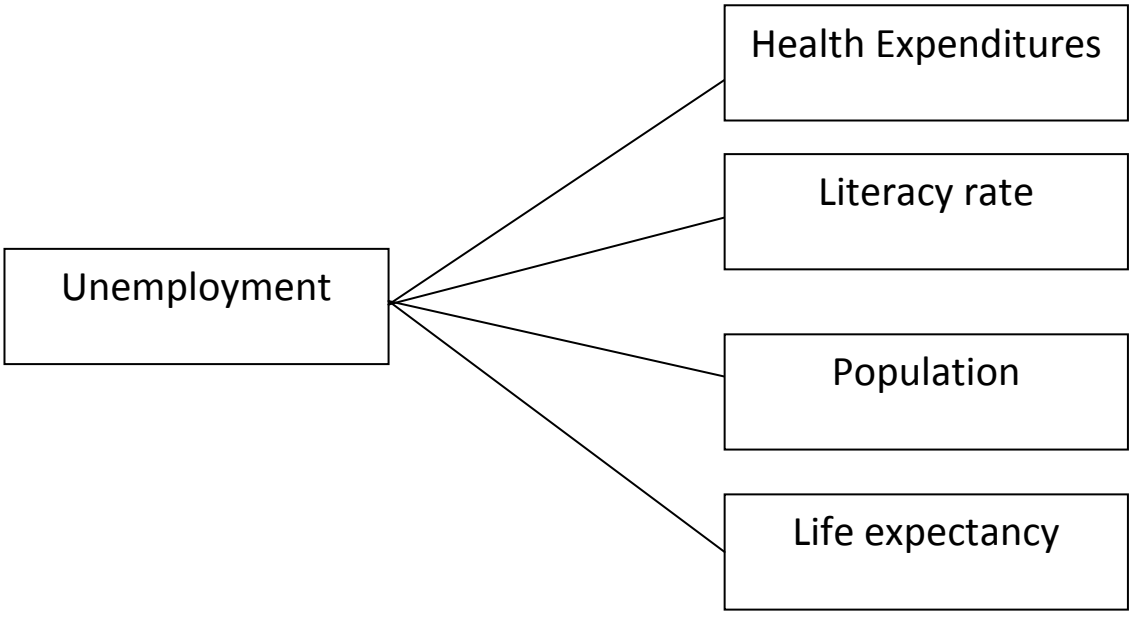
### 1.5 Hypothesis of Study

**Ho: $\beta_1=0$** there is no effect of education on unemployment rate.
**$H_1$: $\beta_1\neq0$** there is effect of education on unemployment rate.
**Ho: $\beta_2=0$** there is no effect of health expenditures on unemployment rate.
**$H_1$: $\beta_2\neq0$** there is some effect of health expenditures on unemployment rate.
**Ho: $\beta_3=0$** there is no effect of life expectancy on unemployment rate.
**$H_1$: $\beta_3\neq0$** there is effect of life expectancy on unemployment rate.
**Ho: $\beta_4=0$** there is no effect of population growth on unemployment rate.
**$H_1$: $\beta_4\neq0$** there is effect of population growth on unemployment rate.

### 1.6 Organization Of Study

The organization of study is as follows, Chapter # 1 mentioned the introduction, Chapter # 2 literature review, in Chapter # 3 studies will explain briefly the model, methodology and then explanation of the variables, after that estimation techniques are in Chapter # 4 and empirical result is provided in Chapter # 5 and at the end conclusion and suggestions are given in Chapter # 6.

**Factors of Human capital that are affecting the unemployment are shown in the schematic diagram.**



## 2. Literature Review

Several studies have been carried out to estimate the impact of human capital on unemployment but mostly researcher takes health and education as factor of human capital some of the studies worked on human capital and unemployment are given below.

