



EFFECT OF GOVERNMENT HUMAN CAPITAL INVESTMENT ON ECONOMIC GROWTH IN SUB-SAHARAN AFRICA: EVIDENCE FROM NIGERIA, SOUTH AFRICA AND GHANA (1980-2013)



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ABSTRACT

This study examines the effect of government human capital investment on the economic growth of three Sub-Sahara African (SSA) countries of Nigeria, South Africa and Ghana from 1980 to 2013. The objective is to analyze the growth effect of three government human capital investment variables of health, education and literacy rate on the economies of these countries; Secondary data are sourced from World Development Indicators (WDI) online Database and analyzed using Co-integration techniques and Vector Error Correction mechanism (ECM) at 1% and 5% significance levels. The results indicate that two out of the three human capital proxy variables; Health,(GIH), and Education (GIE), show significant positive effect on growth only in Nigeria, while literacy ratio (LR)is insignificantly positive in all countries. This study concludes that in spite of the above result, the SSA countries' economies still exhibit the potentials for enhanced economic growth in the long run judging from the VECM test results. The study therefore, recommends for SSA countries to prioritize skill development, increase budgetary allocations, as well as promote policies that enhance school enrolment in secondary schools in the sub-region.

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Keywords: Government human capital investment, Sustainable development, Aggregate effective demand, Government budgetary expansion, Multiplier effects, Keynesian hypothesis, Economic growth, Cointegration and vector error correction model, Sub-Sahara African economies.

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Contribution/ Originality

I hereby certify that this paper is an original record of research conducted by me, and has not been published elsewhere. Any error associated with the result of this research is solely own me.

1. INTRODUCTION

The relationship between government expenditure and economic growth has been an unresolved issue both theoretically and empirically (Cheng, 2002). While some extant studies conclude that government expenditure has positive effect on economic growth (Ram, 1986; Romer, 1990) others report significantly negative relationship, implying that government expenditure tends to exert negative effect on economic growth (Landau, 1986; Grier and Tullock, 1989; Barro, 1990). Studies by Kormendi and Meguire (1985); Levine and Renelt (1992) found no relationship between an increase in government spending and growth in real output.

The central issue has been whether or not public sector spending increases the long run steady growth rate of the economy (Taban, 2010). However, the remarkable economic success of some newly developed countries of the world

is often attributed to the role of government in these countries. The popular view among economists as well as policy makers, is that government can play a very important role using fiscal policy instrument to intervene in the economy, to control fluctuations in the real gross domestic product GDP (Mwafaq, 2011). Lledo *et al.* (2009) posit that many countries in Sub-Saharan Africa (SSA), just like other developing countries are now using fiscal policy to counter the effect of economic down turn, following the low levels of income to generate domestic resources for investment in SSA countries which, had negatively affected economic growth of the region, resulting in periods of low and volatile growth and sometimes periods of economic stagnation and declining growth rates. Hence, the new Partnership for African Development Initiative (NEPAD) document, acknowledged that the challenge for Africa is to achieve high growth rates and develop capacity to achieve poverty reduction and sustainable development. This depends on, among other factors, human capital development, capital accumulation etc. Government expenditure in human capital therefore, has the tendency to accelerate economic growth.

This view was equally corroborated by Loto (2011); Anyanwu (1996); Levine and Renelt (1992); Schultz (1999); Strans and Thomas (1995) and Omojimate (2011) who reveal that human capital development through education training contributes to economic development by imparting general attitudes, specific skills, reducing fertility and improving living standards, while Barro and Lee (1993) revealed that investment in human capital leads to growth in physical capital which in turn leads to economic growth.

Government expenditures on health for instance raise the productivity of labour and increase the growth of national output (Ebiringa and Charles-Anyago, 2012) while in Iran, Nili and Nitisi (2003); Mohammed (2006); Komijani and Mernerjad (2004) observed that the contribution of education towards growth in real output has proven to be higher than the contribution of physical capital. Consequently, conflicting results and inconsistencies often emerge from extant studies as observed from Oluwatoyi *et al.* (2008) and Ogujuba (2013) who found that human capital has positive effect on growth in Nigeria and Kruger and Lindahl (1998) who found that capital stock do not seem to affect economic growth rate. Equally, while Keynes argued that government budgetary expansion, by augmenting aggregate demand, and through multiplier effect stimulates economic growth (Ebiringa and Charles-Anyago, 2012). This view is in contrast with the position of the neoclassical that government consumption expenditure crowds out private investment, hampers economic growth in the short run and diminishes capital accumulation in the long run (Diamond, 1989).

