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AN ANALYSIS OF THE EFFECT OF HUMAN CAPITAL INVESTMENT ON ECONOMIC DEVELOPMENT IN NIGERIA: DOES A NEW INDICATOR ALTER EXISTING EVIDENCE?

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ABSTRACT

This study adopted a broader perspective of economic development using access to clean, affordable and reliable energy services over GDP per capita, which was used in existing studies. To investigate whether the new measure altars existing evidence, the study employed the Johansen cointegration technique. The model follows the specification of the AK model and augmented Rostow's stages of growth to account for the adoption of development indicators. The empirical result using energy access as a measure of economic development differs significantly and seems to portray the realities in the Nigerian economy. Compared with earlier studies, this reassessment shows that indicators of human capital investment do not significantly impact economic development in Nigeria. It is clear that the growth experienced in recent decades occurred independent of human capital capability of the economy, in fact, recent statistics from the Global Competitiveness Index 2018 show that in terms of competitiveness in education quality and on-the-job training, the Sub-Saharan Africa (SSA) regions underperformed when compared with other regions of the world.

Contribution/Originality: The study documents the relevance of human capital investment on economic development in Nigeria. The unique contribution lies in the indicators of economic development adopted. An inclusive measure of economic development was used, and the empirical evidence differs from previous studies using GDP per capita as a measure of economic development.

1. INTRODUCTION

The relationship between human capital and economic development goes as far back as the 1930s when Alfred Marshall asserted in his book, Principles of Economics, that investment in people makes human capital the most valuable of all capitals and stimulates economic development. Many other authors have stressed the importance of the relationship between human capital, or investment in human capital, and economic growth, and have formulated various models to explain this theory. The endogenous growth model, which was an improvement on the Harrod–Domar and Solow growth models, explains that investment in human capital, innovation and knowledge would unquestionably contribute to economic growth.

Other researchers such as Oluwatobi and Ogunrinola (2011), Matthew (2011), Akintunde and Satope (2013), Oladeji (2015), and Jaiyeoba (2015) who have also looked at human capital investment or human capital

development in the Nigerian economy also relate it to economic growth. Also, several authors assert that the relevance of human capital in expanding knowledge and skills of people ultimately impacts growth and development (Adelakun, 2011; Mba, Mba, Oguabor, & Ikpegbu, 2013; Oladeji, 2015). A vast number of existing studies have assessed the impact of human capital on economic growth and the general consensus is that it has a significant impact on growth in developing economies.

In recent times, emerging studies on human capital investment have attempted to separate human capital financing into capital and recurrent expenditure (Ogundipe & Oluwatobi, 2014). This unveiled new evidence on the appropriate channeling of resources, especially as the recurrent expenditure in the Nigerian economy grew significantly, but there is still a lot left to achieve. The economy experienced growth between 3% and 5%, whereas human capital and socio-economic indicators lagged behind. This revealed that the emerging trend in most African economies in the past two decades suggests that statistical correlation alone might not suffice to establish a convincing scenario and that the growth indicators need to be revisited in order to gain a broader perspective and capture the population with a lower income rank inclusively. This present assessment examines the human capital development connection by altering existing evidence via the introduction of a wider and representative measure of development. The study measures development via the extent of access to clean and affordable energy, since energy is fundamental for socio-economic development and poverty eradication (Oyedepo, 2012).

The ideology of this paper centers on the failure of critical assumption of the institutional benevolence and rationality entrenched in the new growth theory. This necessitates an inclusive perspective in capturing economic development. Prior to the infusion of human capital in the growth theory, this dichotomy was prompted by Dudley Seers and Edgar Owens in 1969 and 1987, respectively, where the concept of development was expended from a mere increase in GDP to capture the reduction or elimination of poverty, inequality and unemployment, and the development of people[1]. The experience in Nigeria with respect to the documented relationship between growth and its determinants, such as human capital and other socio-economic indicators, misaligned with current realities. The economy of Nigeria has been growing at an average of 6% per annum for the past 17 years, but the inequality rate still stands at 43%, the unemployment rate is about 30% and the poverty rate is 82.2%. After more than a decade of economic growth, the sharp and continuous decline in crude oil prices since mid-2014, along with a failure to diversify the sources of revenue and foreign exchange in the economy, led to a recession in the second quarter of 2016 (Ministry of Budget and National Planning, 2017). Due to this, it would be necessary to further analyze if the present human capital development contributes to reductions in poverty, unemployment and inequality, and also improves other socio-economic indicators.

