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## IMPACT OF HUMAN CAPITAL FORMATION ON PAKISTAN'S ECONOMIC GROWTH

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### ABSTRACT

*The term human capital formation indicates the process by which the labor force become the productive. The spending on education, health, knowledge and the skills of the labor force facilitate human capital formation. The human capital formation is very important for the progress of an economy and specially in the labor surplus countries such as Pakistan. The objective of this paper is to find out the impact of human capital formation on the economic growth of the Pakistan over the period of 1985 to 2015. The ARDL econometrics approach was applied for empirical analysis and results found that human capital formation has contributed significantly in Pakistan economic growth. Therefore, we recommend that Government of Pakistan must frame such policies which encourage human capital formation in the country.*

**Key Words:** Human Capital Formation, life expectancy, Secondary School Education, ARDL

**Type of Paper:** Original research paper.

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## 1. INTRODUCTION

### 1.1. Background of study

Human capital is the features of population that possess abilities, training, skills to work, level of knowledge and talent. The developing countries are normally characterized as high population so it is very important to improve the labour force (Akram et al, 2008). The specific term human capital formation characterized as the increase in the portion of population that has good education, health facilities, skills and experience of work. The progresses of an economy or improvement in political standards are based on human capital formation.

The level of production is the base of economics activities and it creates job opportunities. The factors of production that is land, labor, entrepreneurship and capital can be efficiently utilized by the human capital formation. Moreover, the efficient management is only possible thorough the

human capital formation by educating and training them (Abbas et al, 2008). Agriculture has big share in GDP of Pakistan and educated farmer can better cultivate its crop by using latest methods. Only educated farmer can conduct latest equipment in his farms such as latest pesticides, fertilizers and other methods of harvestings (Iqbal et al, 2001). We can say the performance of a skilled people is better rather than the unskilled people such as skilled accountant, carpenter, teacher and doctor can perform better. The education at primary and high level makes possible to skill and productive labour force. The provision of primary education opens the door to get higher education and it improves the literacy rate. There are many previous studies such as Qadri and Waheed, (2011) found that education improves the agricultural productivity as well as economic growth of Pakistan. The skilled and educated labor force engaged in agricultural sector can utilizes technology and other inputs efficiently. Health standards shows the key factors that influence human capital and good quality of medical and health services make the labour force more productive, eventually accelerate economic growth in developing nations. The World Bank suggested that the primary and secondary education increases the income of the people that finally caused the reduction of poverty.

Developing countries are facing many economic issues and in these issues the budget and trade deficit are more critical. Due to shortage of budget these countries are unable to allocate a sufficient amount for human capital formation. The low investment on human capital formation results in the low education, poor health standards and unskilled labor force. To meet the budget shortage most of the developing nation relies on the foreign assistance and this assistance is financing of the human capital formation. Many studies explored the foreign aid spending on human capital formation that resulted positive impact on the economic growth (Ahmad et al, 2007). But there is a drawback regarding allocating the aid on human formation, the money of aid has to pay back after a specific period of time and at the time of repay it to create burden on the aid receiving economy. The economy of Pakistan facing poor law and order conditions that resulting is low foreign aid and investment. This low level of investment create constrains to invest more on human capital formation and people are unable to avail latest technology. So, the foreign investors must be facilitated by providing them more attractive environment.

The health and education sectors play most essential role in human capital formation. However, these both sectors are neglected in Pakistan. The other neighbor countries of Pakistan and the

countries in the same region found better human capital formation and Pakistan is far behind in human capital formation. The table 1 makes the comparison of human capital formation on regional basis.