Bashir *et,al* (2012) uses data for the period from 1972 to 2010. With the object of long run and short run estimates, they have taken Cointegration test and VECM respectively. They conclude that in long run educational expenditure, health expenditure and gross fixed capital formation are significant features in magnifying employment level in Pakistan. At the end it is suggested that there should be more spending on education to support enrollment at primary and expert levels by offering scholarships to students. For superior health and education, Govt. should extend health expenditure as well. They also play very important role in enhancing employment level, output and economic growth by providing identical opportunities of education and health to all people of any nation all differences can be removed. Considering the importance, this Study indicates some of the important elements of education and health in reducing unemployment level in the long-run as well as in the short-run.

Mete and Schultz (2002) examine the labor force participation rate due to change in health quality. OLS method used to investigate the results and study find that health and labor force participation are positively related with each other. Improvement in health sector reduces the unemployment rate and vice versa.

Chaudhary *et.al* (2010) investigate the wages and employment level for females by taking health and education as independent variables important determinants of human capital. Study used primary data collected through different field surveys; OLS method is applied to estimate coefficients. Results suggest that education and health are positively and significantly impact on employment level and determination of wages for female workers.

Kenndey and Vance (2006) takes time series data to measure the impact of increase in educational attainment on labor force participation rate and found the results that as the level of schooling are education increase of a person the chances for labor force participation also increase for her/him, people having more qualification are employed more in labor market.

Laplange *et.al* (2007) takes panel data to estimate the change in labor force participation rate due to change in human capital variables such as health and education. Logit model is used to estimate the coefficient of regressors and found that greater labor force participation is achieved by better health and education.

Suedekum (2006) analyze local employment enlargement for the case of West Germany (1977-2002) by keeping impact of human capital as independent variable and find results that skilled cities develop quickly than unskilled ones. A large creative part of high-skilled workforce significantly shrinks successive growth of jobs for high skilled workers. Positive impact observed on total employment growth by increase in human capital and analyzes the fact that low-skilled jobs rise more rapidly than high-skilled jobs. This study concludes significant link between human capital and employment growth.

Doppelt (2012) present a theoretical macroeconomic model that captures the fact that temporary job losses lead to life-long earnings losses. Workers must effectively compensate their employers for the skills that they gain because skills are more valuable during booms, allowing workers to build up general human capital affects the wage determination. Workers accumulate specific human capital on the job, while suffering human capital depreciation during unemployment.

Faridi *et,al* (2010) prepared research on primary data collected through field survey from district Bahawalpure. For the measurement of coefficients of variables Logistic regression technique has been used. The study has concluded that education is negatively and significantly related to unemployment level. The human condition of the worker for work has also important impact on unemployment. The study advocates that Government should suggest health and education services to all the people of the country. Health and education has an important function in the process of human capital improvement. A country well-off in human capital can cover the growth and development in that country.

Manoj and Pandey (2009) measures the change in labor force participation rate due to change in health structure of the people. Study takes unemployment as dependent variable and health expenditures and number of hospitals are used as independent variables 2SLS method is used to estimate results. Results indicates negative and significant results for the case of india.

Christelle *et,al* (2010) examines the relationship between long-term unemployment and education. The study has been run using both a binary logit model and a binary scobit model for time period 2004-2006 to investigate the impact of education on unemployment. The outcome suggests that the chances of a person to be remain in long-term unemployment decreases with increases in her/his educational level. Study also told that younger workers (20-30) are more beneficial than older workers (50-65) and there is a decline in returns of education after the age of 40.

Rehman (2011) make an enquiry into the problem, find out the reasons for suggesting solution, secondary data is used and this article conclude that the Pakistan's economy has covered a long distance from backward to developing stage. The major problem related to ever growing population is the provision of job opportunities. Economy of Pakistan is basically agriculture having surplus labor and the surplus labor is unemployed. The slow

process of industrialization along with the population blast also a cause of unemployment. The paper focuses on the central issues of unemployment and an objective will suggest practicable measures for increasing the rate of employment or for that matter reducing the level of unemployment.

Evans and Koch (2007) estimates the effect of human capital on the unemployment problem using the standard time dependent model makes the individual unemployment rate. They conclude that effect of education on becoming employed is positive. levels of education actually tend to increase the average employment duration. They find that the level of human capital has a negative effect on unemployment.