2. REVIEW OF RELATED LITERATURE

Over time, it has been noted that a relationship exists between human capital investment and economic development, and the nature of this relationship has been seen as mostly positive by researchers. In carrying out the empirical analyses, different methods were used by researchers and a number of the literature are reviewed in this section.

Musibau and Rasak (2005) investigated the long run relationship between education and economic growth in Nigeria between 1970 and 2003 using the Johansen cointegration technique and the vector error correction model (VECM). They examined two different channels through which human capital can affect long run economic growth. In the first channel, human capital is a direct input in the production function; in the second channel, human capital

[1]Their concept was embraced by the United Nation in the World Development Report of 1999 which sees development as : The challenge of development… is to improve the quality of life…better education, higher standards of health and nutrition, less poverty, a cleaner environment, more equality of opportunity, greater individual freedom, and a richer cultural life.

affects the technology parameter. The Johansen cointegration result established a long run relationship between education and economic growth. The study carried out by Oboh, Rahmah, and Abu (2010) investigated the impact of human capital development on economic growth in Nigeria. The data used spanned from 1970 to 2008. The Johansen cointegration technique and vector error correction analysis were used to ascertain this relationship. The macroeconomic variables used in the study were real gross domestic product (GDP)as a proxy for economic growth, and real capital expenditure (RCE) on education, real recurrent expenditure (RRE) on education, real capital stock (RCS), total school (SCHE) enrolments, and labour force (LF) were used as proxies for human capital development. The results indicate that human capital development has a significant impact on Nigeria's economic growth.

Oluwatobi and Ogunrinola (2011) conducted a study that examined the relationship between the human capital development efforts of the government and economic growth in Nigeria. They used a unit root test, the Johansen cointegration technique and the error correction mechanism to analyze the data. They used government capital and recurrent expenditure on education and health as proxies to measure the level of government investment in education and health and their effect on economic growth. It was discovered that while government recurrent expenditure on human capital was positively related to economic growth, expenditure on human capital development was negatively related to economic growth. A study carried out by Matthew (2011) focused on Human Capital Investment and Economic Growth in Nigeria – the Role of Education. The study used the augmented Dickey–Fuller test (ADF), cointegration test and the error correction model and found that a positive relationship exists between government expenditure on education and economic growth while a negative relationship exists between government expenditure on health and economic growth. Therefore, based on these findings, the study recommended that the government should increase not just the amount of expenditure on the education and health sectors, but also the percentage of its total expenditure according to these sectors. Adelakun (2011) carried out a study that showed the relevance of human capital development to growth in the Nigerian economy. He used GDP as the variable for measuring economic growth and total government expenditure on education and health, and the enrollment pattern of tertiary, secondary and primary schools as variables for human capital, and used the ordinary least square (OLS) method of empirical analysis. The study revealed that there is a strong positive relationship between human capital development and economic growth.

Isola and Alani (2012) analyzed the relationship between human capital development and economic growth in Nigeria. They used the unit root test and regression analysis to examine the contribution of different measures of human capital development to economic growth in Nigeria. Time series data on Nigeria from 1980 to 2005 was used for the analysis and estimation. Using the ordinary least square method of data analysis, they discovered that both health (measured by life expectancy) and education (measured by adult literacy) were necessary for economic development. Yet, it was discovered that little investment had been made by the federal government in the health sector compared to education. Akintunde and Satope (2013) investigated the effect of health investment on economic growth in Nigeria from 1977 to 2010. They used the vector error correction model and discovered that although a long run relationship existed between health expenditure and economic growth, the short run impact did not converge to long run economic growth and, therefore, advised the government to increase their spending on health. Health investments (both private and government) were measured as a ratio to the labor force population.

Mba et al. (2013) carried out a study to evaluate the effect of human capital development on economic growth in Nigeria. GDP was used as a proxy for economic growth; real gross domestic product per capita, primary school enrolment, public expenditure on education and health, life expectancy, and stock of physical capital were used as proxies for human capital. The data for this study are time series covering the period from 1977 to 2011—a total of 35 years. The empirical methods employed were the ADF, cointegration and OLS. From the analysis, it was deduced that there is a strong positive relationship between human capital development and economic growth. The

recommendations drawn from the study centered on revisiting the manpower requirements of the various sectors of the economy.

