Relationship between Education, Health and Employment
A Time Series Analysis of Pakistan

Samiullah
National University of Modern Languages, Sector H-9 Islamabad
E-mail: sami4050@gmail.com

Abstract
This study investigates the Impact of health and education employment level in case of Pakistan over the period 1981-2012. The prime objective of the study is to identify and establish a link between health, education and employment. The Johansen co-integration approach is used to determine the long-run relationship among variables. 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 increase the employment level in the country.
Keywords: Health, Education, Employment

1. Introduction

Employment is the most important factor to achieve economic growth in approximately all countries of the world. Employment is defined as "to be in working position in return of wages or the condition of being in labor". Provision of employment is striking problem for developing countries because high rate of employment level is a particular factor which leads to economic development and but in advance countries provision of employment is a common problem. Most of the social harms are reduced with the provision of employment, like suicides, crimes, and poverty rate. Provision of high employment gratify employee, employee's family and even nations, achievement of job represent achievement of revenue both at individual level and national level.

Education is the major factor for the provision of employment. There is strong relationship between employment rate and education level. People can increase their employment opportunity cost by investing in their education. Employment rate and rate of return to education and have positive affiliation *Faridi et al. (2010)*. Non educated workers are less competent than educated workers in looking for new jobs and getting more earnings. If the study is specified about the developed countries literacy or education is most major factor about their societal and economic issues. Maximum budget spend by developed nations in education sector. In case of Israel it is supposed to be allocated 6% of its GDP in education system but Pakistan spends just 2.4% of its GDP on education sector in 2012.

Health has also huge affect on employment level. Healthy employees are more competent and more productive than non healthy workers. More employment opportunities are available to the healthy and physically fit worker because they are able to give more output so they employed more quickly which positively affect the overall economy *Chaudhary et al. (2010)*.

If take the example of developed countries like Germany spends 11.2% of its GDP as health expenditures which builds the strong human capital that reduces the unemployment rate. Developing countries deems low amount on health sector Pakistan spends only 2.5% of GDP in health sector which leads to poor health facilities in Pakistan and further it leads to decrease the chances of employment of the people in term of poor human capital.

1.2 Objective of the Study
This study is performed to examine the impact and relationship of health and education with employment level. Major objectives of the study are as follow.
1. To investigate the relationship of health and education with employment.
2. To highlight the impact of employment on Pakistan's economy.
3. To suggest some important policy points.

Hypothesis
H_o : there is a no impact of health and education on employment .
H_1 : there is a impact of health and education on employment.

All the data related to study have collected from World Bank and different issues of Economic survey of Pakistan. Its time series data from the year 1981 to 2012.
Employment level has measured with labor force participation rate out of total labor force available in Pakistan.
Education has measured with help of total public spending on health and literacy rate. Health has measured with the help of total public spending on health and life expectancy rate in country.
All the independent variables expected to have positive relationship with dependent variable.
Johansen Co-integration technique has applied after confirmation of stationarity level of all variables.

1.3 Organization of Study
The organization of study is Chapter # 2 is about literature review, study will clarify in brief Data and

methodology in Chapter # 3, estimation results are in Chapter # 4, conclusion and suggestions are given in Chapter # 5 and Chapter # 6 is about references.

2. Literature Review
2.1 Introduction
This study is going to review the health and education relation with employment rate in Pakistan. For this purpose different studies has reviewed at national and international level and main theme of all studies has given in section 2.3 of this chapter.

2.2 Theoretical Framework
Existing literature in this study elaborates the relationship of health and education with employment rate. It is reviewed that health and education are positively and significantly related with employment rate.

2.3 Empirical Studies at International Level
Kenndey and Vance (2006) measured the labor force participation rate by increase in level of schooling with the help of time series data. Results indicate that people with high level of schooling have more chance to be employed in labor market level of education and labor force participation have positive and significant relation with each other.

Suedekum (2006) analyzed the factors of human capital by taking labor force participation rate as dependent variable for west Germany case over the period of 1976 to 200. Results suggest that technically skilled cities or nations grow more than less educated and less healthy. Nation with highly skilled labor force shrink the level of unemployment in the particular area of study. Study conclude that there is significant relation between human capital and work force.

