Human Capital and Economic Growth Nexus in Pakistan: The Role of Foreign Aid

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Abstract
Human capital is one of the major factor that increase the level of output and accelerate the economic growth. The efficient human capital stock is mandatory for economic and human development. This paper examined the role of foreign aid in enhancing the quality of human capital in Pakistan for 1980-2016, using Johansen co-integration and granger causality approaches. The findings of Johansen co-integration express the long run nexus between human capital, foreign aid, economic growth, and human development index. The empirical results exposed one-way causality from human capital and economic growth to foreign aid, and the existence of two-way causal relationship among human capital and HDI.

Keywords: Human Capital, Economic growth, Foreign Aid, Johansen co-integration test, Pakistan
JEL Codes: E24, O4, F35,

I. Introduction

Human capital is an important indicator that increase the level of output and stimulate growth of an economy. A better quality of education is one of the reason to enhance the productivity of labor which accelerate the level of economic development. It also increases the efficiency of workers and make them more developed. Sometimes, the developing countries have not been enough resources to make the better human capital stock. These economies may depend on the foreign aid or official assistance. In this regard, there is a common practice of outflow of foreign aid and grant by developed nations to developing countries. This is one of the way to improve the quality of labor by education and trainings.

Wang and Liu (2016) found that education and economic growth are positively correlated. Higher education has significant influence to economic growth, while the impact of secondary and primary education is not significant. Cecen et al. (2014) studied the relationship between institutions, foreign aid and GDP growth in Nepal for 1960-2009. The finding of the study suggest that foreign aid is helpful to enhance growth level in Nepal. Both the human capital and foreign aid are playing a vital role in enhancing economic growth. The human capital is more important as it attract the foreign aid. The efficient human capital is mandatory for economic and human development. There are some factors that affect the quality of education i.e. institutional governance, and some other factors which enhance the quality of human capital i.e. foreign aid and official development assistance.

The purpose of this study is to find out the impact of human capital on economic growth by incorporation of foreign aid in Pakistan for 1980-2016. We also want to check the causality between foreign aid, human capital and economic growth.

II. Literature Review

The literature review has been divided into two sections. The Section 2.1 carries the relationship between human capital and economic growth, and the Section 2.2 explains the nexus among foreign aid and economic growth.

II.I. Human Capital and Economic Growth

In economic literature, education has an important role in economic growth. Tiruneh and Radvansky (2011) & wang and Liu (2016) examined the relationship between growth and human capital by considering various proxies of human capital for the panel of European countries over 1995-2009, using random effect model. The findings expressed that the selected education variables have significant and positive correlation with GDP growth. Mankiw et al. (1992) and Barro, (2001) empirically investigated and proved that there are many determinants of economic growth but human capital is important one. Omotayo (2015) looked at an analysis of human capital and economic growth for 1980-2012, using OLS technique. The findings show a positive impact of human capital on economic growth.

Nowak and Dahal (2016) confirmed that higher and secondary education contribute positively to GDP growth in Nepal for 1995-2013, using OLS and co-integration approach. The elementary level of education is also positively influencing economic growth but the results are less significant. The empirics of co-integration show a long run relationship between education and GDP growth.

Nasir and Nazli (2001) examined the effects of experience, education, and occupation on wage earners and also on salaried persons in Pakistan. The results indicate a significant, positive effect of education and experience on earnings. The outcome of the research show that an additional year of education increase 7% returns for wage earners.

Bloom et al. (2004) found that human capital and economic growth are positively correlated useing 2SLS technique, and concluded that schooling (primary and secondary) and life expectancy are the increasing factor of economic growth. Similarly, Barro, R. (1991) found a positive relationship among enrolment rates (primary & secondary) and economic growth. Bloom and Canning (2000) explored that human capital is not only limited to knowledge. Sala-i-Martin (1997), McMahon, W. (1998), Temple, J. (1999), Bils and Klenow (2000), Self and Grabowski (2004) found that schooling has a positive effect on economic growth.