This study therefore, addresses the problem of the incidence of inconclusiveness and inconsistencies of results from the public expenditure-economic growth nexus, which has continued to be a subject of intense debate among scholars

The reasons adduced for the existence of this scenario is that sometimes government activities produce misallocation of resources and impede the growth of national output, as is the case with some politicians and governments in power who engage in unproductive projects as well as the cross-national nature of some of the previous studies which sometimes involve pooling of data. Pesaran and Smith (1995) had pointed out that pooling of data often result in inconsistent estimates and that the inconsistency does not disappear even when the size of the cross-section and that of the time period is large. Since each country is unique, application of cross-national results to policy formulation for each country may be misleading. The corrective approach therefore, is to avoid pooling of data technique and rather use country specific data and perform separate analyses for each country.

Against this backdrop, this study avoided pooling of data but instead, uses country-specific human capital data to analyze separately the effect of government human capital expenditure on economic growth of Sub-Sahara African countries taking evidences from Nigeria, South Africa and Ghana. The recommendations of the study are equally based on the observed peculiarities of each country to avoid blanket policy effect; meaning that a common policy may not be suitable for all the countries since each country is unique.

The main objective of this study is to investigate the effect of government expenditure in human capital on economic growth in Sub-Sahara Africa (SSA) taking evidence from Nigeria, South Africa and Ghana. The specific

objectives include; determining the effect of the respective proxy variables of government human capital expenditure (GIE, GIH, and LR) on economic growth in Sub-Saharan Africa. The formulated null hypothesis says that the proxy variables of government human capital expenditure have no statistical effect on economic growth in SSA

2. THEORETICAL AND EMPIRICAL FRAMEWORK

The theory of this study focuses on explaining the effect of government expenditure on economic growth in Sub-Saharan Africa. This explanation is based on the Keynesian hypothesis. Keynes in his publication, 'The general theory of employment, interest and money' in 1936, asserted that a key factor that could account for an economy's stagnation and unemployment was the deficiency of aggregate effective demand. His view was that the solution to the problem of economic stagnation rested on the expansion of aggregate demand through massive increase in government expenditure. Thus, in the Keynesian model, public expenditure is an exogenous factor and policy instrument for increasing national income. The Keynesian theory assumes that increased government expenditure tends to lead to high aggregate demand and in turn rapid economic growth. The theory hinges on the belief that public when government increases consumption expenditure it will lead to increase in employment, profitability and investment through multiplier effects on aggregate demand. Hence, Keynes strongly believes on the efficacy of fiscal measures to control the economy through aggregate demand, which became necessary due to the prevalence of market failure.

Contrary to this view, both Wagner's Law and the neoclassical growth models argue that fiscal policy does not have any effect on the growth of national output claiming that higher government expenditure may slow down overall performance of the economy on the grounds that by increasing rising expenditure, government may increase taxes or borrowing. Consequently, higher income taxes may discourage individuals from working for long hours or even searching for jobs, which may result in reducing income and aggregate demand. Similarly, higher profit tax has the tendency to increase production costs and reduce both investment expenditure and profitability of firms. The basis for the argument is that when government increasingly borrows from banks to finance expenditure, it will compete (crowds-out) away the private sector thus reducing private investment. Furthermore, corruption, and activities of some politicians and government officials sometimes result in expenditure and investment in unproductive projects or in goods which the private sector can produce more efficiently. Thus government activities produce misallocation of resources and impede the growth of national output (Abu and Abdullahi, 2010).

However, there are some extant studies which tend to lend credence to the Keynesian hypothesis; Abdullah (2000) carried out a study on the relationship between government expenditure and economic growth in Saudi Arabia and reported that size of government expenditure is very important in the performance of the economy but advised that government should increase its spending on infrastructure, social and economic activities. In addition, government should encourage and support the private sector to accelerate economic growth. Also Olugbenga and Owoye (2007) investigated the relationship between government expenditure and economic growth for a group of 30 OECD countries from 1970 to 2005. The results show both a long run relationship and uni-directional causality from government expenditure to economic growth for 16 out of the 30 countries, thus supporting the Keynesian hypothesis. On the other hand, causality runs from economic growth to government expenditure in 10 out of the 30 countries, thus confirming Wagner's law. Furthermore, Lui *et al.* (2008) studied the relationship between government expenditure and economic growth for the US data from 1974 to 2002. The Causality results revealed that government expenditure causes growth. On the other hand the growth of GDP does not cause expansion of government expenditure. The authors concluded that judging from the Causality Test, Keynesian hypothesis exert more influence on growth than Wagners Law in US.