**Table 1.: Regional comparison of Health and Education expenditures:**

Countries	Education Expenditures as % of GDP	Health Expenditures as % of GDP	Life Expectancy at birth	Literacy Rate
Bangladesh	2.5	0.9	65.7	53.5
India	3.8	0.9	63.4	66.0
Maldives	7.1	6.3	71.1	97.0
Nepal	3.4	1.5	66.3	56.5
Pakistan	<b>2.3</b>	<b>0.4</b>	<b>66.2</b>	<b>54.2</b>
Sri Lanka	6.2	2.0	74.0	90.8

**Source: UNDP, Human Development Report, 2010**

### 1.2. Statement of Problem

Pakistan is facing high population growth and the most of the labor force is not skilled to work efficiently. It is very important to make the labor force skill so that it can take part in the economic activities in a better way. The human capital formation improves the skills of the people and it is advised to spend a comprehensive amount to develop labor force. By investing in human capital the labor force become capable to eradicate the poverty by contributing in productive activities. The human development index and other factors that quantified human development condition showed poor situation of human development in Pakistan. The health facilities, literacy rate, safe drinking water and quality education are characterized very low. The past trends indicate government of Pakistan is interested to invest in physical goods and investment in human capital comprehensibly ignored. Thus, to solve this issue the current study explores the impact of human capital formation on the economic growth of Pakistan.

### 1.3. Objective of the Study

The main objectives of this study are as under:

1. What is the importance of human capital for the economy of Pakistan?

2. What is relationship between human capital formation and economic growth of Pakistan?
3. What policies can should be followed for human capital formation?

#### **1.4 Significance of the study**

This study is important for following reasons:

The current study finds the relationship between the human capital formation and the economic growth of Pakistan. The recent time period employs for empirical estimation over the period 1985 to 2015. The importance of human capital formation for the economy of Pakistan. There, it is a significant economics research that contributes to explore the importance the human capital formation and its impact on the economic growth of Pakistan

## **2. LITERATURE REVIEW**

Elena Pelinescu (2015) explained the impact of human capital on economic growth. The author analyzed the growth on three categories deeply with the sense of growth theories, she explained and mentioned there are three region of growth which have smart, sustainable and the knowledge of the people as a human capital. She explained that it has been observed that the aims to get a suitable economic growth by human capital cannot be essay because without proper education and learning process. The better training system can be modified the human capital by better ways because an educated individual can put great effort on the research activities rather than illustrate person. In her conclusion, she estimates the panel data of different countries that the low investment in education and health (human capital) can negatively affect the development of the countries.

Mankiw et al. (1992) explored relationship between human capital and economic growth. They analyzed their investigation on the basis of secondary data which is collected with different sources. They followed the Solow model of growth in which human capital focused, measured and calculated. The study used the secondary school enrolment as proxy variable to measure the human capital. The results of the study indicated that human capital is the significant effect on growth rate of the country and it has an increasing function of the growth. The increase in human capital increased the economic growth of the country. They suggested that every country should a higher investment on human capital to achieve their goal of higher output level.

Josan (2013) explained relationship among the human capital and organizational effectiveness. The author analyzed human capital formation can be achieved by the excellence, effectiveness and competitiveness and all of these are characteristics of organizational effectiveness. The author explained that human capital is the source of the competitiveness and it is the human skill, their adorable knowledge. So increased the competitiveness than also increase the human capital in which their skill, education, and health play a significant role. By obtaining a large organizational effectiveness human capital can be promoted or large investment on human capital by their education, training, their health etc. In this study the author used time series data in which he measured human capital by the education and training. He found that there has been a significant and positive role of education and training on the organizational effectiveness

Amin et al. (2012) investigated the human capital and economic growth. They analyzed time series data of Pakistan to their research over the period 2000 to 2011. The data was collected through different source such as the economic survey of Pakistan, WDI and IMF. Different economic techniques adopted by the estimation but they used the correlation technique for basic estimation of the model. They used primary and higher education, life expectancy by the proxy of human capital. The results indicated that these proxy variables such as primary education and life expectancy are significant and positive effect on the economic growth. But other variables secondary enrolment had inverse relationship with economic growth of the Pakistan during study period.

Bontis and Serenko (2009) explained the important consequences of the human capital model. They analyzed financial services industry of Canada. They conducted primary data and also conducted the 396 employees of administration of the credit unions. Knowledge management is the most important factor to the firm because if the worker was more accurate knowledge than they are more efficient to their firm and it is the important factor of the firm. T-test is used for estimation and results indicated that knowledge management is the most important factor firm development and also it had done by suitable training.