Ogujiuba (2013) studied the impact of capital formation on economic growth in Nigeria. He made use of secondary data from 1970 to 2010 and used the OLS, cointegration and error correction model for his analysis. The variables used were real GDP growth rate, capital expenditure on education, recurrent expenditure on education, real gross capital formation, primary education enrolment, post-primary education enrolment and tertiary education enrolment. His findings revealed that recurrent expenditure on education as well as capacity building impacted significantly on economic growth, while capital expenditure on education was insignificant to the growth process. Adejumo, Olomola, and Adejumo (2013) carried out a study on the impact of human capital on industrial development in Nigeria. The study made use of the different educational enrollment rates (primary, secondary and tertiary) in order to find out if any significant positive impact using these variables are felt in the industrial sector. Time series data covering the period between 1980 and 2010 were used. The study used the unit root test, regression analysis and cointegration method of empirical analysis. It was discovered that human capital has to a large extent impacted on industry value-added, but in terms of output generated industrially, the effect of human capital in Nigeria remains low.

The study carried out by Eigbiremolen and Anaduaka (2014) adapted the augmented Solow growth model that was used by Oluwatobi and Ogunrinola (2011). They investigated the impact of human capital development on national output using quarterly time series from 1999 to 2012. They used the econometric methods of the augmented Dickey–Fuller test and cointegration, and revealed that there was an inelastic relationship between human capital development and output level measured by real GDP. Oladeji (2015) conducted research to investigate the relationship between human capital (through education and effective health care services) and economic growth in Nigeria using annual time series data from 1980 to 2012. The paper employed OLS methodology. The result showed that an increase in allocation for education and health leads to an increase in GDP. These findings have a strong implication on educational and health policy in Nigeria. The study seems to suggest that a concerted effort should be made by policy makers to enhance educational and health investment in order to accelerate growth, which would, in turn, generate economic growth.

Jhingan (1985) carried out an investigation on the relationship between investment in education, health and economic growth in Nigeria and used time series data that spanned from 1982-2011. The human capital theory of growth was adopted in the study. The methods of trend analysis, the Johansen cointegration and ordinary least square technique were used for data analysis. The study indicated that there was a long run relationship between government expenditure on education, health and economic growth. Also, the variable of government expenditure on education and primary enrolment rate was seen as statistically insignificant. Okafor, Jegbefumwen, and Ike (2016) focused on a detailed analysis of the impact of human capital investment on economic development in Nigeria. Analysis of the data was done using the OLS technique. The study employed two models, the first used GDP per capita as a proxy for economic development, while the second used infant mortality rate as a proxy for economic development. Government recurrent and capital expenditure on education and health were used as proxies to measure human capital investment.

From the study, it was discovered that government recurrent expenditure on education, and government capital expenditure on education and health impacted positively on GDP per capita, while government recurrent expenditure on health had a negative impact. Also, all components of human capital investments, except government recurrent expenditure on health, had positive significant impacts on infant mortality rate. Finally, infant mortality rate was more reliable than GDP per capita as an index of economic development.

Idenyi, Eze, and Ogbonna (2016) examined the effect of human capital development on the growth of the Nigerian economy. Using Johansen's cointegration and the vector error correction model it was discovered that there was a significant long run relationship between human capital development and economic growth.

Government expenditure on education and health had a significant effect on economic growth. While government expenditure on education had a positive relationship with economic growth, the relationship between government expenditure on health and economic growth was negative. Adeyemi and Ogunsola (2016) carried out a study to examine the impact of human capital development on economic growth in Nigeria using time series data from 1980 to 2013. The study employed the ARDL cointegration analysis to estimate the relationship among the variables that were used in the study. The findings revealed that there was positive long run relationship among secondary school enrolment, public expenditure on education, life expectancy rate, gross capital formation and economic growth, but was statistically insignificant. The results also showed that there was a negative long run relationship among primary and tertiary school enrolment, and public expenditure on health and economic growth. In line with the findings, the study recommended that the government should implement the required education and training policies that would guarantee quality schooling for primary and tertiary education, and also that the government should commit more funds to the health sector to enhance human capital development.

