THE RELATIONSHIP BETWEEN HUMAN CAPITAL INVESTMENTS AND ECONOMIC DEVELOPMENT IN NIGERIA

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Abstract

Economic development is attainable through the reduction in poverty, a reasonable rate of employment, equality in distribution of national resources and wealth; which all culminate to enhanced standard of living in general. For the past four decades, the role of human capital in the achievement of economic development has been at the centre stage of discourse amongst the development economists. This study therefore empirically investigates the short run and long run relationships between human capital investment and economic development in Nigeria using GDP per capita as proxy, within the framework of new growth model (specifically Lucas endogenous growth model). Adopting autoregressive distributed lag (ARDL) technique using E-Views 9, the dynamic relationships between GDP per capita and indicators of human capital development such as gross enrolment ratios at the three levels of education subsisting in Nigeria are examined. Also due to the imperative of government policies in the development of human capital as recognized by the Lucas model, measures such as total government expenditure on education and health are relevant in Nigeria context and are therefore incorporated into this research. The results of the study indicate mixed relationships between measures of human capital development adopted and economic development. Following the findings, it is suggested that measures that will enhance quality human capital formation through skills acquisition in order to ensure labour productivity, job creation and sustainable development should be encouraged by the stakeholders. Furthermore, proper institutional framework which ensures effective, quality and efficient utilization of government resources allocated to both the education and health sectors should be pursued with vigour and put in place.

Keywords: *Human capital; Economic development; Labour productivity; New growth model; Sustainable development.*

1. Introduction

The failure of economic growth to deliver on sustainable economic development and improved standard of living especially in most developing economies of the world, as hypothesized by the early theories of growth (that is, especially the classical and the neoclassical theories) has led the contemporary theorists to shift focus in favour of measures that will solve the contemporary challenges of development.

One of such measures is the development of human capital. Human capital according to Harbison (1962) refers to the abilities and skills of human resources while human capital development is the process of acquiring and increasing the number of persons who have the skills, education, and experience which are critical for the economic growth and development of a country. Achievement of this can be made possible through the development of the two critical and social sectors of the economy (i.e. education and health).

Neoclassical theories (especially Solow growth theory) associated the growth in productivity and hence, long run economic growth to physical capital, and exogenously determined technology (i.e. technology determined from outside the economic environment). Experience however has shown that human beings are the most important and promising means of achieving growth in productivity, economic growth and development, and not physical capital like equipment and exogenous technology as earlier proposed. Hence, developing the value and quality of the human factor through education and health, with the aim of achieving growth and development cannot be over-emphasized.

Ever since the work of Schultz (1961), studies on the role of human capital on the economy have continued to gain ground and much importance. In recent times, the topic has emphasized new growth theory (Romer, 1986; Lucas, 1988; Barro & Sala-i-Martin, 1995) where human capital is analyzed to be endogenously determined (i.e. developed within the economic system). Technically advanced human capital and a growing knowledge base can in the long run increase output per unit. Thus, important implication of Lucas' hypothesis on human capital is linked with investment in man and his development as a creative and productive resource (Harbison, 1962).

Economic development no doubt is a good determinant of economic welfare and an enhanced standard of living. Considering the high rate of population growth in the developing countries, quality and persistent development of its human capital is particularly important to achieve high labour productivity and particularly, reduced unemployment. This is due to the need to extract a large proportion of the population from the jaws of abject poverty thereby setting the nation on the path of rapid economic development. Ranis, Stewart and Ramirez (2000) observe and support the fact that labour productivity is the outcome of a significant relationship between economic and human development.

