HUMAN CAPITAL DEVELOPMENT: PANACEA FOR ECONOMIC GROWTH

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Abstract

This paper examined the impact of human capital development on economic growth in Nigeria from 1981 to 2018 using time series data. Descriptive analysis was conducted to reveal the descriptive nature of the data while Autoregressive Distributive Lag (ADRL) regression model was employed to examine both short run and the long-run relationships. The short reveals that the coefficient of the co-integrating equation, that is, error correction term or speed of adjustment (∅ = -0.2988, p-value = 0.0000 < 0.05) is negative and significant. Thus, about 29.88% of the disequilibrium in the previous periods falls back to equilibrium in the current period. It could be observed that the current recurrent expenditure exerts positive significant short-run impact on GDP. The estimated long-run equation showed that at 5% (0.05) and 10% (0.1) levels of significance, percentage of tertiary school enrolments (PTSE) and capital expenditure on education and health (CEXEH) exert positive significant impact on GDP with p-values 0.0005 < 0.05 and 0.0893< 0.1 respectively. On the contrary, life expectancy (LEXP), percentage of primary school enrolment (PPSE) and recurrent expenditure on education (REXED) exert negative but insignificant impact on the growth of the Nigerian economy (GDP) with the p-values of 0.3346, 0.6603 and 0.8419 respectively while percentage of secondary school enrolments (PSSE) and recurrent expenditure on health (REXHT) have positive insignificant impact on GDP with the values 0.2299 and 0.1984 respectively. In other words, percentage of tertiary school enrolments (PTSE) and capital expenditure on education and health (CEXEH) have long run effects on the growth of the Nigerian economy (GDP). The study recommends that government should invest and improve on the quality of education at the primary level and increase its recurrent expenditure on education to achieve the desired level of economic growth and concludes that for an economy to grow, investment in human capital (education and health) must be prioritized so as to give rise to accumulation of new capital, which is a key determinant of whether a country is poor or rich.

Keywords: *Human capital, education, health, government expenditure, economic growth, Descriptive Analysis, Autoregressive Distributive Lag.*

Introduction

Every economy whether developed or developing is in need of efficient human and material resources. A vibrant human resources of any nation is capable of transforming the material resources to achieve desired economic growth and this can only be achieved by investing in human capital. These material resources must be converted into productive uses by efficient human resources to meet the ever increasing needs of mankind (Abosede & Onakoya, 2013).

It is widely believed that the world is becoming knowledge-based. Thus, human capital development and skill acquisition occupy the center stage for researchers who engage in development economics. Hadir and Lahrech (2015) asserted that human resources are the most valuable assets of any nation and these assets must be deployed sensibly and effectively to attain economic growth. Human capital development has been argued to be a veritable source for economic growth. No country can achieve the desired level of economic growth without investing in capacity building of her human assets.

There can be no meaningful economic progress where the required human resources of any nation is untrained, unskilled, uneducated and lacking in basic health standards, dignity and self-confidence, as human capital development is an agent of national integration and development. Lopez-Casanovas, Costa-Font and Planas (2005), to attain a state of continuous economic growth, a country's labour force must have a minimum level of education and health status. Human capital development is strategic and critical to the socio-economic development as it ensures that a country's human resources is skilled, productive, knowledgeable and healthy to ensure that other resources available are optimally exploited for growth to occur (Adeyemi & Ogunsola, 2016). The development of human capital assets will ensure that adequate and qualified manpower is readily available for the challenges of embarking on productive activities. The trained manpower will create jobs on their own, become employers of labour, the level of unemployment will reduce as they will not be depending on the government and other employers for the provision of jobs. Their meaningfully engagement after these training will reduce youth restiveness, ensure political stability and economic progress.

The challenges facing countries of the world especially the less developed countries in which Nigeria is a member by circumstances is how to achieve economic growth which is a pre-condition for economic development. The development of human assets is one of the surest ways to achieve accelerated economic advancement. Until the late 1950's it is the belief of some economists that the quantity of labour is given and that their performance cannot be increased (Krasniqi &Topxhiu, 2016). One of the major problems confronting less developed countries is the non-availability of required man-power to chart the course of economic growth. Adeyemi and Ogunsola (2016), submitted that Nigeria is categorized as economically backward because of her low level of labour efficiency, factor immobility, limited specialisation in occupation, deficient supply of entrepreneurship and customary values and traditional social institutions that minimise the incentive for economic growth. One way the quality of human assets can be improved is to ensure adequate investment is made in human capital development (Ogunleye, Owolabi, Sanyaolu & Lawal, 2017). Nigeria no doubt is the largest black nation in the world and as one of Africa's largest economies is confronted yearly with problems of economic growth despite the huge natural and human resources available in the country. It is the quality and not only the quantity of human resources that aid economic growth. No doubt there is scarcity of quality human resources, and this has become worrisome and poses a serious threat to rapid economic development of most developing economies as indicated by World Economic Forum (2013).