Conclusion of the all literature is that all the past study investigate the impact of human capital on unemployment by keeping health and education as factors of human capital but this study also consider the impact of population and life expectancy as factor of human capital to measure the unemployment variations due to human capital

## 3. Data Source and Methodology

The real Sources of data is being Pakistan economic survey, world data bank global development indicators, Labor survey of Pakistan and yearly details of state bank and monetary figures. Data have also collected from the different sources such as indexmundi.com and Quaid-e-azam University. 30 years data have been taken and it is time series data to check the affiliation among dependent variable unemployment and independent variables health expenditures, education expenditures, population growth and life expectancy.

### 3.1 Methodology

This study is an attempt to analyze the impact of human capital on unemployment in Pakistan over the period 1981-2010. Secondary data source is used for the estimation of model. Study includes various techniques to investigate the problem of unemployment. Here, four economic variables of human capital such as education, health, population and life expectancy have been taken to analyze the impact on unemployment in Pakistan. The study focuses mainly on effect of these four variables on unemployment in long run.

The economic model created as

***Unemployment (U) = f (Human capital)…… (1)***

***Human capital = f (Education, health, Population, Life expectancy)…….. (2)***

Now by putting equation (2) in equation (1)

***Unemployment (U) = f (Education, health, Population, Life expectancy)***

*If*

Education (literacy rate) = $\mathbf{X_1}$

Health expenditures (%age of GDP) = $\mathbf{X_2}$

Population (growth rate) = $\mathbf{X_3}$

Life expectancy (in years) = $\mathbf{X_4}$

Economic model for long run estimation can be written as

$$U_t = \beta_o + \beta_1 x_{1t} + \beta_2 x_{2t} + \beta_3 x_{3t} + \beta_4 x_{4t} + \mu_{it}$$

Where

**μi =** Random error term

### 3.2 Description of Variables

Literacy rate taken in percentage and usually has negative impact on unemployment as expenditures on education increases it promote the literacy rate in the country which is likely to produce efficient and skilled workers, those workers highly demanded in the labor market which reduces the unemployment level.

Health expenditures taken as percentage of GDP usually link between health expenditures and unemployment level is also negatively. More health expenditures means more health facilities available to the people when people are healthy and physically fit they are able to participate and work more in the labor market which decreases the unemployment level in the economy.

Population is taken as percentage change in population annually or annually growth rate of population. It is consider to be factor of human capital as it indicates the number of people in economy if more expenditures and better health care provided to people strong human capital can be build that reduces the unemployment in the country and vise versa *Ehrenbely and Smith (2005)*, the affiliation between Population growth rate and Unemployment is negative if proper health and education facilities are provided to people.

Life expectancy taken as average age of the people living in Pakistan it indicates health of the people and also it indicates the experience of workers which is negatively related with unemployment people having long life likely to reduce unemployment.

## 4.Estimation Techniques

After the gathering of data from different sources initially we will check the data is stationary or non stationary in time series model by applying unit root test it will be in 1st difference of level it means it is greater than critical region. A stationary time series has constant variance and the co-variance is independent to time. Stationary process is essential for standard econometric theory, without it we cannot obtain constant estimators.

To check the stationerity from variables, the augmented dicky fuller (ADF) is a test for unit root in a time series sample.

**The hypothesis is**

$$H_o: \delta = 0 \text{ (Unit Root)}$$
$$H1: \delta \neq 0$$

**Decision Rule**

If t-statistics > critical value ⟶ null hypothesis will not reject.
If t-statistics < critical value ⟶ null hypothesis will rejected.

**4.1 Cointegration Test**

Cointegration test is an economic characteristic of time series variables. Whenever the linear combination of two or more time series is stationary but themselves they are non stationery then the series are said to be cointegrated. This research applied Johansen Cointegration test to examine existence of the long run affiliation among all variables. This test investigate that is there any relation exist between the variables or not in long run.

After the verification of long run affiliation among all variables, the impact of all independent variables is measure through normalized coefficients equations where coefficients and standard error are given and t-statistics is calculated through following formula.

