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GRANGER CAUSALITY RELATIONSHIP BETWEEN EDUCATION AND ECONOMIC GROWTH IN NIGERIA

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Abstract: **In many countries in Africa today, formal education is in a state of crisis. While curricular reform continues to serve as an ongoing source of public policy debate, Nigerian leaders are confronting increasing difficulties in allocating educational resources to meet present and future levels of demand. This research work investigates on causal relationship between education and economic growth in Nigeria. OLS method was adopted in presenting multiple linear regressions. The research found that considering the magnitude 1% increase in RGDP (proxy Economic growth) is brought about by 118% increase in gross fixed capital formation, 114% increase in total expenditure on education, 22% increase in total recurrent expenditure on education and 0.00095% increase in Total labour force. This postulates that an increase in total expenditure on education and other related variables will lead to astronomical increase in real GDP, proxy for economic development in Nigeria. The research also revealed that the resources allocated to education is still insufficient but has significant impact on economic growth. Therefore, recommendation was made that Government should as a matter of priority implement the minimum United Nations recommendation of 26 percent budgetary allocation to education. The donor agencies like the World Bank, UNDP, UNESCO, etc. should also be encouraged to inject funds into the educational sector especially, the tertiary institutions.**

Keywords: **public policy, education, economic growth, World Bank.**

1. INTRODUCTION

The world has entered the age of knowledge economy. As a matter of fact, the role of education in any economy is more crucial today than ever before because of the knowledge based globalized economy where productivity greatly depends on the quantity and quality of human resource, which itself largely depends on investment in education (Sikiru, 2011). Education and human capital development are now the pivoting tools to engender profound transformations and periods of rapid growth and development of a country (Ajetomobi & Ayanwale, 2005). There is increasing empirical evidence that education matters, not only for personal development, health status, social inclusion and labour market prospects of individual learners, but also for the broader economic performance of countries (OECD/UIS, 2003).

In recent times, the percentage of the annual federal government budget to education in Nigeria for the period of 2005-2010 was 6.3%, 7.8%, 8.7%, 13% and 18% respectively (CBN 2011), falling short of the recommended 26% by the United Nations Education Scientific and Cultural Organization (UNESCO) (Dauda, 2010). Nigeria allocated averagely less than 10% from 1985-2007, but a look at other countries shows USA spent averagely 35% of her annual budget on education while Ghana allocated annually 30% of her budget to education (Ajetomobi & Ayanwale 2005; CBN, 2000).

Nigeria's real GDP growth rate was 6.51% in 2005. This declined to 5.63% in 2006, 5.0% in 2009 and rose to 6.4% in 2007, before another fall to 6.1% in 2008 and in 2010, the economy grew at an estimated real rate of 7.98 % and 7.36 % in 2011 (CIA 2010; NBS, 2012).

Nigeria has a moderate economic growth rates records but still struggle with myriad of economic challenges. The growth records did not bear positive relation to the performance of other sectors of the economy. The question is why did the country record such growth rate figures and yet have serious socio-economic problems such as high unemployment, high poverty and illiteracy rates, dilapidated health and educational infrastructure, incessant strike action among its workforce especially in the education sector couple with high rate of drop out among school age children etc?.

In Nigeria, the decline in the quality of education at all levels has become a fact of national life. Indeed, the most significant event in the sector in the recent past has been the continuing crisis besetting the educational system. This crisis is rooted in the deteriorating conditions within the citadels of learning in respect to teaching facilities and other infrastructural facilities, the welfare of those engaged in the teaching profession and the ever increasing cost of education. This has culminated on students' unrest and industrial actions by lecturers and teachers through their respective umbrella association such as Academic Staff of Nigeria Universities (ASNU), Nigerian Union of Teacher (NUT) at the different levels of the educational system

Owing to the failure of the state and local government to fund primary and secondary education appropriately, the federal government moved to take over the responsibility of these tiers of the system at the different levels of education at the expense of higher education. Due to this shift in the government policy, the crisis in the Nigerian educational system, and their fundamental causes that is the gross under funding of the institutions, poor condition of service for teachers among other issues have continued unabated.

Summarily, the problems of this research are as follows:

i. the decline quality of education at all levels and its effects on economic growth in Nigeria

ii. Failure of the state and local government to fund the primary and secondary education appropriately.

iii. The poor condition of service for teachers, which lead to poor investment in education.

iv. Global economic crisis as it affects the rapid expansion of education system in Nigeria.

As much as this question begs for an answer, the position of empirical and theoretical studies on this problem proves more contentious. Some of the studies established a strong and positive relationship between education and economic growth (Raja, 2000; Afzal, 2012; Babatunde & Adefabi, 2005). Others, in their conclusions affirmed that the linkage between these variables is not direct due to the effects of economic and non-economic variables (Moroto, 2000). Therefore, issues such as granger causality relationship between education and economic growth in Nigeria with the relevance of the structural form of the model in the regression analysis provide the basis that this study would explore.

There is increasing empirical evidence that education matters, not only for personal development health status, social inclusion and labour market prospects of individual learners, but also for the broader economic performance of countries (OECD/UIS, 2003:2006).

Despite the importance of and need for education many low –income countries still gives it less attention and lack appropriate polices to promote educational investment. This study intends to look at investment in education and economic growth. The findings of this study would serve as a yard stick for appraising the policy shift of the government away from education funding.

