

Impact of Human Capital on Inclusive Growth of Pakistan: With Special Focus on CPEC

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Abstract

Growth is said to be inclusive if it is accessed and shared equitably by all segments of society and a wide-ranging concept in addressing with poverty, inequality and growth of a country. This paper attempts to explain the impact of human capital on inclusive growth of Pakistan with a special focus on CPEC. Investment in human capital and labor force are used as indicators of human capital. Human capital, trade, investment and infrastructure are used as determinants of inclusive growth. Main reason to use these variables as determinant is CPEC. CPEC will particularly affect all these measures in Pakistan. Growth adjusted for inequality is used as a measure of inclusive growth; Data is used for 1987-2015. ARDL approach to cointegration is applied to test long run relation between the variables and error correction mechanism is used to check the correction in short run. The long run relation is negative and significant for investment in human capital, Government investment in education and health appear as cost of Government in developing countries which does not add to economic growth. Positive and significant long run association prevails for trade labor force and FDI with inclusive growth. Infrastructure did not show any significant impact. The short run relation extracted is found mean reverting.

Keywords: Inclusive growth, Environmental factors, CPEC, Trade.

1. Introduction

Inclusiveness, a concept that comprises equity, equality of opportunity with protection in market and employment transitions, is essential for any successful growth strategy (World Bank, 2009). The growth is said to be inclusive only if it includes all segments of society and ensure equitable distribution of resources and opportunities to all. Growth is inclusive if it is accessed and shared equitably by all segments of society and a wide-ranging concept in addressing with poverty, inequality and growth of a country. So, Inclusive growth is defined as the “output growth” that is “sustained over decades”, is broad-based across economic sectors, creates productive employment opportunities for majority of the country’s working age population, and reduces poverty (World Bank, 2009). It allows people to contribute to and benefit from economic growth through equality in opportunities of access to markets, resources and unbiased regulatory environment for business (World Bank, 2009). For inclusive growth strategies are made by focusing on long term perspectives of production and employment instead of short term fixing mechanism. Thus strong pillars of growth like human capital, trade, investment etc. gain attention in this regards. Both Neo Classical school of thought and exogenous growth models emphasized at the role of human capital in economic growth. Human capital is human knowledge. Human knowledge and productivity can be increased through trainings, Research and development (R & D) and other sources of human capital investment without diminishing returns (Abbass and Peck, 2008). Human capital is not restricted to knowledge but health is also considered as positive and significant

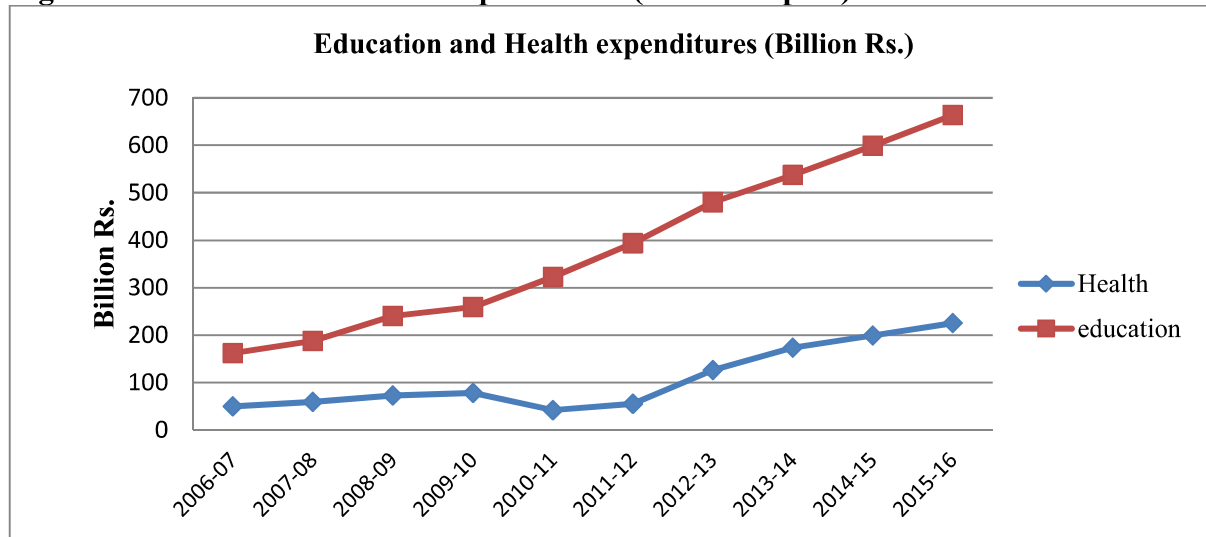
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contributor to human capital (Bloom and Canning, 2003). That is why when we talk about investment in human capital it can comprises of two aspects; firstly, investing in education either vocational or training and secondly, investment in health sector. The government of Pakistan is striving hard to build a knowledge based society and for improving capacity building, R & D, for this purpose the education expenditures are gradually increasing and with the passage of time quality of education has improved, new investment has been made in up-gradation of existing universities, assurance of teachers, building new infrastructure, same is true for health sector, over the previous year's health expenditures increased gradually as depicted in figure 1.