Salim et al. (2004) analyzed the topic of the human capital and organizational performance. They conducted their research in an Egyptian Software company. They collected the sample of 38 companies out of total 107 but the only 16 had been positive responded and allowed to supply their data. They formulated different types of questionnaires and filled them. They conducted different

types of interviews for their concluded data. Data was analyzed by the correlation and regression techniques. The outcomes of the study indicated that imitability, ideas, intelligence and ambition of the employees are influenced by the firm's productivity.

Yahaya (2007) analyze the impact of investment on the human resource. The author conducted his research to the efficiency of employees of the Nigerian banks. He selected three banks of Nigeria for the empirically estimation. The primary data was collected through questionnaire and interviews of the employees were conducted. Basically it was collected from Training and Development Activities Scale (ATDAS) of the Nigerian Banks. To check the employee's effectiveness, he used some econometrics techniques such as OLS to obtain his results. The outcome of this study was that more efficient worker can promote the banks performance. He suggested that if banks increased the retirement benefits, compensation and provide them better training program to their employees and they can achieve their goals in a better way.

### **3.CONCEPTUAL FRAMEWORK**

#### **3.1 Rostow's Stages Theory:**

This theory argues that there are different stages which are necessary for the growth of an economy (Todaro, 2006). All the economies that are developed today also passed through this stage of growth and these stages are as under: -

1. Traditional Society
2. Pre-condition to take off
3. Take off stage
4. Drive to maturity
5. High mass consumption

In the traditional society stage all work was done by the labor and the quality of labor force was poor. The only source of income was cultivation and the cultivating methods were backward. The people were illiterate, unskilled and education level was also deprived. It will be right to say that it was pre Newton age and human capital formation was underprivileged.

In second stage that is Pre-condition to take off, people start thinking about the science and invention. New ideas and knowledge was introduced during that period so, in second stage of growth human capital formation started. People knew the importance of education and the economic situations.

The duration of third stage is twenty to thirty years and it has some distinguish properties such as

- Five to ten percent of investment level with related to GDP must be fulfilled
- Maintenance of political and social institution must be there in society
- At least one industrial sector must be developed in third stage

Thus in third stage of growth the human capital was important and formation of human capital was appreciated.

After third stage, next stage is drive to maturity develops business and technology. The development in medical and educational sector are the most important pillar of forth stage and human capital mere develops in forth stage. The betterment in education and health qualities empowered human capital formation and history of USA proved it.

The twentieth century represents the high mass consumption stage and the luxuries are common in final stage of growth. The luxuries such as TVs, ACs, modern ways of transportation and high calories food improves the people's qualities. The education level is very high in this stage and different modern techniques are introduces to develop the labor. Thus this final stage is the peak point in the human capital formation.

### **3.2 Solow Neoclassical Growth theory:**

The Solow theory of growth basically focused of the capital accumulation that leads to increase in economic growth. The model illustrates that increase in foreign and domestic investment caused capital accumulation that provides the help for economic growth. The current model is different from Harrod-Domar growth model because it includes the technological level and more important factor of labor force. These both factors referred to diminishing returns as individually and the constant returns to scale as jointly. However, technological factor was considered exogenous by the Solow Neoclassical Growth theory. The standard form of model presents in equation in the following equation: -

$$Y = K^{\alpha} (AL)^{1-\alpha}$$

The Y indicated the gross domestic product, K shows the capital which includes both physical and human capital, the variable A indicates the labor productivity and L is labor factors involves in gross domestic product. In this equation, it an elasticity of physical and human capital that shows the impact of percentage change in capital on total output.

Here is an important point in the model, the quality and quantity of labor force is main factor to determine the output. Moreover, it also indicates that there are three factors that can boost the output growth. These three factors are capital accumulation by increasing savings and investment; increasing the quality of technology and improving quantity and quality of the labor force. This process of production is very low in the close economy because the low savings and investment. The open economy increases trade opportunities, increase in foreign savings and increase in foreign investment improves productivity. The trade openness encourages the foreign investment that brings new ideas, capital inflows and modern technology.

