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ABSTRACT
Education plays a vital role in economic growth of a nation; it raises productivity and efficiency of individuals which are necessary conditions for sustainable economic growth. The research is on impact of public education expenditure on economic growth in Nigeria 2004-2014. The basic objective of the study is to assess the long run impact of public education expenditure on economic growth in Nigeria. In analysing the time series secondary data, an ex post facto research design research design was used in order to answer the research questions and to test the hypotheses. Augmented Dickey Fuller unit root test was used to test for stationarity, Vector Autoregressive Model and causality tests were employed to determine the long run impact and direction of relationship between education expenditure and economic growth at 0.05 level of significance. It is recommended in the study that government should increase the education expenditure in order to impact significantly on economic growth up to the 26 percent of the UNESCO’S recommendation, education should be made affordable for all i.e. subsidizing education that would increase the government cost of providing education but would lower the cost of education attainment; thereby raising the demand for education and this in turn would increase the stock of human capital.

Keywords: Public Education, Government Expenditures, Public Expenditures, Economic Growth and Sustainable Economic Growth

INTRODUCTION
The relationship between government expenditures and economic growth has continued to generate series of debate among scholars. Saad and kalakeck (2009) and Sàez and Garcia (2006), argued that increase in government expenditures on socio-economic variables (education and health) and physical infrastructures increases the growth of national output. While Mitchell (2005) and Komain and Brahmasrene (2007), argued that higher government expenditure may slowdown overall activities of the economy.

Generally, government expenditures are broadly categorised into two (2) components namely; capital and recurrent expenditures. Capital expenditures are incurred on the creation or acquisition of fixed assets such in education includes outlay on construction, renovation and major repairs of school building, new or replacement of laboratory equipment etc. While recurrent expenditures are incurred on the purchase of goods and services, payments of wages and salaries and settlement of depreciation on fixed assets. In education recurrent expenditures includes payment of teachers’ salaries, pensions, overheads and teaching materials etc.

Furthermore, public expenditures are divided into exhaustive and transfer expenditures. Exhaustive expenditures are incurred when government actually consume and make purchase of factor inputs while transfer expenditures does not involve purchase of factor inputs by government. Evidences from Nigeria showed that the total government capital and recurrent education expenditures have continued to increase over the years. For instance, in 1980, ₦597.20million was the total recurrent education expenditures; it increased to ₦29,514.93billion in 2000 and rose to 443,922.09 billion in 2014. The capital education expenditure stood at ₦952.60 million in 1980, it rose to ₦23,342.60billion in 2000 and further to ₦49,536.04billion in 2014. (CBN,2014). An examination of available data showed that Africa’s gross national income (GNI) per capita declined by almost 10 per cent between 1980 and
2004 (African Development Bank 2006; 37). Specifically, Nigeria’s GNI per capita declined from US$652 in 1980 to US$390 in 2004. Ironically, some countries in Asia such as, the Republic of Korea, Singapore, Taiwan and Thailand (the Asian Tigers) tripled their per capita income within the same period (Maddison, 2001). The poor performance in Africa could be attributed to the slow or negative growth rate in the member countries. A review of existing literature shows a continuous extension of the factors that determine economic growth. This is due partly to the inability of existing theories to explain growth (or lack of growth) patterns. The shortcomings of the exogenous growth theory (such as its inability to account for observed growth and lack of convergence among countries) led to the development of the endogenous growth theory. Subsequently, other factors such as institutions, poor infrastructure, imperfect capital and goods markets and geography, amongst others have been identified to have significant impact on the growth slowdown of developing countries. According to the United Nations Development Programme (UNDP 2005:24), gaps in opportunity for education remains large. It noted that in an increasingly knowledge-based global economy, about 115 million children worldwide are denied the most basic primary education. Most of these children are in Sub Saharan Africa (SSA) and South Asia. Moreover, while the primary enrolment gap may be closing, the gap between rich and poor countries measured in terms of average years of education is widening. This is before taking into account differences in educational quality. Undoubtedly, these inequalities of today are the global social and economic inequalities of tomorrow.

