
Public Education Expenditure and Economic Growth in Nigeria

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Abstract

The paper examined the impact of public education expenditure on economic growth in Nigeria from 1980 to 2015. Co-integration/Error Correction Mechanism and Granger Causality test were employed to analyze the data. In analyzing the data for this study, it was observed that all the variables were stationary at their first differences using Augmented Dickey-Fuller unit root test. The Co-integration test revealed that there is a long-run relationship among the variables. The result of the parsimonious ECM showed that the overall model is satisfactory given the coefficient of determination of 65 percent and f-statistic of 5.312802. The result also revealed that government capital education expenditure and government recurrent education expenditure have significant relationship with economic growth. Meanwhile, there is no significant relationship between gross capital formation and economic growth. Moreover, the Pairwise Granger Causality result showed a unidirectional causation between government capital education expenditure and real gross domestic product, government recurrent education expenditure and real gross domestic product as well as gross capital formation and real gross domestic product. Based on these findings, the study recommended amongst others that: government should carry out capital projects in the educational sector including building of quality class rooms, laboratories, purchase of teaching and learning aids including computers because these facilities will have multiplier effect on the economy. Government should begin implementation of UNESCO's recommendation of 26 per cent of the country's annual budget allocate to educational sector. Also, in order to increase the morale of the teaching and non-teaching workforce for efficiency, a good salary scheme and incentives should be implemented by the government.

Key Words: Public Expenditure, Education, GDP, Causality, UNESCO, Co-integration and ECM.

I. INTRODUCTION

Government plays an important role in any economy. The reason for this is the acceptance of the argument that the market mechanism cannot deal with some important problems of the society, i.e., that the market mechanism does fail in certain circumstances, and that

government involvement is needed in instances of market failure. To Keynes, government intervention is needed to achieve stability in the economy. According to the Keynesian idea, public expenditure will contribute positively to economic growth. That is, public expenditure will play significant role in the functioning of an economy at all levels of development. Hence, expenditure on education will help the country to achieve adequate or sustainable economic growth. That is, expenditure in training the human beings to acquire skills and knowledge of different types will impact on the economy positively because every human being is a resource for society. Strictly speaking, education up-scales hidden abilities which if properly harnessed would enable the citizens to contribute more to the economy.

Education refers to knowledge at all levels (primary, secondary and tertiary) whether formal or informal. Education is an instrument through which the society can be transformed because it equips human resources with knowledge, skills and competencies needed to enhance productivity, foster economic growth, contribute to personal and social development, raises people's creativity, promotes entrepreneurship and technological advances and reduce social inequality. This is why both developed and developing countries of the world emphasize the enhancement of educational sector because education is considered as a long term investment that leads to a high production for a country in the future and Nigeria has no exceptions in developing and enhancing its educational system in order to be among the first twenty economies in the world by 2020. Strictly speaking, no country can achieve adequate economic growth and development without considerable or significant investment in human capital development.

Moreover, Umo (2012) submitted that the revolution in the economics of human capital has highlighted the centrality of education. When broadly viewed, educational sector contains cognitive skills, knowledge, technology, socio-political networking skills, health and migration which today underpin economic growth. The world is now evolving a 'new economy' in which knowledge provided by education plays a critical role. Growth in intangible (knowledge) asset now accounts for 90% of total assets in industrialized economies (Umo, 2012). Resource-based growths are showing serious limitations with the explosive progress in science and technology. It is clear that without a good dose of investment in quality education, it would be difficult to sustain growth with employment essential for poverty reduction.

In addition, education of the right quality and quantity is expected to catalyze skill sets, technology and innovation in the service of development and in the process of reducing poverty. But it has failed to do so in Nigeria because of constraints facing the educational sector. For instance, the attention given to educational sector by the governments (federal, state and local) is relatively low in terms of investment in educational sector. Nigeria has one of the lowest expenditure commitments to education in Africa and by implication in the world. The country spent under 1% of her GDP on education in the 1980s and most of the 1990 while her educational expenditure-budget ratio averaged about 9.5% between 1997 and 2006. Compare this to Ghana's 4% of GDP and 24% of the budget or Malaysia's 5% of GDP and 20% of the budget (Umo, 2012).

Supporting the above, Abayomi, (2012), Ojewumi and Oladimeji (2016) submitted that Nigeria spent an insignificant proportion of financial resources on education. Education budget as a percentage of total national budgets were 8.43% in 2012 and 8.67% in 2013 which is below United Nations Educational, Scientific and Cultural Organization's- UNESCO's recommendation of 26 per cent of the country's annual budget allocate to educational sector and those of other developing countries including South Africa, Ghana, Cote d'Ivoire, Kenya and Morocco which had 25.8%, 31%, 30%, 23% and 17.7% respectively for their annual budget for education (Ojewumi and Oladimeji 2016).

Another constraint facing the educational sector as identified by Umo (2012) is the explosive enrolment growth. With an enrolment of about 35 million students (in 2003), Nigeria has the highest concentration of students in the school enrolment in Africa. This is made up of about 26 million at the primary level, 7 million at the secondary level and about 1.5 million at tertiary level (Umo, 2012). The educational sector also faces an increasing deficit (i.e., there is a funding gap in the educational sector) when compared with the country's population, demographic structure and the increasing number of schools. Hence, government's approach or policy aimed at empowering the public with quality skills and knowledge needed to produce goods and services have not receives sufficient or enough attention. Although the quantification of the quality aspect of educational attainment is tricky, some proxies can shed valid light on this problem. These proxies include overcrowding in classrooms from primary to universities. The students-teacher ratio remains very high at the primary and secondary schools (far above 40:1) and in the universities (far above United Nations Educational, Scientific and Cultural Organization-UNESCO's 8:1) and available academic staff especially in the university subsector is grossly inadequate. The consequences of inadequate funding of educational sector cannot be over emphasized. Strictly speaking, the inadequate funding of education sector which reflects in the area of poor state of the infrastructural facilities, irregularities of teachers' remuneration, inadequate staffing, poor salaries to teachers, etc. has resulted to intermittent strikes by some unions including the Academic Staff Union of Universities (ASUU), Academic Staff Union of Polytechnics (ASUP) and Non- Academic Staff Union of Universities.

