International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor (2018): 7.426

Economic Growth and Human Capital in South Asian Countries: A Static Panel Evidence

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Abstract: ***The study focuses onto examine the impact of human capital in the economic growth of South Asian countries and it investigates the effectiveness of policy implication on education in these countries. For this extent, a quantitative research method is employed to analyse the relationship between human capital and economic growth. The empirical results provide the evidence that government expenditure on education is positive and significant on secondary education at 10% level of significance and it is significant at 5% or below for tertiary education but insignificant on primary school enrollment. Government expenditure on primary school enrollment is positive and significant in RE model at 5% level of significance but insignificant in FE model. Government expenditure is positive and highly significant on tertiary school enrollment and GOVET is positive and weakly significant. GOVES is significant at 5% level of significance. The finding tells that there is weak contribution of human capital in the economic growth of these economies. Weak contribution of human capital in growth is attributed to inefficient and weak implementation of education policies. Therefore, education policies should strongly and effectively be implemented to achieve strong and significant impact of human capital on the economic growth of these countries.***

Keywords: Economic Growth, Human Capital, School Enrollment, Fixed Effects, Random Effects

1. Introduction

Human resource is one of the major factors of production in any type of economies whose efficient utilization and effective contribution in the economy will only be through the implementation of apt and applied educational system. Educated human resource is more efficient than the uneducated for the economic development because only educated manpower has innovative and confidence abilities, developed and modern motivational attitude and can adopt the activities of new technology for the growth of the country (Williams, 1967). Educated people can follow nation's rules and regulations effectively. They know the laws of the country, can import international technology and skills, can develop required rules and policies and as a whole they can change the country economically, socially and culturally. Therefore, educated human resource is assumed as the cornerstone of the country's development. The educated human resource is more disciplined than the uneducated ones and such a disciplined mass is contributing to the country for its welfare and has highly positive impact for the growth (Lucas, 1988; Romer, 1990).

Human resource via human capital; an active factor of the economy is measured by a number of proxy variables and is a type of population which is associated with the achievement of education by any means such as skills of labour force, health, education levels, experiences, training and a number of other factors. Human capital is embodied in person and it enhances the productivity of labor. Ultimately, it positively affects economic growth (Lucas, 1988). To foster its efficiency, capacity and productivity, education plays a vital role. Therefore, several researches have taken place to formulate a model of economic growth with the association of its determinants including education and tested those models with the respective data. The theoretical keystone about the relationship between human resource and economic growth began with the proposition of Cobb-Douglas production function. Then several works related to economic growth and education under theoretical and empirical grounds have been performed. Researchers identified different types of results between the proxies of education and economic growth because education enhances country's economy through various channels. Primarily, it innovates technologies and facilitates the implementation and adaptation of those new technologies, which are continuously invented, (Nelson and Phelps, 1966). The endogenous growth theories from 1980s in contrast to neoclassicists argue that the investment in human capital i.e., in R & D is a key to linking higher savings rates to higher long-run economic growth on the other (Dornbusch et al., 2012). This implies investment in R & D hinges on substantial external returns to capital which can bring long-run growth in the country.

Most of the researches from 1980s concentrated on cross-country analysis as the countries emphasized for the public spending on education in terms of school enrollment and other educational activities. Researchers have found the mixed results about the relationship between human capital proxies and economic growth in cross-country analysis. Gallagher (1993) argues government spending has positive impact on educational achievement only when controlling quality of education. Kaur and Misra (2003) utilized a panel data analysis in some Indian states to examine the effect of public expenditure on educational attainment. The government expenditure on education is more productive and poorer the country or state more essential is the government expenditure on education. However, all empirical analysis could not show the direct relationship between education expenditure and economic growth. For instance, McMahon (1999) and Wössmann (2001) found negative and significant relationship between education expenditure and gross school enrollment. Barro (1990) argues that government expenditure has no positive effect on private productivity and it lowers saving and hence economic growth through distorting effects from taxation (i.e., government expenditure programs).

In addition, education can play a crucial role to increase the quality of human life by transferring the society into civilized one and has better contribution in the economy. For instance, they are less likely to engage in criminal activities, engage in well disciplined social positive norms, and create good environmental and structural changes. Ultimately, it has positive impact in the economy. Nevertheless, developing countries have been facing various problems such as poverty, inequality, political violence and its instability and others from a long time. South Asian countries are also suffering from such various socio-economic problems and these problems might be distorting their development process. There is also an argument that decline in human capital deteriorated economic development and growth of developing countries due to high turnover from school (Seebens and Wobest, 2003).