Education is considered a major remedy for many problems facing developing countries, it is also regarded as a key element of policy to promote broad-based economic growth. Education has high economic value such as, increase chances of employment in the labour market that allow them to reap pecuniary and none pecuniary returns hence a considerable part of the country’s wealth must be invested in education. Education contributes to economic growth through human capital development, which can serve as both consumer and capital inputs in the production of other goods and services. It also increases human capital development through building, training, acquisition of useful skills, knowledge, productivity, inventiveness etc to the inhabitant of the economy required to manipulate capital and technology to produce goods and services, which in turn improve economic growth.

An economy with higher ratio of human capital to physical capital is like an economy that is described as transitional dynamic of the neoclassical growth model. However, human capital development allows an economy to adapt the technologies that were discovered elsewhere, that is higher rate of absorption of the lending technology thereby increase economic growth. Through education, human capital development plays a primary role in achieving sustainable growth and development as it raises per capita gross national product (GNP), reduce poverty, inequality and supports the expansion of knowledge, skills etc. The major reason behind the speedy growth of the Asian Tigers was investment of 25 percent to 35 percent of their annual budget on human capital development through education (Omotor, 2004).

Generally, expenditure on human capital development is based on its impact on individual’s income, economic growth and poverty reduction. To achieve this therefore, there is need for increase in human capital expenditure. With increase in globalization, competition among nations, investment in highly skilled and capable workers and for Nigeria to achieve higher economic growth, investment in human capital through education is very important, that was why the Nigerian government increased the budgetary allocation to the sector in the last decades. For instance, in 1980, ₦1,549.8million (Nigeria Budget, 1980) was the allocation to the education sector, in 2000, ₦67,568million (Nigeria Budget, 2000) and it rose to ₦493.6billion in 2014 (Nigeria Budget 2014) that is equivalent to only 10.7 percent of the total budget, which is less than the 26percent of the UNESCO’S recommendation. However, there was increase in the school enrolment in the country, for instance the primary school enrolment increase from 92.69percent of the gross enrolment in 1980 to 97.85percent in 2000 and fell to 85.28 percent in 2010 while the secondary enrolment stood at 13.45percent of the gross enrolment in 1980 which increased to 24.28 percent in 2000 and later to 44.05 percent of the gross enrolment in 2010 (MGD’s 2013).

Despite the increment on education expenditures in Nigeria, Ireghe (2013), opined that, schools experienced overcrowding, inadequate teaching and learning materials, insecurity, poor management and sanitation among others. If despite huge public education expenditures, there seems to be no significant appreciation in the level of human capital development and by extension on economy-wide growth, one may ask if time lag between implementation and impact is important. It is based on these
problems that the research objectives were formed as follow, the broad objective of the study is to determine the impact of public education expenditures on economic growth in Nigeria. Other specific objectives are to: Assess the long run relationship between public education expenditure (PEEXP) economic growth (GDP) and human capital development (SSE) in Nigeria; Determine the long run and short run causality between public education expenditures and economic growth in Nigeria, and lastly evaluate the contribution of public education expenditures to human capital development in Nigeria. However, the hypotheses of the research were formed from these objectives.

**Literature Review**

Empirical research on impact of government education expenditures on economic growth showed positive, negative and some mixed results as shown below.

Tamour, Maleti and Gashiti (2012), investigate the effect of government expenditure composition on economic growth of economic cooperation organisation countries (ECO) between 1995-2009. Using dynamic panel data method and generalised method of movement, the result showed that education expenditure by government statistically has significant and positive effect in these countries. The study used panel data and generalised method of movement in analysing the data but this work used time series data and Vector Autoregressive model in analysing the data on Nigerian economy. Riasat, Atif and Zaman (2011), used bond testing approach to investigate the impact of education expenditure on economic growth of Pakistan over the period of 1972-2010 and discovered a positive and significant impact on economic growth in the long-run. It used bond testing approach to investigate the impact on Pakistan while this research used Vector Autoregressive model to investigate the impact in Nigeria.