## 4.2 Vector Error Correction Mechanism (VECM)

It is a restricted VAR model. The VECM requirement limits the long run activities affiliations and the short run analysis of the explanatory and endogenous variables in a scheme are prejudiced by the divergence from the long run equilibrium Engel and Granger (1987). If co integration exists between two variables in the long run, then, there must be either unidirectional or bi-directional causality between these variables. VECM is for short run dynamics. VECM is applied to measure short-run impact and adjustments. It shows that due to disturbance in short run equilibrium which is disturbed at which speed it will restored in long run annually and how much time it takes

**4.3 Impulse Response Function**

An impulse response functions used to draw the effect of an impact of time on the present value and future value of the unemployment rate on all independent variable. In this study we will test or investigate the response of unemployment to shock in all other independent variables Ozer (2008).

**5. Result and Discussion**

After collection of data first of all test for stationerity is applied to check the data is stationerity or not if it is stationerity than at what level for this purpose Augmented dicky-fuller test is applied to calculate stationerity of data and results are in the table 1.

**Table 1.**

| Variable | Stationarity at 1st difference | | Integration order |
|---|---|---|---|
| | ADF – statistics | Critical values | |
| Unemployment Rate | -12.72654 | 1% -3.6959<br>5% -2.9750<br>10% -2.6265 | I(1) |
| Health expenditures | -6.617246 | 1% -3.6959<br>5% -2.9750<br>10% -2.6265 | I(1) |
| Literacy rate | -7.856191 | 1% -3.6959<br>5% -2.9750<br>10% -2.6265 | I(1) |
| Population growth rate | -5.785234 | 1% -3.6959<br>5% -2.9750<br>10% -2.6265 | I(1) |
| Life expectancy | -7.998073 | 1% -3.6959<br>5% -2.9750<br>10% -2.6265 | I(1) |

First of all the unit root test is applied on all variables at level but data is not stationerity at level than all the data becomes stationery at first difference as all critical values in the table are greater than ADF-Statistics showing all variables are stationary at first difference.it confirms that to estimate long run relationship cointegration test will

be applied.

**5.1 Lag Length selection**

| Lag Lengths | Schwarz Information Criterion |
|---|---|
| 0 | 9.750579 |
| 1 | 2.759572 |
| 2 | -4.955803* |
| 3 | -3.911624 |
| 4 | -1.169540 |

*Note: * indicates the Lag order chosen by Criterion*

Above table point out about the selection of lag length for long run model. We have followed Schwarz Information Criterion for lag length choice and have selected '2' as an appropriate lag.

**5.2 Cointegration Analysis**

Now we analyze the long-run affiliation among the unemployment rate and all independent variables such as health expenditures, literacy rate, population growth rate and life expectancy. For this cointegration test is apply to analyze the long run relation between dependent and independent variables using 2 lag value.

As all five variables are integrated with same order level I(1) we are capable to apply cointegration test for consistent long run results.

Long run relation can be observed by using Trace and Maxeigen statistics value. Following table gives an idea about long run cointegration relationship. Probability values illustrate that null hypothesis is rejected, and there at most 4 cointegration relationships confirms that there are 3 cointegration relationships.

Results for cointegration analysis are in table 2.

**Table 2**

| Hypothesized no of CE(s) | Eigen Value | Trace statistics | 5% critical value | Probability |
|---|---|---|---|---|
| None* | 0.924125 | 155.2528 | 69.81889 | 0.0000 |
| At most 1* | 0.748124 | 85.62871 | 47.85613 | 0.0000 |
| At most 2* | 0.710731 | 48.40064 | 29.79707 | 0.0001 |
| At most 3 | 0.353514 | 14.90991 | 15.49471 | 0.0611 |
| At most 4 | 0.195300 | 3.132394 | 3.841466 | 0.0767 |
| **Hypothesized no of CE(s)** | **Eigenvalue** | **Maxeigen Statistic** | **5% Critical Value** | **Probability** |
| None* | 0.924125 | 69.62407 | 33.87687 | 0.0000 |
| At most 1* | 0.748124 | 37.22807 | 27.58434 | 0.0021 |
| At most 2* | 0.710731 | 33.49074 | 21.13162 | 0.0006 |
| At most 3 | 0.353514 | 11.77751 | 14.26460 | 0.1193 |
| At most 4 | 0.109538 | 3.132394 | 3.841466 | 0.0767 |

*Note: * showing the rejection of Null Hypothesis*

For long run Cointegration association among variables the overall hypothesis is

$\mathbf{H_o}$ = there is no Cointegrated affiliation among all variables in the long run.