The main objective of this paper is to investigate the impact of human capital development on economic growth in Nigeria. In ascertaining this fact, certain components of human capital development will be x-ray to verify their relationship between economic growth and government expenditure on education, primary and secondary school enrollment, university enrollment, technical and vocational training and the health care facilities.

Background to the study

Prior to the second world war, Economists paid less attention to the impact of human capital development on economic growth until the works of Schultz (1961), Mincer (1970) and Rosen (1976) and other notable Economists who drew the attention of the world that in order to achieve the desired level of economic growth, the world should focus on educating and investing in its human resources. Furthermore, numerous studies were carried out to ascertain the veracity of the

relationship between human capital development and economic growth. Investment in physical stock of capital without a corresponding investment in human assets will not yield the required and desired level of economic advancement. The economic view of human capital encompasses education, training, health, migration and other investment that enhance an individual's productivity (Onisanwa, 2014).

Human capital development has been defined in various ways by different scholars at different times. Human capital can be seen as the totality of skills and knowledge acquired by an individual through formal, semi-formal or informal education applied in the production of goods and services which aid economic well-being. Adam Smith (1776) in his wealth of nations posited that production generates wealth, however, production is driven by the available human resources in a nation and these human resources must be trained to meet the challenges of modern production techniques. Economic development and technological progress will not be possible if technical and vocational competency is not embedded in the workforce (Khilji, Kakar & Subhan, 2012; Yusuff & Soyemi, 2012). Human capital according to World Economic Forum (2013) is not a one dimensional concept, it is viewed as a combination of education and experience but it appears to mean different things to different people depending who is looking at the concept of human capital. To the business world, it is the economic value of an employee's set of skill and experience and to policy makers it is the capacity of the population to drive economic growth.

According to Rastogi (2002), human capital is seen as knowledge, competency, attitude and behavior embedded in an individual. Romer (1990) refers to human capital as a fundamental source of economic productivity. According to Rosen (1999), human capital is an investment that people make in themselves to increase their productivity. Frank and Bemanke (2007) define human capital as an amalgamation of factors such as education, experience, training, intelligence, energy, work habits, trustworthiness, and initiative that affect the value of a worker's marginal product. Human capital is also defined as the aggregation of investments in such areas as education, health, on-the-job-training, and migration that enhance an individual's productivity in the labour market, and also in non-market activities (Sharpe, 2001) as cited in Shuaibu and Timothy (2016). Human capital is also seen as the skill, knowledge and capabilities possessed by all the inhabitants of a

society which is traded in the labour market and is essential for the production of goods and services for the general well-being of the masses.

World Economic Forum (2013) sees human capital endowment as the skills and capacities that are available in people which is put to productive uses and can be a more important determinant of its long term economic success than any other resources.

Health, Life Expectancy, Insecurity, Education as a factor in Human Capital Development and its Relationship to Economic Growth:

The health sector of any nation plays a pivotal role in economic growth, healthy people propels a healthy nation and the health sector cannot be ignored while ascertaining the impact of human capital development on economic growth, as the sector contributes positively to the growth of any nation. Ishola and Alani (2012) are of the opinion that sound health enhances physical and mental abilities of workers which increases their productivity. In Nigeria, the health sector is grouped under primary, secondary and tertiary health services with each specialising in one aspect of health or the other for the overall benefit of the citizenry. The recurrent expenditure budget for the health sector rose from N84.46m in 1981 to N16, 638.77m in 1999 and reached its highest in the period under review to N296, 442.79m in 2018. Improvement in the health sector increases life expectancy. Life expectancy in Nigeria stood at 45.64 years as at 1981 and in 1999 it rose to 46.10 years thereafter increased to 54.33 years as at 2018. The implication of this is that people are likely to make little or no investment in developing themselves beyond primary, secondary and tertiary levels of education. However, as life expectancy increase, investment in education will increase. Investment in health care sector will increase life expectancy beyond its current level, this will make investment in human capital meaningful to the individual, corporate organisations and the government. Early childhood is a critical issue in the life of the teeming population, this has become necessary in the face of the fact that many problems faced in the adolescence stage of life like mental imbalance, criminality, prostitution, illiteracy are associated with lack of proper investment in early childhood. Investments made in health in the early stage of life are reaped at the working age of the individual.