The coefficients of human capital variables from the estimation show that there is not significant result in all cases which further directs to investigate the effectiveness of education policies undertaken by the governments. There is a mechanism that government policies prepared for human capital is assumed to have contribution in the economic growth. As Hanushek and Woessmann (2007) explain government policies should essentially be effective such that in developing countries efficient education is possible with the policies of providing facilities and access of trained teachers. Therefore, the question arises whether or not government policies such as government expenditure on education, public expenditure on primary education, secondary education and tertiary education are effective. In this regard, we tried to examine the impact of government policies onto generating human capital formation.

2. Research methodology

2.1 Data and variables

World Development Indicators (WDI) official website is the main source of data for various proxies of the determinants of economic growth. The data is taken from the year 2000 to 2015 of 7 South Asian countries including Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. In this paper, school enrollments at different levels (primary, secondary and tertiary) are used as proxies for human capital. The major dependent variable for the proxy of economic growth is log of GDP per capita and other control variables are investment, government expenditure on education and inflation rate. Government expenditure on education is also considered as proxy for government policy. These policy variables (i.e., government expenditure on education, government expenditure on primary, secondary and tertiary education) are utilized to examine their effect on the school enrollment. In spite of these, some control variables such as those of investment, inflation are also considered in the model, because if the appropriate explanatory variables are not included in the model, it may give rise to the problem of specification bias in the regression equation. To avoid this problem, other control variables such as those of inflation, investment and government expenditure on education are included in the estimation process. The variables and their brief description are provided in Table 1.

Table 1: Proxies of variables

Variables	Proxies	Notations
Economic growth	Real GDP per capita	LGDPPC
Human Capital	Primary school enrollment (% gross) Secondary school enrollment (% gross) Tertiary school enrollment (% gross)	SEP SES SET
Government Expenditure	Government expenditure on education (% of GDP) Government expenditure on primary education (% of GDP) Government expenditure on secondary education (% of GDP) Government expenditure on tertiary education (% of GDP)	GOVE GOVEP GOVES GOVET
Inflation	Consumer price index (2005=100)	INF
Investment	Gross fixed capital formation (% of GDP)	INV
Rural population	Rural population (% of total population)	RPOP

2.2 Model specification

2.2.1 Theoretical concept

The theoretical base to establish the relationship between economic growth and its determinants goes beyond the proposition of Cobb-Douglas production function; $Y = AL^{\alpha}K^{\beta}$ (assuming y = economic growth, A = technology, L = labour, K = capital and α, β be the constants). The economic growth models with their determinants then are written in the simplified form like; $Y = f(L, K)$. From a conventional view, this states that the average annual economic growth rate of a country is the aggregate contribution of capital and labor. Capital in modern economy is disaggregated in various forms including human capital that enhances the country's economy. The investment on human that contributes to the country's development through various channels refers to the human capital and the contribution of human capital is measured in terms of the national income of a country. The researches such as Gemmell (1996), McMahon (1998), Keller (2006) and others argue that there is positive association between human capital and economic growth.

2.2.2 Empirical model specification

On the basis of aforementioned theoretical background, a general empirical model is proposed for the estimation of coefficients of parameters and is symbolized to represent the given variables;

$Y_t = \alpha + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + u_t$

Y_t is a dependent variable and it is a proxy for economic growth or school enrollment variables. The variables X_{1t}, X_{2t}, X_{3t} …….. are the variables of interest and other control variables and α, β_1, β_2, β_3, …… represent the parameters to be estimated and u_t is the stochastic disturbance term present in the stochastic process. All the variables used in the estimation are in the log form. More simplified form of the above equation can be represented as:

$GDPPC_t = \alpha + \beta_1 ED_t + \beta_2 C_t + u_t$

This study uses panel data analysis to examine the impact of education in the economic growth or to examine the impact of government expenditure in the school enrollment. Estimation of parameters under the panel model is better than cross-section OLS estimation because it consists of

large number of observations with the increase in the degrees of freedom and reduces the probability of presence of large co-linearity between explanatory variables. Therefore, while using panel estimation, it increases the efficiency of the estimation (Hsiao, 2003). The simple panel static model to be utilized in this study is based on King and Levine (1993) where economic growth is assumed as a function of education and other macroeconomic and policy variables.