Figure1. Education and Health expenditures (Billion Rupees)



Education and health expenditure with natural resource rents are helpful tools for making growth as inclusive (Raheem et al., 2018).

China Pak Economic Corridor (CPEC) is considered as game changer and leading step for introducing inclusive growth in Pakistan. It includes all the necessary ingredients of inclusive growth like:

- Integrated Transport & IT systems including Road, Rail, Port, Air and Data Communication Channels between Pakistan and China.
- Energy cooperation between Pakistan and China.
- Spatial layout, functional zones, industries and industrial parks between Pakistan and China.
- Agricultural development & poverty alleviation.
- Tourism cooperation & people to people communication.
- Cooperation in livelihood areas.
- Financial cooperation between Pakistan and China.
- Human Resource Development.

If Pakistan utilizes this investment effectively with a vision about how to use improved infrastructure, global trade and its benefits to economy, it will be soon enjoying inclusive growth (Khan, 2018; Qazilbash, 2017). This study question impact of human capital at inclusive growth as human capital development is one the most important missions of CPEC. Few studies try to forecast the effect of CPEC at Pakistan economy like Haq and Farooq (2016) forecasted the impact of CPEC on social welfare of Pakistan including all four provinces. By concentrating three dimensions of welfare: health, education and housing the results obtained for this mega project indicates that till 2020 there will be on average 5.2%

growth in overall social welfare of country. At provincial level 6.4% for Baluchistan, 6.31% for Sindh and projected welfare for KPK and Punjab is 5.19% and 3.5% respectively. The net effect of three dimensions was found as; education 3.85, health 4.74 and housing 8.6 percent. Though long run association of human capital and economic growth is tested many times but presence of CPEC particularly increases the value of this relationship. Especially when we talk about inclusive growth that is growth adjusted with income inequality. Being very focused to CPEC, trade, investment and infrastructure along with human capital are used as the determinants of inclusive growth in this study. Trade is the factor which seems to be flourished most due to CPEC's infrastructure projects like Gawadar Port, Air ports, road maps and railway maps.

Paper is designed as, Section 2 discusses review of literature, section 3 explains data and methodology, section 4 presents results while section 5 concludes the paper.

2. Literature Review

Dinda (2014) used human and social capital as determinants of inclusive growth, where social capital includes social culture, norms and regulations and promote economic reforms and developmental accomplishments and development of human capital is measured through schooling. Study found the positive association between social and human capital formation with inclusive growth and suggest that improve consumption of nutrition intake, bridging social capital formation, improving school enrollment and capacity building are most essential tools for inclusive growth. Similarly, Mandlebe (2014) investigated that whether investment in human capital contributes to inclusive growth in Botswana. Study was designed on basis of Lucas's endogenous growth theory and Human capital includes the factors like education, training, and other investments that enhance an individual's productivity for the time 1966–2012. Using multiple linear and logistic regression finding showed that human capital was positively related to national income and human welfare.