### 3.3 Romer's Growth Theory

The Romer's growth theory follows the exogenous growth approach and it mainly explains the technological spill overs and the knowledge of effectiveness of labor. According to Romer, growth process starts by the firms because each industry produces the constant returns. Here the theory indicates the production level depends on the knowledge of the firm and a high knowledge firm produces the more output. The current theory criticized on the saving and investment type growth models of Harrod-Domar and the Solow's. In short, Romer's growth theory explained that production function that depends on capital, labor and Knowledge/effectiveness of labor. This is shown in the following equation:-

$$Y = f(K, AL)$$

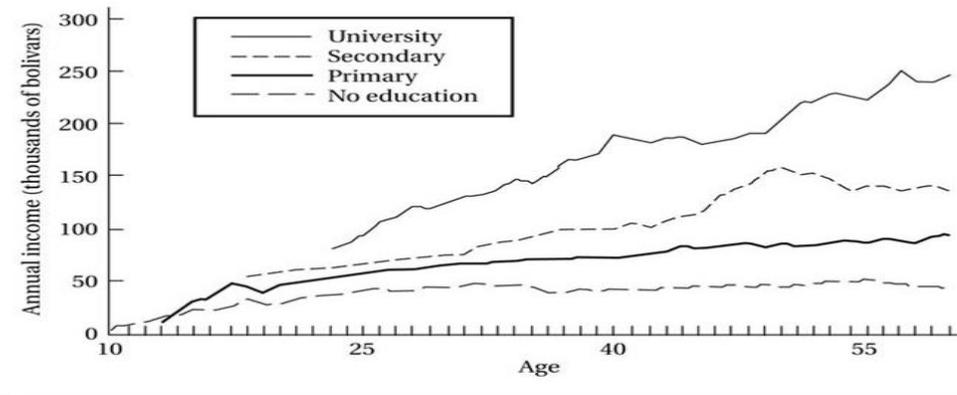
This model indicates that the knowledge of labor increase is also a technological progress as term AL shows effectiveness of labor force or technological progress. In this equation Y is output, K is capital, L is labor and A represents the knowledge or effectiveness of the labor force. There are many flaws in the theory such as it represents only the single sector that is industrial sector and its output. The Romer's model is unable to capture the labor force that migrate from the rural to urban sector such as the Lewis model explains the migration from the rural to urban sector. The third word is normally lack of efficient infrastructure, lack of good technology and modern research in industrial sector so; it is not an appropriate theory to develop the human capital.

### 3.4 Investment in Education and Health: Human Capital Approach

The spending on education and health are solid tools in human capital formation because it improves the qualities of people. Human capital formation is often known as the quality of education, health and other skills in labor force. The current theory argues that investment in

physical capital will increase the income in future which can utilize the improvement in health and education qualities. Thus, this theory indicates indirect impact because by the increasing in income also improves the well-being of the people.

**Figure 1: Earnings by age and level of Education**



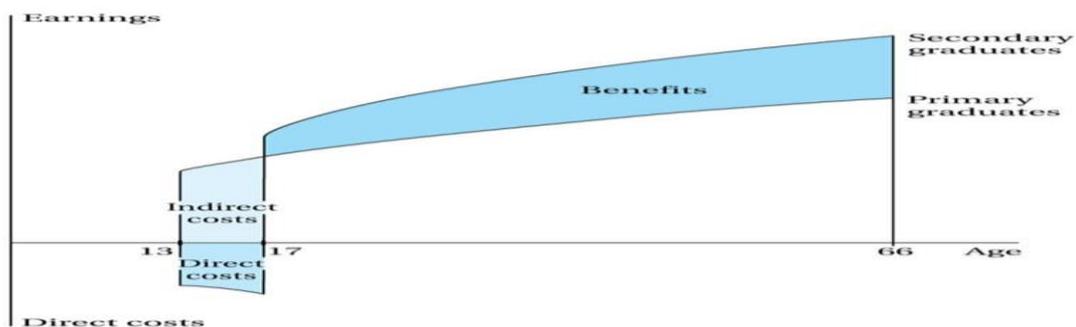
**Source: World Bank**

Figure 1 indicates the life cycle of income that shows income changes with the change in education. The gain from income can be written as

$$\sum \frac{E_t - N_t}{(1+i)^t}$$

Where the E shows the income that change with the additional education and N depicts the income without that additional income. Discount rate depicts by I and t shows the time period.