Hence, this study can be linked to the Keynesian view since government intervention in the economies of SSA countries through massive increase of public spending on the selected variables, (human capital financing, among others), is expected to expand aggregate demand in the economy and enhance economic growth in the region.

Hence, this study examines the effect of government expenditure on economic growth in the SSA countries of Nigeria, South Africa, and Ghana through government financing of human capital.

3. METHODOLOGY

The study used an ex-post-facto design because the data type for this study are already documented by highly research-based institutions like the World Bank, IMF, OECD, CBN, among others. The data for the study was collected from the World Bank Development Indicator (WDI) Online Database, which provides the detailed information about the Gross Domestic Product (GDP) growth rates and human capital investments variables (including Government Investment on Health, Government Investment on Education, and Literacy Rate) for the selected Sub-Saharan African (SSA) countries. The data covers annual time series for the period (1980 – 2013). The time period was chosen because some of the variables to be used in this study started from 1980 for most of the countries selected for the study. Hence, the selection of 1980 to 2013 as time frames. The countries selected are in the same homogenous class (middle-income Sub-Sahara Africa).

The model for the study hinges on the Keynesian proposition that government expenditure is an exogenous variable that propels economic growth. The model assumes that human capital investment has positive effect on GDP. This model is adapted from Ogujiuba (2013) and Oluwatoyi *et al.* (2008). These previous researchers used model:

$GDP = f(EXEDU, EXHE, CAPBD)$ representing expenditure on education, health, and capacity building at primary and secondary levels respectively,

This study modified the model as:

$$GDP = f(GIH, GIE, LR) \quad (1)$$

Where:

GDP = the growth rate of the GDP at current market prices. It is the dependent variables.

GIH = Government Investment on Health is proxied by Public Health expenditure (% of GDP).

GIE = Government Investment on Education is proxied by total public spending on education (% of GDP).

LR = Literacy Rate (LR) is represented by School enrolment, secondary (% gross).

The relationship can be explicitly formulated into a model equation thus:

$$GDP = a_0 + a_1GIH + a_2GIE + a_3LR + \mu \quad (2)$$

Where a_0 is a constant or intercept. a_1 , a_2 and a_3 are the coefficients of the explanatory variables. μ is stochastic error term.

The GDP is the dependent variable while GIH, GIE and LR are the independent variables and proxies for human capital investment.

Econometric techniques were used for data analysis namely; the unit root, co integration, and vector error correction model. Unit root test is used to test for the stationarity of the time series data. In order to eliminate statistically deviated results in the time series analysis, Sirucek (2012) recommend testing the stationarity and subsequently using only stationary time series. Economic time series often have non-stationary character, i.e. the median value or spread change in time and/or the time serial values show a clear tendency to returning to a certain constant.

The study adopted the Augmented Dickey-Fuller (ADF) (Dickey and Fuller, 1979) and the Phillips-Perron (PP) (Phillips and Perron, 1988) tests for the unit root analysis. Both techniques were used so that they can validate the result of each other.

When the results obtained from the unit root test confirm that all the variables used are stationary, a co-integration test is performed to ascertain the presence or otherwise of cointegration between the series of the same order of integration through forming a cointegration equation. This, tests for the existence of long-run relationship

between dependent and independent variables. The Johansen (1991) cointegration technique was adopted to determine the order of integration.

If cointegration is found to exist, error correction mechanism is constructed to model dynamic relationship. The error correction model is designed to capture the short-run deviations that might have occurred in estimating the long-run co-integrating equation. The purpose of error correction model is to indicate the speed of adjustment from short run equilibrium to the long run equilibrium state. The error correction model is as follows:

$$\Delta Y_t = \phi_0 + \sum_{i=1}^{p-1} \phi_i \Delta Y_{t-1} + EC_{t-1} + \mu$$

Where:

EC_{t-1} indicates the error-correction term.

