The Role of Human Capital in Economic Development in the Selected Central Asian Countries

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Abstract

This aims to investigate the influence of human capital on economic development in Central Asia. For this purpose the study used panel data over the period 1999 to 2015 for the three Central Asian countries Kazakhstan, Kyrgyzstan and Tajikistan. The parameter of Gross Capital Formation *is found positive and significant with every proxy of Human Capital while the parameter of* Secondary Education (Pupils) *and* Secondary Education, (General Pupils) *are positive and significant and the parameters of Health Expenditure,* Secondary Education (Vocational Pupils) *and Education Expenditure are found positive but insignificant. The study concluded that human capital in all forms affecting the economic development of Central Asian countries. This study further concluded that there exist a long run equilibrium among these variables, which means that all these variables influence economic development in Central Asia in the long run. The countries of Central Asia must invest in both physical and human capital, because both are important for one another as well as for achieving the higher level of economic development.*

Key words: Human Capital; Education; Economic Development

Introduction

The increase in the production of goods and services in a country is called economic growth. Economic growth is also defined as continues increase in per capita gross domestic product. Every country desires to rise the development level as compared to other countries which is possible though economic growth. Labor is the main factor of production which play main role in the production of goods and services and then to improve economic growth. Labor productivity can be increased through investment on labor. The skills, knowledge, similar assets and experience

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of individuals meaningfully affect factors of production through labour and faster economic growth.[1]

The deep economic, demographic and social disturbances in the region since 1990 have harmfully affected the national education systems. While the countries like Uzbekistan and Kazakhstan, are increasing the percentage of community resources assigned to education. But in real, they declining government spending on education every year. In Kyrgyz republic, the government expenditure on education declined from 6 percent of gross domestic product in 1991 to 4.5 percent in 2002. During this time, the families faced much problems due to increase in the prices of uniforms, schools fee and textbooks. The current trend in education facility mostly reflect the developing trends and alters in the labour markets and in the structure of the economies.[2]

The education systems in Central Asia (Uzbekistan, Turkmenistan, Tajikistan, Kyrgyzstan and Kazakhstan) are no exclusions and share several of the problems which exist in the post-Soviet countries. All the earlier Soviet countries had high level of literacy and education, as staffing and schooling levels, in quantitative terms, were in extra of those for economies which are market based at similar levels of per capita income.[3] The conversion has result of reduction in the number of jobs due to underutilization of labour, as well as decrees in industries in industries. These economic shifts had chief insinuation for the education systems in Central Asia. Despite the circumstance that there is no evidence of quantities deductions in the provision of education and health during the initial years of the conversion in Uzbekistan and Kazakhstan, there are influences of sectorial disorganizations in the said republics that demote the quality of education and heath provision. However, there are found some indications of decline in the stock of human capital.[4]

The problem of the study is that every country want to achieve and maintain the desirable level of economic growth and living standard of the people. The main objectives are to influence the economic growth and raise the living standard of the people of Central Asia through Human Capital and improve the Human Capital to achieve high level and maintain the regional economic development in Central Asia. Dervis Boztosum et al. describe that investment in human capital is more important than physical capital to achieve the desirable level of economic development.[5] , Gray Becker et al. also described that human capital is less effective in developing countries and more effective in developed countries in economic growth.[6] , Muhammad Azam et al. also highlight that the human capital play vital role in the process of economic development.[7] This study will be more beneficial for policy maker all

over the world in order to influence economic development through investment in human capital. This study discusses the introduction, problem statement, objective and significance of the study in first part and review of relevant literature in part second. Methodology of the study describes in part third, data analysis in part fourth, conclusion and recommendations in part five and reference is given in last.