A study carried out by Ebong, Ogwumike, Udongwo, and Ayodele (2016) was done to assess the impact of government capital expenditure on economic growth in Nigeria from 1970 and 2012. A multiple regression model based on a modified endogenous growth framework was utilized to capture the relationships among capital expenditure on agriculture, education, health economic infrastructure and economic growth. Drawing on error correction and cointegration specifications, an OLS technique was used to analyze annual time series. Both short and long run effects of government capital expenditure on economic growth were estimated. Government capital expenditure had differential effects on economic growth, and capital expenditure on agriculture did not exert a significant influence on growth in the long or short runs. The study carried out by Obialor (2017) examined the effect of government human capital investment on economic growth in three Sub-Saharan Africa countries (Nigeria, Ghana and South Africa) from 1980 to 2013. He used government investment in health and education as well as literacy rate as proxies for government human capital investment and GDP growth rate as a proxy for economic growth. Using cointegration and the vector error correction mechanism, the study revealed that government investment in education and health showed a positive effect on economic growth only in Nigeria, while literacy rate had an insignificant positive effect on economic growth in all three countries.

A study carried out by Adejumo (2017) looked at the analysis of human capital development and productivity growth in Nigeria to find the direction of causality. The study covered a period from 1970 to 2010 and adopted the endogenous growth model. The variables used were total factor productivity, gross fixed capital and secondary enrollment rate. The results revealed that productivity growth has been very low and unstable in Nigeria as it fluctuated between -1.5% and 0.6%. In addition, the connection between human capital and productivity growth was examined. The findings revealed that while productivity growth led to human capital development, human capital development did not lead to productivity growth.

Okafor, Ogbonna, and Okeke (2017) carried out a study to determine the long run relationship between government expenditure on education and health and human capital investment in Nigeria. They used secondary data that covered the period from 1986 to 2016. They used the unit root, Granger causality, and vector auto regression tests for empirical analysis. It was discovered that there was no direct impact between the human development index (describing the quality of education, health and income growth) and government expenditure on education and health. The study has also shown that an inverse relationship exists between the HDI and government expenditure on education and health in previous years. The HDI was also observed to be positively related to government expenditure in education and health in the current year.

3. METHODOLOGY

3.1. Model Specification

The model framework discussed in this study is based on the endogenous growth theory, and the AK model adopted is presented in Equation 1. The model represented follows an existing specification in literature where the growth rate of per capita income was used as a measure of development (Ogundipe & Oluwatobi, 2014; Oluwatobi & Ogunrinola, 2011). As mentioned earlier, the evidence obtained previously did not reflect reality as economic growth has occurred without a corresponding improvement in human capital, and social and cultural indicators. To this end, the study adopted a broader measure of economic development relevant to the context of the Nigerian economy (see Equation 4).

$$GDPPC = f(GCF, GEEPT, GEHPT, LEXP, LBF) \quad (1)$$

Where GDPPC is gross domestic product per capita, GCF is gross capital formation, GEEPT is government expenditure on education as a percentage of total government expenditure, GEHPT is government expenditure on health as a percentage of total government expenditure, LEXP is life expectancy at birth, and LBF is labor force population.

The explicit form of the model is represented as follows:

$$GDPPC = GCF^{\alpha}_{1}\, GEEPT^{\alpha}_{2}\, GEHPT^{\alpha}_{3}\, LEXP^{\alpha}_{4}\, LBF^{\alpha}_{5} \quad (2)$$

The above equation in its non-linear form cannot be estimated. It therefore has to be linearized to enable estimation. When the above equation is put in a linear form, we have:

$$LnGDPPC = \alpha_0 + \alpha_1 LnGCF + \alpha_2 GEEPT + \alpha_3 GEHPT + \alpha_4 LnLEXP + \alpha_5 LnLBF + \varepsilon_t \quad (3)$$

The emerging interest in developmental research and global development cooperation has identified a lack of access to modern energy as an barrier to socio-economic development in developing African economies (Dioha & Emodi, 2019). Access to clean and efficient energy was identified as a major hindrance to the attainment of millennium development goals (MDGs) by most African economies and has formed the bedrock of the sustainable development goals (SGDs) in Africa (Ogundipe, Akinyemi, & Ogundipe, 2018).

According to Bazilian et al. (2012), the provision of affordable, reliable and sustainable energy is pivotal in addressing many of today's global problems, including climate change, poverty and food security. Hence, the study used the availability of clean energy sources, such as electric power, as a proxy for development in Equation 4.

$$LEPC = \beta_0 + \beta_1 LGCF + \beta_2 GEEPT + \beta_3 GEHPT + \beta_4 LLEXP + \beta_5 LLBF + \mu_t \quad (4)$$

Where EPC is electric power consumption. In these equations, the coefficient estimates are now interpreted as elasticities, which capture the sensitivity of the dependent variable to a unit change in each explanatory variable. β_0 and α_0 are the intercept terms, α_1 - α_5 and β_1 - β_5 represent the slope coefficients and ε_t and μ_t represent the stochastic error terms.