$\mathbf{H_1}$ = there is a Cointegrated affiliation among all variables in the long run.

Our results shows the long-run affiliation exist among all variables such as unemployment, literacy rate, health expenditures, life expectancy and population as the trace and maxeigen statistics indicates there are at most 3 cointegrated relationship in the long run where the value of trace statistics is greater than the critical values for each of the variables and thus null hypothesis rejected the that is there is no Cointegrated association among all variables in the long run and accepted the alternative hypothesis at the significant level of 5%.

**5.3 Normalized Cointegrated Coefficients**

| Unemployment | Population | life expectancy | Literacy rate | health expnds. | C |
|---|---|---|---|---|---|
| **1.00000** | **-4.916598** | **0.612032** | **1.437768** | **11.11925** | **-12.20091** |
| | **(3.02010)** | **(0.15637)** | **(0.29361)** | **(3.00694)** | **(3.22713)** |

**Log likelihood -92.18037**

*Note: values in ( ) are standard error and value without brackets are coefficients*

Value of t-statistics has been obtained after dividing coefficient by standard error to check that either variable are significant or not to explain the dependent variable in long run.

**Table 3**

| Variable | Coefficient | Standard error | t-statistics |
|---|---|---|---|
| Population | -4.916598 | 3.02010 | -1.62795* |
| Literacy rate | 0.612032 | 0.15637 | 3.9139* |
| Life expectancy | 1.437768 | 0.29361 | 4.89686* |
| Health expnditrs. | 11.11925 | 3.00694 | 3.69786* |
| C | -12.20091 | 3.22713 | -3.78730* |

*Note: * showing the significance of variables*

Table 3 shows the results for estimated coefficients for long run relationship. These results indicate all variables are statistically significant from the period of 1981 to 2010 in long run.

Economic model for estimated coefficients is

$$U = \beta_o + \beta_1(\text{literacy rate})_t + \beta_2(\text{health expd})_t + \beta_3(\text{population})_t + \beta_4(\text{life expect})_t + \mu i_t$$

$$\text{Unemployment} = (12.20091) - (0.6120)\text{literacy rate}_t - (11.119)\text{Health expnd}_t + (4.9165)\ \text{population}_t - (1.4377)\ \text{life expectancy}_t$$

Intercept includes all other variables which are not included in the model but they are affecting the dependent variable. Value for coefficient of intercept is (12.20) indicating 1% increase in all other variables will increase the unemployment rate by 12.20%.

First variable is literacy rate, it is statistically significant and negatively related to the unemployment. If literacy rate increase by 1% it leads to reduce the unemployment 0.61% in long run. This result following the economic theory also that tells us that as we increase the literacy rate or improve the education the unemployment level reduces in the economy because in the labor market people having more education or skilled people are prefer more to some specific job means as year of education increases you have more chance to be employed. Same results are also examined by Christelle et al. (2010) also.

Next most important variable is health expenditures; it is highly significant and negatively related with unemployment statistically. Results suggest that 1% increase in health expenditures will lead to 11.11% decrease in unemployment in long run. Health is a major component of human capital the people those are healthy and physically fit are employed more and vice versa because healthy people can work more as compare to unhealthy persons, healthy people gives more output so, usually they employed more that will leads to reduce unemployment in the economy. Study of Bashir et al. (2012) also gives the same results.

Coming to next variable results indicates the positive and significant relation among population and unemployment in case of Pakistan. We can say that 1% increase in population growth rate will lead to 4.916% increase in unemployment rate in long run. Education system of Pakistan is not too much strong that cannot able to produce technical and skilled labor due to lack of institution, further people are not provided with better health care facilities on the other hand population of Pakistan is increasing with very high speed that is causing to increase unemployment in the country.