Literature Review

Robert E Lucas conducted a study "*on the mechanics of economic development*" and states that the factors behind the economic growth is the human capital accumulation rate, in which both the economic growth and human capital accumulation rate is proportional to each other since, human capital levies externalities on production. The economic growth rate is proportionally more than the increase in the accumulation rates of human capital, thus, constructing increasing return to scale. He further explain satisfactorily the rich countries growth but does not explain the poverty traps countries.[8] Jess Benhaib et al. conducted a study on the topic "*the role of human capital in economic development evidence from aggregate cross-country data*" by the growth accounting regressions indirect by an aggregate Cobb-Douglas production function. There results depicted that human capital arrives insignificantly in clarifying per capita growth rates. They further stipulate another model in which the growth rate of entire factor productivity be contingent on a nation's level of human capital stock. Tests of this specification do depict a nonnegative role for human capital.[9]

Emilio Sacerdoti et al. conducted a study in Western Africa to investigate the impact of human capital on economic growth and depicted that the human capital was not more effective like physical capital on economic growth. The study depicted that the reason behind the less effective of human capital was that the individuals was not qualified and trained and they are unable to use innovative technology in human capital.[10] Richard Blundell et al. conducted a study to analyze the influence of human capital on growth trust that the output growth rate depend on the human accumulation and innovation. The labour productivity was influence by the level of education and the stock of human capital.[11] Vladimir K Teles conducted study titled "the *role of human capital in economic growth*" and concluded that the method human capital was distributed with in growth model was motionless not totally free of inadequacies. He further concluded that human capital was a basic share of the economic growth process of nations.[12] Halil ALTINTAS et al. conducted a study to investigate the relationship among economic growth, exports, fixed capital and human capital for the period of 1970 to 2007 in Turkey and tested causality relationship in

short-run by error correction method and in long-run by co-integration between the variables. They concluded that there was positive and significant relationship among exports, fixed capital and human capital in the long-run. They further concluded that in Turkey human capital caused in economic growth.[13]

Raul Ramos et al. represent the effect of human capital by education level. The education level has positive effect on employment level, associated to over education. Modern development in Spain and other like the southern parts of European, truly exposed that the education level that one cannot lead to higher growth rates and higher level of employment. It means that education must reflect the structure of economics of the market needs and the reign.[14] Jan Cadil et al. tries to confirm that human capital should be reproduce the structure of economics to substitute the economic growth. Else it might only higher the unemployment level due to crowding out effect and inequities in the labour market. In first stage, they analyze the group of Nomenclature of Territorial Units for Statistics 2 (NUTS 2) regions for the members of European Union (EU) states in time series data for the period 2007-2010. In second stage, they make clusters of similar economic structure regions and analyze these separated group. At the end they estimates for three shorter periods. The first period was take before crises 2007-08, the second period 2008-09 which was critical and 2009-10 after the crises. They concluded that the human capital was not a positive on economic growth in the selected period in the regions Europe Union. They further concluded that there was no positive effect of human capital on unemployment and economic growth in the period 2007-11 in the NUTS 2 regions of EU.[15] Elena Pelinescu conducted a study titled "*the impact of human capital on economic growth*" by the panel methodology using annual data for the period 2000-2012 and tried to expose that human capital is a factor of economic growth and conclude that the sluggish investment in human capital should inspiration the sustainable economic development of the couturiers.[16]

Dervis Boztosun et al first investigate the basic human capital approaches theoretically. After this, the co-integration and causality tests were employed to analyze the relationship between economic growth and human capital by using the data for the period 1961-2011 of Turkey. They found that there exist a dual causality relationship between economic growth and human capital variables.[17] Francesco Cinnirella et al. finds that the 1st Industrial Revolution was related with the innovation and the 2nd Industrial Revolution was the transition period was bring to the role of human capital. As in the following 20th century, the quality of elementary education was related with firms' Research and Development

processes. In the last step, they illustrate that literacy had negative effect on fertility and fertility are positive associated with innovation. They finally concluded that the basic human capital accumulation was vital for the transition to recent economic growth.[18]

Research Methodology

The study used the panel data over the period 1999 to 2015 for the three Central Asian countries Kazakhstan, Kyrgyzstan and Tajikistan. The data were collected from the World Development Indicator data base of World Bank. The panel data technique is used to analyze the data. The long period and panel data are considered significant for the determination of economic growth .[19] Panel data estimation also allows us to minimizes the miss-specification bias and control for heterogeneity .[20]

This study will use panel least square model to estimate the effect of Capital formation, Human Capital on Human Development Index used as proxy for Economic Development for the period of 1999 to 2015. The similar model was used by Anjum Siddiqui et al. as well. [21]

$$HDI_{it} = \beta + \beta_{1it}K_{it} + \beta_{2it}HK_{it} + \mu_{it} - - - - \quad --Equation(1)$$

Where

Dependent Variable
HDI = Human Development Index for country *i* in period *t*.