3.2. Estimation Technique

The estimation technique adopted for this study was Johansen's cointegration technique. The procedure begins by examining the time series property of the data using the unit root test, such as the augmented Dickey–Fuller (ADF) and Phillip Peron unit root tests. The choice of Johansen's cointegration was based on the condition that all variables in the model become stationary at first order of integration. After establishing a long run equilibrium relationship in the model, the vector error correction model (VECM) was conducted to ascertain the extent of error correction in the model and also provide an insight into the short-run relationships among the variables.

3.3. Data Sources

This study used secondary data covering a period of 38 years from 1981 to 2018. Table 1 comprises the description and sources of data for the variables used in the empirical analysis. The data were obtained from the World Development Indicators (WDI) from the World Bank publication of 2019, the Central Bank of Nigeria

(CBN) statistical bulletin of 2016, Central Bank of Nigeria annual reports and statements of accounts, and the United Nations Conference on Trade and Development (UNCTAD).

Table 1. Overview of the Variables of the Model.

Variables	Description	Measurement	Source
GDPPC	Gross domestic product per capita	Current US dollar (US$)	WDI
EPC	Electric power consumption	kWh	WDI
GCF	Gross capital formation	Current US dollar (US$)	WDI
GEEPT	Government expenditure on education as a percentage of total government expenditure	Percentage	CBN Bulletin 2016
GEHPT	Government expenditure on health as a percentage of total government expenditure	Percentage	CBN Bulletin 2016
LEXP	Life expectancy at birth	Years	WDI
LBF	Labor force	Thousands	UNCTAD

Source: Researcher's compilation.

4. ECONOMETRIC ANALYSIS AND DISCUSSION OF RESULTS

4.1. Preliminary Test

The descriptive statistics present the mean, median, maximum, minimum, standard deviation, skewness, kurtosis, Jarque–Brea, probability, sum, sum square deviations, and number of observations. The normalized differences among the series tends to close; for GDP per capita, the difference between the minimum and the mean values suggests some improvement over time. The standard deviation is below one, which suggests that average income in the country has not moved away from the center. This same trend is witnessed in electric power consumption where the mean value is nearly equal to the average value. This suggests that improvement is still needed in the availability and consumption of affordable, clean and efficient energy in Nigeria. On the other hand, the government expenditure on education and health shows some improvement as the variation between the mean and the maximum value seem larger than that of other variables in the model; education has seen more of an increase than health.

The skewness of a series is seen as the measure of asymmetry of the distribution of the series around its mean. The skewness of a normal distribution is zero. A positive skewness indicates that the distribution has a long right tail (positive) and a negative skewness indicates that the distribution has a long left tail (negative). Kurtosis measures the sharpness of the peak or flatness of the series distribution. If the kurtosis exceeds three, the distribution is peaked (leptokurtic) relative to the normal; if the kurtosis is less than three, the distribution is flat (platykurtic) relative to the normal.

Table 2. Summary of Statistics.

Variable	LGDPPC	LEPC	LGCF	GEEPT	LLBF	GEHPT	LLEXP
Mean	6.3774	4.6023	22.8169	6.3031	10.5077	3.1817	3.8646
Median	6.0193	4.5336	22.1799	6.3050	10.5182	2.6100	3.8311
Maximum	8.0777	5.0599	25.2212	10.580	10.9963	7.3000	3.9777
Minimum	5.0347	3.9261	21.4274	0.7300	10.0590	0.4200	3.8206
Std. Dev.	0.9112	0.2776	1.2865	2.3283	0.2737	1.8632	0.0514
Skewness	0.6067	-0.0508	0.7752	-0.2018	0.0166	0.5234	0.9953
Kurtosis	2.0390	2.4555	2.1278	2.7540	1.8649	2.1892	2.4379
Jarque–Bera	3.5939	0.4601	4.7473	0.3351	1.93416	2.6294	6.4177
Probability	0.1658	0.7945	0.0931	0.8457	0.38019	0.2686	0.0404
Sum	229.5873	165.6818	821.4091	226.9100	378.2782	114.5400	139.1247
Sum SqDev.	29.0631	2.6967	57.9254	189.7282	2.6216	121.5079	0.0924
Observations	36	36	36	36	36	36	36

Source: Researchers' computation from EVIEWS 9.