In developing economies, the return on investment in education especially at the primary level is higher compared to the secondary and tertiary level while in developed economies, the return on investment in education is higher at the tertiary level. Many schools in Nigeria at all levels are

operating on curriculum that has outlived its usefulness in a knowledge-based economy. Research and Development which is a core instrument that drives human capital development is not properly funded, the little fund that is rarely available is distributed not on the basis of priorities but on political affiliation. Another problem that confronts the educational system in Nigeria is the issue of half-baked graduates and technicians who have no relevance in the emerging business world. Other challenges that hinder the growth of the educational systems which by extension affects the development of human capital was identified as: inadequate classrooms, lack of qualified manpower, poor funding, cultism, examination malpractices, decay in educational infrastructure, corruption, unconducive academic environment and hooliganism (Odia & Omotonmwan , 2007).

Access to quantitative and qualitative education is one of the major factors that affects the level of human capital development. The role of education in the attainment of economic growth cannot be over-emphasized as according to Hanushek and Wobmann (2007), education increases human capital in the labour force which increases productivity and thus leads to higher equilibrium in the level of output and it increases the innovative capacity of the economy. Education enhances the understanding of people, make them relevant, exposed, cultured and gives them a sense of happiness.

Burdett and Snower (1996) opined that the acquisition of human capital promotes countries Gross Domestic Product performance. The acquisition of skills make people more productive, produce more output over time and also make themselves adaptable. The acquisition of sills make capital equipment to be more productive, machines can be effectively and prudently used to produce technological based products and services. A workforce that is not constantly acquiring new skills will not be able to reap the benefits associated from technological progress. They asserted that professional training and development allows individuals who have acquired such training and development to be more productive, increase their earning and in the process help in expanding the economy and that there are differences between training and education but both have something in common in that it makes people more productive and adaptive.

For countries to join the knowledge economy, it must break out of low-level of skill acquisition. It also exerted that investing in education and training alone cannot bring out the desired result but

changing the mindset of the people, developing institutions that recognizes the importance of investing in people and creating a conducive environment where the workforce can develop their skills, productivity and efficiency in other to move into knowledge based economy.

Empirical Review

There have been series of empirical works to determine the impact of human capital development on economic growth both in Nigeria and the world at large. Research has shown that investment in human capital is one of the greatest investment any nation can make towards the attainment of economic growth.

Shuaibu and Timothy (2016), investigates the determinants of human capital development in 33 African countries over the period of 2000 – 2013. Result obtained from the unit root shows that all the variable are integrated of order one while the co-integration test shows that the human capital development and its determinants have a stable long run equilibrium relationship. It was observed that human capital development in the long run were influenced by all the variable, on the other hand, institutions matters as indicated by the contemporaneous models. The paper concludes that by sustaining education and health by African countries can lead to a robust human capital development while maintaining institutional quality and infrastructure development for short term gain.

Arabi and Abdalla (2013) examined the impact of human capital on economic growth: empirical evidence from Sudan from 1982 – 2009 adopting a simultaneous equation model that incorporates human capital that is school attainment, and investment in education and health to economic growth, total productivity, foreign direct investment and human development index. Using a three stage least square technique, empirical results of the paper show that quality of the education has a determinant role in economic growth such that higher level of education contributes more to economic output than secondary education. The quality of health has a positive impact on economic growth. However, the paper reveals that there is an adverse relationship between the ratio of total government expenditure to GDP on the ratio of foreign direct investment to GDP, this can be attributed to government concentration on consumption rather than production.

Adeyemi and Ogunsola (2016) examined the impact of human capital development on economic growth in Nigeria using time series data from 1980 to 2013, with the objective of determining the relationship human capital indices (education and health) and economic growth. The study

employed ARDL co-integration analysis to estimate the relationship among the variables used in the study. Findings reveals that there is a positive long run relationship among secondary school enrollment, public expenditure on education, life expectancy rate, gross capital formation and economic growth but statistically insignificant. The result further shows that there is a negative long run relationship among primary and tertiary school enrollment, public health expenditure and economic growth. The study thereby recommend that the government should review the education and training policies at the tertiary and primary level and increase its funding to the health sector for effective human capital development in other to contribution positively economic growth.

Obi and Obi (2014), focused on the impact of education expenditure on economic growth as a means of achieving the desired socio-economic change needed in Nigeria, using time series data from 1981 to 2012. The data was analysed using the Johansen's co-integration and the Ordinary Least Square econometric techniques were used to determine the relationship between gross domestic product (GDP) and recurrent expenditure on education. Findings from the study reveals that there is a positive relationship between education expenditure and economic growth, but the period under study does not suggest the existence a long run relationship between variables. This is attributable to redundancy of the workforce, labour market distortions, job discontinuity and industrial disputes as well as brain drain among other numerous factors. The study further reveals that the education sector has not performed as expected; this is due to high rate of school drop outs, increasing cases of cultism and poor quality of graduates. The paper therefore suggest that improvement in the education can be attained if there are transparency, good governance and accountability in the management of public resources, and therefore efforts should be made to check, preserve and protect the plight of educational capital to other countries.