Last independent variable is life expectancy rate it suggests that the relationship is statistically significant and also decreasing the unemployment means life expectancy rate is negatively related to unemployment. If life expectancy rate increase by one year it leads to 1.43% decrease in unemployment in long run. According to economic theory basically more expected life is indicating more health of the people means when people are healthy they have more life and healthy people brings reduction in unemployment, more age also indicates more experience and more experienced people employed more so they reduces the unemployment. That's why life expectancy rate is negatively related with unemployment rate.

**Residual**

Residual is generated for (VECM). For this, it is essential that when unit root test is applied on residual, it must be stationary at level. Results of unit root test given in table indicating that residual is stationary at level.

| ADF test statistic | -3.880830 |
|---|---|
| **t-statistics** | **critical values** |
| 1% | -3.679322 |
| 5% | -2.967767 |
| 10% | -2.622989 |

As the t value in the table is less than critical value its mean residual is stationery at level and VECM can applied to check short run impact and short run adjustments also.

**5.4 Vector Error correction Model(VECM)**

The study also analyze vector error correction model(VECM) for short run adjustments. As t-statistics in the table given below are greater than 1.6 with negative sign of coefficient indicating the significance of variables. Significant means they are converging towards equilibrium in long run.

**Table 4**

| Independent variables | Dependent Variables | | | | |
|---|---|---|---|---|---|
| | **D(Unemployment)** | **D(Health)** | **D(Life expectancy)** | **D(Literacy rate)** | **D(population)** |
| **D(U(-1)** | (-0.06)<br>[-2.312] | (0.0006)<br>[0.216] | (-0.022)<br>[-0.539] | (0.013)<br>[0.811] | (-0.126)<br>[-8.860] |
| **D(health(-1)** | (-0.608)<br>[-3.250] | 0.0006<br>0.028 | (-0.338)<br>[-1.128] | (-0.026)<br>[-0.220] | (0.004)<br>[0.889] |
| **D(life(-1)** | (-4.060)<br>[-1.844] | 0.250<br>0.971 | (-0.003)<br>[-0.001] | (-1.672)<br>[-1.166] | (0.095)<br>[1.523] |
| **D(literacy(-1))** | (-0.077)<br>[-0.575] | 0.012<br>0.788 | (-0.089)<br>[-0.425] | (-0.017)<br>[-0.200] | (0.015)<br>[4.096] |
| **D(pop(-1))** | (-3.02)<br>[-1.382] | -0.022<br>-0.549 | (0.494)<br>[0.891] | (0.441)<br>[1.96] | (0.847)<br>[13.561] |

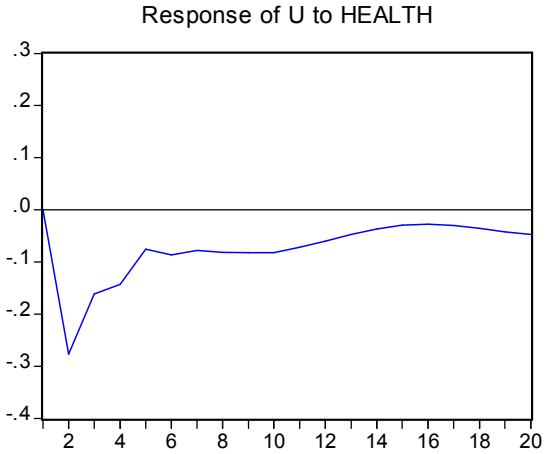
Results indicating negative and significant error correction term which is identified as speed of adjustment term for dependent variable unemployment. It advises that due to disturbance in the short run equilibrium will be restored by taking (0.06) 6% annual adjustments its mean this model moves towards equilibrium 6% annually and it takes almost (1/0.06 = 16.67) sixteen and half year to achieve equilibrium.

Variable population is also converging towards equilibrium in long run by taken
(-0.126) 12% annual adjustments and also it takes almost eight year to achieve equilibrium.