Education in Nigeria is currently in crisis. The educational sector complains of under funding while the government accuses the sector of inefficient utilization of available resources. The rate of falling of educational standard at all levels of education is alarming and this calls for urgent attention. Different researches have shown a downward trend in the performances of students especially at the secondary school level, as this affects their enrolment in tertiary institutions.

The effects of the backwardness in educational standard on other sectors cannot be overemphasized which also results in low quality skilled labour and "half-baked" graduates who are relatively not employable leading to low productivity with its defects on the economic growth. Consequently, the overall effects is increasing poverty level, and crippling national economy.

Nigeria has economic problems, her poverty situation is alarming though it records an impressive rates of economic growth which grew at an average 7.6% between 2003 and 2010(World Bank 2011), but this did not leads to sustainable development (Oladoyin, 2010)

According to CIA (2010), Nigeria's real GDP growth rate was 6.51% in 2005, it declined to 5.63% in 2006, 5.0% in 2009 and rose to 6.4% in 2007, before recording another fall to 6.1% in 2008. In 2010 it stood at 8.2% (Abiola, 2012).

This study focuses on the reason why Nigeria's educational standard is falling and her economy is growing to the extent of being the largest in Africa but none of her university is among the best ten (10) even in Africa. Therefore this research work will empirically investigate the granger causality relationship between education and economic growth in Nigeria.

- The society will find this study imperative because it explains why investment in education of both the private and government yield low or no return.
- The government can now see vividly the importance of investment in education as quasi-public goods which has both direct and spillover effect on the economy and why high rate of the economy has not led to sustainable development.
- Students would have a background to take further research and understand the chronic effect of low allocation education on their ability to perform effectively in the economy.
- The education sector as a whole system would see effect of financial crisis on their products (student) for proper recommendation to the government to boost its investment in education in other to have sustainable economic growth in the country.

The country policy maker will have important information about the past planning basis and the present predicament to be able to formulate adequate policy that will drive the economy generally into maturity and become a real player in the challenging world.

2. LITRATURE REVIEW

2.1 Relationship between Education and Economic Growth:

To data, researchers have mostly found a positive relationship between enrolment rates and/or years of schooling and gross domestic product (GDP) growth in developing countries (Baldacci, Clement, Qui and Gupta, 2005). The linkage between education and economic growth are robust and suggestive.

Bratti et al (2007) estimated a model of economic growth and human capital accumulation based on a sample of countries at different stages of development. Their result revealed that the increase in the primary and secondary level of education contributes to an increase in productivity. Bakare (2006) investigated the growth implication of human capital investment In Nigeria using vector auto regressive correction mechanism. The study revealed that there is a significant functional and institutional relationship between the paradox of education and economic growth n Nigeria using the standard accounting model. The findings suggest that education has not had the expected growth impact on economic growth.

Education at all levels contributes the economic growth thought imparting general attitude and discipline and specific skills necessary for a variety of workplace. It contributes to economic growth by improving healthy reducing fertility and possible by contributing to political stability Babatunde and Adefabi (2005). The major importance of educational system to any labor market would depend majorly in it's absolutely to produce a literate disciplined flexible labor forces via high quality education. Adams Smith (1937), Marshal (1930) and Schultz (1961). Consequently with economic development new technology is applied in production which results in an increase in the demand for workers for better education. The pioneer work in this regard is the work of hicks (1988) which revealed that the growth rate of human capital which is also dependant on the amount of time allocate by individuals to acquire skills

Rebelo (1991) later examined the model by introducing physical capital accumulation function. However the model of endogenous growth by Roomer (1990) assumes that the creation of new ideas is a direct function of human capital which manifests in the forms of knowledge as a result of investment in human capital leads to growth in physical capital which in turn leads to economic growth in physical capital which turn leads to economic growth other studies that as a source of economic growth. Include Barrow and Lee (1993), Roomer (1991), Benhabib and Spiegel (1994). Some studies have examined different ways through which investment in education can affect economic growth in Nigeria.

In a recent development Gupta and chakraborty (2004) development an endogenous growth model of a dual economy where investment in education is the source of economic growth. They argued that the duality between the rich individuals exists in the mechanism of investment in education accumulation. Rich individual allocate labor time not only for their own production and knowledge accumulation but also train the poor individual. In a different dimension{bratty et all (2004)} estimate a model of economic growth and the investment in education accumulation based on a sample of countries at different stages of development. Their result revealed that an increase in the primary and secondary level of education contributes to an increase on productivity. They posit that investment in education accumulation rates are affected by demographic variables. For examples, they established that an increase in life expectancy at birth brings about an increase in secondary and tertiary education, while a decrease in juvenile dependency rate negatively affects secondary education.

Abiodun (2002) stated that education is fundamental to the process of nation building and should be given prominence in the developing efforts. Bamisaye (1987) observed that education is expected to affect social behavior of the educated person or the person being educated, such social behavior ranges from avoidance of abusive language, unrely and ethical consideration are relevant to the concept of education. Osokoya (1989) defined education as the process of cultural transmission. He used culture to embrace the people's religion commerce political organization, science and technology as well as other ideals and values that permeate a society and binding its people into a recognizable unit.

Alabi (2010) says that education can be formal, informal and non-formal. He says education is a means of achieving the nation's normal objectives.