Literature is replete with studies on economics of human capital amongst which are that of Adamu (2003); Ogujiuba and Adeniyi (2004); Babatunde and Adefabi (2005); Lawanson (2009); Dauda (2010); Adawo (2011); Aderemi (2014); Okoro and Eyenubo (2014); Olunkwa (2014). In spite of the fact that they have provided both theoretical and empirical foundations for the contributions of human capital to the economy, the empirical linkage in Nigeria is yet to be settled and thus remain inconclusive. Suffice to say that the results from past studies have presented diverse outcomes hence, the need for further study to investigate the short run and long run effects of human capital investments on economic development in Nigeria, spanning 1981 to 2015. The rest of the paper is structured as follows: Section 2 briefly reviews related literature; section 3 discusses the methodology (that is, theoretical framework, model specification and estimation procedure); section 4 presents and discusses the results; while section 5 concludes the paper with recommendations.

2. Literature Review

Empirical studies on economic growth predicated on the neoclassical model particularly that of Solow (1956) focused on exogenous technical factor that determines output-input ratios. This approach to growth pays little or no attention to human capital development. Yet, evidence of a close link between investments in human capital and economic growth is quite strong. Abbas (2001) noted that investment in human capital has been a major source of economic growth in the advanced countries, while the negligible amount of human investments in underdeveloped countries has done a little to extend the capacity of people to meet the challenge of accelerated development.

Several empirical studies that adopted the model of endogenous human capital to determine the linkage between human capital development and the economy have emerged ever since the rediscovery of the role of human capital in economic development by Schultz (1961). Some are country-specific (Ncube, 1999; Babatunde & Adefabi, 2005; Lawanson, 2009; Dauda, 2010; Anyanwu, Adam, Obi & Yelwa, 2015) while most are cross-national; often seek to explain differences in economic growth rates across countries due to levels of human capital (Barro, 1991; Pritchett, 2001). In these studies, an act that keeps recurring is the use of diverse variables as proxies for human capital accumulation hence, indicating the existence of a measurement problem. Among the variables used include literacy rates, educational spending, school enrolment ratios, mean year of schooling, and so on. This has therefore led to results that are conflicting, mixed and inconclusive.

For instance, the study of 98 countries between 1960 and 1985 using school enrolment rates as measures of human capital by Barro (1991) indicates a positive relationship between initial human capital measured by 1960 school enrolment rates and real per capita GDP. This means that the initial level/stock of human capital is of great importance in explaining the issue of economic development as revealed by the study of Barro (1991) and subsequently, that of its accumulation. Also, in his cross-country study using cross-national data, Pritchett (2001) found a negative and an insignificant association between increases in human capital attributable to the growth in educational capital and attainment of the labour force and the rate of growth of output per worker.

At the country level, Ncube (1999) incorporated a variable of human capital proxied by total enrolment into the standard growth model. His results indicated a very strong long-run relationship between human capital investments and economic growth in Zimbabwe. Equally, the study of Babatunde and Adefabi (2005) in Nigeria adopted Johansen co-integration technique and the vector error correction model on time series data between 1970 and 2003 to investigate the long run relationship between education and growth. The results established a long run relationship between primary and tertiary enrolment ratios as well as the average years of schooling and output per worker. Also, education expenditure was found to significantly influence growth.

The study of Lawanson (2009) revealed a positive relationship between human capital (proxied by tertiary enrolment and education expenditure) and economic development. The results however indicate a no relationship between health expenditure, primary and secondary enrolments and economic development measured by GDP. The short study period between1983 and 2007 (24 year observation) as well as the use of GDP as proxy for economic development are a source of concern, and may be seen as the flaw of the study. Dauda (2010) on the other hand used real GDP as proxy for economic development. Contrary to that of Lawanson (2009), the results of her study revealed that both the secondary and tertiary enrolments individually show a positive relationship with economic development (that is, real GDP). Precisely, a 1 per cent increase in tertiary and secondary enrolments increase real GDP by 48 per cent and 104 per cent respectively. This further reiterates the fact that the measure used to proxy a variable matters greatly in shaping the outcome of an empirical research.

Anyanwu, Adam, Obi and Yelwa (2015) employed autoregressive distributed lag model to examine the dynamic impact of human capital development indicators on economic growth in Nigeria. The outcome of the study shows that in the long run, majority of human capital development indicators positively impact economic growth within the reviewed periods. However, their impacts are largely statistically insignificant.

