EFFECT OF HUMAN CAPITAL INVESTMENT ON ECONOMIC GROWTH   IN NIGERIA FROM 1983 TO 2013

BY

Musa, Nuhu

Department of Economics,Kogi State College of Education,
Ankpa, Nigeria.

GSM:07060526595
E-mail : musanuhuadams@gmail.com

Abstract

This paper is focused on empirical examination of the impact of human capital investment on economic growth in Nigeria for the period 1983-2013, using time-series approach. It employed the theoretical framework of the endogenous growth model and the analytical technique of Co-integration and Error Correction Mechanism (ECM). The variables used in the study were tested for stationarity using the Augmented Dickey Fuller unit root test. The result showed that the variables were stationary after first differencing. Co-integration test revealed the presence of co-integration between human capital development and economic growth. The result revealed that investment in human capital in form of education and training has significant effect on economic growth in Nigeria although, the government expenditure on health has negative coefficient which is inconsistent with apriori expectation. It is recommended that all the stakeholders; both government and non-governmentalorganizations in collaboration with the private sectors should place high priority on human capital development to achieve the desired sustainable economic growth and development of Nigeria.

Keywords: Human capital investment, Economic growth, Public expenditure.

Introduction

Investment in human capital is a key component of long term economic growth and development. Economic growth depends on capital accumulation and investment. Capital accumulation without the appropriate human capital may not result in economic growth. Development theorists generally agree that the quality of human resources has significant impact on economic growth. According to Anaduaka and Eigbiremolen,(2014) there can be no significant economic growth in any country without adequate human capital development . They observed that human capital investment is the most contributory factor that accounted for the rapid and sustained economic growth in most developed and emerging economies. As a matter of fact, human beings are the most valuable assets in a country. Economic theorists have realized that human beings are the most important and promising source of growth and development of any country. Equipment and technology are products of human minds and can only be made productive by people. Capital and natural resources are passive agents. The active agents of modernization are human beings, for they alone can accumulate capital, exploit natural resources for long term economic growth and development. Olaniyan and Okemakinde (2008) observed that it is human resources, not physical capital or natural resources that constitute the basis for the wealth of nation.

According to Yesufu (2000),"human resource development is necessary to ensure that the workforce is continuously upgraded to meet the new challenges of its total environment". This implies that those already on the job require retraining, reorientation or adaptation to meet the new challenges. This special human capacity can be acquired and developed through quality education and training.

The human factor has been identified as the cornerstone of economic growth and development of any country. Societies that invest in education raise per capita GDP growth rate. It is the human resources of any nation, rather than its physical capital and material resources, which ultimately determines the character and pace of its economic and social development. According to Harbison (1973):

> *"Human resources constitute the ultimate basis for the wealth of nations. Capital and natural resources are passive factors of production; human beings are the active agents who accumulate capital, exploit natural resources, build a social, economic and political organization, and carry forward national development. Clearly, a country which is unable to develop the skills and knowledge of its people and utilize them effectively in the national economy will be unable to develop anything else".*

The development experience of East-Asia , particularly ''greater'' China, Singapore and Malaysia and Latin America, such as Brazil, Mexico, Argentina and Chile was as a result of priority accorded to the development of human resources. In spite of the importance of education, Nigeria spends an almost insignificant proportion of her financial resources on education. According to Yetunde and Aluko (2011), since the late seventies, budgetary allocations to education have not matched the increasing need for qualitative education. He stated further that the low priority in budgetary allocation to education by the Nigerian government relative to other developing countries like South Africa, Malaysia, Brazil, Argentina, and Indonesia has caused the problem of brain drain from the universities and industrial strikes. These had led to shortage of technical and skilled manpower that has been a major constraint to the rapid economic growth and development of the country.