The VECM provides a means whereby a proportion of the disequilibrium in the short run is corrected in the longrun; thus, error correction mechanism is a means to reconcile the short-run and long-run behaviours of the variables (Gujarati, 2003). The size of the error correction term indicates the speed of adjustment of any disequilibrium towards a longrun equilibrium state. However, the greater the coefficient of the parameter, the higher the speed of the adjustment of the model from short run equilibrium to the long run equilibrium state

4. DATA ANALYSIS AND INTERPRETATION OF RESULTS

4.1. Unit Root Test

The Augmented Dickey-Fuller (ADF) and the Phillips and Perron (PP) tests are conducted on the variables, to determine whether they are stationary or non-stationary series. The two tests were employed to reinforce one another, to ensure their robustness and boost confidence in their reliability. The tested null hypotheses for both unit root tests are to determine the presence of a unit root.

Decision rule: Reject the null hypothesis when the test statistical value is less than the critical value. Otherwise, accept and test at higher difference (1 or 2). The significance level for the analysis is at 5%. The tests are done at levels and first difference and presented in Tables 4, 5 and 6 for variables on Nigeria, South Africa and Ghana respectively.

Table-1. Test of Stationarity of Variables

VARIABLES	Levels		First Difference		Order of Integration
	ADF	PP	ADF	PP	
NIGERIA					
GDP	-3.47**	-4.07*	-	-	1(0)
GIH	-3.41**	-3.01**	-	-	1(0)
GIE	-4.52*	-6.80*	-	-	1(0)
LR	-2.25	-2.47	-4.73*	-6.27*	1(1)
SOUTH AFRICA					
GDP	-3.90*	-4.07*	-	-	1(0)
GIH	-2.47	-2.53	-2.98	-5.76	1(1)
GIE	-3.04**	-3.87*	-	-	1(0)
LR	-2.31	-2.36	-4.41*	-6.41*	1(1)
GHANA					
GDP	-3.17**	-2.67	-6.58*	-7.41*	1(1)
GIH	-3.49**	-4.01*	-	-	1(0)
GIE	-1.64	-1.64	-6.27*	-9.19*	1(1)
LR	-0.28	-0.69	-4.53*	-6.91*	1(1)
Critical Values	1%	-3.6496	-3.6422	-3.6576	-3.6496
	5%	-2.9558	-2.9527	-2.9591	-2.9558
	10%	-2.6164	-2.6148	-2.6181	-2.6164

*, **, *** denotes significance at 1%, 5% and 10% respectively.

The results on Table 1, show that GDP, GIH and GIE are stationary at level, while LR is stationary at first difference for Nigeria. This means that GDP, GIH and GIE are integrated in 1(0) while LR is integrated at 1(1). For South Africa, GDP and GIE are stationary at level, while GIH and LR are stationary only at first difference. In Ghana, only GIH is stationary at level, while others (GDP, GIE and LR) are stationary first difference. From the analyses on result in Table 1, we conclude that variables on Nigeria, South Africa and Ghana are reliable for co-integration analyses at first difference 1(1).

4.2. Tests for Co-integration

This study adopts Johansen co-integration test (Johansen, 1991). A co-integration test is carried out to determine the long-run relationship between the dependent and independent variables. Co-integration of two or more time series suggests that there is long run equilibrium (relationship) between them (Gujarati, 2003).

Decision Rule: The decision rule is to reject the null hypothesis if the value of the Likelihood Ratio is greater than the Critical Value. Otherwise, we do not reject.

The lag interval indicates the number of periods it takes the combination of the variables to co-integrate (if any). The lag length of the co-integration will also determine the lag length for the ECM analyses.

Table-2. Test of Co-integration among Variables of Government Human Capital Investment and Economic Growth in Nigeria, South Africa and Ghana

Nigeria			South Africa			Ghana		
Likelihood Ratio	5% Critical Value	1% Critical Value	Likelihood Ratio	5% Critical Value	1% Critical Value	Likelihood Ratio	5% Critical Value	1% Critical Value
65.9483**	47.21	54.46	48.1328*	47.21	54.46	52.6317*	47.21	54.46
32.4876*	29.68	35.65	23.7056	29.68	35.65	26.4626	29.68	35.65
15.8615*	15.41	20.04	11.3740	15.41	20.04	9.9547	15.41	20.04
3.4251	3.76	6.65	3.1394	3.76	6.65	0.0823	3.76	6.65

*(**) denotes rejection of the hypothesis at 5%(1%) significance level

Test assumption: Linear deterministic trend in the data

Series: GDP GIH GIE LR

The results of the co-integration test for long run relationship between government human capital investment and economic growth for Nigeria, South Africa and Ghana are presented on Table 2.