In summary, the foregoing review shows conflicting results in the relationship between human capital and economic growth/development especially in Nigeria. Also, most of the reviewed studies scarcely made reference to health as a form and component of human capital development except in few cases. Hence, further study to contribute to the literature in the area of economics of human capital is considered necessary.

3. Methodology

3.1 Theoretical Framework

This study is predicated on Romer (1986) and Lucas (1988) endogenous human capital-growth models. According to the models, continuous and long run growth is endogenously dependent on the human capital developed within the economic environment. Thus, public policies play

essential roles in evaluating the long run growth process through a substantial government investment in human capital. By implication, the models indicate that human capital is the driving force in the growth process of an economy.

Unlike the neoclassical approach, this pays little or no attention to the role of human capital in engendering long run growth. Neoclassical approach rather emphasizes exogenously-determined technology in enhancing the activities of labour to ensure growth. Romer (1986) version of endogenous model recognizes and aligns with a one-time increase in the stock of human capital to sufficiently augment the rate of economic growth. Lucas (1988) however, in addition to the stock also identifies the rate of accumulation of human capital to speed up the rate of economic growth. This implies that Lucas (1988) recognizes the role of both the stock and accumulation of human capital in economic growth and development. Since human capital embodied knowledge and skills, and economic development depends on advances in technological and scientific knowledge, growth rate and development presumably depend on the accumulation of human capital which is the thrust of Lucas (1988) endogenous growth model. Thus, the basic Lucas model is of the form:

$$Y = AK^{\alpha}(\mu hL)^{\beta} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.. (1)$$

Expressing equation (1) in per capita terms gives the intensive form in equation (2) as:

$$y = Ak^{\alpha}(\mu h)^{\beta} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where,

$'Y'$ is aggregate output; $'y'$ is output per capita measured by real GDP per capita; $'A'$ is the level of technology; $'K'$ stands for the stock of physical capital measured by gross fixed capital formation; $'\mu h'$ according to Lucas is the stock of human capital; $'L'$ represents labour; $'\mu'$ is the proportion of total labour time spent working; and $\alpha + \beta = 1$ (output based on constant returns to scale in capital and labour).

Since knowledge and skills are accumulated through learning when individuals study, thus relating economic development proxied by real GDP per capita (y) to human capital accumulation through time spent not working, equation (2) transforms to:

$$Y = AK^{\alpha}(H)^{\beta} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Taking the natural log of equation (3) and introducing the disturbance term to produce the estimable form of the model gives equation (4) as:

$$In\, Y = In\, A + \alpha\, In\, K + \beta\, In\, H \ + \mu \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

3.2 Model Specification

The model in equation (4) is the theoretical model that defines the relationship between human capital development and economic growth. For the purpose of this study and for its relevance to Nigeria, the model in equation (4) is modified and expanded to include the human capital development variables of interest. These are the gross enrolment ratios at the three levels of education in Nigeria (i.e. primary, secondary and tertiary levels) to measure human capital accumulation, H. This is done to evaluate the impact of each level of education on economic development in Nigeria. Also, government expenditures on education and health are incorporated to examine how government investments through her policies on education and health influence the level of economic development during the study period. This is because government policies through her investments in social sectors like education and health enhance access which positively impacts school enrolment and health, thereby improving human capital, especially in developing countries like Nigeria. The new expanded model is thus stated in equation (5) as follows:

$$In\, Y_t = In\, A_t + \alpha\, InK_t + \beta_1 In\, PSE_t + \beta_2 In\, SSE_t + \beta_3 In\, TSE_t + \beta_4 In\, GEE_t + \beta_5 In\, GEH_t + \mu_t \ldots\ldots (5)$$

Equation (5) becomes:

$$In\, Y_t = \alpha_0 + \alpha_1 InK_t + \beta_1 In\, PSE_t + \beta_2\, In\, SSE_t + \beta_3\, In\, TSE_t + \beta_4\, In\, GEE_t + \beta_5\, In\, GEH_t + \mu_t \ldots\ldots (6)$$