2.2 Goals of Education in Nigeria:

In the words of Aziru (2004), the goals of traditional education were similar in most communities i.e. functionalism remains the guiding principle of the Nigerian indigenous education. Omolewa (2001) cited by Adefabi (2012) opined that education remains the bedrock of growth and development of any nation and the major tool for bringing about desirable changes.

Borishade (2001) cited by Watts (2003) say that the aim of traditional African education is multi-lateral and the end objectives is to provide an individual who is honest, respectable, skilled, co-operative and conforms to the social order of the day. Fafunwa (1975) identified the seven (7) **cardinal goals** of traditional education in Nigeria, which are as stated below;

i. To develop the child's latent physical skills

ii. To develop character

iii. To inculcate respect for elders and those in position of authority.

iv. To develop intellectual skills

v. To acquire specific vocational training and to develop a healthy attitude towards honest labor

vi. To develop a sense of belonging and to participate actively in family and community affairs.

vii. To understand, appreciate and promote the cultural heritage of the community at large.

Ararat (2007) stated some vital **functions** of education in any community which includes;

1. Inculcation of permanent literacy, numeracy process, skills and sound attitudes.
2. Transmission, improvement and preservation of the cultures of the society in the youth and adults.
3. Affecting sustainable human development that would eradicate ignorance, hunger, poverty and diseases; the global impediment to individuals and national developments.
4. Preparation for happy and useful living within the context of existing resources and culture of the society.
5. Stimulation and adoption of reflective thinking as basis for development of problem solving abilities, creative imagination and constructive analysis of issues.
6. Improvement in societal and individual wellbeing and societal status in an attempt to restore the nation to the main stream of respectable humanity.

2.3 Concept Of Economic Growth:

Economic growth refers to the phenomenon of a quantitative increase in the economy' output, inputs, and efficiency for a considerable length of time

Odularu (2006) economic growth shows the conditions necessary for full employment, full capacity growth of the economics

Torado (1977) cited by Anyanwu (1995) says economic growth in the steady process by which the productive capacity of the economy is increased overtime to bring about rising levels of national income.

Economic growth can be measured in three (3) basic forms which are:-

(i) Nominal measurement of Growth

(ii) Real output Growth rate

(iii) Growth measured in per-capita values

2.4 Empirical Review:

Education and Economic Growth in Nigeria:

Ndiyo (2002) on the "paradox of Education and economic growth in Nigeria" modeled for contribution of education growth. He considered real growth of gross product (RGDP) as respondent variable and gross fixed capital formation (GFCT), aggregate labor force (LAF) and real budget allocation to education (REDUB) as explanatory variables. He estimated the modes in both level firm and in logarithmic form respectively. In essence, education plays positive relationship between education and economic growth.

Ndiyo (2002) persist that the contribution of education to economic growth certainly depends on the quality of education.

Babatunde and Adefabi (2003) investigated the long run relationship between education and economic growth in Nigeria between 1970 and 2003 through the application of Johansen Cointegration technique and vector auto correction methodology. Their finding reveals that the Johansen Cointegration result established a long run relationship between education and economic growth.

Lawal, Wahab and Iyiola (2011) investigated the relationship between education and economic growth in Nigeria between 1980 and 2008 through the application of ordinary least square techniques (OLS). The result shows that education investments have direct and significant impact on economic growth in Nigeria.

Deniz and Durrell (2008) traced an interaction between economic growth and education to the pioneering work of Becker (1962), Schultz (1960), Nelson and Phelps (1966). Later following neo-classical growth theory introduction by Solow (1956), several growth models were developed to explain the interaction between economic growth and education. The models developed by Roomer (1986) and (1990) and Lucas) (1988) on the effects of the technology on the economic growth stimulated on a new wave of discussion on the role of education on economic growth.

Otu and Adenuga (2006) examined the relationship between economic growth and human capital development using Nigeria data from 1970 to 2003. They applied the cointegration theory incorporating the error correction mechanism and found that investment in human capital through the availability of infrastructural requirement in the educational sector accelerates economic growth.

The paper then concludes that there can be no significant economic growth in any economy without adequate human capital development (Education).

Adebiyi M.A (2004) investigated the paradox of educational expenditure and economic growth relationship in Nigeria using annual time series data from 1970 to 2008. Some statistics tools were employed to explore the true relationship between these variables. The study examines statistic characteristics of each time series by testing their stationary using Augmented Dickey Fuller (ADF) and Phillip Peron (PP) tests and using vector Auto Regression (VAR) model. Then the relationship between growth rate of real GDP and Real capital expenditure or education is dynamically examined using error correction mechanism. The finding reveals that or increase in real expenditure on education reduces growth rate of gross domestic products which is a paradox.

Adawo M.A (2010) examined that this education (human capital) contributed to the economic model to Nigeria. The study used an econometric model to examine the contributions of primary education, secondary education and tertiary education to economic growth of Nigeria. The result of this study showed that human capital (education) of primary school form contributed to growth while in most cases secondary school form and that of tertiary institution dampen growth in Nigeria.

Oyerinde O.E (2013) also examined the investment in education and economic growth in Nigeria: An Empirical Evidence and posits that Total Expenditure on Education, Gross Fixed Capital Formation, and Total Labour Force, contributes to the Real Gross Domestic Product{Economic Growth} of Nigeria from 1980 to 2010.