A lot of theoretical and empirical studies on human capital development exist, some of which agree that stock of human capital and total government expenditure on education stimulates economic growth, others disagree. Controversies abound on the effectiveness of human capital investment and government expenditure on education in accelerating economic growth of developing countries. The empirical resultsof the effect of human capital investment on economic growth (measured by per capita GDP growth rate) are inconsistent or inconclusive and divergent. It is this controversy that has engendered the curiosity of the researcher to carry out a further study on the effect of human capital investment on economic growth in Nigeria. In addition, certain studies in this area are obsolete in terms of timeframe;

hence the need to carry out an up-to date studies of the impact of human capital investment on economic growth in Nigeria. This study addresses two research questions. Does human capital investment have any significant impact on economic growth and development of Nigeria? Are there any long run relationship between human capital investment and economic growth in Nigeria? The main objective of this study is to assess the impact of human capital investment on economic growth in Nigeria.

Theoretical Framework and Review of Related Literature

The importance of human capital accumulation as an engine of economic growth and development has been widely recognized in theoretical and empirical studies. No country has achieved sustained economic development without substantial investment in human capital. Several studies have evolved to analyze the channels through which human capital can affect economic growth (Nnanna, Englama and Odoko, 2004:55). Much of this literature has emphasized on the relationship between human and physical capital, noting that any imbalance in these two stocks, may not result in economic growth. Jhingan (2009) identified human capital as the bedrock of economic growth and development.

The concept of human capital refers to the abilities and skills of human resources of a country, while human capital formation refers to the process of acquiring and increasing the number of persons who have the skills, education and experience that are critical for economic growth and development of a country (Okojie, 1995). Human capital could therefore, be defined as the knowledge, skills, abilities and capabilities possessed by people. Yetunde and Aluko (2011), define human capital as the stock of accumulated skills, knowledge, abilities and capabilities possessed by people. Human capital refers to processes that relate to training, education and other professional initiatives in order to increase the levels of knowledge, skills, abilities, and proficiency of labour force. Thus, the term human capital denotes the knowledge, skills, competencies, and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being.

The desire to achieve economic growth has been the major concern of economists for centuries. The various growth models have come to realize that the rate of growth of an economy is determined by capital accumulation both physical and human, the efficiency of resource use and the ability to apply modern technology. Within the framework of the neo-classical growth theory, capital accumulation is the engine of growth. In the Keynesian framework, increase in aggregate demand is a prerequisite for growth. Contrary to this view, Harrod-Domar growth model points out that investment is pivotal to economic growth. This model implied a direct link between the rate of economic growth and the level of current investment. The model is express as; $\Delta Y/Y = sk$ or $g=sk$, $g_w = sk$ where $g=\Delta Y/Y$ is the growth rate of national output, s is the savings ratio in GDP; k represents capital-output ratio and g_w denotes the warranted growth rate which refers to the growth rate of GDP arising from saving and investment activities of the entrepreneur (Nnanna, Englama and Odoko, 2004).

The two-gap model introduced by Chenery and Strout (1966) is an extension of the simple Harrod-Domar growth model. This model explains that development is a function of investment and that such investment which requires domestic savings is not sufficient to ensure that development take place. There must be the possibility of obtaining from abroad the amount that can be invested in any country with the amount that is saved. It states that the growth rate of national output equal the saving ratio divided by the capital-output ratio. This is expressed as; $g_w = s_d/k + s_f/k$ where, s_f is the foreign capital and sd is the domestic capital. This model established the positive relationship between investment and economic growth. The various gap models specify the structural constraints faced by LDCs attempting to mobilize resources for industrialization.

The endogenous growth theory developed by Romer, (1986) was a complete departure from the neoclassical growth model. The body of the literature that challenged the assumptions of the solow growth model came to be known as endogenous growth model. The model introduced a new concept of human capital, the skills and knowledge that make workers productive. It's key argument is that long-term growth is conditional on

what happens within the domestic economy including the types of macroeconomic environment and policies adopted and how the latter affect savings and investment decisions (Dike and Bogunjoko, 1997).Endogenous growth theorists contend that changes in outputs are due to changes in the qualities of inputs. The endogenous growth model explains the 'miracle of East-Asian industrialization by providing more relevant insights into why and how some emerging economies like china, Malaysia, Singapore, Hong Kong, Brazil, Mexico, Argentina, have successfully used technology transfer as a strategy to transform their economies into circles of rapid growth leading to catch-up and convergence with the developed world.