This scenario has the ability to increase the rate of illiteracy in the country, reduce the marginal productivity of the workers (especially unskilled workers) and can also lead to low real income, low savings, low investment and as a result low rate of capital formation and this is in tandem with the vicious circle theory which attempt to explain underdevelopment of the LDCs by the existence of a particular system of mutual relationship of some limiting factors which do not just exist but are related in such a way that breaking away is difficult, if not impossible. Therefore, to break out of the vicious circle government must take investment in the educational sector seriously. Because education impacts skills and competencies that is central to human development and enhanced worth of life, transporting wide variety benefits to both individuals and societies. Also, investing in education produces exceptionally high social and economic returns.

Furthermore, a lot of empirical studies have been carried out on the relationship between government education expenditure and economic growth in Nigeria. But the results are conflicting. For instance, while the studies of Lawal and Wahab (2011), Chude and Chude (2013) as well as Sefa, Siew and Mehmet (2015) indicated that expenditure on education has a positive relationship with economic growth in Nigeria. The study of Abu and Abdullahi (2010) revealed that government expenditure on education has negative effect on economic growth. Therefore, difference in opinion and empirical findings on the impact government education expenditure on economic growth in Nigeria is of serious concern and the above state of affairs raised a pertinent question: what is the relationship between government education expenditure and economic growth in Nigeria? An answer to this question is the major concern of this paper because in related terms, similar studies have lost touch on current realities of public expenditure and economic growth in Nigeria. Strictly speaking, this paper stands out to examine the impact of recurrent and capital public education expenditure on economic growth in Nigeria between 1980 and 2015. Also, evaluate the impact of gross capital formation on economic growth in Nigeria. The paper is separated into five-sections, namely, introduction, literature review, methodology, results and discussion; and conclusion and recommendations.

II. LITERATURE REVIEW

Theoretical Framework

Attempts to examine the association between public expenditure and economic growth have resulted in a number of theories and general statements on the subject, which some are reviewed hereunder.

The Wagner's Law-Theory of Increasing Activities of State

This law is named after the German economist Aldolph Wagner (1835-1917). Writing in the 1880's Wagner noted that there are inherent tendencies for the activities governments (for instance, in Nigeria we have the federal, state and local governments) to continually increase, over time, both intensively and extensively. These increases in state activities necessitate increase in government expenditure. In the light of the above, a functional relationship was postulated to exist between the growth rates recorded by an economy and the growth rates of activities performed by government to such an extent that the government sector grows faster than the general economy. That is, that there is a long run tendency for government expenditure to rise as per capita income increases. He observed a tendency for government expenditure to increase directly with the level of industrial output and therefore called for increased allowance for "social consideration" in the conduct of industry with anticipation of continuous expansion of the public sector. Wagner explained the development of public expenditure in its various categories such as expenditure on law and other (police services), justice, education, health and welfare services, recreation and culture, information, among others to the development of the economy and its derivatives, also relevant are the changes in these expenditure categories mirrored by their income elasticity's of demand. Wagner and Musgrave have shown these services are income elasticity. That is, public expenditure revealed that changes in the income elasticity of demand for public goods in the ranges of per capita income. They submitted that at when the level of per capita income is low, demand for public services tends to be very low, because such income is committed to satisfying main needs and that when per capita income starts to rise, the demand for services supplied by the public sector such as education, health, and transport starts to rise, thereby forcing government to increase expenditure on them. While, when the level of per capita income is high, the rate of public sector growth tends to fall because the more basic wants are satisfied. As reported by Ezirim (2005) "this theory, economic growth as reflected in real per capita income growth, urbanization, and increased enlightenment on the part of the electorate, naturally results in enlargement of the public sector. Logically, therefore, reduction in public sector growth would need a decrease of economic growth". Therefore, an increased in the activity of government and corresponding increase in government expenditure is an inevitable consequence of growth of the economy. Wagner (1883) stressed on the growth of the economy as the fundamental determinant of growth of the public sector. As noted by Ezirim (2005), future expectations of concerted development of modern industrial economy would draw out rising political anxiety for societal development and/or fairness will lead to a rise social thought in the behaviour of industry. Thus, it is anticipated that a nonstop expansion of the government sector and its expenditure would occur.

Wiseman-Peacock Hypothesis

Another explanation on the growth of public expenditure was advance by Jack Wiseman and T. Peacock (1961) resulting from their study of public expenditure in the United Kingdom for the period 1890-1955. They argued that public expenditure does not increase in smooth and continuous manner, but in jerks or stepwise fashion, favoring a post-ante analysis of direction of causality on the budgets of government, they submitted that at a number of times some social or additional instability happens making the call for public expenditure to be increased

which the current public revenue will not be enough to meet. The effect of each social disturbance or crisis is to shift the electorate's perception of tolerable of taxation to new heights with willingness to tolerable greater tax burden, which finances an expanded scope of government. A process that stabilizes both government revenue and expenditure at new and higher levels after each social disturbance or crisis with the displacement and inspection effects as link variable. So that, major crisis leads to an expansion of public sector relative to the economy, with concentration effect, which dualistic. However, Ezirim (2005) submitted that latter in the study period, and up to the time of Wiseman-Peacock study in 1961, the pressure increased and caused an upsurge in public expenditure in such a way that the resulting effect was the apparent exposure of the inadequacy of the present revenue to every economic watch and analysis. The development was a kind of revenue-expenditure spiral, which, in turn, affected economic activities in a country. They observed that governments like to spend money, while citizens do not like to pay taxes, and concluded that government needs to pay more attention to the wishes of their citizens. In their presentation, the individual voter is conceived as a 'free rider' who likes to enjoy the benefits of public goods and services without willing to pay for them through taxes. Consequently, they believe the government is mindful of the electorate's reaction to the tax implications of the expenditure side of the budget consequently, they believed that there is some tolerable level of taxation, which acts as a constraint on government behavior. However, as the economy grows, tax revenue also grows at constant rate; thereby enable public expenditure to grow proportionally with GNP (Agiobenebo, 2003). According to their contention, earlier in the period under study, revenue constraint exerted a domineering and restraining influence on public expenditure expansion, which was caused, in part, by insufficient pressure for public expenditure.