II.II. Foreign Aid and Economic Growth

A substantial body of literature have been focused on the relationship between foreign aid and economic growth. Siddique et al. (2017) established a relationship between foreign aid and economic growth for a panel of East and South Asia for 1995-2013, using dynamic panel data estimation method. The empirical findings show that foreign aid increases the level of economic growth. Moreira, S. (2005) used GMM approach and found that foreign aid is helpful to enhance economic growth for developing countries for 1970-1998. The impact of aid is strong in the long run but weak in short run.

Durbarry et al. (1998) found that aid is a rising indicator of economic growth, in the presence of stable economic policies. Similarly, Kargbo (2012) also found a significant contribution of foreign aid in economic growth. Dowling and Hiemenz (1983), Levy, V. (1988) and Hadjimichael et al. (1995) also invented a positive and significant role of aid to growth.

Karras, (2006) established a significant and positive correlation among aid and economic growth for 71 developing economies which received aid in 1960-1997. According to Gomanee et al. (2005), foreign aid increases the economic growth for the panel of twenty-five countries of Africa over 1970-1997. Wang and Liu (2016) express that education and economic growth are positively correlated for the panel of 55 countries around the world for the time period of 1960 to 2009. Higher education has noteworthy effect on economic growth, while the impact of primary and secondary education is not significant. The study also established a positive relationship between life expectancy and GDP growth.

Cecen et al. (2014) consider the life expectancy as a proxy of human capital due to the unavailability of respective variable in Nepal over 1960 to 2009. The finding of the study suggest that foreign aid enhance economic growth in Nepal. The findings of the study of Ekanayake and Chatrna (2010) are mixed for aid and growth in 85 developing countries. The positive effect of aid on economic growth is not necessary in all regions while it varies from region to region (Chheang, 2009). Papanek, (1973) developed a positive and significant effect of aid on growth, while on other side Voivodas, (1973) concluded the adverse and insignificant impact of aid on growth for 22 LDC for 1956-1968. Mosley, P. (1980) found a weak and negative relation between foreign assistance and growth.

We have tried to fill the gap in the economic literature by incorporating the foreign aid and human development index into the nexus of human capital and economic growth in Pakistan over the period of 1980-2016.

III. Methodology

Our determination is to establish a nexus between economic growth, human capital and foreign aid, to achieve this objective we have applied different estimation techniques. Economic growth is used as a dependent variable. The independent variables are human development index, foreign aid, human and physical capital. So following the methodologies of Chani et al., (2011), Ahmad et al., (2014), Ali (2015), Ali and Rehman (2015) and Ali and Bibi (2017), the functional form becomes as:

$$Y = f\ (K, AID, H, HDI)$$

It can be written in the following form.

$$Y_t = \gamma_0 + \gamma_1 P_t + \gamma_2 FA_t + \gamma_3 H_t + \gamma_4 HDI_t + \mu_t$$

Here, Y shows economic growth, K denotes physical capital, FA represents foreign aid, H is human capital and HDI indicates human development index. The term t expresses the time from 1980-2016, γ_0 is intercept, $\gamma_1$is the elasticity of capital with respect to growth, γ_2 expresses aid's elasticity, γ_3 is the elasticity of H, and γ_4 is a coefficient of HDI. The different tests are applied to investigate the relationship between economic growth, human capital and foreign aid. At initial stage, the augmented dickey fuller (ADF) test is used to check the order of integration of indicators. The ADF model is as follows:

$$\Delta Y_t = \gamma_0 + \alpha t + \gamma_1 Y_{t-1} + \beta_i \sum_{i=1}^{n} \Delta Y_{t-i} + \varepsilon_t$$

It carries the lagged difference terms to examine the order of autocorrelation. The ideal number of lags are used on the basis of Schwartz selection criteria. According to the literature, when all variables are stationary at level then ordinary least square method is used. The Johansen co-integration test is suitable if all variables have one order of integration. In this study all variables are stationary at difference one, so we have applied the Johansen co-integration test.