However, Hussain, Muhammed and AbdulRazak (2012), conducted a similar study on education expenditure and economic growth in Malaysia between the periods of 1970-2010 showed that economic growth is a short-term granger for education and human capital plays an important role in influencing economic growth in the country, the result was achieved through the use of Vector Autoregressive method (VAR). Even though the study used the same technique of data analysis but the variables are not the same and the country too. According to Harpaljit, Baharom and Habibullah (2014), linkages between education expenditure and economic growth in China and India within 1970 to 2005, through the use of multiple econometric tools; Ordinary Least Square (OLS) method, Dynamic Ordinary Least Square (DOLS) and Vector Error Correction model, the result revealed a long-run trending relationship between income level, gross domestic product, per capita and education expenditure. The study used multiple econometric tools to determine the linkages in China and India not Nigeria.

Research conducted by Kakar, Khilji and Khan (2011), on the relationship between education and economic growth in Pakistan from 1980-2009 concluded that there is no significant relationship between education and short- term economic growth but educational development through increase government education expenditure has impact in the county’s long-run economic growth, where error correction model was applied. However similar studies on Uganda’s economy by Musila and Belassi (2004), by applying ordinary least square showed that an increase of 1 percent average in educational expenses for each labour will lead to 0.04 percent rise in national short-run production and 0.6 percent rise in long term production. No scope that was used but in this work it covered 10 years and Vector Autoregressive model was used.

According to Musai, Mehrara and Farkhr (2011), the elasticity of the production of human capital, physical capita and labour force are 0.28, 0.696 and 0.044 respectively. This was arrived at after carrying research on relationship between education and economic growth of 79 countries. Therefore increase in education spending, physical capital and labour force will lead to increase the economic growth. It was conducted in different countries with different economic structure and population while this was carried out in Nigeria Yildirim, Deniz and Hepsag (2011), showed that there is unidirectional causality between Turkey’s real GDP per capita to real per capita education expenditure from 1973 to 2009. The study revealed that public education expenditure does not affect Turkey’s economic growth within the period under study. Chandra (2010) has tested for a causal relationship between education investments and economic growth for India for the time period 1951-2009 using linear and non-linear Granger causality methods. He found that there is bi-directional causality between education spending and GDP for India.
The researcher’s opinion on the above studies is that the works were conducted on international economies hence the results cannot not be apply to Nigerian economy because their policy structures and populations are not the same with that of Nigeria. Nururuddeen and Usman (2010), revealed that both total capital and recurrent expenditures have negative impact on the economy’s growth in Nigeria. Akinsanya, Aninka and Oni (2014), arrived at the opposite result that both capital and recurrent expenditure have positive impact on growth of Nigeria. Both capital and recurrent expenditures have stronger and more accelerating effect on growth. However, Bose, Haque and Ozborn (2003), investigated the effect of government expenditure for panel of 30 underdeveloped nations. The result revealed that government capital expenditure is significantly correlated with economic growth while recurrent expenditure is insignificant. Study by Abu and Abdullahi (2010), revealed that total capital expenditure, total recurrent expenditure and government education expenditure have negative impact on economic growth. Odedokun (2001), examined the effects of different categories of government expenditure revenue and deficits on economic growth in developing countries. Based on panel data of annual series over three decades for 103 countries the results suggest that capital expenditure has negative impact on growth likewise recurrent expenditure has impact on goods and services.

Abiodun and Iyiola (2011), examine the contribution of education to Nigeria economic employing time series data that spanned between the periods of 1980-2008 and analyzing the data using ordinary least square revealed that education investment have direct and significant influence on economic growth. It also showed that human capital development is a component of economic growth hence the need for quality and quantity investment in education. The research covered only 28 years which is 7 years different from the present research which made it not up to date.