The Keynesian Theory

John M. Keynes (1936), a British economist and the father of macroeconomics argued that public expenditure is a fundamental determinant of economic growth. Keynes theory made it clear that fiscal policy instrument (i.e., government expenditure) is an important tool for achieving short-term stability and superior long run growth rate. To achieve stability in the economy, this theory prescribes government interventions in the economy through economic policy specifically fiscal policy. From the Keynesian idea, public expenditure will contribute positively to economic growth. Keynes argued that there is need for government to intervene in the economy because government could alter economic downturns by borrowing money from the private sector of the economy and then returning the money to the private sector through its various spending programmes. In addition, government capital and recurrent expenditure in the building of quality class rooms, laboratories, purchase of teaching and learning aids including computers and payment of salary will have multiplier effect on the economy. Expenditure in education will improve productivity and development by raising the quality of the labour force. It will also help in creating a body of educated leaders in both the private and public sectors of the economy to plan and manage the economy.

Rostow-Musgrave Theory of Public Expenditure Growth

Rostow presented a political theory of the stages of growth and the role of public finance in the process, whereas Musgrave (1969, 1971 and 1974) provided a macroeconomic viewpoint of public expenditure policy for industrialization and development. According to this theory, in the early stages of economic growth and development, investment made by public sector as a amount of total investment is found to be high. That is, Rostow and Musgrave, argued submitted that the rate of growth of public expenditure will be very high during the early stages of economic development. The public sector therefore is seen to provide a social

overhead capital in the form of expenditure on education, health, nutrition, roads, electricity, water supply, etc. this public investment, it is argued is necessary to gear up the economy into the middle stages of socio-economic development (i.e., social overhead capital provided by the public sector is necessary to launch the economy from the traditional stage to the take off stage of economic development). Rostow argued that once the economy reaches the mature stage, the mix of public expenditure will shift from expenditures on infrastructures to increasing expenditure on education, health and welfare services. This theory presented approaches to the role of public sector.

The Endogenous Growth Theory

Regarding the endogenous growth theory, Chude and Chude (2013) submitted that the major improvement in the endogenous growth theory over the previous models is that it looks at the determinants of technology. That is, it explicitly tries to model technology rather than assuming it to be exogenous. Momentously, it is a statistical explanation of technological improvement that incorporated a new idea of human capital, knowledge and skills that enable workers to be more productive. More often than not, economic growth comes from technological progress, which is fundamentally the ability of economic agents to utilize their productive resources more effectively over time through the process of learning. This is because human capital development has a high rates or increasing rates of return. Therefore, the rate of growth depends to a large extent on what (the type of capital) a country invests in. Thus, to achieve economic growth, public expenditure in human capital development especially expenditure on education must be increased. At the same time, the theory predicts positive externalities and spillover effects from development of a high valued-added knowledge economy which is able to develop and maintain a competitive advantage in growth industries in the overall economy.

Empirical Literature

Because of the importance of this topic, a lot of research works have been carried out on it. For instance, Gylych, Modupe and Semiha (2016) analyzed the impact of education on economic growth of Nigeria using ordinary test squares (OLS) to determine the relationship between education as human capital and Real Gross Domestic Product. The study discovered statistically significant relationship between GDP and other variables (capital expenditure on education, recurrent expenditure on education, primary school enrolment and secondary school enrolment) used in the study with the exception of primary school enrolment (PRYE). Lingaraj, Pradeep and Kalandi (2016) investigated the dynamics of expenditure on education and economic growth in selected 14 major Asian countries by using balanced panel data from 1973 to 2012. The co-integration result states the existence of long-run equilibrium relationships between expenditure on education and economic growth in all the countries. The results also revealed a positive and statistical significant impact of education expenditure on economic development of all the 14 Asian countries. In addition, the panel vector error correction presents unidirectional Granger causality running from economic growth to expenditure on education both in the short and in the long-run. But, expenditure on education only Granger causes economic growth in long-run in all the countries. The result also showed a positive impact of educational expenditure on economic growth. The study argued that education sector is one of the important ingredients of economic growth in all 14 Major Asian countries. A good share of governments' expenditure should be made on educational sector by enhancing various basic, senior and technical educations in the respective nations to make available the skilled man power for the long-term economic growth and development. Ojewumi and Oladimeji (2016) empirically examined the effect of government funding on the growth of education in Nigeria. In the study, public expenditure on education was

classified into two categories (recurrent and capital expenditure). The data used spanned from 1981 to 2013 and were secondary in nature. The data were obtained mostly from the publications of World Bank, Central bank of Nigeria and National Bureau of Statistics. OLS econometrics technique was used to analyze the data. The major finding showed that the impact of both capital and recurrent expenditure on educational growth were negative in Nigeria for the study period. The study recommended that the high level of corruption prevalent in the educational sector should be checked to ensure that funds meant for education especially capital expenditure in the sector are judiciously appropriated. Government at different levels in Nigeria should also increase both capital and recurrent expenditures to boost educational sector in Nigeria up to the United Nations' recommendation.