Therefore, equation (6) forms the operational model specified for the study. Here, PSE, SSE and TSE are primary, secondary and tertiary enrolment ratios respectively; GEE: total government education expenditure as a ratio of GDP; GEH: total government health expenditure as a ratio of GDP; α_0: constant term, this represents the level of economic development due to technology (A) when the measures of human capital represented in equation (6) remain constant; μ: the

disturbance/stochastic error term; the symbols: $'\alpha'$ and $'\beta's$ are the parameters to be estimated; the subscript (t) indicates analysis with time-series data; all other variables are as defined earlier. The study period is 1981 to 2015 and sources of data include CBN Statistical Bulletin (2016) and World Development Indicators, WDI (2016).

Intuitively, it is expected that all the explanatory variables will have positive effects on the dependent variable (i.e. real GDP per capita). This means, the a priori is such that: α_1, β_1, β_2, β_3, β_4, $\beta_5 > 0$.

3.3 Estimation Procedure

Time series of variables in most countries (especially those of the developing economies) usually exhibit the presence of unit roots. In other words, most time series data do not have constant variance thereby making them to be non stationary. The results of estimation conducted on non stationary time series are prone to bias and therefore resulting to spurious regression. Hence, the test for unit roots and order of integration of the variables was first conducted on the time series using the Phillip Perron (PP) test. This is done to establish the stationarity or otherwise of the time series data. Adebiyi (2003) posits that it is imperative for data involving macro time series to test for unit roots and co integration before a structural relationship is estimated and reported for potential policy use.

Thereafter, co integration analysis was conducted employing the technique of autoregressive distributed lag to establish the nature and extent of the short run and long run relationships between economic development proxied by real GDP per capita and human capital development indicators adopted in the study. This technique was adopted to examine the dynamic impact of human capital accumulation on economic development in Nigeria, and also because of the small sample size (1981 to 2015). Furthermore, the error correction mechanism was engaged to check for deviations in the long run equilibrium relationship between the dependent variable and the explanatory variables. The motive is to establish the short run dynamics of the equation.

4. Presentation and Discussion of Empirical Results

4.1 Unit Root Test Result

The results of the Phillip Perron unit root test are as presented in table 4.1 below. As observed from the table, at 1 per cent significance level all the variables with the exception of government education expenditure (GEE) were non stationary at their levels. This therefore reveals the presence of unit roots for the variables at levels. Hence, the null hypothesis of unit roots cannot be rejected for the variables at levels. However, the series that were non stationary at levels became stationary at their first difference thus, making the study model to consist of both series that are stationary at level and those integrated of order 1. Hence, the study employed autoregressive distributed lag (ARDL) technique to investigate the short run and long run relationships between the dependent and the explanatory variables.

Table 4.1: Results of Unit Root (Stationarity) Test

Variables	Phillip Perron (PP) @levels (critical value @ 1% level of significance)	First differenced (critical value @ 1% level of significance)	Order of integration
LGDPPC	0.241041	-6.696460***	I(1)
LGFCF	0.709284	-4.568325***	I(1)
LPSE	-2.121837	-5.29507***	I(1)
LSSE	-2.349027	-7.741854***	I(1)
LTER	-1.338191	-11.60059***	I(1)
LGEE	-3.797724***	-13.32437***	I(0)
LGEH	-1.887538	-7.292762***	I(1)
Critical values	-2.951125	-2.954021***	I(1)

Source: Author's computation (2017) using E-Views 9

Note: Superscript *** represents significance level at 1%

The short run estimated results as revealed in table 4.2 shows that all the explanatory variables except the differenced primary enrolment with its differenced lag 2, differenced secondary school enrolment lag 1, differenced tertiary enrolment and its lag1 show a significant relationship with GDP per capita. Notably capital formation, primary school enrolment and health expenditure revealed significant inverse cumulative effect on standard of living measure. In terms of magnitude and direction it could be observed that primary school enrolment in the

previous year has the highest negative impact on standard of living. Specifically, an increase in primary school enrolment in the previous year showed retarded effect on living standard.