Canlas (2016) measured the impact of Investment in human capitals, specifically in higher education on the inclusive growth of Philippines and found that human capital; a single instrument has twin goals of boost up economic growth as well as inclusive growth but Philippines have low proportion of enrollees in graduate and higher scientific education but due to rising demand of skilled labors gap is widening. To minimize gaps priority must be given to instituting loan programs for higher education and monitoring by standardized test and standards applied to both public and private institutions. While, Afridi (2016) examined the relation between human capital and growth using time series data for the period 1972–2013 for Pakistan. Applying ARDL and VECM models to the data, results showed that Human capital plays role in growth and physical capital, birth rate also have positive impact on the economic growth. But these results are not effective in the short run so requires more investment in the short time to have well consequences in the long run.

Kazmi et al. (2017) measured the impact of human capital on economic growth of Pakistan over the period 1992–2014. By using log-log model and employing Johansen co-integration technique in order to find short run and long run association between human capital and economic growth results reveals that economic growth has long term relationship with human capital and there is need to invest even more in education sector so as to maximize human capital.

3. Data and Methodology

3.1. Data

The data is collected from World Development Indicators form 1978 to 2015 for Pakistan. Inclusive growth is measured by taking per capita GNI growth adjusted with income

inequality using social mobility function at macro level indicators and is used as dependent variable (Y). Trade as percentage of GDP (T), Foreign Direct investment net inflows as percentage of GDP (FDI) as an indicator of investment, Goods transported through Railways (I) is used as representative for infrastructure, and human capital represented by two variables first by total labor Force (LF) and second by index of government expenditures at health and education (HC) are used as independent variables.

3.2. Methodology

3.2.1. Unit Root Test

The linear combination of the two non stationary time series can be stationary. If it is stationary, then the series are considered to be co-integrated and form a long run relationship with each other (Engle and Granger, 1987). Therefore, the first step toward the analysis of time series data is to check for the stationarity properties of the time series data used. Dickey and Fuller (1979) test is applied to check whether the series used to carry out the analysis are stationary or not. Equation below was employed to perform these tests.

$$\Delta y_t = \delta_0 + \theta y_{t-1} + \gamma_1 \Delta y_{t-1} + \gamma_2 \Delta y_{t-2} + \dots + \gamma_p \Delta y_{t-p} + \sigma_t trend + \varepsilon_t$$

Where y_t corresponds to the series for which stationarity is to be tested whereas ε_t is the error term.

The variables included in our dataset have I(0), I(1) order of integration so in such situation, for realistic and efficient results, application of ARDL approach/bound procedure for long run relationship is preferred and long run relationship of underlying variables is identified through F-statistic of Wald test. Distributed lag model includes the lag of independent variable in a regression function, Distinct from Johansen cointegration procedure Autoregressive Distributed Lag approach helps in identifying co-integrating vectors and if one co-integrating vector is identified, the ARDL model is re-parameterized into ECM and gives short-run dynamics and long run association between variables of a single model. The re-parameterization is possible because the ARDL is a dynamic single model equation and of the same form with the ECM.

3.2.2. ARDL

The ARDL bound test is based on the Wald-test (F-statistic). The asymptotic distribution of the Wald-test is tested under the null hypothesis of no cointegration among the variables (Dritsakis, 2011). Two critical values are given by Pesaran et al. (2001) for the cointegration test. The lower critical bound assumes all the variables are I(0) meaning that there is no cointegration relationship between the examined variables. The upper bound assumes that all the variables are I(1) meaning that there is cointegration among the variables. When the computed F-statistic is greater than the upper bound critical value, then the H_0 is rejected the variables are cointegrated otherwise it is accepted (Dritsakis, 2011).