$GDPPC_{it} = \alpha + \beta_1 ED_{it} + \beta_2 C_{it} + u_{it}$, where, i= 1, 2, …….,n and t= 1, 2, …….., T, with $u_{it} = \mu_i + \lambda_t + \nu_{it}$, where, GDPPC represents GDP per capita growth, ED represents the education variables and C stands for the control variables. μ_i denotes the inherent country individual effect which is time invariant, λ_t denotes the inherent time effect which is individual invariant and ν_{it} is the stochastic disturbance term. The static panel estimation provides internal instruments for the explanatory variables which are endogenous. In this system, original variables are assumed to be uncorrelated with error terms and correlated with explanatory variables (Verbeek, 2012). In recent years panel estimation is commonly utilized to estimate the parameters of the regression equation. Furthermore, the panel method is better to estimate the parameters than other methods because it takes into an account of the heterogeneity of individual cross-sectional units by allowing individual-specific effects and gives more variability and degrees of freedom.

3. Descriptive scenario of some macroeconomic indicators of South Asian Countries

This section is an attempt to shed light on the general trends and conditions of economic growth, school enrollment and government expenditure on education of the sample countries. They are presented in Figure 1 and 2 and in Table 2. Descriptive data help to shed light on the general features of given indicators in the sample countries. It also provides a comparative scenario of socio-economic indicators within the countries. GDPPC seems to be the highest in Maldives followed by Sri Lanka and Pakistan during the sampling period. Nepal showed the lowest performance in GDPPC among the countries. The primary school enrollment ratio in the region is the highest followed by secondary and tertiary school enrollment. Since high priority was accorded to increasing enrollment in primary school in the developing countries (Hanushek and Woessmann, 2007). All the countries seem to concentrate highly on primary school enrollment activities rather than secondary and tertiary. This ratio is the highest in Nepal in 2011 and the lowest in Pakistan in 2000. In recent years, India focuses highly on tertiary school enrollment. In the late time of sampling period, tertiary school enrollment in India is the highest (26.73%) and in Pakistan is the lowest within the region.