**Figure 2: Financial trade-offs in the decision to continue in school**



**Source: IBRD Report, 2009**

Figure 2 describes the trade-off with the decision involves for schooling. It is supposed a person works when he leaves the school and continues the work until he died. The average age selected 66 years and the different level of schooling such as primary and secondary as discussed in the figure. The 13 years of age presents the primary education and 17 years' age presents the secondary education. The higher education responds the higher return as the shaded area shows the benefits for the secondary education.

#### 4. RESEARCH METHODOLOGY

The main purpose of this research study is to analyze relationship between human capital and economic growth of Pakistan during the period of 1985-2015.

##### 4.1 Data Source and Time Period

Data is basically time series from period of 1985 to 2015 of Pakistan economy and data was collected from different sources such as Economic Survey of Pakistan, World Development Indicators (WDI) and Ministry of Finance, etc.

##### 4.2 Model Specification:

In this model we have used GDP per capita as independent variables. Human capital can be measured by the secondary school enrolment and life expectancy. Other supporting variables are trade openness, gross fixed capital formation and inflation. The model has been engraved in the following equation: -

$$Y_t = f(INF, SSE, LE, TR, GFCF) \quad (1)$$

Where

$Y_t$  = GDP per capita

SSE = Secondary School Enrolment

TR = Trade Openness

INF = Inflation

LE = Life Expectancy

GFCF = Gross Fixed Capital Formation

Now the model is specified below,

$$GDPPC = B_0 + B_1 OPP + B_2 SSE + B_3 LE + B_4 GFCF + B_5 INF + U_i \quad (2)$$

## 4.2 ESTIMATION TECHNIQUES

Present study is to measure the impact of human capital on economic growth of Pakistan for the period of 1985-2015. GDP per capita is taken as dependent variable and the explanatory variables are inflation rate, employment labor force, gross capital formation per worker, trade openness, and agriculture value added growth rate and manufacturing value added growth rate. The following estimation techniques were used to analyze data: -

1. Multiple Regression
2. Unit Root Test
3. Ordinary Least Square
4. The ARDL Approach

## 5. DATA ANALYSIS

### 5.1 Descriptive Analysis:

Descriptive statistics are related to the variables that are used in current study and these variable are the part of economics model. The result of descriptive statistics illustrates in table 1 which indicates the central tendency, dispersion and probability value of the time series data.

**Table 2 : Descriptive statistics of the variables**

	<b>GDPPC</b>	<b>GFCF</b>	<b>INF</b>	<b>LE</b>	<b>SSE</b>	<b>TR</b>
<b>Mean</b>	1.95	2.76	8.55	63.75	28.869	34.07
<b>Median</b>	2.13	4.18	8.68	63.88	29.42	34.01
<b>Maximum</b>	5.49	19.90	20.28	68.55	39.58	38.90
<b>Minimum</b>	-1.43	-7.70	2.91	59.61	19.10	28.12
<b>Std. Dev.</b>	1.77	6.07	3.86	2.361	6.26	2.62
<b>Skewness</b>	0.16	0.42	0.71	-0.05	-0.05	-0.03
<b>Kurtosis</b>	2.50	3.67	3.92	2.029	1.90	2.61
<b>Jarque-Bera</b>	0.46	1.53	3.74	1.23	1.55	0.19
<b>Probability</b>	0.79	0.46	0.15	0.54	0.45	0.90
<b>Sum</b>	60.59	85.6	265.27	1976.46	894.95	1056.42
<b>Sum Sq. Dev.</b>	94.41	1108.15	448.88	167.23	1176.01	206.48
<b>Observations</b>	31	31	31	31	31	31

**Source: Author's calculation based on EViews 9.0.**

Table 2 presents the descriptive analysis of the data. Total 31 observations explored for all the variables by descriptive statistics. The GDP per capita has the value 1.91 with standard deviation 1.77 and the value of mean of LE is 63.7 with standard deviation is 2.3 and SSE has 28.86 as mean value with standard deviation is 6.26. The mean value of INF funds 8.5, having the 3.86 standard deviation. Trade Openness (TR) depicts the 34.07 mean value and standard deviation is 2.62 and the gross fixed capital formation (GFCF) finds the 2.76 as mean value and 6.07 as the value of standard deviation.