Muhammad and Benedict (2015) analyzed empirically the impact of education expenditure on economic growth in Nigeria over the period of 1981-2010. Co-integration and Granger causality tests were used in order to analyze the causal nexus between education expenditure and economic growth. They found that there is Co-integration between real growth rate of gross domestic product, total government expenditure on education, recurrent expenditure on education and Primary school enrolment. The result also revealed that there is no causality between real growth rate of gross domestic product (RGDPG) and Total government expenditure on education (TGVTEE) but there is bi-directional causality between recurrent expenditure on education (REDEXP) and total government expenditure on education (TGVTEE). Primary school enrollment (PRYSE) does not Granger cause Total government expenditure on education (TGVTEE), the latter does Granger cause the former. No causality between recurrent expenditure on education (REDEXP) and real growth rate of gross domestic product (RGDPG) and also no causality between Primary school enrolment (PRYSE) and Real Growth Rate of gross domestic product and consequently the study recommends that the government should improve manpower, the quality of life of ordinary Nigerians and teacher education should be given desired attention in order to check the falling standard of education in the country.

Harpaljit, Baharom, and Muzafar (2014) examined the relationship between education expenditure and economic growth in China and India by employing annual data from 1970 to 2005. This study utilized multi econometric tools including Co-integration test, OLS method, VECM. The result revealed that there is a long run relationship between income level Gross Domestic Product per capita and education expenditure in both China and India. Meanwhile, a unidirectional causal relationship for both countries, running from income level to education expenditure for China, while for India, education expenditure Granger causes income level.

Urhie (2014) examined the effects of the components of public education expenditure on both education attainment and economic growth in Nigeria from 1970 to 2010. The study employed Two Stage Least Squares estimation technique to examine the hypotheses. The outcome revealed that both recurrent and capital expenditures on education have different effects on education attainment and economic growth. That is, public education expenditure has both direct and indirect effects on economic growth. Recurrent expenditure had a negative impact on education, while capital expenditure was found to have appositive impact. On the contrary, recurrent education expenditure had a positive and significant impact on economic growth while capital expenditure had a negative impact.

Chude and Chude (2013) investigated the effects of public expenditure in education on economic growth in Nigeria over a period from 1977 to 2012, with particular focus on disaggregated and sectorial expenditures analysis. Error Correction Model (ECM) was used. The outcome revealed that in the long run, total expenditure on education is statistically significant and has a positive relationship on economic growth in Nigeria.

Abdul (2013) examined Education and Economic Growth in Malaysia: Because Human capital or education has become one of the central issues in the study of economic development. The researcher argued that the existing literature suggested that human capital, especially education, is an important component of economic growth. Therefore, the researcher explored the issues of Malaysia education data. Despite some issues and data quality problems, Malaysian education datasets are highly correlated for both secondary and tertiary education data. The researcher also tests the effect of different datasets on education and growth relationship. The results were very similar suggesting that Malaysian education datasets are reliable. The results were robust regardless of education measure. All datasets lead to similar conclusion; education is negatively related to economic growth.

Alvina and Muhammad (2013) examined the long-run relationship between public education expenditures and economic growth. The study employed heterogeneous panel data analysis. Panel unit root tests are applied for checking stationarity. The single-equation approach of panel co-integration (Kao, 1999); Pedroni's Residual-Based Panel Co-integration Test (1997; 1999) was applied to determine the existence of long-run relationship between public education expenditures and gross domestic production. Lastly, panel fully modified OLS outcome revealed that the impact of public education expenditures on economic growth is greater in the case of developing countries as compare to the developed countries, which verified the "catching-up effect" in developing countries.

Mehmet and Sevgi (2013) examined the relationship between education expenses and economic growth in Turkey. The study used econometric method as the main analytical tool. The outcome revealed a positive relationship between education expenses and economic growth in the Turkish economy for the period 1970-2012. Meaning that, education expenses in Turkey had a positive effect on economic growth.

Srinivasan (2013) examined the causal nexus between public expenditure and economic growth in India using co-integration approach and error correction model from 1973 to 2012. The Co-integration test result revealed the existence of a long-run equilibrium relationship between public expenditure and economic growth. The error-correction model estimate revealed a one-way causality which runs from economic growth to public expenditure in the short-run and long-run.

Mohd and Fidlizan (2012) focused on the long-run relationship and causality between government expenditure in education and economic growth in Malaysian economy from 1970 to 2010. The study used Vector Auto Regression (VAR). The outcome showed that economic growth positively Co-integrated with selected variables namely fixed capital formation (CAP), labour force participation (LAB) and government expenditure on education (EDU). The Granger causality relationship, it was discovered that the economic growth is a short term Granger cause for education variable and vice versa. Moreover, the study proved that human capital such as education variable plays an important role in influencing economic growth.

Anthonia, (2012) in the quest to finding plausible solutions to the problems faced by the country, examined Education and Economic Growth in Nigeria: A Comparative Analytical Approach. Specifically, the researcher examined the impact of education on economic growth using primary and secondary annual data ranging from 1985 to 2007. The result showed that only recurrent expenditure has significant effects on economic growth as the academic qualifications of teachers also have significant impact on students' academic performance.

Lawal and Wahab (2011) examined the relation between education expenditure and economic growth in Nigeria. Time series data were collected from 1980 to 2008, and ordinary least squares technique was used to estimate the model. It was discovered that education investments have direct and significant impact on economic growth in Nigeria. It

was therefore recommended that government at all levels should increase their funding on different segments of education in the country.

Dauda (2010) examined investment in education and economic growth in Nigeria. The study used annual time series from 1977 to 2007 and employed Johansen co-integration techniques and error correction methodology. The outcome showed that gross fixed capital formation and educational capital have positive and significant effect on economic growth while labour force has positive and insignificant effect on economic growth.