Tichaona Z. (2012) conducted an empirical investigation on the causality between education and economic growth in Zimbabwe. He carried out the research by Pairwise Granger Causality and Vector Autoregression(VAR) modelling using modern econometrics techniques of unit root test and his findings confirmed that there is uni-directional causality between education and economic growth in the Zimbabwean economy running from education to economic growth as established by granger causality tests, variance decomposition and impulse response functions.

He thus deducted from his findings that investing in education is important for economic growth. The results he got also confirmed a transmission mechanism that runs from education to economic growth via physical capital investment and this simply means that a rise in human capital boosts the return on physical investment. He therefore recommended that the government and the private sector should concentrate on policies that will improve the education system.

Ejiogu U., Okezie A. I. and Nwosu C.(2013) conducted a study on 'Causal relationship between Nigeria Government Budget Allocation to the Education Sector and Economic Growth' and they examined the commitment of the federal government of Nigeria to education through her budgetary allocations and also assessed the causal relationship between the government expenditure on education and economic growth from 1981-2011 using time series data. The result revealed that Expenditure on education is positively related to GDP while Gross fixed capital formation is negatively related to GDP. Using the granger causality test, they discovered that Gross Domestic Product granger causes Expenditure on education with no reserve causality from Education expenditure to Gross Domestic Product. Their study also revealed that education funding under civilian rule (7.5%) was higher than education funding under military rule (4.18%). Based on these findings, they therefore recommended that Government should increase her budget allocation to the sector which is far below the UNESCO recommendation of 26% of total budget because of the important role of the sector to the nation's economic growth and development.

Md. Raihan (2014) also conducted a study on 'Education and Economic Growth in Bangladesh-An Econometric Study' and examined the short and long run causal relationship between education and economic growth in Bangladesh using annual time series data covering the period from 1973 to 2010. The improved econometric methodologies; unit root and cointegration test, Granger Causality test, and Error Correction Modeling approach were applied. The stationarity of the data have been examined by using Augmented Dickey-Fuller (ADF) test. The implication of their result is that the role of education as an independent stimulus on GDP growth is not only for the long run but also for the short run. The Granger Causality test he applied also supports the results that the relationship between educational expenditure and economic growth is positive and statistically significant. One of the important findings of his study is that there is uni-directional causality between educational expenditure (proxy of education) and GDP volume (proxy of economic growth). Because, GDP causes education but education does not cause GDP to grow in Bangladesh.

M. Solaki (2011) conducted a study on 'The Relationship between Education and GDP Growth: A Bi-variate Causality Analysis for Greece' and investigated long-run and the short-run relationship between human capital and economic growth in Greece over the period 1961-2006. He used bi-variate causality analysis, to study dynamics, by employing different methods of estimation. The empirical results he got suggested that there is a positive relationship between education and GDPC and that Tertiary Education should be considered as exogenous variable, which implies that education, contributed to economic growth in Greece during the estimation period. Thus, he recommended that there is a motivation for the government to increase the public expenditures on education and to expand the number of students in Tertiary education, since that causes economic growth.

Oseni M. (2012) also revealed facts through the research he embarked on, on 'Adequacy of Budgetary Allocation to Educational Institutions in Nigeria' and in the course of his research, focused on the question: "were those amounts budgeted for education enough?". The data he used were of Federal Government Recurrent Expenditure from 2000 to 2011 sourced from Central Bank of Nigeria CBN Statistical Bulletin (2000 - 2011). He also adopted the Simple descriptive statistics and he discovered that though there were increases but they fall short of the international benchmarks. He therefore recommended that internally generated revenues (IGR) should be increased from 10 % to 15% to have access to additional funds and education should not be left in the hands of bureaucrats or politicians who are not aware of the implications for the quality of life of the coming generations.

3. RESEARCH METHODOLOGY

This study employed a regression model coupled with bivarite granger causality test to analyse the granger causality relationship between education and economic growth in Nigeria. The model for this study make use of human-capital augmented solow model by Mankiw, Romer & Weil (1992). It is presented as a simple extension to the Solow model by letting human capital enter as a separate input into an otherwise standard Cobb-Douglas production function with labor-augmenting technological progress and theory of capital accumulation. The production technology in this model, which has come to be known as the human-capital augmented Solow model, will thus take the form:

$$Y_t = K^{\alpha}_t H^{\beta}_t \ (A_t L_t)^{1-\alpha-\beta} \quad \ldots\ldots(1)$$

where Y is output, K is capital, H is the stock of human capital, A is the level of technology and L is "raw" labor. The exponents α, β and 1-α-β measure the elasticity of output to the respective inputs and α + β are assumed to be < 1, so that the function exhibits constant returns to scale but diminishing returns to reproducible factors. Like in the Solow model, the population and the level of technology grow at the exogenous rates n and g, respectively, while capital depreciates at the rate δ.

Summarily, this model will assume that the creation of new ideas is a direct function of human capital, which manifests in the form of knowledge. As a result investment in human capital led to growth in physical capital which in turn leads to economic growth.

3.1 Granger Causality Test:

Correlation does not necessarily imply causation in any meaningful sense of that word. The econometric graveyard is full of magnificent correlations, which are simply spurious or meaningless. Economists debate that correlations are less obviously meaningless.