This result is also observed for the differenced secondary school enrolment. This implies that increases in primary and secondary school enrolment are not sufficient evidences of improvement in living standard particularly in the short-run duration. Evidently, two previous years of tertiary enrolment accounted for a significant positive impact on living standard. Specifically, a percentage change in tertiary enrolment (differenced lag 2) brings about 89.3 percentage changes in living standards. Notably, it can be observed that variations in school enrolment accounted for significant changes in GDP per capita in the short-run.

Most importantly, the responsiveness of living standards to the variations in primary and secondary education enrolment is observed to be elastic, thus a proportionate change in primary and secondary school enrolments brings about a more than proportionate change in living standards. The analysis of government expenditure reveals that although education expenditure is significant in explaining real GDP per capita, it has no direct impact on standard of living in Nigeria in the short-run. Consequently it is observed that while health expenditure suggests a significant positive impact on living standard, its lag does not contribute to improvement in people's standard of living.

Table 4.2 Short-run Estimates using ARDL Technique

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGDPPC(-1))	0.324998	0.175784	1.848843	0.0915
D(LGFCF)	0.326214	0.156365	2.086227	0.0610
D(LGFCF(-1))	-0.393501	0.152258	-2.584436	0.0254
D(LPSE)	-1.309094	0.860604	-1.521135	0.1564
D(LPSE(-1))	-3.957879	0.866982	-4.565124	0.0008
D(LPSE(-2))	1.218746	0.747482	1.630470	0.1313
D(LSSE)	-2.437507	0.563861	-4.322885	0.0012
D(LSSE(-1))	-1.037043	0.588278	-1.762846	0.1056
D(LTER)	-0.234823	0.265709	-0.883759	0.3957
D(LTER(-1))	-0.082612	0.263651	-0.313337	0.7599
D(LTER(-2))	0.893263	0.285093	3.133232	0.0095
D(LGEE)	-0.119764	0.062966	-1.902035	0.0837
D(LGEH)	0.579199	0.077157	7.506776	0.0000
D(LGEH(-1))	-0.417265	0.108012	-3.863153	0.0026
CointEq(-1)	-0.607721	0.181744	-3.343830	0.0065
R-square		F-statistic	350.00	

	0.998434		
Adjusted R-squared	0.995586	Prob(F-statistic	0.0000
		Durbin Watson	2.005013

Source: Author's Computation (2017) using E-Views 9

The diagnostic tests from the ARDL approach shows that the F-statistic (350.00; p-value<0.01) is significant at 1 per cent, suggesting the overall significance of the estimated model at 1 percent level. The R-squared result shows that 99.84 percent variations in living standard (proxied by real GDP per capita) is accurately predicted by the joint explanatory variables in the model while the Durbin Watson statistic (2.005) revealed that there is no incidence of serial autocorrelation between the error terms and the parameter estimates of the model.

Further analysis of the study shows that the error correction term was correctly signed, significant and within the magnitude of zero and 1. The result (-0.6077) of the systemic dynamism from the short-run duration to the long-run equilibrium indicates that 60.77 percentage of the imbalance in the system in the short run could be corrected per time as it converges to the long run equilibrium state. The error correction term explains the speed of adjustment from any distortion in the short run as it converges to the long run equilibrium. Thus, the error correction term coefficient of -0.6077 implies that approximately 60.8 per cent of any disequilibrium witnessed in the short run is restored in the first year.

Similarly, analysis of the long run estimates of the relationship between human capital and economic development proxied by real GDP per capita in Nigeria from 1981 to 2015 is presented in table 4.3. The results of the estimated long run coefficients of the model show that capital formation has a significant direct relationship with real GDP per capita. This implies that an increase in gross fixed capital formation suggests a significant improvement in living standards. The detailed analysis of the result shows that a percentage change in gross fixed capital formation brings about a corresponding 80.6 percentage change in living standards holding other variables constant. It is further observed that the degree of responsiveness of GDP per capita to the variations in capital formation is inelastic in the long run. This shows that a percentage change in gross fixed capital formation brings about a lesser percentage change in GDP per capita.