The results show three (3) cointegrating equations for Nigeria, and one cointegrating equation for South Africa and Ghana respectively. It becomes necessary to reject the null hypothesis of no co-integration and conclude that there is the existence of long-run relationship among the variables in Nigeria, South Africa and Ghana respectively.

4.3. Vector Error Correction

Since the results above reveal the existence of co-integration among the variables of the models, error correction models (ECM) are required to determine the short run dynamism of the relationships. For theoretical meaningfulness, the coefficient of the error term should be negative and range between zero and one in absolute term (Ogundipe and Oluwatobi, 2014). The error-correction term to be estimated represents the speed of adjustment to equilibrium trends.

The values in bracket are the standard errors while the values in parentheses are the t-statistics (see Table 3). The ECM_{t-1} is the coefficients of the lag dependent variables in their first difference. The decision rule is to accept as statistically significant, when the t-statistics is greater than 2.0. This criterion is described as rule of the thumb in Onuorah and Akujuobi (2012).

The results of the VECM for each model by country are presented as below. The presentation format was adapted from the works of Oluwatobi and Ogunrinola (2011) and Ogundipe and Oluwatobi (2014).

Equally, the nature of the long run relationship that emerged from co-integration test is examined. The contributions of the coefficients (variables) in each model were interpreted and its significance tested at 5% level, as adapted from [Onuorah and Akujuobi \(2012\)](#).

Table-3. Short-run Vector Error Correction (VEC) test results on Government Human Capital Investment and Economic Growth, and cointegrating Equation coefficients for Nigeria, South Africa and Ghana.

Vector Error Correction Model for Nigeria				
Variable	D(GDP)	D(GIH)	D(GIE)	D(LR)
ECM _{t-1}	-0.235468	-0.028976	-0.028142	-0.218247
	(0.10984)	(0.01202)	(0.01006)	(0.09562)
	[-2.14372]	[-2.41066]	[-2.79701]	[-2.28235]
Vector Error Correction Model for South Africa				
Variable	D(GDP)	D(GIH)	D(GIE)	D(LR)
ECM _{t-1}	-1.044073	0.000152	-0.056395	0.828217
	(0.21543)	(0.02249)	(0.04273)	(0.68142)
	[-4.84653]	[0.00674]	[-1.31972]	[1.21543]
Vector Error Correction Model for Ghana				
Variable	D(GDP)	D(GIH)	D(GIE)	D(LR)
ECM _{t-1}	-0.512042	0.129197	0.123822	0.047496
	(0.23219)	(0.04662)	(0.05904)	(0.23280)
	[-2.20530]	[2.77118]	[2.09724]	[0.20402]
Cointegrating Equation for Nigeria				
GDP =	-165.1810	+10.82688GIH	+30.86722GIE	-0.925768LR
		(4.61900)	(9.24133)	(0.24711)
		[2.34399*]	[3.34013*]	[-3.74631*]
Cointegrating Equation for South Africa				
GDP =	2.985595	+2.349261GIH	+1.061600GIE	-0.221991LR
		(1.30726)	(1.07565)	(0.04556)
		[1.79709]	[0.98694]	[-4.87212*]
Cointegrating Equation for Ghana				
GDP =	27.71336	-6.990090GIH	-0.423287GIE	-0.208870LR
		(1.38808)	(0.42298)	(0.09068)
		[-5.03579*]	[-1.00072]	[-2.30347*]

NB: Standard errors in bracket & t-statistics in parentheses

Table 3 was used to examine the short run dynamism of the Government Human Capital Investment and Economic Growth Model as well as the nature of the relationship that exist in the model. The analyses were performed for variables in Nigeria, South Africa and Ghana. In line with the co-integration results, the VEC was performed at one year lag interval for Nigeria and South Africa and two year lag internals for Ghana.

