

## **Impact of Investments in Human Capital on Economic Growth: Time Series Analysis**

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### **Introduction**

The Impact of Human Capital on economic growth has always been a matter of discussion in the field of Economics. According to OECD “Human Capital is defined as the knowledge, skills, competencies and other attributes embodied in individuals acquired during their life and used to produce goods, services or ideas in market circumstances”. The aggregate Human Capital of an Economy determined by national health and education standards. Over a long time of economic growth leading to improvements in human capital, better educated, healthy, innovative and creative workforce can help increase labor productivity in economic growth. There can be no significant economic growth in any country without adequate Human capital developed. In the Sri Lankan context there is a controversial discussion on the role of human capital in the economic growth process. Sri Lanka has achieved a higher level of education and health indicators relative to the other south Asian countries (HDI Reports 2014 – 2015). But there is a problematic situation regarding contribution of education and health sectors in economic growth of a Sri Lanka relative to the investments on both sectors. So far results of researches which was conducted on impact of human capital in economic growth is directly depend on variables and indicators they used in their research. Therefore it is necessary to examine the impact of Human Capital on economic growth of Sri Lanka consisting broader variables than before. This study examines the impact of human capital on economic growth in Sri Lanka after incorporating both health and education.

Oyedele (2014) has found a relationship between human capital and economic growth using Sargen test and GMM method in Nigeria. This research mainly focused on analysing the effect of human capital on economic growth. It concluded that policy makers should pay attention to both health and education sectors simultaneously. Further they emphasized that the government should increase their financing of both sectors. Conversely, Acroglu and Ada (2014) argued that government expenditure on human capital had no effect on economic growth. Also the results showed increasing quality of education and health sectors improving GDP by directly causing an acceleration of economic growth. Many works of research have been carried out in Sri Lanka on the impact of human capital on economic growth. However there is a limited literature on understanding the human capital contribution on economic growth considering both health and education simultaneously. According to that background this study is conducted to fill this research gap.

### **Objectives**

The main objective of this study is to identify the effectiveness of investing simultaneously in both health and education as a human capital indicator for the achievement of Sri Lankan Economic growth.

### **Methodology**

There is hardly to find any study on the effectiveness of the simultaneous investments in the human capital determinants for achievement the aim of economic growth of Sri Lanka. Therefore, this study attempts to provide a foundation to conduct an empirical analysis on the particular issue. This study uses time series analysis method to examine simultaneous investment in human capital determinants on economic growth in Sri Lanka during 1990 – 2015. To develop the model the Cobb – Douglas production function was used, which is a widely used production function to represent the technological relationship between the amounts of two or more inputs (particularly physical capital and labor) and the amount of output that can be produced by those inputs. The Cobb-Douglas function postulates a strong positive relationship between the growth of production and investment on human capital. In this study, in order to analyze the impact of simultaneous

investment in both health and education sectors, a new variable called Health Adjusted Education Index (HAEI) was calculated by taking enrollment rate at primary level and then multiplied the value with expenditure on health as percentage of GDP. This study employed Sri Lankan annual data from 1990 – 2015 and co – integration techniques in the analysis. Considering Health and Education variables as proxies for human capital following regression model was constructed.

$$\ln GDPPC_t = \beta_0 + \beta_1 \ln(HAEI)_t + \beta_2 \ln(CEXP)_t + \beta_3 \ln(REXP)_t + \beta_4 \ln(HDI)_t + \varepsilon_t \quad (1)$$

Where  $GDPPC_t$  is the per capita gross domestic product,  $(HAEI)_t$  is the health adjusted education index,  $(CEXP)_t$  is the capital expenditure on the human capital,  $(REXP)_t$  is recurrent expenditure on human capital,  $(HDI)_t$  human development index and  $\varepsilon_t$  is the error term and the variables are relevant to Sri Lanka and secondary data were collected from World Human Development Reports and Central Bank reports. ADF and PP unit root tests are used to examine the stationarity of these variables. In order to identify the number of co- integrating relationships Johansson Co-integration technique is adopted. Granger causality test is employed to evaluate the causality or dynamic relationship between variables and vector error correction model (VECM) is used investigate the short run relationship of these variables.

## Results and Discussion

According to the unit root test results, all two unit root tests confirmed that all variables are stationary at their first difference. According to lag length criteria based on FPE, AIC, and HQ criteria, 2 lags were selected. So lag length suggested 2 lags. Johansson co-integration rank test detected one co-integrating relation in the system of equations at 5% level of significance which implies that there is a long run relationship between variables. In order to identify the nature of the long run relationship Johanson Co- Integration Technique is adapted and long- run adjustment and short run relationship are examined using Vector Error Correction Model. According to the co-integrating results, the long run relationship between the variables is shown in Equation 2.

Long Run Relationship: From Co – integration Vector.

$$\ln GDPPC = -12 - 7.06 \ln HDI + 2.29 \ln HAEI + 0.95 \ln CEXP - 3.35 \ln REXP \quad (2)$$

As shown in Equation 2, mainly health adjusted education index (HAEI) and capital expenditure on human capital (CEXP) has a positive and significant impact on economic growth in long run. When capital expenditure on health and education increase by 1% Gross domestic per capita growth rate increase by 0.95% while other variables remain unchanged. Also an increase in the health adjusted education index by 1% is associated with an increase of 2.29% in gdp capita growth rate in the long run. It is clear then that simultaneous investments in both health and education causes an increase in the economic growth of a country. All variables are significant in the long run when HAEI and CEXP positively impact on GDPPC and HDI, REXP negatively impact on GDPPC.

The negative and significant error correction term reveals that the model is stable in the long run. Gross domestic per capita growth rate moves back to equilibrium path and the disequilibrium error is corrected by 6% each year following an exogenous shock. The results do not explain the short run relationship between the variables significantly. According to the result the value of intercept is 0.138 which shows the gross domestic per capita growth rate value when the other variables are constant. There is no short run relationship defined between gross domestic per capita growth rate and the previous year's values of the other variables. Furthermore, the Granger causality test was used to test whether there is a causality relationship between variables. Results show that there is no causality relationship with the gross domestic per capita growth rate in Sri Lanka (Table 2).

## **Conclusion**

The empirical results indicate that there is a positive and significant relationship between gross domestic per capita growth rate and health adjusted education index in the long run. It reveals the importance of investing in both education and health sectors simultaneously in order to achieve healthy economic growth. Results show that there is no relationship between human capital and gross domestic per capita growth rate in the short run. Because of that policy makers should turn to long run investment based policies to bring countries economy upto a desired level. Also the results show that capital expenditure on human capital has a positive relationship when recurrent expenditure on human capital determinants have a negative relationship with gross domestic per capita growth rate. In order to

improving stock of human capital Sri Lanka should invest more on the capital expenditure of health and education sectors. Up to now Human capital was defined only based on education in Sri Lanka. But in order to achieving the goal of economic growth Sri Lanka should give priority to interactive benefits of the both health and education sectors.

## **References**

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