Adetomobi and Ayanwale (2006) examined the link between education expenditure trend, higher education student enrolment and unemployment and economic growth in Nigeria. The results showed that government funding was unstable and unpredictable, capital and recurrent funding since 1970 are only a very small fraction of the nation's budget, total enrolment contrasts sharply with level of employment and the proportion of GDP that goes to education is still low.

Musibau and Rasak (2005) investigated the long run relationship between education and economic growth in Nigeria between 1970 and 2003 through the application of Johansen Co-integration technique and Vector Error Correction Methodology. It examined two different channels through which human capital can affect long run economic growth in Nigeria. The first channel is when human capital is a direct input in the production function and the second channel is when the human capital affects the technology parameter. The Johansen Co-integration result revealed a long run relationship between education and economic growth. Educated labour force shows to significantly influence economic growth both as a factor in the production function and through total factor productivity.

Babatunde and Adefabi (2005) investigated the long run relationship between education and economic growth in Nigeria between 1970 and 2003 through the application of Johansen co-integration technique and vector error correction methodology. The Johansen co-integration results revealed a long run relationship between education and economic growth.

Gylfason and Zoega (2003) examined the impact of gross secondary-school enrolment and public expenditure on education relative to national income on economic growth. The study found that education is directly related to income equality. It also found that more and better education appears to encourage economic growth directly as well as indirectly through increased social equality and cohesion.

III. METHODOLOGY

The study is analytical in nature because of the kind of data used. The econometric methods of Co-integration/Error Correction Mechanism and Granger causality test were employed to analyze our data. While the unit root test helps to ascertain stationarity of the variables, the co-integration measures the long run relationship among the variables and Granger causality test shows the direction of effect between two time series. The model for this study is specified in line with the conceptual, theoretical and empirical literature reviewed. Specifically, this work adopted the model of Mohd and Fidlizan (2012) on government expenditure in education and economic growth in Malaysian economy from 1970 to 2010 because the study proved that human capital such as education variable plays an important role in influencing economic growth of a country. This was done to actually showcase the impact of public education expenditure on economic growth in Nigeria from 1980 to 2015. The model for the study and the apriori, expectations is specified as:

$$RGDP_t = \alpha_0 + \alpha_1 GCEE_t + \alpha_2 GREE_t + \alpha_3 GCF_t + \mu_t \dots\dots(1)$$

Where; $RGDP_t$ = Real Gross Domestic Product, $GCEE_t$ = Government Capital Education Expenditure, $GREE_t$ = Government Recurrent Education Expenditure and GCF_t = Gross Capital Formation. α_0 = Constant term, α_1 , α_2 and α_3 are Regression Coefficients of

independent variables and μ_t = Stochastic Error Term. On the apriori, we expect α_1, α_2 and $\alpha_3 > 0$.

Unit root test precedes Co-integration, ECM and Granger tests in order to test for stationarity of the variables. The unit root test used in this work is the Augmented Dickey-Fuller (ADF). The general form of ADF is estimated by the following regression

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum \alpha_i \Delta y_i + \delta_t + U_t \dots\dots\dots(2)$$

Where: y is a time series, t is a linear time trend, Δ represents first difference operator, α_0 is a constant, n is the optimum number of lags in the independent variables and U is random error term. Co-Integration is an econometric technique used for testing the correlation between non-stationary time series data. Two variables are said to be Co-Integrated if they have a long run or equilibrium relationship between them (Gujarati, 2007). Hence, co-integration technique has been developed to address the problem of spurious correlation often associated with some time series data. This study used Johansen co-integration procedure. Moreover, the basic argument of Johansen's procedure is that the rank of matrix of variables can be used to determine whether or not the two variables are co-integrated. A lack of co-integration suggests that such variables have no long-run relationship. According to Johansen (1998), the general form of co-integration is given by:

$$y_t = \mu + \Delta_1 y_{t-1} + \dots + \Delta p y_{t-p} + U_t \dots\dots\dots(3)$$

Where: Y_t is an $n \times 1$ vector of variables that are integrated of order commonly denoted (1) and U_t is an $n \times 1$ vector of innovations. However, an extension of this in the co-integration technique is the error correction mechanism (ECM) (Engle and Granger, 1987). Engle and Granger have recognized that co-integration is a sufficient condition for an error correction model formulation. Granger causality test shows the direction of effect between two time series. Such effect could be bilateral, bidirectional, unidirectional and independence causality. The general form of Granger causality is estimated by considering two variables Y and X in the following regressions:

$$Y_t = \sum_{t=1}^n \Psi_1 X_{t-1} + \sum_{t=1}^n \Omega_1 Y_{t-1} + \varepsilon_{1t} \quad (i)$$

$$X_t = \sum_{t=1}^n \omega_1 Y_{t-1} + \sum_{t=1}^n \theta_1 Y_{t-1} + \varepsilon_{2t} \quad (ii)$$

Where it is assumed that the disturbances ε_{1t} and ε_{2t} are uncorrelated, the two variables case is called bilateral causality. Also, from the Y and X in the equations, unidirectional causality from Y to X exists if the set of lagged X coefficients in (i) is not statistically different from zero (i.e., $\sum \omega_1 \neq 0$) and the set of the lagged Y coefficients in (sii) is statistically different from zero (i.e., $\sum \theta_1 \neq 0$). Data for the study were sourced from CBN Statistical Bulletin.

IV. RESULTS AND DISCUSSION

Unit Root Test (Test for Stationarity)

To stay away from spurious regressions which could arise as a result of carrying out regressions on time series data, we first subject the data to stationarity test by using the Augmented Dickey Fuller (ADF) tests.