From Table 2, we can see that the mean for all the variables is higher than their respective standard deviations, so we can conclude that there is likely to be a low coefficient of variation. For the skewness, all the variables in the series except GEEPT and LEPC have a long right tail (LGDPPC, LGCF, LLBF, GEHPT, and LLEXP). GEEPT and LEPC have a long left tail because they have a negative skewness. We can also see that the kurtosis values for all the variables are less than three and are, therefore, termed platykurtic.

4.2. Econometric Analysis of Data

The time series data from 1981 to 2016 was examined using the EVIEWS 9 software. The process began with the unit root tests (augmented Dickey–Fuller and Phillip Perron) in order to test for stationarity. First, we tested for stationarity at levels, then we tested for stationarity at first difference. Afterward, the cointegration test (Johansen cointegration) and vector error correction model were used. The choice of cointegration was dependent on the result of the unit root test, and the choice of vector error correction model was dependent on the result of the cointegration test.

4.2.1. Unit Root Test

The unit root test is essential because annual time series data are said to be non-stationary over time periods due to trends in the data. It is important that time series data becomes stationary before proceeding with the cointegration analysis. The study adopted two unit tests, the augmented Dickey–Fuller (ADF) test and the Phillip Perron (PP) test (see Table 3). The augmented Dickey–Fuller test produces strong results when dealing with large sample sizes. Phillips Perron's test statistics can be viewed as Dickey–Fuller statistics that have been made robust to serial correlation by using the Newey and West (1987) heteroscedasticity and autocorrelation consistent covariance matrix estimator. The advantages of the PP test over the ADF test are that the PP test is robust to general forms of heteroscedasticity in the error term and lag length does not have to be specified.

Table 3. Augmented Dickey–Fuller Test for Stationarity.

Augmented Dickey–Fuller				Philip Perron		
Variable	**Stat.**	**CV@5%**	**order**	**Stat.**	**CV@5%**	**Order**
LGDPPC	-5.285	-2.951	I(1)	-5.272	-2.951	I(1)
LEPC	-8.205	-2.951	I(1)	-8.483	-2.951	I(1)
LGCF	-4.207	-2.951	I(1)	-4.171	-2.951	I(1)
GEEPT	-5.275	-2.960	I(1)	-8.663	-2.951	I(1)
LLBF	-4.518	-2.951	I(1)	-4.534	-2.951	I(1)
GEHPT	-5.794	-2.954	I(1)	-9.164	-2.951	I(1)
LLEXP	-3.885	-2.968	I(1)	-3,951	-2.951	I(1)

Source: Researcher's computation from EVIEWS 9.

Table 3 shows that all the variables are stationary (that is, void of unit root) at first order of integration both for the ADF and PP tests. Judging from the same and unique order of integration for the variables, the Johansen co-integration approach is deemed appropriate in ascertaining the existence of long run relationship in the model.

4.2.2. Johansen Cointegration Test

The Johansen cointegration test was performed after the unit root test and was used to determine the long run relationship between the variables when all variables are integrated of order one. Now that it has been recognized that all the variables are stationary at first difference, the Johansen cointegration test determines if there is a long run relationship among the variables. Evidence from Table 4 and Table 5 shows the existence of long run relationship in the models. Using the trace statistics and the maximum eigen value criterion, cointegrating equations were obtained for the models capturing the different measures of economic development. The number of cointegrating equations was determined when the test statistic (for either trace or max. eigen statistics) is lower

than the 5% critical value. Also, the lower panels of Table 4 and Table 5 contain the normalized long run equations for the models.

Table 4. Unrestricted Cointegration Rank Test.

Dependent Variable: GDP Per Capita

Trace Statistics					**Max-Eigen Statistics**			
No. of CE(s) Hypothesized	**Eigenvalue**	**Trace Statistic**	**CV@5%**	**Prob.***	**Eigenvalue**	**Max-Eigen Statistic**	**CV@5%**	**Prob.***
None *	0.8721	193.4219	95.7536	0.000	0.8721	69.9097	40.0775	0.000
At most 1 *	0.7340	123.5121	69.8188	0.000	0.7340	45.0286	33.8768	0.002
At most 2 *	0.6065	78.48345	47.8561	0.000	0.6065	31.7114	27.5843	0.014
At most 3 *	0.4917	46.77202	29.7971	0.000	0.4917	23.0083	21.1316	0.027
At most 4 *	0.3449	23.76374	15.4947	0.002	0.3449	14.3823	14.2646	0.048
At most 5 *	0.2411	9.38145	3.8416	0.002	0.2411	9.3814	3.84146	0.002
Normalized cointegrating coefficients (standard error) [T stat]								
LGDPPC	LLBF	LLEXP	LGCF	GEEPT	GEHPT			
1.000000	-3.6653	-12.4123	0.7154	-0.374	0.479			
	(0.538)	(4.984)	(0.163)	(0.042)	(0.096)			
	[-6.809]	[-2.490]	[4.381]	[-8.851]	[5.012]			

Source: Researchers' computation from EVIEWS 9.