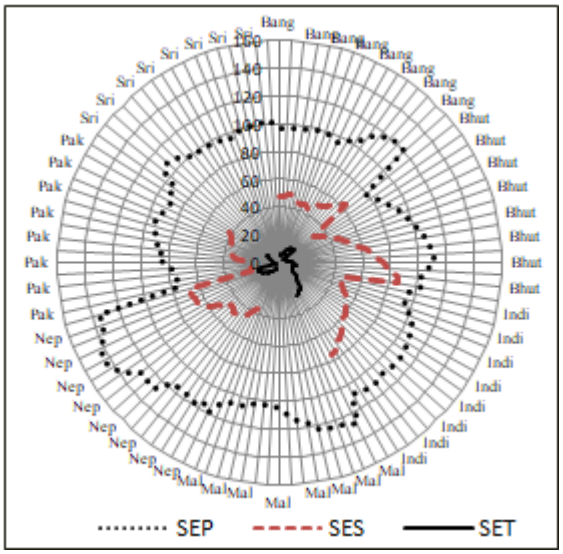

Figure 1: School Enrollment in SA Countries

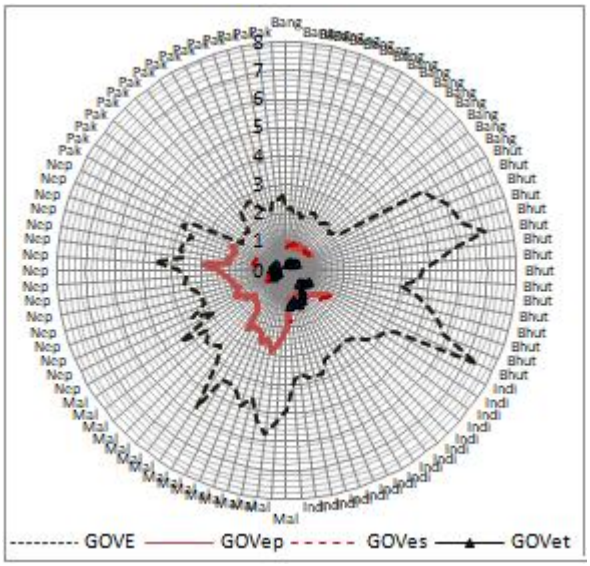

Figure 2: Government Expenditure on Education in SA Countries

Table 2: Summary of the variables

Variables	Mean	Std. Dev.	Minimum	Maximum
GDPPC	2005.19	2005.89	459.11 (Nepal-2000)	8288.58 (Maldives -2015)
INF	6.49	4.63	-18.11(Bhutan-2004)	22.56(Sri-Lanka-2008)
SEP	105.34	14.67	73.96 (Pakistan-2000)	145.40 (Nepal-2011)
SES	50.19	14.50	20.78 (Pakistan-2000)	85.49 (Bhutan-2015)
SET	9.75	5.50	2.00 (Pakistan-2001)	26.73 (India-2015)
INV	28.76	12.02	13.74 (Pakistan-2014)	64.34 (Bhutan-2011)
GOVE	3.64	1.35	1.83 (Pakistan-2000)	7.39 (Bhutan-2015)
GOVEP	1.57	0.61	0.77 (Bangladesh-2004)	2.94 (Nepal-2009)
GOVES	1.10	0.31	0.65 (Nepal-2000)	1.79 (India-2015)
GOVET	0.57	0.35	0.19 (Bangladesh-2003)	1.33 (India-2011)
RPOP	71.67	8.18	54.46 (Maldives-2015)	86.57 (Nepal-2000)

4. Economic growth and human capital: an empirical evidence

In order to get an insight into the impact of human capital in the South Asian economies, static panel estimation is employed with LGDPPC as dependent variable and other independent variables. The impact of alternative measures of human capital estimated under panel model is displayed in Table 3.

Table 3: Dependent variable; GDPPC growth

Variables	M1		M2		M3	
	FE	RE	FE	RE	FE	RE
Intercept	-1.065*	-0.641	1.150*	1.618*	2.100**	1.677**
	(0.028)	(0.140)	(0.047)	(0.022)	(0.004)	(0.002)
INF	-0.008**	0.013	0.050*	0.178**	0.019	0.239**
	(0.863)	(0.789)	(0.217)	(0.000)	(0.556)	(0.000)
INV	0.597	0.646*	0.437	0.721*	0.370	0.818*
	(0.167)	(0.061)	(0.179)	(0.010)	(0.258)	(0.010)
SEP	1.623**	1.369**	---	---	---	---
	(0.003)	(0.000)	---	---	---	---
SES	---	---	0.695**	0.116	---	---
	---	---	(0.002)	(0.688)	---	---
SET	---	---	---	---	0.365*	-0.053
	---	---	---	---	(0.011)	(0.657)
P-value of F-test	0.0002	0.000	0.007	0.000	0.014	0.000
Bet-R^2	0.007	0.032	0.187	0.462	0.095	0.559
Within-R^2	0.594	0.588	0.824	0.520	0.803	0.325
Overall-R^2	0.045	0.080	0.294	0.472	0.221	0.495
No. of Obs.	96	96	80	80	80	80

Notes: Notes: The Numerals in parentheses are p-values. "**" and "*" indicate coefficients are significant at the 0.05 and 0.10 level of significance respectively.

The table presents simple panel models of economic growth over the period 2000-2015 for the set of seven South Asian countries[1] with required data on GDPPC, school enrollment and other control variables. The first column or the model-1 relates GDPPC to primary school enrollment with other control variables. The researcher carefully runs the regression estimation to avoid the possibility of presence of high multicollinearity between the variables so that school enrollment variables are separately introduced in the models and they are symbolized as M1, M2 and M3. In both of the fixed and random effects models, the coefficients of primary school enrollment are positive and significant. When secondary school enrollment variable is introduced in the estimation leaving primary school enrollment, its coefficient is positive and significant in FE model but insignificant in RE model. Similarly, same evidence is observed in M3 as tertiary school enrollment is inserted in the equation as an independent variable instead of SEP.

The positive and significant coefficient of school enrollment variables i.e., primary, secondary and tertiary school enrollment highlights higher the level of school enrollments positively contributes to the country's economy and vice versa. Most of the significant results of school enrollment variables below 10% of level of significance are positively correlated with GDPPC. The controlled variable; investment is positively and significantly correlated with economic growth which is common in the economy. Inflation in most of the cases has positive sign with appropriate level of significance. This indicates level of inflation in these countries is at appropriate condition. However, all school enrollment indicators do not have positive and significant coefficient.