Several studies have been carried out to examine the impact of human capital investment on economic growth. There seems to be a consensus from most of these studies that the development of human capital engenders economic growth. A review of some of the empirical literature is provided below.

Johnson (2011) investigated the impact of human capital development on economic growth in Nigeria from 1986-2009 and employed ordinary least square (OLS) to analyze the relationship using the GDP as proxy for economic growth; total government expenditure on education and health, and the enrolment pattern of tertiary, secondary and primary schools as proxy for human capital. The result showed that there is a strong positive relationship between human capital development and economic growth.

Babatunde and Adefabi, (2005) also used time series data for the period 1970 – 2003 and applied the co-integration and Vector Error- Correction methodology to investigate the relationship between education and economic growth. The paper employed a variety of analytical tools, including unit root tests, co-integration tests and error correction mechanism (ECM). The empirical results indicated that a long-run positive relationship exist between human capital development and economic growth in Nigeria. Barro (1997), examined the relationship between human capital development and economic growth in cross country regression frame work using panel data for the period 1960 – 1990 and discovered the level of schooling and life expectancy, lower fertility, lower government

expenditure, better maintenance of law, lower inflation and improvement in terms of trade have positive influence on economic growth. On the basis of that, he then concludes that growth rate of per capita GDP is positively related to human capital (proxy by secondary school enrolment ratio). Adamu (2003) investigated the impact of human capital formation on economic growth in Nigeria from 1970 to 2000, using co-integration and error-correction (ECM) technique. The result revealed that investment in human capital has significant effect on economic growth. Anaduaka and Eigbiremolen (2014) empirically investigated the impact of human capital development on economic growth in Nigeria for the period 1999-2012.The ordinary least square technique was used and it revealed that total stock of human capital and total government expenditure on education, are statistically significant in the determination of the level of economic growth.

Although extensive work has been done in this area, there are some gaps that this study intends to fill. Majority of the literature reviewed employed time series data upon which stationarity tests were not carried out and as a consequence revealed spurious results. This study attempts to bridge the gap in the literature by using estimation technique different from the previous studies in order to avoid the problem of spurious results. In addition, certain studies in this regards in Nigeria are obsolete in terms of time frame. This study attempts to bridge the gap by exploring time series data covering the period that previous studies did not cover.

Methodology
The study adopted the endogenous-growth model developed by Romer, (1993). The model expresses output as a function of total productivity and capital stock.
$$Y = A K^\alpha L^\beta H \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$
Where, Y is actual output level or economic growth; K is the stock of physical capital; h is the level of human capital; L is the labour supply, measured by number of workers; and A is the technology; α represents the elasticity of capital input with respect to output; while β denotes the elasticity of labour input with respect to output.

This paper employed the co-integration and error correction (ECM) mechanism to investigate the impact of human capital investment on economic growth in Nigeria for the period 1983 to 2013.The choice of this model was informed by the desire to avoid the problems of spurious regressions that are associated with non-stationary time series models. The data used in this study were secondary time series obtained from Central Bank of Nigeria Statistical Bulletin (2007), National Bureau of Statistics (2014) and Central Bank of Nigeria Statistical Bulletin (2014)

Model specification
This study model is expressed as follows:

$$RGDPGR = \beta_o + \beta_1 HUK + \beta_2 PED + \beta_3 PEH + \beta_4 DIF + \beta_5 RER + \beta_6 INFRAC + \beta_7 GDS + \mu \text{------2}$$

Where;
GDPGR= the growth rate of real gross domestic product,

HUK= Stock of human capital (proxy by secondary school enrollment ratio, defined as total enrolment in secondary education as a proportion of the population of secondary school age)

PED= Public expenditure on education

PEH = Public expenditure on health

GDS = Gross Domestic Savings

RER = the real exchange rate of the recipient country

DIF = Domestic inflation rate

INFRAC= Infrastructure development (proxy by per capita electricity consumption)

β_s are parameters to be estimated.

μ=the stochastic error term.