Table 4.3 Analysis of the long-run coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGFCF	0.805742	0.077706	10.369066	0.0000
LPSE	-1.679333	1.301546	-1.290260	0.2234
LSSE	0.362281	1.034561	0.350178	0.7328
LTER	-0.977826	0.854464	-1.144373	0.2768
LGEE	-0.197070	0.138779	-1.420033	0.1833
LGEH	1.306627	0.323360	4.040784	0.0019
C	10.001399	5.914890	1.690885	0.1190

Source: Author's Computation (2017) using E-Views 9

A close observation of the results in table 4.3 shows that though primary school enrolment indicate an elastic relationship, while secondary school enrolment shows an inelastic relationship with the living standards in the long run, they are however insignificant. Furthermore, secondary school enrolment suggests a positive but insignificant relationship with standard of living. The evidence from government education expenditure suggests no significant contributions to living standards while health expenditure indicates a significant positive effect on living standards. Further analysis of health expenditure shows that the degree of responsiveness of living standards to changes in public health expenditure is elastic. Therefore, a percentage change in public health expenditure will result in greater percentage change in living standards. Specifically, the analysis of the estimated long run coefficient of government expenditure on health reveals that a percentage change in health expenditure will result approximately to 13.1 percentage change in living standards.

5. Conclusion and Recommendations

This study critically analyzed the relationship between human capital investment and economic development proxied by real GDP per capita in Nigeria. The theoretical framework adopted is hinged on the endogenous growth model which posited that human capital development plays a critical role in economic progress through the reduction in inequality, unemployment, poverty, an improved standard of living and enhanced economic growth.

The autoregressive distributed lag technique was employed to examine the dynamic relationship of indicators of human capital investment with economic development in Nigeria. The motive was to dynamically examine how human capital development has impacted living standards in

Nigeria during the study period. Contrary to the a priori, the short run analysis indicated that both primary and secondary enrolments show no evidence of improvement in living standards. This may be attributed to high drop-out rates, as well as inadequate and low quality of education received at these levels of education. Apparently, low skills are acquired at both the primary and secondary levels of education in Nigeria.

In contrast to the a priori, evidently only the lag 2 tertiary enrolment significantly and positively impact economic development. Furthermore, government expenditure on education revealed a negative impact on economic development in Nigeria in the short run. This may be due to low efficiency and effectiveness in the allocation of government funds, which may be linked to misappropriation and corruption that have long plagued the country. However, government expenditure on health is not only significant but also positively related to economic development in Nigeria.

The long run estimates showed that indicators of human capital development such as primary, secondary, tertiary enrolments and government education expenditure are insignificant in explaining economic development while capital formation and government health expenditure significantly influence real GDP per capita. Also, primary, tertiary enrolments and government education expenditure showed a negative relationship with economic development in the long run. Capital formation, secondary enrolment and government health expenditure on the other hand are positively related to real GDP per capita which indicated an improvement in standard of living during the study period. This goes contrary to a priori

Further evidence showed that equilibrium is fully restored for any distortion in the short run. Specifically, the error correction term coefficient that explains the speed of adjustment from any distortion in the short run to its long run equilibrium showed that 60.8 per cent of any disequilibrium witnessed in the short run is restored in the first year. Following from the findings, the study recommends the need for efficient, quality and effective allocation of public funds earmarked for the education and health sectors considering their strategic roles in economic development. Such funds should be logically monitored till the end to prevent its diversion, misappropriation and also, to curb the corruptive tendencies of the custodians of the funds. Similarly, efforts should be made to provide qualitative and adequate education that will

deliver on skills acquisition, with a view to enhancing job creation thereby reducing unemployment, inequality and poverty for the attainment of economic development.

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