Hadir and Lahrech (2015), examined the relationship between human capital development and economic growth in Morocco using Ordinary Least Square (OLS) method. The objective of the paper was to determine the relationship using total government expenditure on health and education, and the enrollment data of tertiary, secondary and primary school as proxy for human capital. The analysis reveals that Morocco can achieve a high level of socio-economic development if human capital development is given greater priority and that it helps to improve the standard of living of the citizenry. The paper concludes that human capital development, given the right policy decision can translate into a good and import growth in the economy.

Oluwatobi and Ogunrinola (2011) carried out a study on the relationship between human capital development efforts of the government and economic growth in Nigeria. The study seeks to find out the impact of government recurrent and capital expenditure on education and health in Nigeria and there effects on economic growth. Secondary data were used while adopting the Augmented Solow model. The dependent variable in model is the level of real output while the explanatory variables are government capital and recurrent expenditure on education and health, gross fixed capital formation and the labour force. It was discovered that there is a positive relationship between recurrent expenditure on human capital development and the level of real output, while government capital expenditure has a negative impact on the level of real output. It was recommended that capital expenditure on education and health should be properly channeled to promote economic growth.

Behrooznia, Shafizadeh, Laalbar and Karsalari (2016) writing on the causal relationship between education and GDP in 40 Asian countries by using panel unit root test and panel cointegration analysis for the period 1970 – 2010. A three-variable model was formulated with capital formation as the third variable. The results from the analysis show that there is a strong causality from investment and economic growth to education in these countries. It was revealed that education does not have any significant effect on GDP and investment in the short and long run, this means that education is driven by capital formation and GDP in these countries. Findings reveal that higher economic growth leads to higher education proxy as such the quality of education declines as the number of enrollments increases. Formal education in these countries are not market oriented may be the reason an increase in education investment does not generate higher growth. It was therefore recommended that the educational system in these countries should promote technical education which will guarantee long term jobs and improve the countries future prospects.

Theoretical Review

Many studies have examined the relationship between Human capital Development and Economic growth. These studies include Hadir & Lahrech 2015; Lawanson 2015; Obi & Obi 2014; Arabi & Abdalla 2013; Krasniqi & Topxhiu 2014; Jihene 2013. Amongst the numerous economic theories that link human capital development and economic growth, Human Capital Theory was adopted for the purpose of this paper.

Human capital theory provides a framework for analyzing educational investment. In human capital theory, education is an investment of current resources in exchange for future returns. Human capital theory asserts that individuals consciously choose to invest in themselves through various activities. Usually, this is through education and training. The standard approach assumes that the individual invests an amount of time in education, and then the return comes in the form of enhanced future earnings, i.e. investment in education increases the individual's future earnings.

Knowles and Owen (1995) put forward that the importance of human capital generally, and of education in particular in growth theory was emphasized only in the 1980s and 1990s by endogenous growth models and the expanded neoclassical growth model of Mankiw, Romer and Weil (MRW). The expanded neoclassical growth model sees human capital as an added input, hence countries that have faster growth rate of education will have faster transition growth rates and higher incomes. Endogenous growth models see education as a process that changes the production technology itself (new products, processes, or knowledge) (Romer, 1990, 1993; Aghion and Howitt, 1998; Nelson and Phelps, 1966), makes it easier to adapt foreign technology (Barro, 1997; Hall and Jones, 1999), or facilitate resource transfer to the most technologically dynamic sector of the economy (Kim and Kim, 2000; Schiff and Wang, 2004).

In the endogenous growth literature, education is seen as subject to increasing returns so it could overcome the growth reducing effect of diminishing returns to physical capital (Lucas, 1988). It appears that in either endogenous or expanded neoclassical growth model, education should have a positive effect on the growth rate of income. However, it is possible that a minimum level of education is required in order for education to have any measurable growth impact (Azariadis and Drazen, 1990; Rebelo, 1991).

The Human capital theory based upon the works of Schultz (2002). Sakamota and Powers (1995) and Psacharopoulos and woodhall (2004) emphasized how education increases the productivity and efficiency of workers by increasing the level of cognitive stock of economically productive human capability, which is a product of innate abilities and investment in human beings. Thus, human capital plays a special role in a number of models of endogenous economic growth.

In Romer (1990) human capital is the key input to the research sector, which generates the new products or ideas that underlie technological progress. Thus, countries with greater initial stocks of human capital experience a more rapid rate of introduction of new goods and thereby tend to

grow faster. In multi-country models of technological change, the spread of new ideas across countries (or firms or industries) is also important.