**5.5 Impulse Response Function**

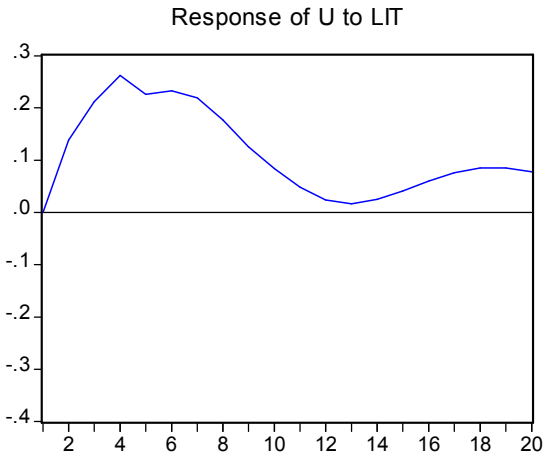
Impulse response analysis shows the response of dependent variable that is unemployment to shock in all other variables Ozer (2008).

Results of impulse response functions are following.

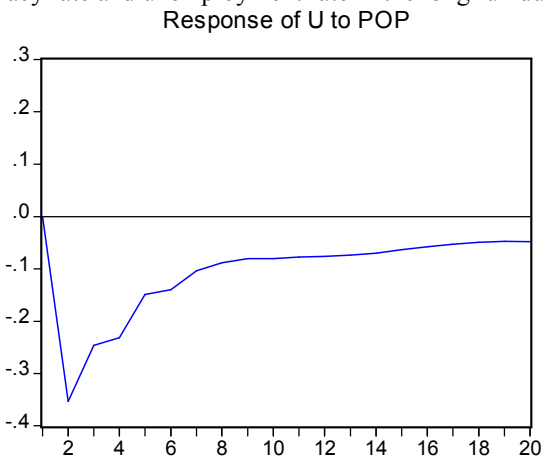



Graph shows the unemployment response due to health expenditures shock that is negative in the beginning but

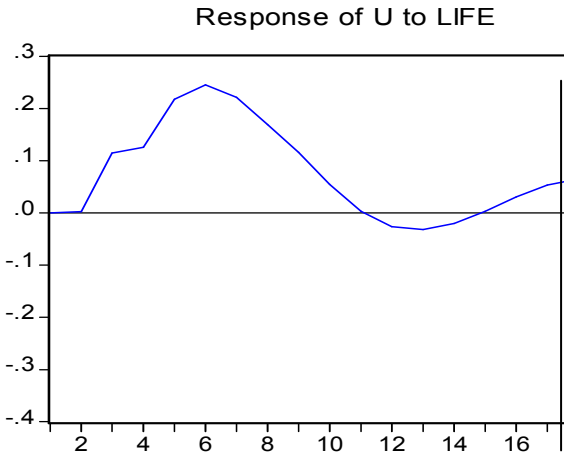
after that in some middle time period positive relation between health and unemployment and in the long run positive shock in health expenditures and reduces the unemployment rate in Pakistan.




Graph shows the unemployment response due to shock in literacy rate has positive impact on unemployment in short run after that this shock become negative in long run its mean there is negative relation exist between literacy rate and unemployment rate in the long run due to shock in literacy rate.




Graph shows some shock in population growth at starting time period and in short run there is a negative relation between unemployment and population but in the long run this relation is positive due to population growth shock.




According to the graph the response of unemployment is positive due to shock in life expectancy rate after that unemployment reduces due to shock in expected life but in long run response of population is positive due to shock in expected life. its mean positive relation exist between the expected life and unemployment rate in long run.

**6. Conclusion**

This study is conduct to investigate the impact of human capital on unemployment in case of Pakistan over the

period 1981–2010 time period study. The OLS and Johansen co-integration techniques have been used for assessment and ensure the significance of the variables in the short run and long run effect respectively. We know that unemployment is the very worst and a key problem for any country because due to this economy of the country become retort. It is conclude from this study that when the health and education sector of the country improved the rate of unemployment in the country decreases and vice versa because health and education are negatively related to unemployment. Because when the people of the country are well educated, technically skilled and physically fit the are able to work more and employed more into the labor market that leads towards reduction of unemployment level in the Pakistan. We have also analyzed the relationship of population growth rate and expected life with unemployment rate. The results shown that these two variables are positively related with unemployment rate an increase in these two variables also increases the unemployment rate and vice versa in case of Pakistan. In Pakistan the demand for jobs is more than their availability and the population of Pakistan is increasing rapidly the job opportunities are too much low so increasing population also increasing the unemployment in the country. The life expectancy is basically health indicator more expected life indicates better health facilities but according to our results the more expected life added more to unemployment rate in case of Pakistan. This problem arises due to unavailability of jobs and young workers are usually employed more because they can produce more and give more output.