The Granger (1969) approach to the question of whether x causes y is to see how much of the current y can be explained by past values of y and then to see whether adding lagged values of x can improve the explanation. "X" is said to be Granger-caused by "Y" if it helps in the prediction of "X", or equivalently if the coefficients on the lagged' "X"s are statistically significant. Note that two-way causation is frequently the case; "X" Granger causes "Y" and "Y" Granger causes "X".

Eviews runs bivariate regressions of the form:

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \ldots + \alpha_l y_{t-l} + \beta_1 x_{t-1} + \ldots + \beta_l x_{-l} + \in_t$$

$$x_t = \alpha_0 + \alpha_1 x_{t-1} + \ldots + \alpha_l x_{t-l} + \beta_1 y_{t-1} + \ldots + \beta_l y_{-l} + \mu_t$$

$$\beta_1 = \beta_2 \ldots = \beta_1 = 0$$

Therefore the granger causality test was used to test the econometric relationship between variable under consideration. Null hypothesis state that X does not granger cause y while alternative hypothesis against it, Decision rule state that if the probability value is less than 0.5 reject H_0 if otherwise do not reject.

3.2 Method of Data Analysis:

This study adopted the Granger causality Pairwise bivariate technique to examine the granger causality relationship between education and economic growth in Nigeria. For the estimation of the growth model below, standard econometric tests like: Durbin Watson statistic, standard error of coefficient and F-statistic were carried out. However, the coefficient of determination that is R-square (R^2) was used to measure the rate at which the independent variables explained the dependent variable. The model for this study is therefore:

$$TEXPEND_t = \alpha_0 + \alpha_1 TEXPEND_{t-1} + ... + \alpha_l TEXPEND_{t-l} + \beta_1 GDP_{t-1} + ... + \beta_l GDP_{-l} + \in_t$$

$$GDP_t = \alpha_0 + \alpha_1 GDP_{t-1} + ... + \alpha_l GDP_{t-l} + \beta_1 TEXPEND_{t-1} + ... + \beta_l TEXPEND_{-l} + \mu_t$$

$$TEXPEND_t = \alpha_0 + \alpha_1 TEXPEND_{t-1} + ... + \alpha_l TEXPEND_{t-l} + \beta_1 GDP_{t-1} + ... + \beta_l GDP_{-l} + \in_t$$

$$RGDP_t = \alpha_0 + \alpha_1 RGDP_{t-1} + ... + \alpha_l RGDP_{t-l} + \beta_1 TEXPEND_{t-1} + ... + \beta_l TEXPEND_{-l} + \mu_t$$

$$RECUEXP_t = \alpha_0 + \alpha_1 RECUEXP_{t-1} + ... + \alpha_l RECUEXP_{t-l} + \beta_1 TEXPEND_{t-1} + ... + \beta_l TEXPEND_{-l} + \in_t$$

$$TEXPEND_t = \alpha_0 + \alpha_1 TEXPEND_{t-1} + ... + \alpha_l TEXPEND_{t-l} + \beta_1 RECUEXP_{t-1} + ... + \beta_l RECUEXP_{-l} + \in_t$$

$$TEXPEND_t = \alpha_0 + \alpha_1 TEXPEND_{t-1} + ... + \alpha_l TEXPEND_{t-l} + \beta_1 EDUPROD_{t-1} + ... + \beta_l EDUPROD_{-l} + \in_t$$

$$EDUPROD_t = \alpha_0 + \alpha_1 EDUPROD_{t-1} + ... + \alpha_l EDUPROD_{t-l} + \beta_1 TEXPEND_{t-1} + ... + \beta_l TEXPEND_{-l} + \in_t$$

$$EDUPROD_t = \alpha_0 + \alpha_1 EDUPROD_{t-1} + ... + \alpha_l EDUPROD_{t-l} + \beta_1 GFCF_{t-1} + ... + \beta_l GFCF_{-l} + \in_t$$

$$GFCF_t = \alpha_0 + \alpha_1 GFCF_{t-1} + ... + \alpha_l GFCF_{t-l} + \beta_1 EDUPROD_{t-1} + ... + \beta_l EDUPROD_{-l} + \in_t$$

$$TLBF_t = \alpha_0 + \alpha_1 TLBF_{t-1} + ... + \alpha_l TLBF_{t-l} + \beta_1 GDP_{t-1} + ... + \beta_l GDP_{-l} + \in_t$$

$$GDP_t = \alpha_0 + \alpha_1 GDP_{t-1} + ... + \alpha_l GDP_{t-l} + \beta_1 TLBF_{t-1} + ... + \beta_l TLBF_{-l} + \in_t$$

Where:

GDP= Gross Domestic Product (proxy for economic growth) RECUEXP= Recurrent Expenditure on Education, EDUPROD= Educational Productivity, TERE= Tertiary Education Enrolment, GCF= Gross Capital Formation, TEXPEND= Total Expenditure on Education.

The a priori expectations were α_0, α_1, α_2, α_3, α_4, α_5, α_6, $\alpha_7 > 0$. This implies that all the variables are expected to have a positive relationship with each other.

3.3 Method of Evaluation:

The evaluation consists of deciding whether the estimates of the parameters are theoretically meaningful and statistically satisfactory. For this purpose the three basic criteria ('a priori'. Statistical, econometrics) are used to evaluate the model specified.

The 'a priori' criteria: This refers to the signs and magnitude of the coefficients of the variables.