The long run association is tested through the equation presented below, where Δ represents the change in the said variable and μ_t is a white noise error

$$\begin{aligned} \Delta Y_t = & \alpha_o + \sum_{i=1}^n \beta_1 \Delta Y_{t-i} + \sum_{i=1}^n \beta_2 \Delta HC_{t-i} + \sum_{i=1}^n \beta_3 \Delta LF_{t-i} + \sum_{i=1}^n \beta_4 \Delta I_{t-i} + \sum_{i=1}^n \beta_5 \Delta T_{t-i} \\ & + \sum_{i=1}^n \beta_6 \Delta FDI_{t-i} + \gamma_1 Y_{t-i} + \gamma_2 HC_{t-i} + \gamma_3 LF_{t-i} + \gamma_4 I_{t-i} + \gamma_5 T_{t-i} \\ & + \gamma_6 FDI_{t-i} + \mu_t \end{aligned}$$

3.2.3. Error Correction Mechanism

These long run models can be used to extract the short run model, with an error correcting term included in it. As shown in equation below, EC_{t-1} is the error correcting term. It shows that if the value of θ is negative and significant than the short run values diverge towards their mean values in long run.

$$\Delta Y_t = \alpha_o + \sum_{i=1}^n \beta_1 \Delta Y_{t-i} + \sum_{i=1}^n \beta_2 \Delta HC_{t-i} + \sum_{i=1}^n \beta_3 \Delta LF_{t-i} + \sum_{i=1}^n \beta_4 \Delta I_{t-i} + \sum_{i=1}^n \beta_5 \Delta T_{t-i} + \sum_{i=1}^n \beta_6 \Delta FDI_{t-i} + \theta EC_{t-1} + \varepsilon_t$$

4. Results and Discussion

4.1. Unit root test

Table 1 shows the results of Unit root test. Augmented dickey Fuller and Phillip Parron unit root tests are applied; both tests show that all the variables except inclusive growth are non-stationary at level but show stationary attitude at first difference. Inclusive Growth remained stationary at level with probability 0.01. With all the series stationary at first difference and dependent variable stationary at level leads to Auto regressive Distributive lag (ARDL). To apply ARDL Wald test of ARDL is applied and lag length is selected through Akaike (AIC) and Schwarz (SC) information criterion Table 2. ARDL is applied with optimal lag length as 2. Both Long run and short run relations are explained below.

Table 1: Unit Root Test

	Variables	ADF	P -value	P-Parron	P -value
At level	Inclusive Growth (Y)	-3.354	0.0126	-3.275	0.0160
	Human Capital (HC)	-2.389	0.1450	-2.624	0.0881
	Labor force (LF)	-1.043	0.7374	-1.103	0.7138
	Infrastructure (I)	-2.019	0.2782	-2.064	0.2592
	Trade (T)	-1.798	0.3814	-1.813	0.3742
	Foreign Direct Investment (FDI)	-1.713	0.4244	-2.078	0.2535
At first difference	Inclusive Growth (ΔY)	-6.333	0.0000	-6.501	0.0000
	Human Capital (ΔHC)	-4.402	0.0003	-4.390	0.0003
	Labor force (ΔLF)	-5.300	0.0000	-5.300	0.0000
	Infrastructure (ΔI)	-4.786	0.0001	-4.787	0.0001
	Trade (ΔT)	-6.643	0.0000	-6.708	0.0000
	Foreign Direct Investment (ΔFDI)	-3.393	0.0112	-3.411	0.0106

4.2. Long run results

The Wald test shows that there exists the cointegrating relation between the variables. All the variables have significant long run association between with inclusive growth except infrastructure. Human capital has significantly negative cointegrating relationship with inclusive growth. That is one unit increase in Government expenditure at health and

education leads to 8.1 units decline in inclusive growth. That might be the true in case of developing countries like Piabuo and Tieguhong (2017) found negative effect of government expenditures at health and education at economic growth in Central and Other African countries. More over as in case of developing countries growth pattern varies year to year and very differently to the growth in education and health level of human capital. Government Investment in education and health appear as cost of Government in developing countries which does not add to economic growth. Labor force and trade have positive and significant effect at inclusive growth.