As Nelson and Phelps (1966) suggested, a larger stock of human capital makes it easier for a country to absorb the new products or ideas that have been discovered elsewhere. Therefore, a follower country with more human capital tends to grow faster because it catches up more rapidly to the technological leader.

Becker, Murphy, and Tamura (1990) assumed that the rate of return on human capital increases over some range, an effect that could arise because of the spillover benefits from human capital that Lucas (1988) stresses. As an example, the return to some kinds of ability, such as talent in communications, is higher if other people are also more able. In this setting, increases in the quantity of human capital per person tend to lead to higher rates of investment in human and physical capital, and hence, to higher per capita growth. A supporting force is that more human capital per person reduces fertility rates, because human capital is more productive in producing goods and additional human capital rather than more children.

Methodology

The study employed both descriptive and econometric techniques in analysing the data. Descriptive analysis was conducted to reveal the descriptive nature of the data, then Pre-tests estimations (such as unit root test and bound tests for co-integration). Estimation and post-estimation were carried out thereafter. As regards the estimation techniques, Autoregressive Distribution Lag (ADRL) regression model was employed to examine both short run and the long-run relationships. An ARDL is a least squares regression containing lags of the dependent and explanatory variables. The ARDL that this method has three main advantages; firstly, compared to other multivariate co-integration methods, the bound test is a simple technique because it allows the co-integration relationship to be estimated by OLS once the lag order of the model is identified. Additionally, the unit root test is not a pre-condition of this model. It is only conducted to ensure that none of the variables being examined is integrated at order two *i.e. I(2)*. Thirdly, the long-run and short-run parameters of the model can be simultaneously estimated.

Model Specification

The functional of the form of the model is specified as follows:

$$GDP = f(LEXP_t, PPSE_t, PSSE_t, PTSE_t, REXE_t, REXHT_t, CEXEH_t) \quad (3.1)$$

where *GDP* =real GDP,*LEXP* =life expectancy, *PPSE* = percentage of primary school enrolment, *PSSE* =percentage of secondary school enrolment, *PTSE* = percentage of tertiary school enrolment *REXED* = recurrent expenditure on education, *REXHT* = recurrent expenditure on health and *CEXEH* = capital expenditure on education and health.

The modeling technique employed is ARDL and was estimated using OLS. ARDLs are usually denoted with the notation ARDL($p, q_1, q_2, \dots, q_k$), where *p* is the number of lags of the dependent variable, q_1 is the number of lags of the first explanatory variable, and q_k is the number of lags of the *k*-th explanatory variable. Thus, a general ARDL $(p, q_1, q_2, \dots, q_k)$ is specified as follows:

$$y_t = \psi + \sum_{i=1}^{p} \alpha_i \, y_{t-i} + \sum_{j=1}^{k} \sum_{i=0}^{q_j} \beta_{j,i} x_{j,t-i} + \varepsilon_t \quad (3.2)$$

where $\varepsilon_t$is the error term, ψ is a constant term, and α_i and $\beta_{j,i}$ are respectively the coefficients of lags of y_t, and lags of the *k* regressors $x_{j,t-i}$ for $j = 1, 2, 3, \dots, k$.

Hence, the specific ARDL model for this study is expressed as follows:

$$GDP_t = \psi + \sum_{i=1}^{p} \alpha_i \, GDP_{t-i} + \sum_{i=0}^{q_1} \beta_{1i} \, LEXP_{t-i} + \sum_{i=0}^{q_2} \beta_{2i} \, PPSE_{t-i} + \sum_{i=0}^{q_3} \beta_{3i} \, PSSE_{t-i} + \sum_{i=0}^{q_4} \beta_{4i} \, PTSE_{t-i} + \sum_{i=0}^{q_5} \beta_{5i} \, REXED_{t-i} + \sum_{i=0}^{q_6} \beta_{6i} \, REXHT_{t-i} + \sum_{i=0}^{q_7} \beta_{7i} \, CEXEH_{t-i} + \varepsilon_t \quad (4.3)$$

As stated earlier, *p*, q_1, q_2, q_3, $q_4$and q_5 are the respective numbers of lags of the dependent variable (*GDP*) and the lags of the four (7) explanatory variables (*LEXP*, *PPSE*, *PSSE*, *PTSE*, *REXED*, *REXHT*, *CEXEH*). Likewise, α_i, β_{1i}, β_{2i}, β_{3i}, β_{4i},β_{5i}, β_{6i} and β_{7i} are respectively the coefficients associated with the lags of the dependent variable (*GDP*) and lags of the four (7) explanatory variables. It should be noted that some of the explanatory variables may have no lagged terms ($i.e. q_j = 0$). Such variables are called static or fixed regressors. Explanatory variables with one or more lagged terms are called dynamic regressors.