In the case of Nigeria, the co-integrating equation indicates that investment in health (10.82688 GIH) and education (30.86722GIE) have positive relationship while literacy rate (-0.925768LR) indicate negative relationship with GDP. The study further indicates that, at 5% level, health, education and literacy ratio are statistically significant. This implies that one percentage increase in government investment in health leads to 108% significant increase in GDP; one percentage increase in education leads to 308.6% in GDP while a percent advancement in literacy rate brings about 92% shortfall in GDP. The result further indicates that all the variables have significant positive effect on the GDP of Nigeria. Furthermore, The VECM test in Nigeria indicate that the model has negative sign; also the magnitude of the error correction term coefficient lies between zero and one. This indicates about 24% (-0.235468) short run disequilibrium adjustment to long run equilibrium each year, and the significance of the error

correction term obtained from the government human capital investment components shows that the speed of growth to converge to equilibrium path is high. The result thus indicates that government human capital investment has significant short run effect on economic growth in Nigeria.

In South Africa, co-integration equation indicates that government investment in health (2.349261GIH) and education (1.061600GIE) have positive relationship while literacy ratio (-0.221991LR) has negative relationship with GDP. The result implies that a percent increase in government investment in health will result in 235% increase in GDP; government investment in education leads to 106% increase while results in 22% fall in GDP. At 5% level, only literacy rate ($t = -4.87212$) has significant effect on GDP. Furthermore, the error correction term is not within the expected bound (between 0 and 1), though it possess the expected negative sign. This indicates that the 104% (-1.044073) of the drift from the long-run equilibrium value will be restored within a year and the coefficient is equally statistically significant. The result thus indicates that government human capital investment has a very high significant speed of short run effect on economic growth in South Africa.

For the result in Ghana, the equation of co-integration indicates that government investment in health (-6.990090GIH) and education (-0.423287GIE) as well as the literacy rate in the country (-0.208870LR) all have negative relationship with GDP. This show that a percentage increase in government investment in health results to 699% fall in GDP; education has 42% fall in GDP while literacy rate leads to 21% fall in GDP. Among the variables government investment in health ($t = -5.03579$) and literacy rate ($t = -2.30347$) have significant effect. The result suggests that government investment in human capital brings about adverse effect in Ghana. Moreover, the error correction analysis was performed at two lag intervals. The coefficient is rightly signed and shows that there is a bi-annual speed of adjustment to the long-run equilibrium value at about 51.2% (-0.512042), statistically significant ($t\text{-value} > 2$). The result thus indicates that government human capital investment has significant short run effect on economic growth in Ghana.

On the overall, the result of the error correction term indicates that the adjustment speed for short run disequilibrium to converge to long run equilibrium is about 24% in Nigeria, 104% for South Africa and 51% for Ghana. Thus we conclude that government human capital investment has significant effect in SSA.

4.4. Hypothesis Testing

The study has investigated the objective, using the co-integration and VECM tests. Having found long run relationship among the variables for all the countries in the models developed, we thus tested the hypotheses based on Cointegration and Vector Error Correction Model, (that is, using ECM to reconcile the short run behavior of the explanatory variables with its long run behavior).

Decision Rule (test of short run effect): the coefficient of the error term should be negative and range between zero and one in absolute term ($ECt_{-1} \geq 0$ or ≤ 1), and to accept as statistically significant, when the t-statistics is greater than 2.0 ($t^* > 2$).

The hypotheses testing are shown below:

Null Hypothesis Ho: There is no positive significant effect of human capital on economic growth in Sub-Saharan African (SSA) countries of Nigeria, Ghana and South Africa

Table-4. Hypothesis - Summary of Results

Variables	Nigeria	South Africa	Ghana
ECM_{t-1}	-0.24*	-1.04*	-0.51*
Constant	-165.18	2.99	27.71
GIH	10.82*	2.35	-6.99*
GIE	30.87*	1.06	-0.42
LR	-0.93*	-0.22*	-0.21*

Source: Derived from Table 19

For Nigeria, Health (GIH) and Education (GIE) are positively related with economic growth (GDP) and all are statistically significant; while LR has statistically significant negative effect on economic growth. The VECM test is negatively signed (-0.24), lies between zero and one, and statistically significant. This means that Nigerian economy adjusts 24% to restore long run equilibrium.

Decision: Reject the null hypothesis that “there is no significant positive effect of human capital on economic growth in Nigeria”.

We conclude that human capital investment has significant and positive short run effect on economic growth in Nigeria.

For South Africa, Health (GIH) and Education (GIE) are positively related with economic growth (GDP) and 149but not statistically significant; while LR has statistically significant negative effect on economic growth. The VECM test shows a negative sign and is statistically significant though lies above one. This means that the adjustment speed to long run equilibrium is 104%. Though the ECM shows tendency to adjust to long run disequilibrium, the variables of human capital investment (GIH, GIE) are positive but not significant.