Statistical Criteria: This study makes use of statistical criteria like standard error, t-statistics, probability value and coefficient of determination. Higher standard errors imply inefficient estimates while low standard errors imply efficient estimates.

Econometrics Criteria: The econometrics criteria aimed at investigating whether or not the assumptions of the econometrics method is satisfied. The econometrics criteria make use of the F-test in testing the overall significance of model and the stability of coefficients.

Therefore the granger causality test was used to test the econometric relationship between variable under consideration. Null hypothesis state that X does not granger cause y while alternative hypothesis against it, Decision rule state that if the probability value is less than 0.5 reject H_0 if otherwise do not reject.

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4. DATA ANALYSIS AND PRESENTATIONS

4.1 Data Presentations:

A time series data was used for this study which covers a period of thirty three (33) years (1981-2013). The data collected were of Real Gross Domestic Product (RGDP) measured as proxy for economic growth, gross Fixed Capital Formation (GFCF), Total Expenditure on Education (TEXPEDU) and Total Labor Force (TLBF). Data used in this study were obtained from Central Bank of Nigeria statistical Bulletin 2012, CBN Annual Report and statement of Account and Federal Office of Statistics, Data on Total Labor force and poverty index were obtained from World Development Indicator database of 2013.

4.2 Analysis of Result and Discussion:

Time series data was used for the analysis is E-view7.2. Windows econometric package was used to process the data obtained.

4.3 Empirical Analysis:

Table 1: below presents the stationarity test of the time series data used in the empirical analysis.

Variables	ADF Statistical with Intercept	Probability	Order of Integration
EP	-7.585006	0.0000*	I(1)
RGDP	-5.437210	0.0020*	I(1)
TEXPEDU	2.26570	0.0200**	I(1)
GFCF	3.660109	0.0278**	I(1)
TLBF	-5.613055	0.0001*	I(1)

* Stationary at 1% significant level.

**Stationary at 5% significant level.

The empirical evidence from many literatures has shown that most of the time series data are not stationary, this research work make of Augmented Dickey fuller Test due to short of fall of dickey fuller with problem of autocorrelation, with $\Delta Y_t = \beta_1 + ZY_t + ai + et$ (Intercept Only). The null Hypothesis stated that the times series variable is not stationary or got unit root. The test in the above table reveals that the entire variables are stationary in their first difference.

The OLS result obtained is presented below:

Dependent Variable: EP				
Method: Least Squares				
Included observations: 33				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-85.28112	72.96170	-1.168848	0.2523
GCFC	1.145055	0.216177	5.296850	0.0000
TEXPEDU	0.917137	0.305191	3.005121	0.0055
TLBF	9.53E-06	2.20E-06	4.338827	0.0002
TREXPEDU	0.220512	0.187093	1.178622	0.2485
R-squared	0.980754	Mean dependent var		422.6909
Adjusted R-squared	0.978005	S.D. dependent var		220.8697
S.E. of regression	32.75660	Akaike info criterion		9.954813
Sum squared resid	30043.86	Schwarz criterion		10.18156

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Log likelihood	-159.2544	Hannan-Quinn criter.	10.03111
F-statistic	356.7178	Durbin-Watson stat	0.894658
Prob(F-statistic)	0.000000		

The numbers in parenthesis are under the parameter estimate of the corresponding standard errors. This establishes that the degree of error terms is considerably minimized and hence the estimates are reliable. The parameter estimates comply with a priori expectations which explain that quality of education is grossly depend on the explanatory variables.

Considering the magnitude 1% increase in RGDP (proxy Economic Growth) is brought about by 114%increase in total expenditure on education, 22% increase in total recurrent expenditure on education (TREXPEDU) and 0.00095% increase in (TLBF) Total Labour Force. This postulates that an increase in total expenditure on education and other related variables will lead to astronomical increase in Real GDP, proxy for economic development in Nigeria. fall in standard of education in Nigeria. The estimated value of R^2 (goodness of fit) of 0.98 or 98% shows that 98% systematic variation in Real GDP is caused by variation in total labour force, total expenditure on education, total recurrent expenditure on education and gross fixed capital formation. This equally ascertains that apart from the parameters or outside the scope of this analysis accounts for about 2% variation in the Economic growth which is covered by the error terms (μ).

The adjusted R^2 when the degree of freedom is considered with the number of explanatory variable also explain the 98% variation in Real GDP. However, the analysis is statistically significant.

The overall significance of the entire model or the goodness of fit of the model as measured by the F-statistic shows that the F-statistic calculate (F^*) is greater than the F-statistic tabulated (F) at 5% level of significance, hence we accept the alternative hypothesis that variation in total labour force, gross fixed capital formation, total expenditure on education and total recurrent expenditure on education grossly affects RGDP which is proxy for economic growth in Nigeria and ultimately affects its sustainable development. However, the analysis applies with econometrical criteria and shows that the model has overall significance and the coefficients are stable.

Total expenditure on education (TEXPEDU) which is one of the important variables in the model shows a positive and significant relationship to Real GDP (RGDP). With probability value of 0.0000, this result shows that probability is less than 0.05. Hence, it shows that Total expenditure on education is a significant factor that affects positively the real GDP in Nigeria and also increase the Economic growth. The result however is not surprising because from the A-prior expectation, it was clear that increment in TEXPEDU (total expenditure on education) as human capital will enhance the country's economic development.