III.I. Data

The various variables are used to examine the nexus between economic growth, human capital and foreign aid, and the data are taken from world development indicator (WDI). The dependent variable is log of GDP per capita (at constant price 2010 US$) used as a substitute of economic growth, as it is used in previous studies (Siddique and Majeed, 2016; Omri and Kahouli, 2014). The independent variables include the log of gross capital formation used as physical capital, log of official development assistance and aid received in current US$ also used by Siddique et al. (2017) taken from WDI, human capital and human development index are taken from Barro and Lee also used by Mustafa et al. (2017).

Table 1 describes the results of descriptive statistics of 37 observations of each variable with a good form showing by Jarque berra test. The mean value of economic growth is 6.7293 and median is 6.7265, and the maximum and minimum values of economic growth are 7.0411 and 6.3212 respectively. The average value of human

development index is 0.4519 and median is 0.4460, and the maximum and minimum values of human development index are 0.5490 and 0.3331 respectively. The mean value of foreign aid is 21.0633 and median is 21.0257, and the maximum and minimum values of foreign aid are 22.057 and 20.3759 respectively. The mean value of human capital is 1.4526 and median is 11.4320, and the maximum and minimum values of human capital are 1.6880 and 1.2340 respectively. The mean value of physical capital is 23.6511 and median is 23.700, and the maximum and minimum values of physical capital are 24.077 and 22.9712 respectively.

Table 1: Results of Descriptive Statistics

Variables	Obs.	Mean	Median	St. dev.	Max. Value	Mini. Value
Y	37	6.7293	6.7265	0.2064	7.0411	6.3212
HDI	37	0.4519	0.4460	0.0711	0.5490	0.3331
AID	37	21.0633	21.0257	0.5179	22.0557	20.3759
H	37	1.4526	1.4320	0.1435	1.6880	1.2340
K	37	23.6511	23.7000	0.3099	24.0770	22.9712

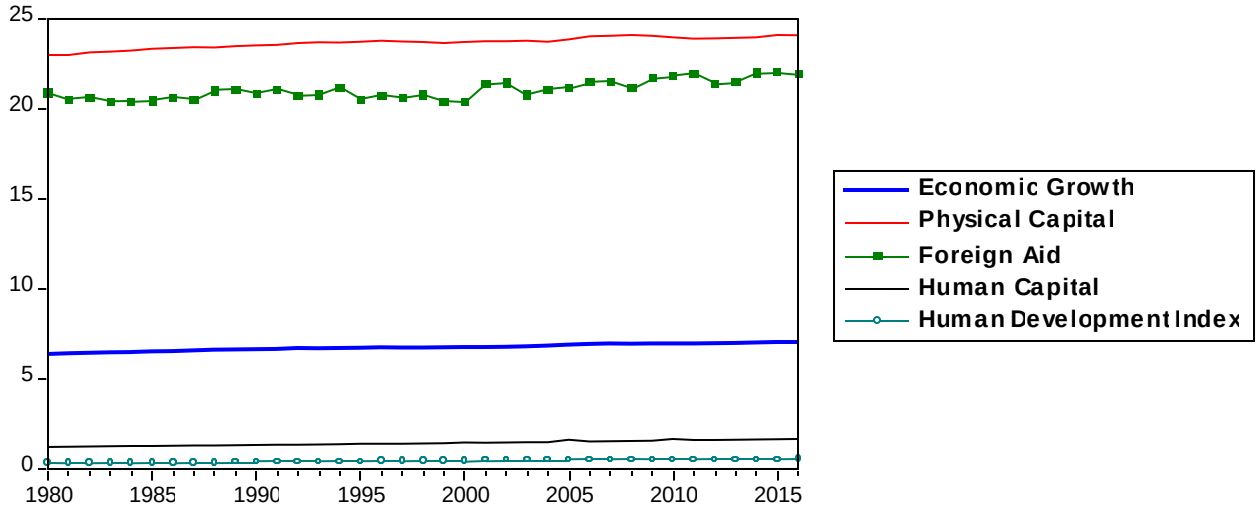
Table 2 contains the correlation among the variables. The results show that the correlation of all independent variables is strong with dependent variable and week correlation among the independent variables.