Table I: UNIT ROOT TEST AT LEVEL

Variables	ADF Test	Critical Values			Order of integration
		critical value 1%	critical value 5%	Critical value 10%	
RGDP	2.275536	-3.639407	-2.951125	-2.614300	Not Stationary
GREE	-0.482399	-3.639407	-2.951125	-2.614300	Not Stationary
GCEE	-0.446252	-3.632900	-2.948404	-2.612874	Not Stationary
GCF	-0.396019	-3.646342	-2.954021	-2.615817	Not Stationary

Note: RGDP, GREE, GCEE and GCF as earlier defined.

Source: Computed Result Using (E-Views 8)

The stationarity test result presented in Table one shows that at various levels of significance (1%, 5% and 10%), the variables were not stationary at level. In line with Granger and Newbold (1974), the variables were differenced. See table two below.

Table II: UNIT ROOT TEST AT FIRST DIFFERENCE

Variables	ADF Test	Critical Values			Order of integration
		critical value 1%	critical value 5%	Critical value 10%	
RGDP	-6.374925	-3.639407	-2.951125	-2.614300	1(1)
GREE	-9.762383	-3.639407	-2.951125	-2.614300	1(1)
GCEE	-6.788359	-3.639407	-2.951125	-2.614300	1(1)
GCF	-4.110968	-3.646342	-2.954021	-2.615817	1(1)

Note: RGDP, GREE, GCEE and GCF as earlier defined.

Source: Computed Result Using (E-Views 8)

The stationarity test result presented in Table two shows that at various levels of significance (1%, 5% and 10%), the variables were stationary. Specifically, all the variables were stationary at first difference (integrated of order one). Hence, the entire variables in this study are stationary. The results of the variables being stationary at various levels (at first difference) makes it inappropriate for the application of the Ordinary Least Square (OLS) method, therefore the test to determine the long run relationship can be achieved with the aid of the Johansen Co-integration test which is presented in Table three.

Test for Co-integration

Co-integration is conducted based on the test proposed by Johansen. According to Iyoha and Ekanem, (2002) co-integration deals with the methodology of modeling non-stationary time sequence variables. For fact about the Johansen co-integration result, see the Table three.

Table III: Johansen Test for Co-integration

Eigen value	Trace Statistic	5% critical value	Prob. **	Hypothesis of CE(s)
0.639035	68.43198	47.85613	0.0002	None *
0.411095	33.78686	29.79707	0.0165	At most 1 *
0.362673	15.78415	15.49471	0.0452	At most 2 *
0.013673	0.468083	3.841466	0.4939	At most 3

Source: Computed Result Using (E-Views 8)

The Table III indicates that there are three co- integrating equations because three of the Trace Statistic(s) are larger than critical value at 5%. Therefore, there is a long-run

relationship among RGDP, GREE, GCEE and GCF which prevent them from wandering apart without bound. Given that there are three co-integrating equations, the requirement for fitting in an error correction model is satisfied. The Error Correction Mechanism (ECM) intends to validate the presence of long-run relationship and incorporate the short-run dynamics into the long-run equilibrium relationship.

Table IV: Parsimonious Error Correction Mechanism

Dependent Variable: DLOG(RGDP)

Method: Least Squares

Date: 06/11/17 Time: 21:30

Sample (adjusted): 1984 2015

Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.043373	0.011869	3.654270	0.0013
DLOG(RGDP(-1))	0.323796	0.155809	2.078165	0.0490
DLOG(RGDP(-2))	0.054369	0.131039	0.414907	0.6821
DLOG(RGDP(-3))	-0.040834	0.021422	-1.906182	0.0692
DLOG(GREE)	0.049768	0.016150	3.081642	0.0053
DLOG(GCEE)	-0.034757	0.012175	-2.854744	0.0090
DLOG(GCEE(-1))	-0.042272	0.011265	-3.752659	0.0010
DLOG(GCF(-1))	-0.024738	0.029293	-0.844496	0.4071
ECM(-1)	-0.075927	0.023426	-3.241103	0.0036
R-squared	0.648868	Mean dependent var	0.050884	
Adjusted R-squared	0.526735	S.D. dependent var	0.045462	
S.E. of regression	0.031275	Akaike info criterion	-3.859719	
Sum squared resid	0.022497	Schwarz criterion	-3.447481	
Log likelihood	70.75550	Hannan-Quinn criter.	-3.723073	
F-statistic	5.312802	Durbin-Watson stat	2.067121	
Prob(F-statistic)	0.000753			

Table IV indicates that the dynamic model is a good fit. The reason is that the difference in our predictors account for 65 percent of the overall disparity in our model looking at the R^2 . Put differently, the R^2 value of 0.65 indicates that the variation in economic growth (proxied RGDP) explained by government recurrent education expenditure (GREE), government capital education expenditure (GCEE) and gross capital formation (GCF) is 65 percent. Therefore, the explanatory power of the model estimated is 65 percent. The Durbin Watson (DW) value of 2.067121 which is approximately 2.07, suggests no autocorrelation. Moreover, an important characteristic to be noticed in Table IV is the coefficient of the parameter of the ECM. The coefficient of the ECM appears with the right sign (i.e., negative) and statistically significant. This shows that disequilibria in the RGDP in the previous year were corrected for in the current year. It therefore, follows that the ECM could rightly correct any deviations from short run to long-run equilibrium relationship between RGDP and the explanatory variables. However, the coefficient of the current form of government recurrent education expenditure (GREE) was rightly signed (i.e., positive) and this conforms to apriori expectation implying a positive relationship between government recurrent education expenditure (GREE) and economic growth. This means that a percentage increase in government recurrent education expenditure (GREE) will lead to about ₦0.049768 increases in economic growth. Moreover, the absolute value of the t-statistic for the slope coefficient is

statistically significant. The outcome also reveals a significant relationship between government recurrent education expenditure (GREE) and economic growth. This means that government recurrent education expenditure (GREE) significantly impacted on economic growth during the period of study. Put differently, the implication of this result is that government recurrent education expenditure (GREE) variable has the ability to increase economic growth of Nigeria.