Independent Variables
K = Gross Capital Formation (US$) for country *i* in period *t.*
HK= Human Capital for country *i* in period *t.*
This study used the following proxy for Human Capital (HK).
HE = Health Expenditure (percentage of GDP) for country *i* in period *t.*
EE= Government Expenditure on Education (percentage of GDP) for country *i* in period *t.*
SE = Secondary Education, Pupils for country *i* in period *t.*
SEV = Secondary Education, Vocational Pupils for country *i* in period *t.*
SEG = Secondary Education, General Pupils for country *i* in period *t.*
And β, β_1 and β_2 are parameters and μ is an error term.

Data Analysis

Table No. 1: Unit Root Test Results

Test Statistics		**Im, Pesaran & Shin W-stat**		**ADF- Fisher Chi-square**		**PP-Fisher Chi-square**	
Variable	Proxies	Level	1st dif	Level	1st dif	Level	1st dif
HDI		1.57***(0.06)	---	15.66** (0.02)	----	18.50* (0.00)	-----
LK		1.07 (0.86)	2.99*(0.00)	2.57 (0.86)	20.10* (0.00)	7.19 (0.30)	18.32* (0.01)
HK	EE	0.88 (0.81)	-3.13* (0.00)	6.13 (0.40)	19.92* (0.00)	12.14*** (0.06)	18.72* (0.00)

HE	-0.32 (0.63)	-5.74* (0.00)	4.99 (0.55)	36.17* (0.00)	6.15 (0.41)	39.77* (0.00)
LSE	5.92* (0.00)	------	37.15* (0.00)	-----	20.72* (0.00)	-------
LSEG	1.45*** (0.07)	------	12.01*** (0.06)	-----	22.94* (0.00)	-------
LSEV	1.50 (0.93)	-5.76* (0.00)	10.81*** (0.09)	35.53* (0.00)	11.51*** (0.07)	44.44* (0.00)

*Note: (1) L stand for Log (2) *, ** and *** indicate stationarity of variables at 1%, 5% and 10% level of significance respectively*

Table No.1 shows the stationary level of the variables. This study used three tests to check the stationarity of the variables by Im, Pesaran and Shin W-stat, ADF-Fisher Chi-square and PP-Fisher Chi-square. All the tests indicate that HDI is stationary at level while LK is stationary at 1st difference at 1% level of significance. The PP-Fisher Chi-square test EE is stationary at level at 10% level of significance and stationary at 1st difference at 1% level of significance while the other two tests shows that EE is stationary at 1st difference at 1% level of significance. The HE is stationary at 1st difference at 1% level of significance indicated by all three tests. The variables LSE and LSEV are stationary at level at 1% level of significance indicated by all three tests. According to ADF-Fisher Chi-square and PP-Fisher Chi-square that LSEV are stationary at level at 10% level of significance and all the three tests shows it significance at 1st difference at 1% level of significance.

Table No.2: Estimation Based on Equation 1

$$HDI_{it} = \beta + \beta_{1it}K_{it} + \beta_{2it}HK_{it} + \mu_{it}$$

Proxies for HK	Estimated Coefficients	Value	t-statistics	p-value
EE	β	0.0197	0.34	0.74
	β_{1i}	0.0296*	8.87	0.00
	β2i	0.0001	0.04	0.97
HE	β	0.0272	0.04	0.65
	β_{1i}	0.0288*	13.69	0.00
	β2i	0.0020	0.002	0.48
LSE	β	-0.7569	-3.69	0.00
	β_{1i}	0.0260*	14.73	0.00
	β2i	0.0616*	3.82	0.00
LSEG	β	-0.9872*	-4.89	0.00
	β_{1i}	0.0246*	14.62	0.00
	β2i	0.0805*	5.03	0.00
LSEV	β	0.0082	0.13	0.90
	β_{1i}	0.0297*	17.04	0.00
	β2i	0.0014	0.20	0.85