Table 2: Correlation among Variables

Variables	Y	HDI	Aid	H	K
Y	1.0000				
HDI	0.9693	1.0000			
AID	0.7914	0.7968	1.0000		
H	0.9718	0.9651	0.8069	1.0000	
K	0.9724	0.9331	0.7147	0.9106	1.0000

This section contains the graphical explanation of variables with time and among the variables. The graph 1 shows the positive trend of all used variables with time.

Figure 1



Graph 2 indicate the positive correlation between economic growth and human development index the blue line shows the correlation while the red line is neighbor regression line conveys the trend.

Graph 3 indicate the positive correlation between economic growth and foreign aid. It implies that foreign aid increases the economic growth. The blue line shows the correlation while the red line is neighbor regression line conveys the trend.

The graph 4 represents the rising trend between economic growth and human capital. The human capital is an indicator with causes the high economic growth.

Figure 2: Economic Growth and HDI

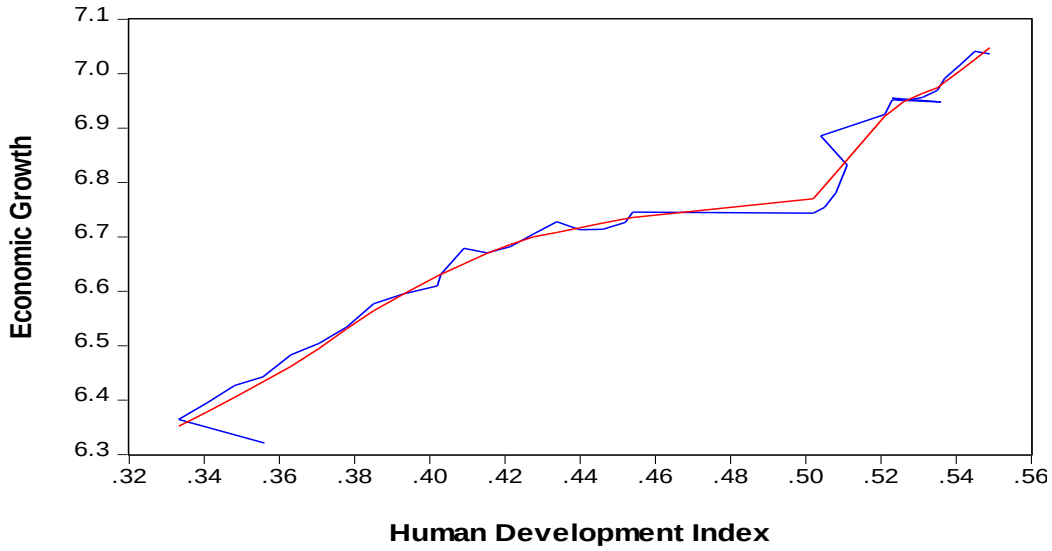


Figure 3: Economic Growth and Foreign Aid

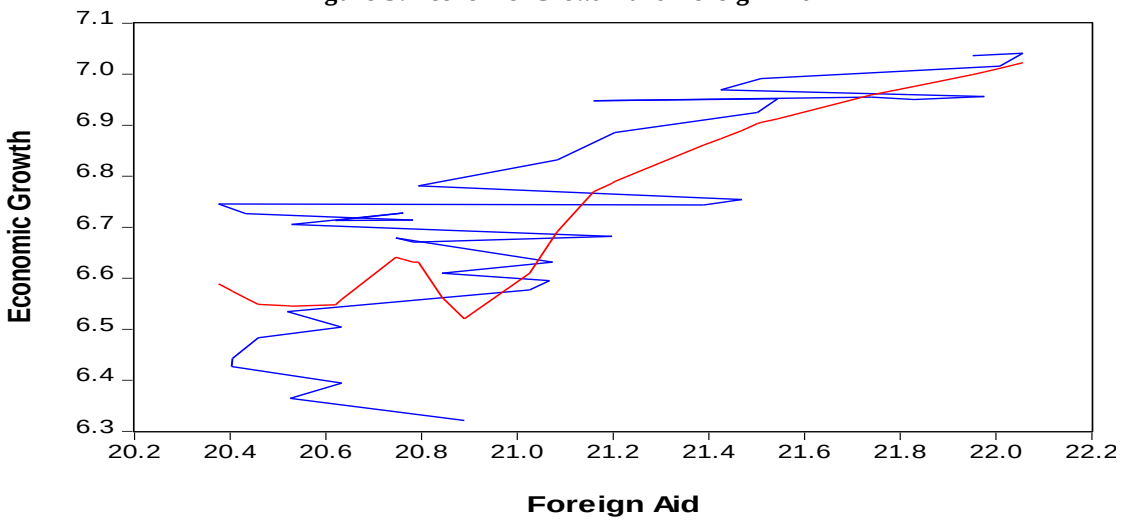
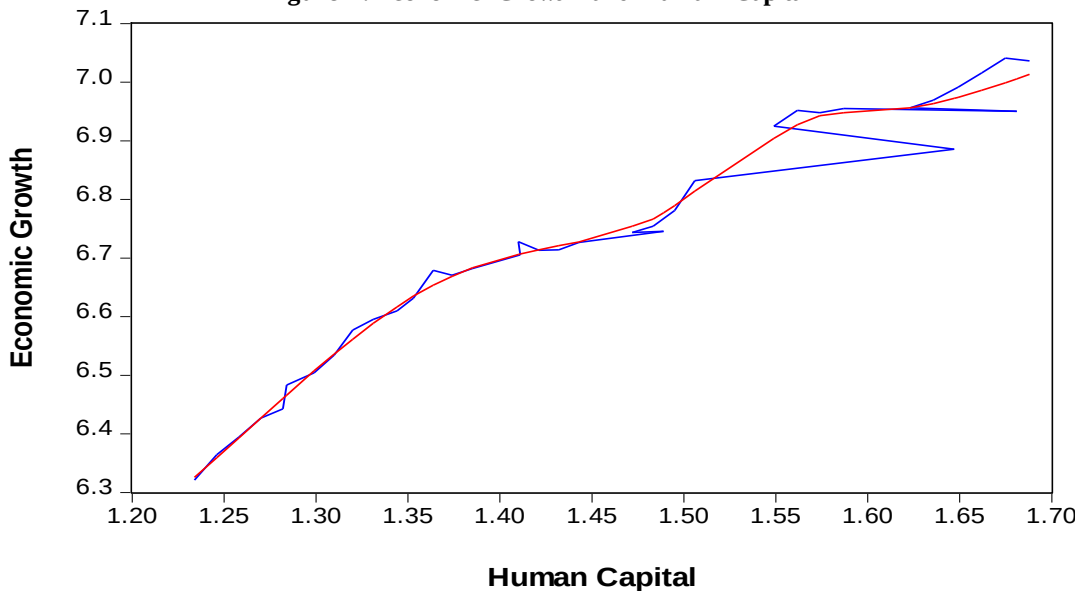
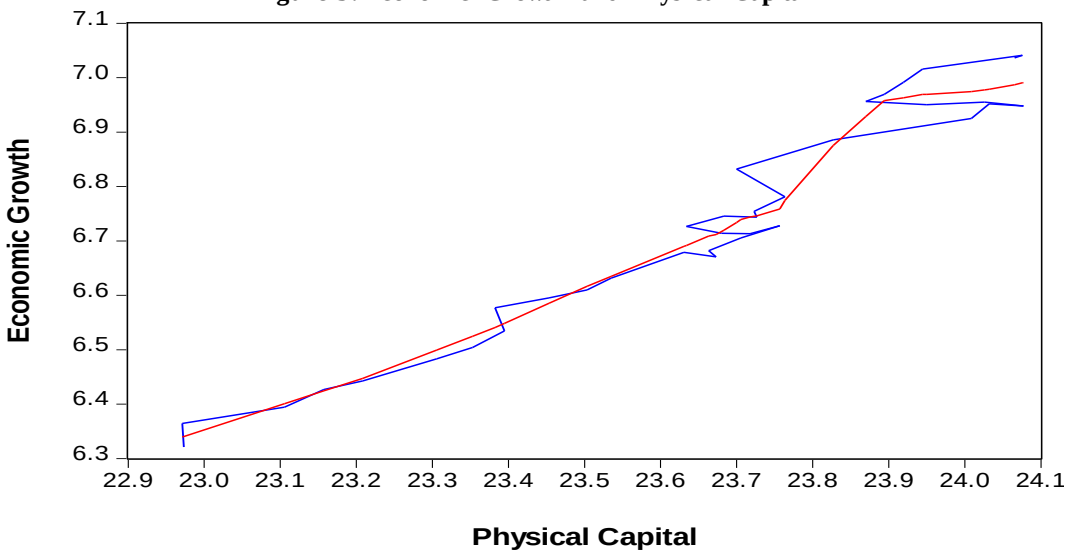