This is consistent with earlier studies including this is consistent with earlier studies including Anthonia (2012), Japheth, Moses and Cyprian (2014), Gylych, Modupe and Semiha (2016) who reported a significant relationship between government recurrent education expenditure (GREE) and economic growth (RGDP) in Nigeria. In addition, the coefficient of government capital education expenditure (GCEE) was wrongly signed (i.e., negative) instead of positive; implying a negative relationship between government capital education expenditure (GCEE) and economic growth (RGDP) during the period of study (i.e., a unit increase in government capital education expenditure will decrease economic growth during the period of study). But this does not conform to the apriori expectation. The wrong sign displayed by government capital education expenditure may be due to high level of mismanagement of national resources, misappropriation of funds and wasteful spending in Nigeria. Meanwhile, government capital education expenditure (GCEE) is statistically significant. Thus, we accept that there is a significant relationship between government capital education expenditure (GCEE) and economic growth (RGDP) in Nigeria. The significant relationship between government capital education expenditure (GCEE) and economic growth (RGDP) reflects the potency of the variable (i.e., government capital education expenditure) as an important conduct in transmitting fiscal policy impulses to the aggregate economy thereby increasing economic growth in Nigeria. This is consistent with earlier studies including Gylych, Modupe and Semiha (2016) who reported the existence of a significant relationship between government capital education expenditure (GCEE) and economic growth (RGDP) in Nigeria. At the same time, the coefficient of the lag one form of gross capital formation (GCF) was wrongly signed (i.e., negative) instead of positive. Meaning that, an increase in gross capital formation (GCF) will decrease economic growth by 0.024738. Also, gross capital formation (GCF) is not statistically significant. Thus, we accept that there is no significant relationship between gross capital formation (GCF) and economic growth (RGDP) in Nigeria. The insignificant relationship between gross capital formation (GCF) and economic growth (RGDP) reflects the ineffectiveness of the variable (i.e., gross capital formation) to transmit impulses to the economy thereby increasing economic growth.

Table V: Pairwise Granger Causality Test Result

Null Hypothesis:	Obs	F-Statistic	Prob.
GREE does not Granger Cause RGDP	34	7.13509	0.0030
RGDP does not Granger Cause GREE		0.02845	0.9720
GCEE does not Granger Cause RGDP	34	6.25853	0.0055
RGDP does not Granger Cause GCEE		0.93364	0.4046
GCF does not Granger Cause RGDP	34	8.87998	0.0010
RGDP does not Granger Cause GCF		0.81130	0.4541

Note: RGDP, GREE, GCEE and GCF as earlier defined.

Source: Computed Result Using (E-Views 8)

In this study, Granger causality test was conducted to find out the direction of causality between government education expenditure and economic growth in Nigeria. The results of Table V showed that there was unidirectional causality among the variables; GREE & RGDP, GCEE & RGDP as well as GCF & RGDP. The implication of this result is that historical variation in GREE, GCEE and GCF can be used to predict the future variation in economic growth. It follows therefore that the performance of GREE, GCEE and GCF influences to a large extent economic growth in Nigeria during the period of study. This also reveals that the variables in this study are necessary condition for achieving economic growth. Thus, the alternative hypothesis is upheld this is because GREE, GCEE and GCF granger cause economic growth.

V. CONCLUSION AND RECOMMENDATIONS

The study examines public education expenditure and economic growth in Nigeria. Therefore, the broad objective of the study is to examine the impact of public education expenditure on economic growth in Nigeria from 1980 to 2015. The literature reviewed in this paper explain the role of education as a tool for the provision of man power for the economy, its social objective function and the cost- benefit of education as a major input to economic expansion and growth. However, the study adopted the co-integration/error correction model and Granger causality test on time series data from 1980 to 2015. Nevertheless, the study regressed government recurrent education expenditure, government capital education expenditure and gross capital formation on real gross domestic product. The regression result reveals that about 65 percent systematic variation in real gross domestic product is explained by the three explanatory variables such as: government capital education expenditure, government recurrent education expenditure and gross capital formation. The F-statistic of 5.312802 is also significant. The result reveals that there is a significant relationship between government recurrent education expenditure and economic growth in Nigeria, there is a significant relationship between government capital education expenditure and economic growth in Nigeria and there is no significant relationship between gross capital formation and economic growth in Nigeria. The result also reveals that there is a long-run relationship among RGDP, GREE, GCEE and GCF. At the same time, there is unidirectional causality among the variables; GREE & RGDP, GCEE & RGDP as well as GCF & RGDP. In the light of the above, it is obvious that public education expenditure as a fiscal policy tool of government if properly managed can be effective in increasing economic growth in Nigeria. On the basis of the findings, the study put forward recommendations in the midst of others towards enhancing the impact of public education expenditure on economic growth in Nigeria. Government should carry out capital projects in the educational sector including building class rooms, laboratories, purchase of teaching and learning aids including computers because these facilities will have multiplier effect on the economy. Government should begin implementation of the United Nations Educational, Scientific and Cultural Organization's recommendation of 26 per cent of the country's annual budget allocate to educational sector. Also, in order to increase the morale of our teaching and non-teaching workforce for efficiency, a good salary scheme and incentives should be implemented by the government. Government should avoid mismanagement of national resources, misappropriation of funds and wasteful spending.