The ARDL Error Correction Model (ECM) specification is given as:

$$\Delta GDP_t = \psi + \sum_{i=1}^{p} \alpha_i \Delta GDP_{t-i} + \sum_{i=0}^{q_1} \beta_{1i} \Delta LEXP_{t-i} + \sum_{i=0}^{q_2} \beta_{2i} \Delta PPSE_{t-i} + \sum_{i=0}^{q_3} \beta_{3i} \Delta PSSE_{t-i} + \sum_{i=0}^{q_4} \beta_{4i} \Delta PTSE_{t-i} + \sum_{i=0}^{q_5} \beta_{5i} \Delta REXED_{t-i} + \sum_{i=0}^{q_6} \beta_{6i} \Delta REXHT_{t-i} + \sum_{i=0}^{q_7} \beta_{7i} \Delta CEXEH_{t-i} + \emptyset ECT_{t-i} + \varepsilon_t \quad (4.4)$$

Equation (4.4) above states the ARDL ECM (error correction model) which bridge the gap between the short run disequilibrium and long run equilibrium. The coefficient, $\emptyset$, of the ECT (error correction term) called the speed of adjustment is expected to be negative in order to restore to equilibrium, *i.e.*$\emptyset < 0$.

Given equation (4.3), the long run form of the ARDL is specified as follows:

$$GDP_t = \gamma_0 + \gamma_1 LEXP_t + \gamma_2 PPSE_t + \gamma_3 PSSE_t + \gamma_4 PTSE_t + \gamma_5 REXED_t + \gamma_6 REXHT_t + \gamma_7 CEXEH_t \quad (4.5)$$

4.0 Data Analysis and Results

4.1 Descriptive Analysis

TABLE 4.1: Result of Descriptive Analysis

	GDP	LEXP	PPSE	PSSE	PTSE	REXED	REXHT	CEXEH
Mean	27945.69	48.10845	94.18447	32.78863	7.691500	110.9400	65.30297	53.09637
Median	6272.553	46.19700	93.54900	28.91350	6.836500	41.74700	15.92850	25.66550
Maximum	129086.9	54.33200	113.0790	56.20500	14.01900	465.3010	296.4430	203.4180
Minimum	139.3110	45.63700	78.66300	17.10600	2.327000	0.162000	0.041000	0.238000
Std. Dev.	38086.86	2.873762	8.694771	9.177062	3.580471	145.2295	90.46192	61.39227
Skewness	1.277475	0.933630	0.406631	0.762139	0.131890	1.144723	1.237677	0.912532
Kurtosis	3.325965	2.330605	2.665843	2.646810	1.700797	2.819859	3.097806	2.493088
Jarque-Bera	10.50387	6.230023	1.224007	3.876266	2.782722	8.350526	9.716822	5.680717
Probability	0.005237	0.044378	0.542263	0.143972	0.248737	0.015371	0.007763	0.058405
Sum	1061936.	1828.121	3579.010	1245.968	292.2770	4215.721	2481.513	2017.662
Sum Sq. Dev.	5.37E+10	305.5649	2797.165	3116.083	474.3316	780390.0	302784.3	139453.4
Observations	38	38	38	38	38	38	38	38

Source: Researcher's computation using e-views, 2020.

The table 4.1 shows the descriptive statistics of each of the variables. It shows the summary statistics of the series; *GDP* = real GDP, *LEXP* = life expectancy, *PPSE* = percentage of primary school enrolment,*PSSE* =percentage of secondary school enrolment, *PTSE* = percentage of tertiary school enrolment *REXED* = recurrent expenditure on education, *REXHT* = recurrent expenditure on health and *CEXEH* = capital expenditure on education and health.

In summary, the Jarque-Bera statistics indicate that real GDP (*GDP*), life expectancy (*LEXP*), recurrent expenditure on education (*REXED*) and recurrent expenditure on health (*REXHT*) are not normally distributed as their p-value are less than 5%. On the contrary, percentage of primary school enrolment (*PPSE*), percentage of secondary school enrolments (*PSSE*), percentage of tertiary school enrolments (*PTSE*) and capital expenditure on education and health (*CEXEH*) are normally distributed since their p-values of the Jarque-Bera statistics are greater than 0.05.

4.2 Unit Root Tests

The Augmented Dickey Fuller (ADF) test of unit root was conducted for each variable.