## 5.2 Correlation Analysis

**Table 3 Correlation Matrix**

	<b>GDPPC</b>	<b>GFCF</b>	<b>INF</b>	<b>LE</b>	<b>SSE</b>	<b>TR</b>
<b>GDPPC</b>	1					
<b>GFCF</b>	0.48951	1				
<b>INF</b>	-0.33026	-0.22279	1			
<b>LE</b>	-0.15108	-0.18744	0.258941	1		
<b>SSE</b>	-0.37034	-0.23248	0.357287	0.866914	1	
<b>TR</b>	-0.02323	0.310853	0.307221	-0.46214	0.42523	1

Source: Author's calculation based on EViews 9.0.

The correlation among the variables shows in table 3 and these variables. Correlation matrix is showed the strength of relationship. Correlation matrix among the GDPPC (GDP per capita), inflation rate (INF), gross fixed capital formation (GFCF), life expectancy (LE), trade openness (TR) and secondary school enrolment (SSE) are shown in table 3.

## 5.3 Unit Root Test:

Unit root technique is commonly employs to check the stationary of the data set and it is an imperative before the estimation of data. There are two techniques employ to check the stationarity of the data that are ADF (Augmented Ducky Fuller) test and (PP) Philliphs-Perron test. The table 4 presents the results of ADF unit root test.

**Table 4 Augmented Ducky-Fuller Unit Root Test:**

Level			First Difference		
Variables	Intercept	Intercept & Trend	Intercept	Intercept & Trend	Conclusion
<b>GFCF</b>	-4.07820 0.0031	-0.42415 0.0188	-6.91623 0.0000	-6.80211 0.0000	I(0)
<b>INF</b>	-2.5472 0.1155	-2.5545 0.3023	-6.7161 0.00000	-6.61800 0.0000	I(1)
<b>TR</b>	-2.54670 0.1151	-3.1643 0.1106	-7.6786 0.0000	-7.5498 0.0000	I(1)
<b>GDPPC</b>	-4.98726 0.0000	-4.37013 0.0000	-10.5159 0.00000	-8.73579 0.00000	I(0)
<b>LE</b>	-3.3636 0.0248	-6.0028 0.0002	-2.71128 0.0847	-4.32308 0.0127	I(0)
<b>SSE</b>	-1.1262 0.6921	-2.5037 0.3241	-3.9573 0.0763	-5.3676 0.0008	I(1)

Source: Author's calculation based on E-Views 9.0.

Table 4 shows the results Augmented Ducky-Fuller unit root test. The results show that some variables are stationary at level I (0) such as GDP per capita, life expectancy and gross fixed capital formation whereas the other variables as secondary school enrolment, trade and inflation are stationary at first difference I (1). So the result suggested the ARDL model of estimation is appropriate technique to estimate the current data.

**Table 5 Phillips-Perron Unit Root Test:**

Level			First Difference		
Variables	Intercept	Intercept & Trend	Intercept	Intercept & Trend	Conclusion
<b>GFCF</b>	-5.6830 0.0001	-0.3283 0.0389	-7.97323 0.0000	-7.8038 0.0000	I(0)
<b>INF</b>	-3.4379 0.2176	-3.4679 0.4022	-7.46788 0.00000	-8.5786 0.0000	I(1)
<b>TR</b>	-2.7930 0.1270	-2.5378 0.2106	-6.4790 0.0000	-8.7699 0.0000	I(1)
<b>GDPPC</b>	-5.8734 0.0008	-5.8343 0.0003	-9.8539 0.00001	-9.73579 0.00000	I(0)
<b>LE</b>	0.7636 0.9948	-1.1828 0.6404	-3.5165 0.0583	-3.5693 0.0045	I(1)
<b>SSE</b>	-3.1562 0.3901	-3.5037 0.2807	-4.8032 0.0563	-7.9020 0.0001	I(1)

Source: Author's calculation based on E-Views 9.0.