REFERENCES

- Abayomi, A. (2012). *Education budget and its implications (Analysis)*. Vanguard Newspaper, Retrieved: <http://www.vanguardngr.com/> 31stAugust, 2016.
- Abdul, J. A.(2013). Education and Economic Growth in Malaysia: The Issues of Education Data *International Conference on Economics and Business Research (ICEBR 2013)*

- Abu, N. & Abdulahi, U. (2010). Government Expenditure and Economic Growth in Nigeria, 1970-2008: A Disaggregated Analysis. *Business and Economic Journal*, 4(3): 237-330. Available at: <http://astoujournals.com>.
- Agiobenebo T.J. (2003). *Public Sector Economics: Theories, Issues and Applications*. LIMA COMPUTERS, Port Harcourt.
- Alvina S. I. and Muhammad W.S. (2013). Does Public Education Expenditure Cause Economic Growth? Comparison of Developed and Developing Countries Pakistan *Journal of Commerce and Social Sciences* 2013, 7 (1), 174-183.
- Anthonia T. O. (2012). Education and Economic Growth in Nigeria: A Comparative Analytical Approach *European Journal of Globalization and Development Research*, 5 (1)
- Babatunde, M.A & R.A. Adefabi (2005). Long Run between Education and Economic Growth in Nigeria: Evidence from the Johansen's Co-integration Approach. *Paper presented at the Regional Conference on Education in West Africa: Constraints and Opportunities, Dakar, Senegal, November 1st -2nd, 2005, Cornell University/ CREA/ Ministerede l'Education du Senegal.*
- Chude, N. P. and Chude, D. I. (2013). Impact of Government Expenditure on Economic Growth in Nigeria. *International Journal of Business and Management Review Vol.1, No.4, pp.64-71, December 2013 Published by European Centre for Research Training and Development UK (www.ea-journals.org)*
- Dauda, R.O. (2010). Investment in Education and Economic Growth in Nigeria: Empirical Evidence. *International Research Journal of Finance and Economic Issue* 55:158-169.
- Ezirim C.B. (2005). *Finance Dynamics: Principles, Techniques and Application 3rd Edition* Markowitz Centre for Research and Development University of Port Harcourt.
- Gylfason, T. & Zoega, T. (2003). *Education, Social Equality and Economic Growth: A View of the Landscape. CESifo Economic Studies*, 49, 557-579.
- Gylych, J. Modupe, F. A. and Semiha, O. (2016) Education As A Key To Economic Growth And Development In Nigeria *The International Journal of Social Sciences and Humanities Invention*. 3(2), 1862-1868.
- Harpaljit, K., Baharom, A. H. and Muzafar S. H. (2014). Linkages between education expenditure and economic growth: Evidence from 'CHINDIA E3 *Journal of Business Management and Economics*. 5(5), 109-119.
- Iyoha, M. A. & Ekanem O. T. (2002). *Introductory Econometrics*. Benin City: Mareh Publishers.
- Keynes, J. M. (1936). *The General Theory of Employment, Interest and Money*. New York: Harcourt Brace. 113-115.
- Lawal, N. A. and Wahab T. I.(2011), Education and Economic Growth: The Nigerian Experience *Journal of Emerging Trends in Economics and Management Sciences (JETEMS)* 2 (3), 225-231.
- Lingaraj, M., Pradeep K. D. and Kalandi C. P. (2016). Impact of educational expenditure on economic growth in major Asian countries: Evidence from econometric analysis *Theoretical and Applied Economics Volume XXIII (2016), 2(607), Summer, 173-186.*
- Mehmet M. and Sevgi S. (2013). The effect of education expenditure on economic growth: The case of Turkey *2nd World Conference On Business, Economics And Management-WCBEM 2013*
- Mohd, Y. M. H. and Fidlizan M. (2012). Education Expenditure and Economic Growth: A Causal Analysis for Malaysia *Journal of Economics and Sustainable Development* 3, (7) www.iiste.org.

- Muhammad M. Y. and Benedict N. A. (2015). Education Expenditure and Economic Growth in Nigeria: Granger Causality analysis *Journal of Business Management And Economics*, 3(4).
- Musgrave, R.A. & Musgrave, B. (1988). *Public Finance in Theory and Practice*, New York: McGraw-Hill Book Company.
- Musibau, A. B. and Rasak A. A. (2005). Long Run Relationship between Education and Economic Growth in Nigeria: Evidence from the Johansen's Cointegration Approach *Paper presented at the Regional Conference on Education in West Africa: Constraints and Opportunities Dakar, Senegal, November 1st - 2nd, 2005. Cornell University / CREA / Ministère de l'Éducation du Sénégal.*
- Ojewumi J. S and Oladimeji W. O. (2016). Effect of Public Spending on The Growth of Educational Sector in Nigeria *JORIND 14(2)*, ISSN 1596-8303 www.transcampus.org/journal/; www.ajol.info/journals/jorind
- Srinivasan, P (2013). Causality between Public Expenditure and Economic Growth: The Indian Case. *Int. Journal of Economics and Management*, 7(2), 335 – 347.
- Umo J. U. (2012). *Economics: An African Perspective*. Millennium Text Publishers Limited Plot 6B, Block 22, Humanities Road, Unilag Estate, Magodo, Isheri Lagos Nigeria.
- Urhie E. (2014). Public Education Expenditure and Economic Growth in Nigeria: A Disaggregated Approach *Journal of Empirical Economics*, 3(6), 370-382.
- Wagner, A. (1883). *Three Extracts on Public Finance*, in R. A. Musgrave and A. T. Peacock eds 1958. *Classics in the Theory of Public Finance*, London: Macmillan.
- Wagner, A. (1958). *The Nature of Fiscal Policy*. In R.A. Musgrave, & A.T. Peacock, *Classics in the Theory of Public Finance* (pp.1-8). London: Macmillan.
- Engel, F. R and Granger, C.W.J (1987). *Co-integration and Error Correction Representations, Estimation, and Testing. Econometrics*, 53:251–276.
- Granger, C.W.J. and P. Newbold, 1973, Some comments on the evaluation of economic forecasts, *Applied Economics* 5, 35-4.