Imoughele and Ismaila (2013), employed Johansen co-integration unit root test and error correction methodology to examine the effect of public education expenditure on the economy in Nigeria between 1980 and 2010. The result of the study showed a long-run relationship between economic growth and investment in Nigeria education. Dauda (2009), indicate that there is long-run relationship between investment in education and economic growth in Nigeria between 1977-2007 using Johansen co-integration technique and error correction methodology. However according to Chude and Chude (2013), there is both short and long run positive effect of education expenditure on economic growth in Nigeria for the period of 1977-2012. This is achieved by using error correction model. Study of causal relationship between Nigeria government budget allocation to the education sector and economic growth for the period of 1981-2011 showed education expenditure is positively related to economic growth and a non-causality between Gross Domestic Product, capital expenditure and education expenditures. The study also revealed that financing education under civilian rule (7.5 percent) was higher than that under military rule (4.18 percent) during the period of the study (Ejiogu, Okezie and Chinedu, 2013).

Urhie (2013), using instrumental variable two stage least squares (TSLS) estimation technique investigate the direct and indirect effects of both public capital and recurrent expenditure on education and economic growth in Nigeria from 1970-2010, the result shows that there is both direct and indirect effects of education expenditure on economic growth in Nigeria. In addition, the study revealed capital education expenditure has greater effect on education while recurrent education expenditure has greater effect on economic growth. Research carried out by Ireghe(2013), on the impact of education expenditure on economic growth in Nigeria revealed a negative effect on economic growth through the employment of error correction model. The model used was geometric method of analysis but Vector Autoregressive model was used in this research. Ernest (2011), examined direct and indirect effect of government spending on education and its relationship to the cyclical economic growth in the long-run using an integrated sequential dynamic computable general equilibrium (CGE) model and the result showed that education expenditure is important in explaining economic growth in Nigeria. This study too used different methodology from that in this work. Ohwofasa, Obeh and Atumah (2012), discovered a long-run relationship between education expenditure and economic growth, from 1986-2011 a two year lags of recurrent expenditure on education exhibit positive impact on economic growth in Nigeria. Also, a year lag on capital expenditure on education and human capital development has negative impact on economic growth within the period of study. This was arrived at using Parsimonious error correction model. According to Oluwatobi and Ogunrinola (2011), using vector error correction model, discovered that there is
positive relationship between government recurrent expenditure on human capital development and real output while capital expenditure has negative impact on real output. The result was arrived at after examining the implication of government on human capital development and economic growth in Nigeria.

Research carried out by Babatunde and Adefabi (2005), on education and economic growth in Nigeria through the use of Johansen co-integration techniques and vector error correction methodology, the findings revealed that there is long-run relationship between education and economic growth via two channels. First, human capital is a direct input in production function and secondly, human capital affects technology parameter in production.

On the works conducted on Nigerian economy by the researchers reviewed in this work, they employed time series data that are years back from the date of their studies which made the researches not up to date. Based on the review of relevant literature, the research came up with these contributions, the scope of the study and the data used covered the period of ten years from 2004 to 2014 whereas in other researches the scopes and the data used covered years before 2014, and the direction of the study of determining the time (short run or long run) to expect impact of public education expenditures.

**Sources and Methods of Data Collection**

The data used in the research are secondary data on education expenditure and real growth domestic product which were obtained from Central Bank of Nigeria Statistical Bulletin of various years, school enrolment were obtained from Nigeria 2013, Millennium Development Goals (MDGs) report, UNESCO Institute for Statistics World Bank Development Indicators.

Since this study sought to explore the relationship between economic growth and public education expenditure, an ex post facto research design is the most appropriate research design to be used in order to answer the research questions and to test the hypotheses. Ex post facto research, by its very design, investigates “the world as it naturally occurs” and explores phenomena that have already occurred (Johnson & Christensen, 2008).

According to Newman, Brown, McNeely and Newman (2006), there are three types of ex post facto research. The first design uses no hypothesis and generally considered the weakest of the three. Other ex post facto design includes the testing of hypotheses and has a bit of scientific value. The third type of ex post facto research design includes the test of hypotheses along with test for alternative hypotheses. It is “considerably more powerful in terms of internal validity” (Newman, Brown, McNeely, and Newman 2006). An ex post facto research design is useful when one wants to investigate the relationship between the dependent and independent variables when randomization or manipulation of the independent variable is not possible. The relationship between the variables could exist due to the presence of an undetermined third variable, one way to combat this is to control for extraneous variables, which could provide for an alternate conclusion, into the research design.