Figure 4: Economic Growth and Human Capital



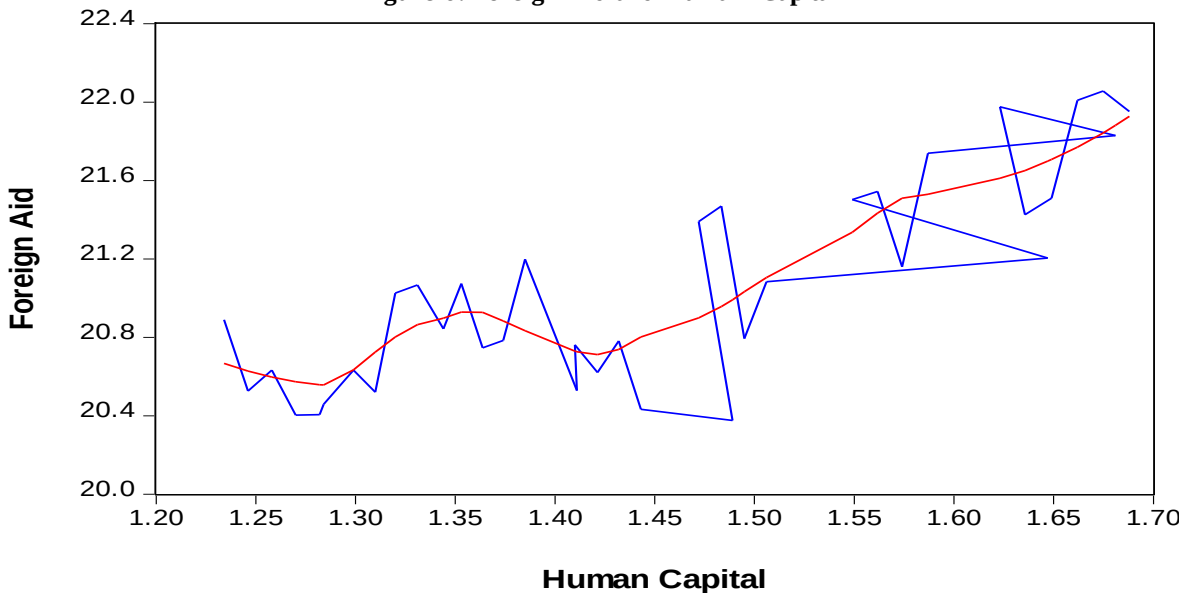
Graph 5 express the relationship between economic growth and physical capital, and implies that capital is increasing the growth of an economy.