Table 5. Unrestricted Cointegration Rank Test.

The Dependent Variable: Electric Power Consumption

Trace Statistics					**Max-Eigen Statistics**			
No. of CE(s) Hypothesized	**Eigenvalue**	**Trace Statistic**	**CV@5%**	**Prob.***	**Eigenvalue**	**Max-Eigen Statistic**	**CV@5%**	**Prob.***
None *	0.8751	182.598	95.754	0.000	0.8751	70.7484	40.077	0.000
At most 1 *	0.7666	111.850	69.819	0.000	0.7667	49.4805	33.877	0.000
At most 2 *	0.5498	62.369	47.856	0.001	0.5498	27.1359	27.584	0.057
At most 3 *	0.4382	35.234	29.797	0.011	0.4382	19.6067	21.132	0.080
At most 4 *	0.3004	15.627	15.495	0.048	0.3004	12.1447	14.265	0.105
At most 5	0.0973	3.482	3.8415	0.062	0.0973	3.4820	3.8414	0.062
Normalized cointegrating coefficients (standard error) [T-stat]								
LEPC	LLEXP	LLBF	LGCF	GEHPT	GEEPT			
1.000000	-25.825	-14.562	4.2084	0.846	-0.2019			
	(12.877)	(2.075)	(0.6619)	(0.665)	(0.1622)			
	[-2.055]	[-7.0169]	[6.3580]	[1.2721]	[-1.2447]			

Source: Researchers' computation from EVIEWS 9.

From the result, government spending on health exerted a significant but negative influence on GDP per capita in the long run; a percentage increase in health expenditure yielded a 0.48% decline in GDP per capita. On the other hand, education spending significantly raised GDP per capita; a percentage increase in education spending yielded a 0.37% increase in GDP per capita. The empirical results show that human capital investment significantly raised average income in Nigeria. There are a number of reasons why the outcome of this empirical process, which conforms to existing evidence in literature (Adeyemi & Ogunsola, 2016; Oluwatobi & Ogunrinola, 2011), should be taken with caution; the first is due to bias inherent in capturing growth and development by average income. In economies where there is a wide income disparity, using GDP per capita as a measure of development will yield misleading evidence because the presence of intense skewness and outliers in income distribution will make the GDP per capita void of representing the true average income of the population. Second, the existing realities currently misalign with the statistical evidence, and empirical evidence suggests a less proportionate return from human capital on growth. This implies that improvement in human capital translates to improvement in growth, but not at the same proportion. Whereas present realities indicate that despite Nigeria lagging behind in major

human capital indicators (in most cases below the SSA average), GDP has continually experienced considerable growth over time. Also, the results showed that domestic investment (gross capital formation), labor force and life expectancy significantly stimulated GDP per capita for the period observed.

Furthermore, the result obtained from a broader measure of economic development unveiled new insights contrary to the ones obtained using the GDP per capita as a measure of economic development. The new evidence clearly indicated an inverse relationship between human capital and access to affordable, clean and reliable energy in Nigeria. This implies that the present state of human capital in Nigeria does not significantly influence economic development. This portrays the realities surrounding the rating of the economy on human capital indicators, which has been declining year-on-year and has fallen below the SSA average in recent times. As mentioned earlier, the evidence widely reported by existing studies that adopted a narrower definition of development would, at best, be useful only for statistical assessment and not suitable for influencing economic and policy-making decisions. Commitment to human capital improvement (education and health) has suffered a significant setback in Nigeria.

The United Nations and WHO minimum benchmark for education and health spending, respectively, are yet to be attained, with health spending drastically below the stipulated target. The basic education system is in chaos with a large number of school-age pupils on the streets begging during school hours. There has been no visible improvement made in terms of the creation of new schools or renovation of dilapidated structures since the emergence of democracy in 1999. In the same manner, tertiary colleges and universities are poorly financed, leaving learning facilities outdated and personnel poorly remunerated. This creates a barrier towards the acquisition of scientific and technological skills needed to compete internationally, attract gains and stimulate economic development. In situations where foreign capital and expertise are imported in the form of foreign direct investment (FDI), the capacity to implement the required technology is lacking making the nation susceptible to capital flights and zero marginal benefit on average income.