Kerlinger and Lee (2000) note that controlling for extraneous variables in a research design makes it possible to extract additional research information on the possible relationship the extraneous variables may have with the dependent variables. The most significant threat to the internal validity of an ex post facto study is the post hoc fallacy, which occurs when the investigator incorrectly concludes that causation exists simply because evidence of a relationship is found (Ary et al., 2010). In order to conclude that a causation relationship exists, researchers must be able to meet the following three standards for a non-spurious relationship: (a) a statistical relationship between X and Y has been established, (b) X preceded Y in time, and (c) other factors did not determine Y.

**Model Specification**

Deterministic model is;
\[ \text{GDP} = w + \beta_1 \text{PEEXP} + \beta_2 \text{SSE} + \beta_3 \text{PSE} + \mu_t \]

The model is stated in stochastic log form as:
\[ \log\text{GDP} = w + \beta_1 \log\text{PEEXP} + \beta_2 \log\text{SSE} + \beta_3 \log\text{PSE} + \mu_t \]

w is constant parameter, \( \beta \)’s are unknown parameter of interest, while \( \mu \) is the error term.

**Techniques of Data Analysis**

The method of data analysis begins with ascertaining the order of integration of the series, of which Augmented Dickey Fuller (1979) was examined.
For the impacts of government spending and economic growth the study employed Vector Autoregressive model to explore the dynamics within the data. In determining the causality between public education expenditure and economic growth, granger causality test was employed. Vector auto regressive (VAR) model was used to measure the dynamic relationship among the variables. The model is chosen as it treats all variables as endogenous. The research treats economic growth as the dependent variable and others as independent variables.

RESULTS AND DISCUSSION

Table 4.1: Unit Root Test Statistics (Augmented Dickey-Fuller)

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>ADF VALUE (CONSTANT INCLUDED)</th>
<th>ORDER OF INTEGRATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LEVELS</td>
<td>1ST DIFF.</td>
</tr>
<tr>
<td>logGDP_{t}</td>
<td>-1.068115</td>
<td>-5.04648*</td>
</tr>
<tr>
<td>logPSE_{t}</td>
<td>-2.81790</td>
<td>-5.85981*</td>
</tr>
<tr>
<td>logSSE_{t}</td>
<td>-2.17370</td>
<td>-3.98807*</td>
</tr>
<tr>
<td>logPEEXP_{t}</td>
<td>-1.99415</td>
<td>-5.47150*</td>
</tr>
<tr>
<td>Critical values</td>
<td>1%</td>
<td>-4.2505</td>
</tr>
<tr>
<td></td>
<td>5%</td>
<td>-3.5468</td>
</tr>
<tr>
<td></td>
<td>10%</td>
<td>-3.2056</td>
</tr>
</tbody>
</table>

**Source:** Author’s Computation.*stationary at 1%, **stationary at 5%.

Table 4.1 shows both the ADF unit root test summary. The decision rule for stationarity is when the Mackinnon values are greater than the critical values regardless of their signs. All the variables are non-stationary at 5 percent level of significance because the computed values are all less than the critical values. At first difference, however, all the variables are stationary because the calculated values are all greater than the critical or tabulated values as observed in the table. The stationarity attained among all variables at first difference, paves the way for cointegration test, which measures the long run relationship among the variables.

Table 4.2 Trace Test

<table>
<thead>
<tr>
<th>Hypotheses No of CE(s)</th>
<th>Eigenvalue</th>
<th>Trace Statistics</th>
<th>Critical values</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>r=0</td>
<td>r=1**</td>
<td>0.540960</td>
<td>57.55375</td>
<td>47.21</td>
</tr>
<tr>
<td>r≤1</td>
<td>r=2*</td>
<td>0.458324</td>
<td>31.85935</td>
<td>29.68</td>
</tr>
<tr>
<td>r≤2</td>
<td>r=3</td>
<td>0.295418</td>
<td>11.62746</td>
<td>15.41</td>
</tr>
<tr>
<td>r≤3</td>
<td>r=4</td>
<td>0.002195</td>
<td>0.072510</td>
<td>3.76</td>
</tr>
</tbody>
</table>