Figure 5: Economic Growth and Physical Capital



Graph 6 shows the positive relationship among the human capital and foreign aid which implies that human capital attracts the foreign aid.

Figure 6: Foreign Aid and Human Capital



Graph 7 shows the increasing trend between human development index and foreign aid, implies that an increasing level of HDI appeal the foreign aid.

IV. Results and Discussion

This section contains results and discussions. Table 3 contains the test results of the ADF test. The results showed that all the variables at hand were fixed on the first difference, or concerned about the first-level integration. In this case, the johansen co-integration test is appropriate. The results of Johansen co-integration test are shown in Table 4. The empirical values of rank and maximum eigenvalue show the relationship between economic growth, physical capital, human capital, foreign aid and human development index.

To check the causal direction among the variables we have applied granger causality test and results are revealed in Table 5. The results show the one-way causality from human capital and physical capital to foreign aid. The findings exposed one-way causality is running from economic growth to aid and to physical capital. The results also express the unidirectional causality from human development index (HDI) to economic growth, foreign aid, and physical capital, which implies that HDI increases the level of economic growth and physical capital, and also

attract the foreign aid. The bidirectional causal relationship found among human capital and HDI, and between human capital and physical capital.

We have also applied the various diagnostic tests to check the stability and normality of the model and residual (Table 6). The insignificant p-value of serial correlation LM test indicate that there is no autocorrelation in the model. The p-value of breusch pagan goldfrey test is greater than 0.10 which is failed to reject the null hypothesis of heteroskedasticity. It means there is no hetero in the used model. The Ramsey reset test is used to check the functional form of model which indicate that the functional form of our model is accurate. The Jarque berra test is applied to check the distribution of residual term, the p-value shows that the residual is normally distributed as the alternative hypothesis of normally distributed is accepted.