Decision: Accept the null hypothesis that “there is no significant positive effect of human capital on economic growth in South Africa”.

We conclude that human capital investment has positive but insignificant short run effect on economic growth in South Africa.

For Ghana, Health (GIH), Education (GIE) and LR have negative effect on economic growth, but statistically significant for GIH and LR only. The VECM test is negatively signed (-0.51), lies between zero and one, and statistically significant. This means that the adjustment speed to long run equilibrium is 51% in Ghana. Though the ECM shows tendency to adjust to long run disequilibrium, the variables of human capital investment (GIH, LR) are negative and significant.

Decision: Accept the null hypothesis that “there is no significant positive effect of human capital on economic growth in Ghana”.

We conclude that human capital investment has significant negative short run effect on economic growth in Ghana.

Based on the hypotheses testing for Nigeria, South Africa and Ghana where: human capital investment is significantly positive in Nigeria, positive but insignificant in South Africa and significantly negative in Ghana, we conclude that effect of human capital investment on economic growth in Sub-Saharan Africa (SSA) is country-specific and largely divergent. Since two countries (South Africa and Ghana) do not support reject hypothesis one, we therefore accept the null hypothesis that there is no significant positive effect of human capital on economic growth in Sub-Saharan African (SSA) countries.

5. DISCUSSION OF THE FINDINGS

Human capital is significantly positive with economic growth in Nigeria and South Africa, but negative with growth only in Ghana. Therefore, we conclude that human capital investment is positively related with economic growth in SSA. Furthermore, the Vector Error Correction Mechanism (VECM) results indicate that the economies of Nigeria, South Africa and Ghana adjust at 24%, 104% and 51% respectively, to long run disequilibrium in the SSA region. The VECM result has evidently shown that government financing policy is a potential approach for economic growth in SSA. This result is consistent with the a priori expectation that human capital (health and education), raise productivity of labour and increases growth of national output. The study is also consistent with the work of [Ebiringa and Charles-Anyagou \(2012\)](#); [Loto \(2011\)](#) which conclude positive impact of education and health expenditure on economic growth.

Furthermore, the results of the study revealed that literacy ratio has negative effect on economic growth in all the selected SSA countries of Nigeria, South Africa and Ghana. This result disagrees with the previous studies such as

World Development Indicator WDI (2013) and Anyanwu and Erhijakpor (2007) which posit that raising average level of schooling of adult population in a single year, increases economic growth above 3% in the long run.

6. SUMMARY AND CONCLUSION

By means of ECM approach, the study investigated the unit roots of the variables and then conducted cointegration and error correction test on the variables of the study and the findings are presented based on the hypothesis. The cointegration test results indicate that in Nigeria, with respect to human capital investment, health and education have significant positive effect on growth in Nigeria, insignificant negative effect on GDP growth in South Africa and both significant and insignificant negative effect on growth in Ghana. However, literacy rate indicates significant negative effect in all the selected SSA countries. The ECM test results indicate that the SSA economies adjust fairly to restore long run equilibrium, thus showing that government human capital financing is a good fiscal policy in the SSA region and so should be improved upon and sustained to enhance economic growth in the region.

7. RECOMMENDATIONS

Based on the observed peculiarities in each selected country, the study recommends as follows;

In Nigeria due to the short run significant positive effect of education and health on economic growth in the economy, government should make concerted efforts to increase budgetary allocation to health and education sectors, for the provision of infrastructural facilities and services in order to enhance literacy rate (through increase in school enrolment in secondary schools), which exhibited a very weak influence on economic growth in the country. Free and compulsory education at secondary school level is therefore necessary.

In South Africa, due to the fact that health and education have insignificant negative effect on GDP growth, while literacy rate has significant negative effect on economic growth, this study therefore recommends that the government of South Africa should act in line with the recommendations for Nigeria. Equally, the government should as well, improve the welfare packages of the staff and personnel of health and education sectors, for improved quality of life, (cited as one of the reasons for migration of some professionals in the past years), in order to forestall further brain drain, which may have adversely affected the country's GDP growth.

And for Ghana, following the observed significant negative effect on economic growth, of all the Human Capital variables, this study equally recommends that Ghana embarks on a comprehensive review of her human capital development policy to redress the imbalances observed in her health and education sectors, especially literacy ratio (LR) (proxied by school enrolment) which impacted negatively on economic growth in Ghana.

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