5. Government's education policy effectiveness on human capital: an empirical evidence

The coefficients of human capital variables in Table 3 show that there is not significant result in all cases. Only few results from the estimation are insignificant still which further directs to investigate the effectiveness of education policies undertaken by the governments. Governments employ education policies because there is a mechanism that government policies employed for human capital formation is assumed to have contribution in the economic growth. As Hanushek and Woessmann (2007) explain, government policies should essentially be effective such that in developing countries efficient education is possible with the policies of providing facilities and excess trained teachers i.e., quality education contributes economic growth positively and significantly. Government spending on education increases the rate of school enrollment and hence higher level of school enrollment implies its positive contribution in the economy. Therefore, the question arises whether or not government's education policies such as government's total expenditure, public expenditure on primary, secondary and tertiary education are effective. In this regard, we tried to examine the impact of government policies onto generating human capital. Studies show that determinants used in explaining school enrollment are economic and non-economic factors. Despite the various determinants of school enrollment, few variables like investment, government expenditure as economic and rural population as non-economic variables are utilized in this analysis due to unavailability of other factor's data. Investment variable implies the overall investment of the economy and it is the aggregated investment of government and private sector. Our concern to insert this indicator is to determine whether or not such investment is effective to increase the school enrollment activities.

Among the various factors determining school enrollment, the geographical location and the development level of the country is also a major factor. In this regard, rural population is assumed as an explanatory variable in the equation where school enrollment is dependent variable. Another important variable or the policy variable used in the analysis is government spending on education. Expenditure on education is an indication of how a country prioritizes education in relation to its overall resource allocation of the economy. Government expenditure includes spending on schools, universities and other public and private institutions involved in delivering education services (World Bank, 2004). Therefore, here we considered government expenditure on education and government expenditure on different education level as major policy variables.

[1] Countries taken in the sample in alphabetical order are; Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri-Lanka.

School enrollment, on the other hand, also depends on the level of development of the country. The rural parts of the country are in lack of facilities and people have low level of understanding of the importance of education. It makes difficult to develop effective community-based strategies to address these issues. As a result, school enrollment ratio in rural parts of the country is very low. Some studies also support the fact of low level of school enrollment in the rural areas of the country. These areas of the developing countries suffer from various problems. And, problems attributed to rural education may reduce the school enrollment in those parts. Children and girls in the rural areas of developing countries like Kenya are at increased risk of being un-enrolled in the school (King et al., 2015). This implies the more the rural areas are there the less will be the school enrollment. Therefore, our other concern is to examine as to what the linkage between rural population and school enrollment in SA countries is. Results obtained from the empirical investigation of government policies on school enrollment are presented in Table 4.

Table 4: Dependent variables: school enrollments

	M1: Dependent Variable; SEP				M2: Dependent Variable; SES				M3: Dependent Variable; SET			
	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE
Intercepts	5.39**	3.28**	4.87**	0.62	11.00**	9.45**	1.744	-0.01	17.95**	17.36**	20.36**	-0.58
	(0.00)	(0.00)	(0.00)	(0.42)	(0.00)	(0.00)	(0.342)	(0.99)	(0.00)	(0.00)	(0.00)	(0.84)
INV	0.018	0.02	0.13	0.33	-0.13	-0.06	0.74**	0.55**	0.04	0.012	-0.10	1.22*
	(0.66)	(0.72)	(0.39)	(0.004)	(0.176)	(0.53)	(0.002)	(0.002)	(0.84)	(0.950)	(0.844)	(0.054)
RPOP	-1.84**	-0.72**	-1.60**	0.50	-2.97**	-1.23**	-0.57	0.503	-3.47**	-2.13**	-3.20**	-0.01
	(0.00)	(0.001)	(0.001)	(0.140)	(0.000)	(0.000)	(0.492)	(0.16)	(0.000)	(0.000)	(0.000)	(0.999)
GOVE	0.016	0.07	---	---	0.24*	0.321**	---	---	0.896**	0.871**	---	---
	(0.742)	(0.288)	---	---	(0.040)	(0.009)	---	---	(0.000)	(0.000)	---	---
GOVEP	---	---	0.039	0.239**	---	---	---	---	---	---	---	---
	---	---	(0.602)	(0.00)	---	---	---	---	---	---	---	---
GOVES	---	---	---	---	---	---	0.52**	0.22**	---	---	---	---
	---	---	---	---	---	---	(0.000)	(0.004)	---	---	---	---
GOVET		---	---	---	---	---	---	---	---	---	0.166	0.28*
	---	---	---	---	---	---	---	---	---	---	(0.434)	(0.020)
P-value of F-test	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Bet-R^2	0.929	0.669	0.936	0.208	0.201	0.12	0.838	0.994	0.163	0.165	0.308	0.967
Within-R^2	0.688	0.648	0.657	0.835	0.76	0.757	0.691	0.636	0.771	0.771	0.712	0.503
Overall-R^2	0.309	0.203	0.221	0.58	0.003	0.001	0.428	0.478	0.001	0.001	0.283	0.555
No. of Obs.	80	80	48	48	80	80	48	48	80	80	48	48