Table 4.2-: Unit Root Tests Results

Variables	Level		1st differences		Level of significant	Order of integration
	ADF stat.	Critical v.	ADF stat.	Critical v.		
LOG(GDP)	-0.9856	-2.9434	-3.3449	-2.9458	5%	*I(1)*
LOG(LEXP)	-4.6683	-3.5485	_	_	5%	*I(0)*
PPSE	-2.3227	-2.9434	-6.1623	-2.9458	5%	*I(1)*
PSSE	-1.1535	-2.9434	-6.6958	-2.9458	5%	*I(1)*
PTSE	-2.4150	-3.5366	-5.3641	-3.5403	5%	*I(1)*
LOG(REXED)	-2.1175	-2.9540	-7.6732	-2.9458	5%	*I(1)*
LOG(REXHT)	-1.4804	-2.9540	-9.9920	-2.9458	5%	*I(1)*
LOG(CEXEH)	-0.5638	-2.9458	-9.4263	-2.9458	5%	*I(1)*

Source: Researchers computation using E-views 10.

Table 4.2 presents the results of the unit test using the Augmented Dickey Fuller (ADF) Test. The table shows that the series *GDP, PPSE, PSSE, PTSE, REXED, REXHT* and *CEXEH* are integrated at order one *i.e.* they are *I(1)* series while *LEXP* is stationary at level, *i.e.* they are *I(0)* series. Thus, the combination of *I(0)* and *I(1)*) as shown in table 4.2 justifies the bounds testing methodology for testing for the long-run relationship among the variable.

4.3 ARDL Bounds Test to Co-integration

ARDL Bounds co-integration test was used to determine whether a long-run relationship exists among the variables in each model. The result of the ARDL bounds test is presented in the table below:

Table 4.3-: Result of ARDL Bounds Test to Co-integration

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	13.13043	10%	1.92	2.89
K	7	5%	2.17	3.21

Source: Author's computation using E-views 10

The table 4.3 presents the results of the ARDL Bounds Co-integration test. Thus, since the F-statistic (13.1304) exceeds upper bounds of the critical value bounds at 10% and 5%, a linear combination or long run relationship exists among the variables, viz. *GDP, LEXP, PPSE, PSSE, PTSE, REXED, REXHT, CEXEH*.

4.4 Estimation of ARDL Error Correction and long run forms

Table 4.4 Result of estimated ARDL Error Correction term and Short-run Coefficients

Dependent variable: Log(GDP)

ECM Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(LEXP)	-18.47916	3.331271	-5.547181	0.0000
DLOG(REXED)	0.090534	0.039264	2.305808	0.0305
DLOG(REXED(-1))	-0.063386	0.020013	-3.167144	0.0043

DLOG(REXHT)	-0.043681	0.038566	-1.132622	0.2690
ECT(-1)	-0.298804	0.023676	-12.62053	0.0000

R-squared	0.634626	Mean dependent var	0.187888
Adjusted R-squared	0.587481	S.D. dependent var	0.115767
S.E. of regression	0.074354	Akaike info criterion	-2.231707
Sum squared resid	0.171385	Schwarz criterion	-2.011774
Log likelihood	45.17073	Hannan-Quinn criter.	-2.154944
Durbin-Watson stat	1.583794		

Source: Author's computation using E-views 10.

Table 4.4 presents the result of the estimated error correction form of the ARDL. The coefficient of the co-integrating equation, that is, error correction term or speed of adjustment ($\emptyset$ = -0.2988, p-value = 0.0000 < 0.05) is negative and significant. This suggests that GDP (*GDP*), adjust to life expectancy (*LEXP*), percentage of primary school enrolment (*PPSE*), percentage of secondary school enrolments (*PSSE*), percentage of tertiary school enrolments (*PTSE*) and capital expenditure on education and health (*CEXEH*), recurrent expenditure on education (*REXED*) and recurrent expenditure on health (*REXHT*) in the long run by a decline of about 29.88%. Thus, about 29.88% of the disequilibrium in the previous periods falls back to equilibrium in the current period. It could be observed that the current recurrent expenditure exerts positive significant short-run impact on *GDP*.

Table 4.5 Result of estimated ARDL long run coefficients

Dependent variable: Log(GDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(LEXP)	-3.545360	3.597358	-0.985545	0.3346
PPSE	-0.326641	0.733549	-0.445288	0.6603
PSSE	0.778152	0.630968	1.233267	0.2299
PTSE	2.043984	0.685774	2.980548	0.0067
LOG(REXED)	-0.059969	0.297299	-0.201714	0.8419
LOG(REXHT)	0.418937	0.316364	1.324227	0.1984
LOG(CEXEH)	0.226581	0.127710	1.774189	0.0893

C		16.64680	12.84836	1.295636	0.2080

Source: Author's computation using E-view, 2019.