Table 5 shows the results Phillips-Peron unit root test. The results shows that some variables are stationary at level I (0) that are GDP per capita and gross fixed capital formation whereas other variables such as secondary school enrolment, trade, life expectancy and inflation are stationary at first difference I (1). The results show in the table 5 prove that ARDL model of estimation is appropriate technique to estimate the current data.

#### 5.4 Bounds Test

Before applying the ARDL technique to estimate, first we check the long run relationship of the variables is created or not, by this we adopt the bounds test. Bound test elaborates that long run

relationship in the model is existing or not. It tells that if the value of F-statistics is larger than critical value than reject the null hypothesis and if F-statistics value is less than critical value than accept the null hypothesis. Table 6 shows that there has been long run relationship exist in the model.

Null Hypothesis: there is no long run relationship

Alternative Hypothesis: there is long run relationship exist

**Table 6 Bounds Test:**

Test Statistic	Value	k
F-statistic	8.186910	5
<b>Critical Value Bounds</b>		
Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	3.41	4.68

Source: Author's calculation based on EViews 9.0.

The table 6 illustrates the result of bounds test and indicates there are log run relationship exists in model. Thus ARDL model of estimation is applicable on the current model.

**Table 6: Results of Human Capital Formation and Economic Growth Model**

Dependent Variable GDPPC				
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GFCF	0.10095	0.032851	3.073176	0.0077
INF	-0.11209	0.054306	-2.063466	0.0568
LE	0.44504	0.123458	3.604824	0.0026
SSE				

	0.31496	0.053328	5.906208	0.00000
<b>TR</b>	-0.00545	0.074015	-0.173433	0.3424
<b>C</b>	14.5176	8.436491	1.191552	0.0738

The goal of this study is to find the effect of human capital on economic growth during the period of 1985-2015 for the economy of Pakistan. We used the proxy variable of secondary school enrolment and life expectancy for measuring the impact of human capital. The other variables are used as supporting variables which are gross fixed capital formation and inflation. The coefficient value of secondary school education is .314 and the prob value is .000 that shows the significant at 5% level. The secondary school enrolment and GDP per capita has positive and significant effect and this result also consistent with (Ahmad 2001, Asghar et al. 2012). It shows that if the enrolment in secondary school increase than growth rate also increases. The possible reason behind this result is that education enhances the knowledge and skill of the people and they can contribute in economic development in a better way. The coefficient value of life expectancy is .044 and the probability value is .00006 that shows the significant at 5% level. The relationship between GDP per capita and life expectancy has found positive and significant and these results are consistent with the results of (Jandhlaya et al.2016, Akram 2012, Cervellati 2009). Higher life expectancy mostly promotes the favorable environment for labor growth. Higher the life expectancy results the higher growth rate of the country.

The gross fixed capital formation and GDP per capita also found positive and highly significant relationship and these results are consistent with the studies of Ali (2014), Gibescu (2010) and Khan (2005). The value of coefficient is .1009 and the prob value is significant at 5% level for the GFCF. This indicates that if increase the fixed capital formation than economic growth of the country increases and vice versa. Gross fixed capital formation increases the production and economics activities in the country.

The coefficient value of inflation is -.11 and the prob value is .0056 that shows the significant at 5% level for the inflation variable. Inflation has negative impact on GDP per capita but it has significant effect on the economic growth (see also khan 2005, Levine 2008). Higher the inflation rate shows that low the growth rate of the country.

Trade openness found not only insignificant effect on economic growth but also has negative impact on the economic growth such as (Yanikkaya, 2003 and Ramey 1995) explored the same results. Pakistan is a developing country, so its imports are greater than its export which caused trade deficit. This trade deficit negatively effaced the economic growth but this impact is insignificant.