Laplange *et al*. (2007) examined the change in work force due to change in health and education indicators by taking panel data for estimation. Probability logit model has used to check the impact of explanatory variables and results shows there is positive and significant relation of health and education variable on employment level.

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.

Manoj and Pandey (2009) estimated 2SLS model to check the change in labor force participation change due to change in different dimensions of health sector. Results indicates there is strong positive relation between health of the people and labor force participation rate as the healthy and physically good worker have to do less struggle to be employed in 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.

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.

2.4 Empirical Studies at National Level
Faridi *et al*. (2010) examined the unemployment rate by taking education as independent variable. Study based on primary data gathered by different field surveys from Bahawalpur district of Pakistan. Log linear method has used to estimate the coefficients of independent variables. Results indicate that education has negative and significant impact on unemployment rate in Pakistan. Study also suggest that government should enhance the education and health facilities to reduce the unemployment in the country. A nation that is well-off in health and education sector can increases the development more rapidly.

Chaudhary *et al*. (2010) has investigated the increase in employment rate and wages if the changes made in education and health sector of Pakistan. Ordinary least square method has used to investigate the relationship between dependent and independent variables after collecting the primary feiled survey data. Results shows the significant impact as health and education sector improves it will leads to rise up the employment level as well as wages of the workers.

Rehman (2011) has studied to find out the reasons and solution for unemployment situation in Pakistan. Study based on secondary data and concludes that economy of Pakistan has taken long time to overcome backward stage and the major issue for the country is to provide employment opportunities as population of the country increasing. Pakistan is an agriculture economy with too much surplus labor and most of the surplus labor has no

jobs. At the end study suggest that government of Pakistan should take serious action to control over growing rate of unemployment.

Bashir *et al.* (2012) estimated the data taken from Pakistan for the year 1973 to 2009 with prime object of long run and short run estimation by taking employment level as dependent variable and education and health are independent variables. Johansen cointegration technique has used for long run and Vector error correction model used for short run analysis. Results provides an evidence that there is strong impact of education and health on employment in Pakistan. So this study suggest that government of Pakistan should increase the spending on health and education because these factor are helpful to build strong human capital in the country that have adverse impact on unemployment rate in Pakistan. Study indicates that education and health are major factors that reduces the unemployment in short run as well as in long run.

2.4 Conclusion

From the all above evidence at national and international level it is conclude that education and health has significant impact on employment rate. These two factors are helpful to boost the employment condition in both developing and developed nations.

3. Data and Methodology

3.1 Introduction

Study attempts to analyze the affect of health and education on employment rate in Pakistan. A time series data will be used for estimation from the year 1981 to 2012. First unit root test will applies on all variables to check the stationarity and than econometric model applied.

3.2 Selection of Variables

Labor force participation rate selected as dependent variable and education and health are selected as independent variable. Education further divided into total Public spendings on education (%age of GDP), Literacy rate and health divided into total public spendings on health (%age of GDP) and life expectancy rate for regression analysis.

3.3 Methodology

$$EMP = \beta_o + \beta_1 PSE + \beta_2 LR + \beta_3 PSH + \beta_4 LF + \mu$$

EMP = Labor force participation rate

PSE = Public spending on education (%age of GDP)

LR = Literacy rate

PSH = Public spending on health (%age of GDP)

LF = Life expectancy rate

μ = Error term

All the explanatory variables likely to have positive relationship with dependent variable.

Education and health has significant impact on employment rate in developed as well as in developing countries. That's why these two variables has taken as independent variables either these two variables are helpful or not to provision of employment in Pakistan.

4.Results

Unit root test has applied to check the order of integration of all variables. Table 4.1 represent the results of unit root test and the integration level of all variables.

Table 4.1

Variable	ADF-Statistics	Critical Values	Integration Order
LFP	-5.923329	-2.647120 (1%) -1.952910 (5%) -1.610011 (10%)	I(1)
PSE	-4.386546	-2.647120 (1%) -1.952910 (5%) -1.610011 (10%)	I(1)
LR	-3.749021	-2.647120 (1%) -1.952910 (5%) -1.610011 (10%)	I(1)
PSH	-4.047089	-2.647120 (1%) -1.952910 (5%) -1.610011 (10%)	I(1)
LF	-5.231816	-2.647120 (1%) -1.952910 (5%) -1.610011 (10%)	I(1)

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.