Table 4.5 presents the result of the estimated long run form of the ARDL. The estimated long-run equation shows that at 5% (0.05) and 10% (0.1) levels of significance, percentage of tertiary school enrolments (*PTSE*) and capital expenditure on education and health (*CEXEH*) exert positive significant impact on *GDP* with p-values 0.0005 < 0.05 and 0.0893< 0.1respectively. On the contrary, life expectancy (*LEXP*), percentage of primary school enrolment (*PPSE*) and recurrent expenditure on education (*REXED*) exert negative but insignificant impact on the growth of the Nigerian economy (*GDP*) with the p-values of 0.3346, 0.6603 and 0.8419 respectively while percentage of secondary school enrolments (*PSSE*) and recurrent expenditure on health (*REXHT*) have positive insignificant impact on *GDP* with the values 0.2299 and 0.1984 respectively. In other words, percentage of tertiary school enrolments (*PTSE*) and capital expenditure on education and health (*CEXEH*) have long run effects on the growth of the Nigerian economy (*GDP*).

Table 4.6 Result of Serial Correlation Test (CPS)

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	3.602954	Prob. F(2,21)	0.6733
Obs*R-squared	9.197104	Prob. Chi-Square(2)	0.5666

Source: Authors' computation using E-views 10.

Table 4.6 presents result for autocorrelation test. Since the p-values (0.6733 and 0.5666 respectively) of both the F-statistic (3.6030) and LM statistic (9.1971) are greater than 0.05, the null hypothesis of no serial correlation cannot be rejected. Thus, the model estimated does not suffer autocorrelation.

Test of Stability (CUSUM test)

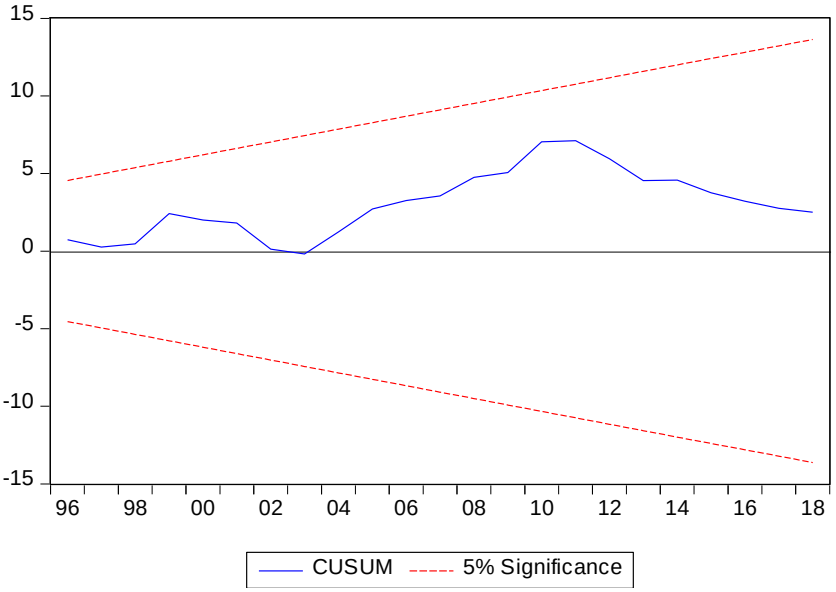

Figure 4.1: Plot of Cumulative Sum (CUSUM) of Recursive Residuals

Figure 4.1 presents the result of the test of stability using CUSUM criterion. Since the plot remains within the critical bounds at 5% level of significant, thus, the model is structurally stable. Therefore, the estimated ARDL coefficients are stable.

Conclusion and Recommendations

The study examined the impact of human capital development on economic growth in Nigeria using time series data from 1981 to 2018. The short run and long run impact of human capital development (education and health) were examined. The short reveals that the coefficient of the co-integrating equation, that is, error correction term or speed of adjustment (Ø = -0.2988, p-value = 0.0000 < 0.05) is negative and significant. Thus, about 29.88% of the disequilibrium in the previous periods falls back to equilibrium in the current period. It could be observed that the current recurrent expenditure exerts positive significant short-run impact on *GDP*.

The estimated long-run equation shows that percentage of tertiary school enrolments (*PTSE*) and capital expenditure on education and health (*CEXEH*) exert positive significant impact on *GDP* On the contrary, life expectancy (*LEXP*), percentage of primary school enrolment (*PPSE*) and recurrent expenditure on education (*REXED*) exert negative but insignificant impact on the growth of the Nigerian economy (*GDP*) while percentage of secondary school enrolments (*PSSE*) and recurrent expenditure on health (*REXHT*) have positive insignificant impact on *GDP* In other words, percentage of tertiary school enrolments (*PTSE*) and capital expenditure on education and

health (*CEXEH*) have long run effects on the growth of the Nigerian economy (*GDP*). *The study recommends that government should invest and improve on the quality of education at the primary level and increase its recurrent expenditure on education to achieve the desired level of economic growth and concludes that for an economy to grow, investment in human capital (education and health) must be prioritized so as to give rise to accumulation of new capital, which is a key determinant of whether a country is poor or rich.*