Gross Fixed Capital Formation (GFCF) which is also an important variable in the model, shows a positive relationship with Real GDP and is also very significant. From the result it shows that a 1 percent increase in gross fixed capital formation (GFCF) will lead to 118% rise in Real GDP which is referred to as an astronomical increase or rise in Real GDP [Economic growth]. This explains that when the government starts investing in fixed capitals such as plants and machinery, Factory, land and its buildings, patients, copyrights, goodwill, computing and communication infrastructure that mostly include work station, servers, data storage, facilities, local area network, the internet, telephone fax e.t.c. It would result in the existence of these thing for long term needs. Gross fixed capital formation has shown a good and positive relationship with Educational Productivityand Economic growth in Nigeria which if invented in would help improve the real gross domestic products of Nigeria.

Labour force [TLBF] was positively related to Economic Growthis a significant factor that determines economic growth in Nigeria since $P<0.05$ it was significant at 5% level of significance. This implies that a 1percent rise or increase in labour force will surely lead to about 0.00095% increase in Real GDP as well as (Economic growth) in the Nigerian Economy which shows an astronomical rise. When the Nigerian government invest in the quality of labour force, poverty level will reduce since unemployment rate will also reduce, for example formal labour which is s sort of employment that is structured and paid in a formal way, contributes greatly to the Nigerian Gross National Product which yields higher income and great benefits and securities for both men and women. From the result above it is shown that investment in the Nigerian labour force would improve the Educational Productivityand real gross domestic product (Economic growth) of the economy and would lead Nigeria into being a Developed Nation.

The F-statistic shows a value of approximately 468.9 which indicates that the overall model is significant with the probability value being P=0.00 which indicates a significance at 1 percent

The Durbin-Watson statistics shows a value of approximately 0.91 which shows the presence of positive serial correlation.

The Akaike information criterion and Schwarz criterion shows about 9.94 and 10.12 respectively which indicates that the model selection is good.

The Hannah-Quinn criterion also shows about 10.00 consequently the conformity with the expected sign indicates that there is a direct relationship between each of the variables and Educational Productivity.

For the Reliability of the result, white heteroskedacity-consistent standard errors & covariance with the HAC standard errors and covariance test were used simultaneously which gives the result pasted below:

White heteroskedasticity-consistent standard errors & covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-85.28112	66.87554	-1.275221	0.2127
GCFC	-1.145055	0.251365	4.555352	0.0001
TEXPEDU	0.917137	0.271669	3.375929	0.0022
TLBF	9.53E-06	2.04E-06	4.666559	0.0001
TREXPEDU	0.220512	0.122415	1.801346	0.8024
R-squared	0.980754	Mean dependent var		422.6909
Adjusted R-squared	0.978005	S.D. dependent var		220.8697
S.E. of regression	32.75660	Akaike info criterion		9.954813
Sum squared resid	3004386	Schwarz criterion		10.18156
Log likelihood	-159.2544	Hannan-Quinn criter.		10.03111
F-statistic	356.7178	Durbin-Watson stat		0.894658
Prob(F-statistic)	0.000000			
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed				
bandwidth = 4.0000)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-85.28112	92.90126	-0917976	0.3665
GCFC	1.145055	0.300230	3.813921	0.0007
TEXPEDU	0.917137	0.281731	3.255362	0.030
TLBF	9.53E-06	2.87E-06	3.320493	0.0025
TREXPEDU	-0.220512	0.090213	2.444356	0.0211
R-squared	0.980754	Mean dependent var		422.6909
Adjusted R-squared	0.97805	S.D. dependent var		220.8697
S.E. of regression	32.75660	Akaike info criterion		9.954813
Sum squared resid	30043.86	Schwarz criterion		10.18156
Log likelihood	-159.2544	Hannan-Quinn criter.		10.03111
F-statistic	356.7178	Durbin-Watson stat		0.894658
Prob(F-statistic)	0.000000			

From both results above, R^2 remains the same and also with other statistical method of evaluation. However the model's is reliable. This simply implies that the result is reliable for policy recommendation.

The above regression result has the consistent problem of auto-correlation which is shown by durbin-watson autocorrelation evaluation method with the result 0.89 for all three ways of statistical evaluation that shows consistent problem of auto-correlation.

However, the study makes use of different procedure to ensure that the results of the regression results are reliable. Durbin Watson *d* test had some drawback because of it inconsistence. Breusch- Godfray tests are used to detect fitness of model. Durbin-Watson *d* test is simply the ratio of sum of the squared difference in successive residuals to the RSS. This test is used to find problem of autocorrelation in the model. To avoid some of the drawbacks of the Durbin Watson d test of the autocorrelation, Breusch and Godfray have constructed a test of autocorrelation that allows for: non stochastic regressors, such as the lagged values of the regressends; and higher order auto regressive schemes such as AR1, AR2.(Gujrati, 2004). The null hypothesis state that there is problem of auto-correlation while alternative hypothesis against it.