Notes: The Numerals in parentheses are p-values. "**" and "*" indicate coefficients are significant at the 0.05 and 0.10 level of significance respectively.

The literature indicates that government expenditure on education is the most influential policy for school enrollment. The more the expenditure on education, the more there will be the school enrollment and vice versa. Considering this fact, so as to explain the school enrollment, government expenditure is assumed to be an explanatory variable in the analysis. To get rid of multicollinearity problem, government expenditure at different levels of school enrollment is differently treated by running different models. Common control variables in each model are investment and rural population. Investment is positive but insignificant in most of the cases on the one hand. Another control variable rural population is negative and significant in most cases on the other. In very few cases, rural population is insignificantly related to school enrollment.

Many argue that the government incentives such as education materials, foods, and also in some cases, cash attract children to enroll in school (Gumus and Chudgar, 2015). This seems true in case of the relationship between government expenditure and school enrollment. Government expenditure on education is positive and significant on secondary education at 10% level of significance and is significant at 5% or below for tertiary education, but significant on primary school enrollment for few cases. Government expenditure on primary school enrollment is positive and significant in RE model at 5% level of significance but insignificant in FE model. Government expenditure is positive and highly significant on tertiary school enrollment and it is positive and significant at 10% level of significance on secondary school enrollment but not significant on primary school enrollment. GOVES is significant at 5% level of significance with secondary school enrollment. But another policy variable: government expenditure on primary school enrollment, is significant only on RE model and GOVET is weakly significant. This analysis provides mixed results to explain the impact of government education policies on human capital formation and the results cannot predict strong positive relationship between school enrollment and government policy variables. If government policies are strong enough on school enrollment via human capital, it is expected to have a strong relationship between human capital and economic growth. Therefore, it is concluded that for the positive contribution of human capital on economic growth, first the policy employed by the governments to promote human capital should be strong enough and should effectively be implemented.

6. Conclusion

Incorporating the human capital, investment and other control variables in the growth model, this study advocated the role of human capital in the growth process of South Asian economies with the use of school-enrollment rates as proxies for human capital. School enrollment via human

capital seems to be an essential component to explore the growth of SA countries. The major contribution of this study is expected to examine the contribution of human capital on economic growth of SA economies. It utilizes the static panel estimation method to examine the relationship between human capital and economic growth and further to examine the impact of government education policies human capital formation. Primary school enrollment shows positive and significant relationship with GDPPC, but tertiary school enrollment has no such relationship with GDPPC. After observing the empirical results of the analysis, the results could not show the consistent relationship between human capital and economic growth. Therefore, further test is employed to investigate the effectiveness of government policies on human capital. If government is careful to implement its policies strongly, there may be significant impact of policies on school enrollment. Difficulty in getting consistent relationship between human capital and economic growth implies education policies are not strong enough in their implementation. Ineffective government policy is resulting in lower school enrollment and low level of school enrollment has low or weak contribution to the economy.

The weak contribution of human capital to the growth of SA countries is attributed to ineffectiveness and inefficient implementation of education policies. As advocated by the World Bank (2018) to sufficiently increase in government spending on education to provide facilities in classroom, to hire qualified teachers, to introduce new technology and others, this research strongly suggests effective and efficient use of government funds and effective implementation of government policies for human capital formation. Therefore, government should give priority to implement its education policies efficiently and effectively.

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