4.2.3. Vector Error Correction Model

Since a cointegrating relationship exists, we used the VECM (restricted VAR) to further analyze the stability of the long run cointegrating model. The VECM was used to analyze the extent and speed of adjustment of short run distortions to long run equilibrium paths by incorporating an error correction mechanism (ECM) into the model. In order to satisfy the stability conditions, the error correction mechanism in the VECM should be statistically significant, its magnitude should be negative and its value must lie between 0 and 1. In cases where the ECM is negative it signifies long-run error correction and, therefore, a convergence (see Table 6 and Table 7).

Table 6. Vector error correction model (GDP Per Capita).

Error Correction:	D(LGDPPC)	D(LLEXP)	D(LLBF)	D(LGCF)	D(GEEPT)	D(GEHPT)
CointEq1	-0.239958	-0.001051	0.001213	-0.260505	1.004875	0.123628
	(0.06444)	(0.00017)	(0.00253)	(0.09113)	(0.65709)	(0.34106)
	[-3.72362]	[-6.11021]	[0.47963]	[-2.85856]	[1.52929]	[0.36249]

Source: Researchers' computation from EVIEWS 9.

Table 7. Vector Error Correction Results (Energy Access).

Error Correction:	D(LEPC)	D(GEEPT)	D(GEHPT)	D(LGCF)	D(LLBF)	D(LLEXP)
CointEq1	-0.800779	-14.05412	-6.732231	-0.286802	0.029907	-0.001219
	(0.25531)	(5.18330)	(1.75455)	(0.65073)	(0.02009)	(0.00048)
	[-3.13648]	[-2.71143]	[-3.83700]	[-0.44074]	[1.48897]	[-2.52070]

Source: Researchers' computation from EVIEWS 9.

Based on the results from Table 6, the coefficient of the error correction model for GDPPC (GDP per capita) has a negative sign and the coefficient value of the dependent variable lies between 0 and 1, which satisfies the

stability condition of the VECM model. The absolute value of the t-statistic is greater than 1.96, which implies that it is statistically significant. The result shows that about 24% of disequilibrium is corrected within a year, which means that 24% of errors are corrected in subsequent periods. At this rate, we can say that the process of error correction in the model is slow.

Based on the results from Table 7, the coefficient of the error correction model for electric power consumption has a negative sign and the coefficient value of the dependent variable lies between 0 and 1, which satisfies the stability condition of the VECM model. The absolute value of the t-statistic is greater than 1.96, which implies that it is statistically significant. The result shows that 80% of errors are corrected in subsequent periods. We can say at this rate that a good speed of error correction exists. Judging from the t-stat values of the independent variables, we can conclude that only gross capital formation and labor force are not statistically significant.

5. CONCLUSION AND RECOMMENDATION

It has been presumed that human capital investment in an economy would increase economic growth as well as economic development. Human capital investment in this context focuses on investment in education and health. The United Nations recommends that countries should invest a minimum of 26% on education, and the World Health Organization specified that at least 5% of a nation's investment should be set aside for health. However, Nigeria has not been able to meet this benchmark. Though the economy has been growing steadily, other socio-economic indicators, such as poverty and inequality, have been on the increase, which suggests that the Nigerian economy might be growing, but is not necessarily developing.

Contrary to the earlier attempts, this study adopts a broader perspective of economic development using an indicator of access to clean, affordable and reliable energy rather than GDP per capita. It was obvious from this re-examination that economic growth is not induced by the acclaimed investment in human capital. The extant studies have possibly over-exaggerated the link between human capital investment and economic growth in Nigeria due to the choice of economic growth indicator adopted.

The empirical results using energy access as a measure of economic development differed significantly and portrayed the realities of the Nigerian economy. As opposed to earlier studies, this reassessment shows that human capital investment does not significantly impact economic development in Nigeria. It is clear that the growth experienced in recent decades occurred independently of the human capital capability of the economy, and in terms of competitiveness in education quality and on-the-job training, the SSA regions relatively underperformed compared with other regions of the world.

The study recommends renewed by government and policy decision makers in revamping the education and health sectors of the economy. This will entail a creation grass-root monitoring strategies towards ensuring that allocated fund to the sectors is properly channeled. In addition, a reorganization of education sector is required in order to address knowledge deficiency currently been witnessed in proffering domestic solutions to critical development challenges of the Nigerian economy.

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