Breusch and Godfray test is presented below:

Breusch-Godfrey Serial Correlation LM Test:				
F-statistic	5.902933	Prob. F(2,26)		0.0077
Obs*R-squared	10.30511	Prob. Chi-Square(2)		0.0058
Test Equation:				
Dependent Variable: RESID				
Method: Least Squares				
Included observations: 33				
Presample missing value lagged residuals set to zero.				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.579220	64.44751	-0.008987	0.9929
GCFC	0.048105	0.808943	0.059466	0.9531
TEXPEDU	2.32E-08	1.82E-05	0.001270	0.9990
TLBF	-1.08E-07	2.62E-06	-0.041291	0.9674
TREXPEDU	0.330947	2.773708	0.119316	0.9060
RESID(-1)	0.542296	0.208892	2.596063	0.0156
RESID(-2)	-0.255433	0.260252	-0.981482	0.3358
R-squared	0.213761	Mean dependent var		4.26E-14
Adjusted R-squared	-0.006386	S.D. dependent var		41.07589
S.E. of regression	41.20685	Akaike info criterion		10.48230
Sum squared resid	42450.11	Schwarz criterion		10.84509
Log likelihood	-164.9580	Hannan-Quinn criter.		10.60437
F-statistic	0.970990	Durbin-Watson stat		1.747857
Prob(F-statistic)	0.473316			

The result gives the probability values of Pro F(2 26)= 0.0077, and Probchi-square(2)=0.0058 which is significant at %5 significant level and move against the Durbin Watson d test of presence of positive serial correlation. However, the Breusch and Godfray test shows absence of serial correlation.

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4.4 Granger Causality Test:

The Granger (1969) approach to the question of whether x causes y is to see how much of the current y can be explained by past values of y and then to see whether adding lagged values of x can improve the explanation. "X" is said to be Granger-caused by "Y" if it helps in the prediction of "X", or equivalently if the coefficients on the lagged' "X"s are statistically significant. Note that two-way causation is frequently the case; "X" Granger causes "Y" and "Y" Granger causes "X".

Therefore the granger causality test was used to test the econometric relationship between variable under consideration. Null hypothesis state that X does not granger cause y while alternative hypothesis against it, Decision rule state that if the probability value is less than 0.5 reject H_0 if otherwise do not reject.

Dependent Variable: RGDP			
Excluded	Chi-sq	Df	Probability
TEXPEDU	13.44994	2	0.0012*
GFCF	2.388976	2	0.3029
TLBF	1.441000	2	0.4865
TREXPEDU	0.372899	2	0.8299
All	23.11077	8	0.0032*
Dependent Variable: TEXPEDU			
Excluded	Chi-sq	df Probability	
RGDP	10.05780	2	0.0065*
GFCF	4.866841	2	0.0877
TLBF	0.787678	2	0.6745
TREXPEDU	2.262603	2	0.3226
All	26.94595	8	0.0007*
Dependent Variable: GFCF			
Excluded	Chi-sq	Df Probability	
RGDP	9.879276	2	0.0072*
TEXPEDU	9.150763	2	0.0103
TLBF	10.70703	2	0.0047
TREXPEDU	6.941363	2	0.0311
All	62.83279	8	0.0000*
Stationary at 5 percent significant level			

From the result above, it could be deduced that the granger causality in VAR environment illustrates joint causality of independent variables on dependent variables. The result shows that RGDP is jointly granger caused by total expenditure on education, gross fixed capital formation, total labor force, total recurrent expenditure, therefore we reject the null hypothesis and conclude that there is pairwise (two-way causality) between education and economic growth.

4.5 Implication of the Result:

The Economic Implication of this result is that all the explanatory variables such as Gross Fixed capital formation (GFCF), Total labor force (TLBF), total recurrent expenditure on education (TREXPEDU) and total expenditure on education (TEXPEDU) jointly affect economic growth in Nigeria. The result also implies that when the government does

not employ in other to increase total labor force or show concern about gross fixed capital formation and labor force, it would lead to an astronomical fall in the economic growth of Nigeria which will discourage development. But if the governments formulates policy an inaugurate empowerment programs in other to reduce the level of poverty in the country that this will increase educational productivity and quality of the labor force by providing, enough classrooms, well equipped laboratories, and teachers that are well paid to motivate excellence in teaching, as well as educational policies, there will be improvement in Real GDP, and eventually the Economic growth of the country.

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary:

This study examines the examine the granger causality relationship between education and economic growth in Nigeria, using secondary data from 1981 to 2013. Some econometrical tools were employed to explore in responding to the research questions using the ordinary least square technique (E-view 7.2). The findings revealed that there is bivariate causal relationship between education and economic growth in Nigeria. This implies that the granger causality in VAR environment illustrates joint causality of independent variables on dependent variables. The result shows that RGDP is jointly granger caused by total expenditure on education, gross fixed capital formation, total labor force, total recurrent expenditure, therefore we reject the null hypothesis and conclude that there is pairwise (two-way causality) between education and economic growth.

5.2 Conclusion:

This study concludes that educational productivity granger cause economic growth and vice versa in Nigeria. It also shows that there is joint causal impact of all explanatory variables on economic growth in Nigeria.

5.3 Recommendations:

Based on the findings of this study and as a result of the information obtained in this investigation, the following are recommended;

1. Government should increase budgetary allocation to at least 26% (as recommended by UNESCO) and stimulate more fund channels to educational sector of the economy.
2. There should be establishment of special agencies with active responsibility of monitoring educational funds in order to prevent channeling of educational funds to private accounts of government officials.
3. Intense effort should be made by the government to combat poverty and incessant of child labour in the street in the country.
4. There should be a corresponding increase in funds as the rate of enrolment increases.
5. Government should provide incentives for private invest in the educational sector.

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