**Source:** Author’s computation.
From the result of Trace test of Table 4.2, co-integration is determined by comparing the trace value with the critical value. Co-integration is established if the trace value is greater than the critical value in at least one rank, otherwise we do not reject the null hypothesis of no co-integration. By using the linear deterministic trend model based on Akaike and Schwarz information criteria, the trace test result presents us with 1 cointegrating equation at 5 per cent level of significance and one cointegrating equation at 1 per cent level of significance too. This is an evidence of a long run relationship between the explained variables logGDP and the explanatory variables (logPSE, logSSE and logPEEXP). Hence, the null hypothesis of no cointegration is rejected at both stated levels of significance and we conclude that, cointegration does exist among the variables.

Table 4.3 Maximum Eigen Value Test

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Eigenvalue</th>
<th>Max-Eigen Statistic</th>
<th>Critical values</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>5%</td>
<td>1%</td>
</tr>
<tr>
<td>r=0</td>
<td>r=1*</td>
<td>0.540960</td>
<td>35.69441</td>
<td>27.07</td>
</tr>
<tr>
<td>r≤1</td>
<td>r=2</td>
<td>0.458324</td>
<td>20.23189</td>
<td>20.97</td>
</tr>
<tr>
<td>r≤2</td>
<td>r=3</td>
<td>0.295418</td>
<td>11.55495</td>
<td>14.07</td>
</tr>
<tr>
<td>r≤3</td>
<td>r=4</td>
<td>0.002195</td>
<td>0.072510</td>
<td>3.76</td>
</tr>
</tbody>
</table>

Source: Author’s computation. Eviews was used in the estimation.

Table 4.3 presents the number of cointegrating equations in the maximum eigenvalue test. Following the same process as in trace test, maximum eigenvalue test presents us with one cointegrating equation at 5 per cent level of significance and none at 1 per cent level of significance. This result equally presents empirical ground to reject the null hypothesis of no cointegration among the variables. Therefore, these series do have common long run relationship in Nigeria considering the period under review, hence the null hypothesis of no cointegration among GDP, PEEXP, PSE and SSE is rejected and the alternative hypothesis of cointegration relationship is accepted. This result, therefore, justifies VAR-based subsequent empirical analysis. It was supported by Musila and Balassi (2004) and Dauda (2009). Both studies used cointegration analysis and found a positive and significant relationship between public expenditure on education and economic growth. Since there is cointegration among the variables, the restricted version of VAR model, Vector Error Correction Model (VECM) is applied to measure the both the long and short run impact of public expenditures on economic growth.

4.4 VAR-based Long-run Causality

Table 4.4 Causality Test Result

<table>
<thead>
<tr>
<th>Null Hypothesis: logPEEXP does not Granger Cause logGDP</th>
<th>Obs</th>
<th>F-Statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>33</td>
<td>3.64309</td>
<td>0.03924</td>
</tr>
</tbody>
</table>

| logGDP does not Granger Cause logPEEXP                 | 3.83320 | 0.03377 |

Source: Author’s computation.

The result of Table 4.4 shows a two-way causality between public education expenditures and economic growth. For the first null hypothesis in the table, logPEEXP does not Granger causes logGDP, the F-Statistic is 3.64 with the probability value of about 0.039. Since the probability value is less than 5% (0.05) level of significance, the null hypothesis of no causality is rejected and the alternative accepted. On the second null hypothesis on the same table, logGDP does not Granger causes logPEEXP, the F-Statistic is 3.83 with the probability value of about 0.033. Since the probability value is less than 5% (0.05) level of significance, the null hypothesis of no causality is
rejected and the alternative upheld too. Based on this bidirectional causality, we can say that public education expenditure contributes to gross domestic product in the long run. Also, where the GDP grows in the long run, public education expenditures also increase. By this, the null hypothesis of no long run causality is rejected and the alternative accepted that there exists causality between public education expenditures and economic growth in Nigeria in the long run. This work agrees with that of Ejigou, Okezie and Chinedu (2013).