Apriori expectations:
On apriori ground, we expect the value of $\beta_0, \beta_1, \beta_2, \beta_3, \beta_5, \beta_6$ and β_7 to be positive and greater than zero while that of β_4 is expected to be negative.

Results and Discussion
Unit Root Test

Table 1 below shows the result for the augmented Dickey-Fuller (ADF) unit root test. It was discovered that all the variables of the study exhibited unit root at various critical levels but mostly at 5% and 10% level of significance. In other words, all the variables were found to be non-stationary at their levels but stationary at their first differences.

Table 1: Result of the ADF Unit Root test

Variable	ADF value	Order of integration	Level of sig.
GDPGR	-3.902510	I(1)	10%
HUK	-8.731599	1(1)	5%
PED	-7.177615	1(1)	10%
PEH	-2.026403	1(1)	5%
DIF	-10.73850	1(1)	5%
RER	-7.476882	1(1)	10%
INFRAC	-7.471691	1(1)	5%
GDS	-9.486893	1(1)	5%

Source:Author's computation using E-views (4.1)

The unit root test result is presented in Table 1.The result indicates that all the variables were non stationary at their levels and became stationary after first differencing. That is the variables were found to be stationary and integrated of order 1 (1) at 5% and 10% level of significance.

Co-integration Test Results

Having found all the variables to be integrated in the same order, a co-integration test was conducted to determine the existence or otherwise of a long run relationship among the variables. To this end, the Johansen co-integration test was used. The results obtained were analyzed in Table 2.

Table 2:Result of Johansen co-integration test

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	5 % critical value	Prob.
None*	0.21208	11.47840	15.41	0.0022
At most 1	0.11337	3.850592	3.76	0.0012
At most 2	0.14739	5.102757	12.45	0.2110
At most 3	0.27871	10.45486	9.24	0.0290
At most 4	0.35057	24.26798	25.21	0.0241
At most 5	0.14965	5.187612	3.72	0.0014

Source:*Author's computation using E-views (4.1)*

The Johansen co-integration test results showed that all the variables were co-integrated. The explanatory variables such as Human capital Investment (HUK), Public expenditure on education (PED) Public expenditure on health (PEH), Domestic inflation rate (DIF) are all co-integrated with the dependent variable; Gross Domestic Product (GDP) growth rate. This suggests that a long-run relationship exists between human capital investment and economic growth in Nigeria.

The parsimonious error correction model (ECM) was estimated having ascertained that the variables were non-stationary at their levels but stationary after first differencing, and that they were co-integrated. The result of the parsimonious error correction model (ECM) is presented in Table 3.

Table 3: Parsimonious Error- Correction Model Result

Variable	Coefficient	Std. Error	t-Statistic
C	-20565.56	12042.96	-1.707683
GDPGR(-1)	1.036039	0.158637	6.530886
HUK	328.2759	184.7805	1.776572
PED	278.6785	63.16923	4.411618

PEH	-278.4773	63.17565	-4.407985
ECM(-1)	-0.338410	0.236495	-0.585254

R-squared	0.919444	Mean dependent var	111123.0
Adjusted R-squared	0.904526	S.D. dependent var	46964.62
S.E. of regression	0.056479	Akaike info criterion	22.16624
Sum squared resid	0.025842	Schwarz criterion	22.43833
Log likelihood	-359.7430	F-statistic	61.63392
Durbin-Watson stat	1.950470	Prob(F-statistic)	0.000000

Source:*Author's computation using E-views (4.1)*

The parsimonious error correction model results show that about 33% of the disequilibrium errors, which occurred in the previous year, are corrected in the current year. The co-efficient of the error term is not statistically significant as shown by the t-value.

The result of the estimation of the model is presented in Table 4 below.