Figure 7: Foreign Aid and HDI

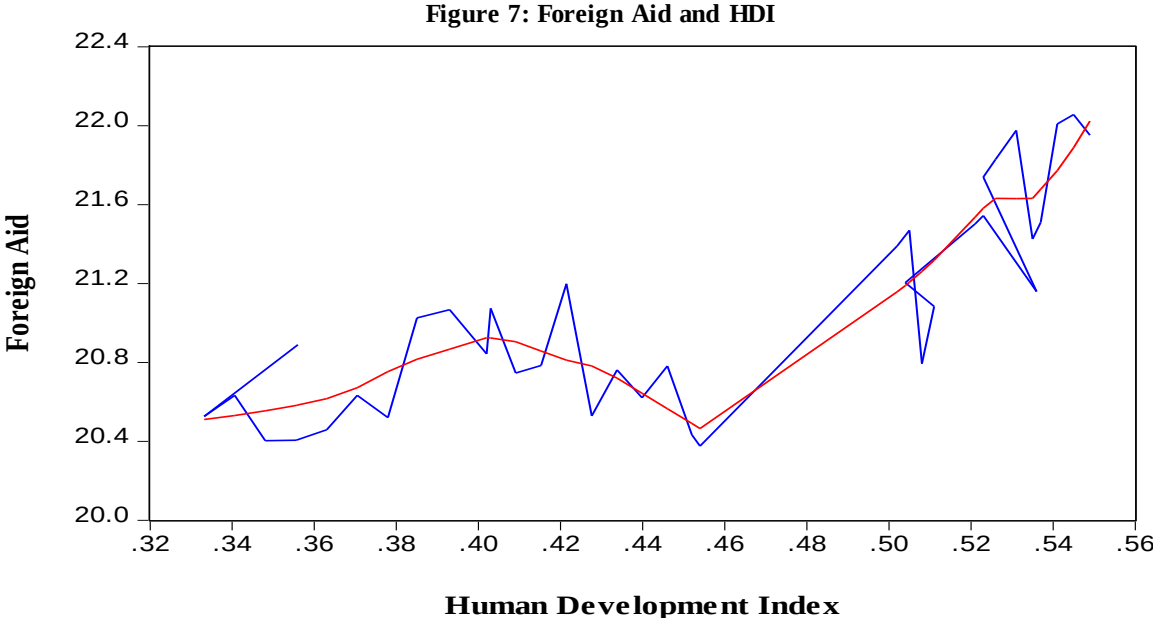


Table 3: Results of Unit root test

Indicators	I(0)	I(1)
Y	-0.5806	-3.6712
AID	-1.7338	-6.8761
H	0.7593	-8.2872
HDI	-0.3878	-7.7225
K	-2.0138	-4.6523

Table 4: Results of Co-Integration Rank Test

Number of Co-Integrations	**Rank Test (Trace)**			
	Eigen value	Trace stat.	5% CV	P-Value
None *	0.6929	116.6095	69.8188	0.0000
At 1*	0.6712	77. 6479	47.8461	0.0000
At 2*	0.4516	40.9399	29.7970	0.0018
At 3*	0.4018	21.1098	15.4947	0.0064
At 4*	0.1182	4.1513	3.8414	0.0416
No.of Co-integrations	**Rank Test (Max. Eigen value)**			
	Eigen value	Max-Eigen stat.	5% CV	P-Value
None *	0.6929	38.9615	33.8768	0.0113
At 1*	0.6712	36.7079	27.5843	0.0026
At 2*	0.4516	19.8301	21.1316	0.0752
At 3*	0.4018	16.9584	14.2646	0.0183
At 4*	0.1182	4.1513	3.8414	0.0416
Trace & Maximum Eigen value test indicates 5 co-integration equations at 5% level * denotes rejection of the hypotheses at the 5% level				

Table 5: The Results of Granger Causality Test

Variables	Y	HDI	Aid	H	K
Y		0.2804	5.1581*	1.8400	11.8963*
P-value		(0.7574)	(0.0119)	(0.1763)	(0.0002)
HDI	4.3849*		3.8251*	6.9750*	3.9692*
P-value	(0.0214)		(0.0331)	(0.0033)	(0.0296)
AID	0.2635	2.0523		0.2731	1.1425
P-value	(0.7701)	(0.1461)		(0.7629)	(0.3325)
H	1.5334	2.5099*	7.4656*		3.5215*
P-value	(0.2322)	(0.0982)	(0.0023)		(0.0423)
K	1.4118	0.5985	3.1808*	4.1550*	
P-value	(0.2594)	(0.5560)	(0.0559)	(0.0255)	

Table: 6 Stability Tests

Tests	**F-stat**	**P-value**
LM	0.6080	(0.4451)
Heteroskedasticity	0.6172	(0.8035)
Ramsey	0.8869	(0.3862)
Jarque-Berra	3.1771	(0.2042)

V. Conclusions

Human Capital is an important factor that accelerates the growth and development process of an economy. This study has investigated the role of aid in enhancing the quality of human capital in Pakistan during the period of 1980-2016. For this purpose, we have applied different econometrics tests for the conclusive methodology and used co-integration and Granger's causality tests for final analysis. The Johansen's test confirms the long-run stable relationship among human capital, foreign aid, economic growth and human development index. The diagnostic tests indicate the absence of autocorrelation and heteroskedasticity in the used model. The functional form of the model is found to be accurate and the residuals are normality distributed. The granger causality approach shows one-way causality from human and physical capital to foreign aid. The findings exposed the one-way causality from economic growth to foreign aid and to physical capital. The results also express the unidirectional causal relationship from human development index (HDI) to economic growth, foreign aid, and physical capital, which implies that HDI increases the level of economic growth and physical capital, and also attract the foreign aid. The bidirectional causal relationship investigated between HDI and human capital, and between human capital and physical capital.

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