4.5 VAR based Short-run Causality from DLPEEXP to DLGDP

Table 4.5 Causality Test Result

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>C(5) = 0</th>
<th>C(6) = 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>F- Statistics</td>
<td>10.00432</td>
<td>Probability</td>
</tr>
<tr>
<td>Chi-square</td>
<td>20.00863</td>
<td>Probability</td>
</tr>
</tbody>
</table>

Source: Author’s Computation.

Table 4.5 is the result of the short run causality test running from DLPEEXP to DLGDP. The 2-lagged coefficient of DLPEEXP Produced from the VECM result of appendix 2 was tested using Wald coefficient test. This test seeks to establish whether DLPEEXP_{t-1} and DLPEEXP_{t-2} are jointly equal to zero or not. That is, if c(5)=c(6)=0. Based on the Wald test in table 4.4, the F-Statistic of about 10.00 and the corresponding P-value of 0.0088, we can conclude that the joint coefficients of DLPEEXP are not equal to Zero. Since the p-value is less than the 5% (0.05) level of significance, the null hypothesis is rejected and we hold that, there is a causality running from DLPEEXP to DLGDP in the short run.

4.6 VAR-based Short run Causality from DLGDP to DLPEEXP

Table 4.6 Causality Test Result

<table>
<thead>
<tr>
<th>Null Hypothesis:</th>
<th>C(14) = 0</th>
<th>C(15) = 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>F- Statistics</td>
<td>1.801149</td>
<td>Probability</td>
</tr>
<tr>
<td>Chi- Square</td>
<td>3.602298</td>
<td>Probability</td>
</tr>
</tbody>
</table>

Source: Author’s Computation.

Table 4.6 is the result of the short run causality test running from DLGDP to DLPEEXP. The 2-lagged coefficient of DLGDP Produced from the VECM result of appendix was tested using Wald coefficient test. This test seeks to establish whether DLGDP_{t-1} and DLGDP_{t-2} are jointly equal to zero or not. That is, if c(14)=c(16)=0. Based on the Wald test of table 4.5, the F-Statistic of about 1.80 and the corresponding P-value of 0.1896, we can conclude that the joint coefficients of DLGDP are equal to Zero. Since the p-value is greater than the 5% (0.05) level of significance, the null hypothesis is upheld and we hold that, there is no causality running from LGDP to LPEEXP in the short run.

Based on the results of tables 4.5 and 4.6, we can reject the null hypothesis of no causality between GDP and PEEXP and conclude a one directional causality running from logPEEXP to logGDP in the short run but not the other way round. In the long run, however, there is bidirectional causality. By implication, public education expenditures have positive impact on economic growth in both the short and long run. This work agrees with Chude and Chude (2013)
CONCLUSION
Based on the annual time series data and the methodology used, the study arrived at the result that all the variables are cointegrated and there is bidirectional causality between log of gross domestic product and log of public education expenditure in the long run and one directional causality from log of public education expenditure to log of gross domestic product which by implication public education expenditure have positive impact on economic growth in both short run and long run. More so, it does not produce immediate positive impact on human capital development as one-standard deviation shock to log of public education expenditure elicited an immediate negative response except in the long run. Therefore, the study concludes that public financing of education is an important determinant of economic growth. The impact of public education expenditures on economic growth is greater in the developing countries as compared to the developed nations. This is because developing countries have greater marginal productivity in human capital formation even though developed countries invest heavily in human capital.

RECOMMENDATIONS
Based on the findings of the study, the following recommendations were made:
(i) Since both in the short and long run public education expenditures have significant impact on economic growth, government should endeavour to increase public education expenditures from 10.7 per cent to 26 per cent of UNESCO’s minimum benchmark
(ii) Medium and long term planning on education should also be embarked upon as the findings showed that it is only in the long run that education expenditures have significant impact on human capital development.
(iii) Education should be made affordable for all i.e. subsidizing education that would increase the government cost of providing education but would lower the cost of education attainment; thereby raising the demand for education and this in turn would increase the stock of human capital.

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