Table 2: Lag Length Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-595.3277	NA	5.62e+10	44.61686	44.95282	44.71676
1	-493.4547	143.3768	1.27e+09	40.70035	43.38801	41.49953
2	-410.7132	73.54799*	2.48e+08*	38.20098*	43.24035*	39.69945*

FDI also witnessed positive and significant impact at inclusive growth in Pakistan (table 3). One unit increase in FDI leads to on average 1.58 units increase in inclusive growth.

4.3. Short run Relation

Table: 3 Long Run Relation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-31.83617	17.22094	-1.848689	0.0793
HC	-8.107788	2.006632	-4.040496	0.0006
LF	0.659141	0.307123	2.146180	0.0443
I	-0.000110	0.000175	-0.627524	0.5374
FDI	1.587405	0.547168	2.901127	0.0088
T	0.276434	0.114954	2.404734	0.0260
R-squared	0.609849	Mean dependent var		1.665287
Adjusted R-squared	0.473296	S.D. dependent var		1.753453
S.E. of regression	1.272558	Akaike info criterion		3.554891
Sum squared resid	32.38807	Schwarz criterion		3.935521
Log likelihood	-41.76848	Hannan-Quinn criter.		3.671254
F-statistic	4.466025	Durbin-Watson stat		2.010799
Prob(F-statistic)	0.003896			
Wald test (F-Statsitics) = 8.106492 (0.0566)				

The model also holds in the short run as shown in table 4. It showed that the error correcting term is negative and significant. This shows that the short run results are mean reverting and diverge to their mean values in long run. The rate of correction is 0.3 every year.

The results of the diagnostics tests are given in the following table 5. The Jarque Bera test for normality showing the value of F-statistic 0.210 and probability is 0.9001. The test for serial correlation Bruesh-Godfrey serial LM test is showing F-statistic 0.013 and probability 0.9105

and the test for heteroscedasticity shows F-statistics 0.8918 and probability 0.6128 at the end the Ramsey RESET test is applied to check the model misspecification and the value of F-statistic is 0.2257 and probability 0.6547. It indicates that there is no serial correlation in the model, no heteroscedasticity in the model, no normality problem and there is no misspecification problem in the model. The probability value of all tests shows more than 0.05 which confirmed the non-existence of the problem related to tests.

Table 5: Diagnostic tests for ECM Model Two

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.013	Prob.	0.9105
Obs*R-squared	0.0725	Prob. Chi-Square	0.7877
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.8918	Prob.	0.6128
Obs*R-squared	19.20	Prob. Chi-Square	0.444
Jarque-Bera Test of Normality			
Jarque-Bera	0.210	Prob.	0.9001
Ramsey RESET Test			
t-statistic	0.47511	Prob.	0.6547
F-statistic	0.2257	Prob.	0.6547

5. Conclusion

Growth is said to be inclusive if it is accessed and shared equitably by all segments of society and a wide-ranging concept in addressing with poverty, inequality and growth of a country. This paper attempts to explain the impact of human capital on inclusive growth of Pakistan with a special focus on CPEC. Inclusive growth is defined as the “output growth” that is “sustained over decades”, is broad-based across economic sectors, creates productive employment opportunities for majority of the country’s working age population, and reduces poverty. Investment in human capital and labor force are used as indicators of human capital. Human capital, trade, investment and infrastructure are used as determinants of inclusive growth. Main reason to use these variables as determinant is CPEC. CPEC will particularly affect all these measures in Pakistan. Inclusive growth is measured by taking per capita GNI growth adjusted with income inequality using social mobility function at macro level indicators. Data is used for 1987-2015. ARDL approach to cointegration is applied to test long run relation between the variables and error correction mechanism is used to check the correction in short run. The long run relation is negative and significant for investment in human capital, as in case of developing countries growth pattern varies year to year. Government Investment in education and health appear as cost of Government in developing countries which does not add to economic growth. Positive and significant long run association prevails for trade labor force and FDI with inclusive growth. Infrastructure did not show any significant impact. The short run relation extracted is found mean reverting.

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