*Note: (1) L stand for Log (2) *, ** and *** indicate significance of variables at 1%, 5% and 10% level of significance respectively*

Table No. 2 indicate the estimated parameters through fixed panel least square of the independent variables capital formation and human capital over the dependent variable human development index. The study use different proxy for HK, the result shows that the Government Expenditure on Education (percentage of GDP) and Secondary Education, Vocational Pupils have too small positive but insignificance effect over HDI while Gross Capital Formation have positive and significant effect over HDI. Another proxy for HK was Health Expenditure (percentage of GDP) have also positive but insignificance effect over HDI while Gross Capital Formation have positive and significant effect over HDI in this as well. The Secondary Education, Pupils and Secondary Education, General Pupils have positive and significance effect over HDI and Gross Capital Formation also have positive and significant effect over HDI. If 1% increase in the secondary school pupils and secondary school, General pupils, it will bring 6.16% and 2.46% increase in HDI respectively. Anjum Siddiqui et al. also shows that secondary school enrollment have significant effect over economic growth.[22] According to Deniel Cohen et al. that his series have a significant for schooling in both cross-country data and panel data as after including physical capital in the growth regression.[23]

Table No.3: Kao Residual Co-integration Test based on Equation 1

$$HDI_{it} = \beta + \beta_{1it}K_{it} + \beta_{2it}HK_{it} + \mu_{it}$$

Proxies for HK	ADF (t-Statistics)	p-value
EE	-2.49*	0.0063
HE	-2.22**	0.0132
LSE	-1.94**	0.0262
LSEG	-2.21**	0.0134
LSEV	-2.54*	0.0056

*Note: (1) L stand for Log (2) *, ** and *** indicate significance of variables at 1%, 5% and 10% level of significance respectively*.

The Table No.3 shows the result of Kao Residual Co-integration test, the null hypothesis of this test is that there is no co-integration in variables. The result was estimated among three variables HDI, HK and LK in which five proxy were used for HK. The result shows that all the variable are found significance in which the proxies used for HK are EE and LSEV are found significant at 1% level of significance and HE, LSE and LSEG found significant at 5% level of significance and reject the null hypothesis. So, there exists long run relationship among these variables. Its means that HK play a significance role to achieve the high level of economic development. The same results was given by Anjum Siddiqui et al.[24]

Conclusion and Recommendations

This study used five proxies (LSE, LSEG, HE, LSEV and EE) for human capital (HK) and regress on HDI as proxy of economic development with addition of log of capital formation (LK). The parameter LK is found positive and significance with every proxy of HK while the parameter of LSE and LSEG are positive and significance and the parameters of HE, LSEV and EE are found positive but insignificance. The study concluded that all variable have played a role in the influence of economic development of a country. The similar results were shown by Robert J Barro, who found that in cross-country data the economic growth is significantly influence though education.[25,26] N Gregory Mankiw et al. also showed that the role of human capital in economic growth is significant.[27] George Agiomirgianakis et al. also deliberate the relationship between economic growth and human capital by using primary education, secondary education and tertiary education enrollment for Greece and give the results that there direct casualty between economic growth and primary and secondary education while reverse causality with tertiary education.[28] Another researcher indicated human capital as one of the most important factor to influence the economic growth .[29]

This study also concluded that there exist a long run equilibrium among these variables, which means that all these variable impact on economic development in Central Asia in the long run. The same result was found by Feixue Huang et al. that there is a long run association between economic growth and enrollment in higher education.[30] Salih Turan Katircioglu also give the similar results that there exist a long run equilibrium between economic growth and higher education in North Cyprus.[31]

This study recommends that investment in human capital is most important for achieving higher level of economic growth which give raise to the per capita income and higher level of slandered of living. The Central Asian countries must invest in both physical and human capital because both are important for one another as well as for achieving the higher level of economic development. This study also recommends that due to positive effects of all proxies of HK the governments of central Asian countries must focus on all these variables to improve the economic development.

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