### 5.5 Vector Error Correlation Model

The short run result of ARDL model describes by the vector error correlation model and it tells the divergence and convergence of the variables. The table 7 shows the results of Vector Error Correlation model.

**Table 7 Vector Error Correlation Model:**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDPPC(-1))	0.686490	0.188932	3.633524	0.0077
D(GFCF)	0.106410	0.053916	1.973646	0.0659
D(INF)	-0.075464	0.073026	-1.033389	0.3168
D(LE)	8.260073	2.574979	3.207822	0.0055
D(LE(-1))	-27.197635	10.637401	-2.556793	0.0211
D(SSE)	0.091172	0.093080	0.979507	0.3419
D(SSE(-1))	0.242019	0.129899	1.863124	0.0809
D(TR)	-0.021216	0.165325	-0.064689	0.3424
CointEq (-1)	-0.852264	0.593110	-1.436940	0.0556

Source: Author's formation based of the E-Views 9.0

The table 7 shows the short run relationship between the dependent and independent variables of the model. In vector error correlation model the speed of adjustment presents by COINTEQ 01. The time takes by a variable move to the equilibrium level and it also indicates the slowly or quickly divergence or convergence of variable. The COINTEQ 01 has the -.85226 coefficient value that refers to the convergence condition. It indicates that the change in the economy of Pakistan will take place near symmetry in the long run period of time and the speed can be forecast as 85 percentage points.

## **6. CONCLUSIONS**

The study has explored relationship between human capital formation and economic growth in Pakistan over the time period of 1985 to 2015. We used time series data and estimate the model by the ARDL technique to find the results. Different studies have different results. Some studies concluded that human capital and economic growth is positive related that are found by (Mehraha and Musai (2013), Amjad (2005) but some other studies highlighted inverse relationship between human capital and economic growth such as (Akram 2008). The theoretical review of the study is focus on the stability and the importance of human capital.

Time series data of 1985 to 2015 extracted from the World Development Indicator (WDI). We used the proxy variable of secondary school enrolment and life expectancy to measure the human capital. The other variables used as supporting variables are gross fixed capital formation, trade openness and inflation. The relationship between GDP per capita and life expectancy have a positive and significant relationship. Higher the life expectancy, higher will be the growth rate of the country. The secondary school enrolment and GDP per capita has positive and significant effect. It shows that if the enrolment in secondary school increases than it brings positive effect on economic growth. The gross fixed capital formation and GDP per capita have also positive and highly significant. It indicates that if fixed capital formation increases than economic growth of the country also increases. Inflation has negative impact on GDP per capita but it has significant effect on the economic growth.

## **7. POLICY RECOMMENDATIONS**

On the basis of the above discussion, we make the following recommendations: -

1. Government should take steps to promote better education for all individuals. It will increase productivity and economic growth.
2. Government should make investment in health care of the people because a higher life expectancy will accelerate a productivity and economic growth.
3. Government should increase the employment opportunities for individuals because it's a biggest problem in the way of economic development.
4. Inflation should be managed because higher inflation can reduce the purchasing power of the people.

5. Government should increase women education because in this way fertility rate will be reduced and productivity level will increase.
6. Public funds must be allocated efficiently in education and health sectors and there must be a big share of foreign aids and investments to be allocated to these sectors.
7. Government must promote practical education and trainings for development of human capital. the resolve of growth the human capital.
8. There must be credit marketplace that delivers credits to students against their future income.

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### Contribution of Authors

This research paper is a part of the dissertation written by Mr. Ali Saeed under the supervision of Prof. Dr. Abdul Ghafoor Awan. It is an original research paper. He chose title of paper, collected relevant material and finalized the paper. Prof. Dr. Abdul Ghafoor Awan provided necessary guide in selection of title, relevant material, research methodology and analytical techniques. He also edited the paper, corrected its language, punctuations and made its formatting as per research standards. He has given final shape to this paper as well. Thus, this paper is the joint efforts of both authors.