The main finding of this study is that all the human capital indicators which are taken in this study have significant and affective impact to increase or decrease the unemployment rate in Pakistan thus all the null hypothesis of this study are rejected.

### 6.1 Suggestions

On the basis of results, it is recommended that Government has to extend the ratio of education and health expenditure. Because these two factors are most encouraging for reduction of unemployment level in the country. High investment in these two sectors are directly amplify the number of school and hospitals that increase the literacy rate and enhance the health condition of people that will leads reduces the unemployment condition of Pakistan. Government should also concentrate to control over population. Population of Pakistan is rising with increasing rate government have to reduce and it can be only possible when government create awareness to control population among people through different campaigns, if it cannot be possible than on the other hand by creating job opportunities for growing population for the reduction of unemployment rate in the country.

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**Data Table**

| Year | unmployment rate | health expend | edu epnd as GNI | population growth | life expectancy |
|---|---|---|---|---|---|
| 1981 | 3.5 | 0.77 | 1.51 | 3.4 | 56 |
| 1982 | 3.7 | 0.69 | 1.49 | 3.43 | 56.5 |
| 1983 | 3.85 | 0.73 | 1.75 | 3.44 | 57 |
| 1984 | 3.75 | 0.83 | 2 | 3.42 | 58 |
| 1985 | 3.65 | 0.79 | 2.12 | 3.38 | 60 |
| 1986 | 3.3 | 0.92 | 2.32 | 3.34 | 60.9 |
| 1987 | 3.07 | 1.14 | 2.11 | 3.29 | 60.9 |
| 1988 | 3.14 | 1.19 | 1.11 | 3.2 | 60.9 |
| 1989 | 3.141 | 1.07 | 2 | 3.07 | 61 |
| 1990 | 6.3 | 0.95 | 2.16 | 2.92 | 61.5 |
| 1991 | 4.689 | 0.86 | 2.29 | 2.76 | 60 |
| 1992 | 6.064 | 0.8 | 2.08 | 2.61 | 60 |
| 1993 | 5.283 | 0.81 | 2.4 | 2.53 | 60 |
| 1994 | 4.785 | 0.75 | 2.4 | 2.52 | 61 |
| 1995 | 5.099 | 0.72 | 2.37 | 2.56 | 63.5 |
| 1996 | 5.362 | 0.85 | 2.31 | 2.63 | 63.5 |
| 1997 | 5.755 | 0.82 | 2.33 | 2.66 | 63.7 |
| 1998 | 6.01 | 0.77 | 2.34 | 2.61 | 62 |
| 1999 | 5.906 | 0.73 | 1.93 | 2.47 | 65 |
| 2000 | 6.87 | 0.58 | 1.93 | 2.28 | 65 |
| 2001 | 7.829 | 0.58 | 1.93 | 2.08 | 62.5 |
| 2002 | 8.051 | 0.57 | 1.94 | 1.91 | 63.6 |
| 2003 | 8.267 | 0.59 | 1.92 | 1.8 | 64 |
| 2004 | 7.977 | 0.58 | 1.52 | 1.76 | 63.5 |
| 2005 | 7.691 | 0.6 | 1.71 | 1.77 | 63 |
| 2006 | 6.908 | 0.51 | 1.94 | 1.79 | 63.9 |
| 2007 | 6.195 | 0.57 | 2.06 | 1.8 | 63.8 |
| 2008 | 6.192 | 0.57 | 2.15 | 1.81 | 63.4 |
| 2009 | 6.2 | 0.56 | 1.92 | 1.81 | 63.7 |
| 2010 | 6.19 | 0.54 | 1.56 | 1.8 | 64.1 |