Table 4: Static Regression Result of the model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	45545.40	12245.37	3.719396	0.0010
HUK	788.8966	172.2616	4.579644	0.0001
PED	55.7295	98.8862	3.597347	0.0013
PEH	-355.7851	98.79762	-3.601150	0.0013
DIF	-6.799536	171.8407	-0.039569	0.9687
RER	0.297910	0.210581	1.414710	0.1690
INFRAC	0.021182	0.018414	1.150298	0.2605
GDS	0.115894	0.030631	3.783587	0.0008
R-squared	0.904946	Mean dependent var		110683.7
Adjusted R-squared	0.879354	S.D. dependent var		46318.44
S.E. of regression	0.035426	Akaike info criterion		22.41189
Sum squared resid	0.024963	Schwarz criterion		22.77104
Log likelihood	-373.0022	F-statistic		35.36123
Durbin-Watson stat	2.183229	Prob(F-statistic)		0.000000

Source: *Author's computation using E-views (4.1)*

The results of the impact of human capital investment on economic growth are presented in Table 4. As shown above, the coefficient of the dependent variable GDPGR is positive. This means that if the value of the explanatory variables were zero, the GDPGR will assume a positive value. Also, the variable representing human capital (HUK) is positive and statistically significant as shown by the t-value. The calculated t-value (4.579644) is greater than t-critical (2.056) at 5% level of significance. This indicates that there is a strong positive relationship between economic growth and the level of human capital development in Nigeria. As the result indicates, ceteris paribus, if HUK goes up by one percentage point, on the average, the per-capita GDP growth rate goes up by about 78.8 percent. The empirical result also revealed that the variable representing PED is positive and statistically significant as shown by the t-value. The coefficient of domestic inflation rate has a negative value. This conforms to a priori expectations. The result shows that, ceteris paribus, a 1% increase in inflation rate will reduce per-capita GDP growth rate by 6.79 percent. Many of the explanatory variables were well behaved in terms of sign and statistical significance of their coefficients except the PEH which is negative and fails to conform to a priori expectation.

The coefficient of determination (R – square) and the adjusted R-square were 90.4 and 87.9 percent respectively as shown in Table 4. This indicates a high explanatory power. About 90% of the systematic variation in the per-capita GDP growth rate is accounted for by the explanatory variables. Only about 10% is left unexplained and this is attributed to other factors included in the disturbance term (μ). The F-value, which is a measure of overall goodness-of-fit, is statistically significant judging from the F-calculated (35.36123) and the probability of F-statistic (0.000000). The Durbin Watson Statistic of 2.183 indicates the absence of positive serial autocorrelation among the successive values of the variables.

The summary of the findings of this study is that investment in human capital in form of education and training has significant impact on economic growth in Nigeria, although, the government expenditure on health has negative coefficient which is inconsistent with apriori expectation. Thus, the policy implication of the findings is that human capital should be developed

to enable the country achieve the desired sustained economic growth. The findings of this study is consistent with the studies carried out by Johnson (2011), Adanuaka and Eigbiremolen (2014) that human capital investment contributes significantly to economic growth and development of Nigeria.

Conclusion and Recommendations

The paper investigated the impact of human capital investment on economic growth of Nigeria using Co-integration and Error Correction (ECM) technique. The result reveals that investment in human capital, in the form of education and capacity building through training and orientation contributes significantly to economic growth and development of Nigeria. Therefore, for the country's ambition of being one of the top twenty leading economies of the world by the year 2020 (Vision 20: 2020) to be achievable, it must develop its huge resource of human capital. To achieve this goal, the following recommendations are put forward:

Increased funding of the universities by the government should be a top priority in budget allocation. The percentage allocation of total government expenditure should be directed to the education sector. This will provide adequate resources for the maintenance of decaying infrastructure, procurement of new equipment, books, journals, chemicals and other learning facilities.

All key stakeholders including the private sectors, the communities and non-governmental organizations should be involved in Education policy formulation, planning and implementation, as well as funding and quality assurance. Institutions for developing human resources must be strengthened to produce the needed capacity for economic growth and development of Nigeria.

In addition, the human capital should be developed through functional education, in-service training, and research initiative. The educational sector needs to be revamped with emphasis on science and technology, as well as vocational training to equip the youth with relevant skills for self – employment.

The government needs to reprioritize her spending in favour of social and economic infrastructure, quality health and quality higher education and training, strong institutions and technological upgrade. This will enhance the efficiency and productivity of labour force, and by implication, economic growth.

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