Cointegration Test

Study now analyze the long-run affiliation among the dependent and all independent variables. For this purpose cointegration test is applied to analyze the long run relation between dependent and independent variables.

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 evidence about long run cointegration relationship. Probability values illustrate that null hypothesis is rejected. Results for cointegration analysis are in table 4.2.

Table 4.2

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.739622	97.82088	69.81889	0.0001
At most 1 *	0.668849	58.79786	47.85613	0.0034
At most 2	0.434432	26.74760	29.79707	0.1079
At most 3	0.229513	10.21980	15.49471	0.2642
At most 4	0.087598	2.658552	3.841466	0.1030
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.739622	39.02302	33.87687	0.0111
At most 1 *	0.668849	32.05026	27.58434	0.0124
At most 2	0.434432	16.52780	21.13162	0.1955
At most 3	0.229513	7.561245	14.26460	0.4251
At most 4	0.087598	2.658552	3.841466	0.1030

*Note. *showing the rejection of Null hypothesis*

Results shows the long-run affiliation exist among all variables as the trace and maxeigen statistics indicates there are at most 2 cointegrated relationship in the long run where the value of trace statistics is greater than the critical values for each of the variables at 5% significance level.

Normalized cointegrating coefficients

Table 4.3 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.

Table 4.3

Variable	Coefficient	Standard Error	T-statistics
PSE	-0.406475	0.20424	1.9901
LR	-0.185007	0.01721	10.749971
PSH	-0.460564	0.04330	10.636582
LF	0.119724	0.05793	2.0667012

EMP = 0.4064PSE+0.1850LR+0.4605PSH-0.1197LF

First independent variable public spending on education is positively and significantly impacting the dependent variable as the t-value is significant for this variable. 1% increase in this variable will leads to 40% increase in employment rate in Pakistan and vise versa. If investment increases in education sector more schools, colleges, universities and other education facilities provided to the general public in the country in results more educated and more productive people can be pushed into labor market that will reduce the unemployment and increases the level of employment in Pakistan.

Second independent variable is literacy rate t-value for this variable is statistically significant and indicating there is positive impact of literacy rate on employment level. If 1% increase made in literacy rate it will leads to increase employment level by 18% and vice versa in long run. According to economic theory literacy rate increases the employment level in the country because people with high qualification and higher education have high chances of to be employed because they have more skills and more efficient to the output level. *Christelle et al. (2010).*

Next independent variable that is public spending on health it is also have significant and positive impact on employment level in Pakistan. Results suggest that 1% increase in health expenditure will leads to increase employment rate by 46% and vice versa it is highly significant to employment rate as economic theory explains

the positive relation between health expenditure and employment rate that healthy workers are able to work more and they can produce more so they are more employed than non healthy workers into the labor market. Samre results are given in the study of *Bashir et al.*

Life expectancy rate is last independent variable taken in regression analysis. For this variable t-value is significant and results suggest the negative impact of life expectancy rate on employment level in case of Pakistan. If life expectancy increase by 1 year it will decreases the employment level by 11% in the country. More life of the people indicate more health of the people that enhance the employment level in the country but in case of Pakistan jobs opportunities are not increasing so much as unemployment rate increasing day by day most of the people are unemployed if the expected life increase it will put inverse impact on employment level of the people.

5. Conclusion and Suggestions
5.1 Conclusion
This study analyzed the impact of education and health on employment level of Pakistan for the year of 1981 to 2012. Conclusion of the study is that all the independent variables have significant impact on employment level. All the variables have positively impacting the employment rate except life expectancy rate. Results suggest that people with higher level of education and greater health have more chances of being employed in the labor market because they are more productive more skilled and more efficient. In case of life expectancy rate it decreasing the employment level in Pakistan because of lack of job opportunities new workers face difficulties to be employed.

5.2 Suggestions
On the basis of results suggestions are that government can increase the education and health budget in order to produce healthier, efficient and skilled labor that will directly increases the employment level in the country. Government can also concentrate to control over education and health facilities in private sector of the country to provide basic infrastructure for the growth of health and education sector so that well educated well skilled and healthy worker can produced and these types of workers increases the employment level due to more chances of being employed.

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