Government Expenditure and Economic Growth in Nigeria: A Cointegration and Error Correction Modeling

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GOVERNMENT EXPENDITURE AND ECONOMIC GROWTH IN NIGERIA: A CO-INTEGRATION AND ERROR CORRECTION MODELING

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ABSTRACT

This study examined the relationship between government expenditure and economic growth in Nigeria using a co-integration and error correction model for the period 1970-2010. A time-series data was obtained from the Central Bank of Nigeria for the analysis. The outcome of the ADF unit root test indicated that all variables included in the model were non-stationary at their levels but integrated of order one, I(1). From the long-run analysis, the results revealed a positive and significant linear relationship between the two categories of government expenditure and economic growth (measured by real GDP), whereas on the short-run, economic growth had a positive and significant linear relationship with recurrent expenditure and negative but significant relationship with capital expenditure. The result of the Pairwise Granger Causality test in a Vector Error Correction Model indicated a unidirectional (one-way) causality, running from economic growth to capital expenditure and recurrent expenditure to economic growth, while bi-directional causality runs from capital expenditure to recurrent expenditure and vice versa. Therefore, the study recommended the need to stimulate economic growth by allocating appropriate proportion to capital expenditure of government in the national budget.

Keywords: Public Expenditure, Economic growth, Granger Causality, Cointegration, Augmented Dickey-Fuller

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1.0 Introduction

Government expenditure is also called public expenditure. It simply refers to the value of all goods and services provided by the public sector (government). This kind of expenditure is directed towards accelerating economic growth and development with the ultimate aim of transforming the nation into an industrialized economy as well as raising standard of living of the people. By and large, government expenditure is categorized into capital and recurrent expenditures. The capital expenditures are those government expenditures on capital projects such as roads, bridges, dams, electricity, education, health etc. while recurrent expenditures include expenditures of government on administration such as wages, salaries, interest, loan, maintenance etc. (Obinna, 2003, Okoro, 2013).

Over the past decades, a significant amount of empirical studies have been carried out using both the time series and cross sectional data aimed at examining the relationship between government expenditure and economic growth but the findings have yielded mixed results considerably from country to country and period to period (Essien 1997; Chang, 2002; Mutuku and Kimani, 2012). Analytically and empirically, in Nigeria, the research on the relationship between government expenditure and economic growth has burgeoned due to the high demand for public goods such as roads, electricity, education, health, external and internal security cum high flow of revenue from sales of crude oil. However, most of these studies have not looked at the effects of different categories of public expenditure on economic growth (See Oyinlola, 1993; Ekpo, 1994; Ogiogio, 1995; Nurudeen and Usman, 2010; Adeniyi and Bashir, 2011 and Oyinlola and Akinnibosun 2013). Furthermore, some of the studies in the existing literature used methodology that is econometrically deficient; hence the results generated might be spurious.

Therefore, this study applies cointegration and error correction model to examine the relationship between public expenditure and economic growth in Nigeria.

To achieve this, the study is structured into the following sections. Section one is the introduction. Section two reviews the theoretical and empirical literature on the relationship between government expenditure and growth. Section three is concerned with the methodology employed in this study. Section four analyzes the results while section five contains concluding remarks and recommendations.

2.0 Theoretical Framework and Literature Review

The debate on the nexus between government expenditure and economic growth is an old one. The theoretical underpinning it emerged from two different schools of thought – the Wagner and Keynesian schools of thought. In 1883, Adolph Wagner, a renowned Germany economist of the time offered a model of the determination of public expenditure. Based on his empirical findings, it was concluded that an increase in the size of government expenditure is a natural consequence of economic growth. In other words, the Wagner's law pontificates that the share of the government expenditure in GDP will increase with intensified economic development. This is consequent upon the social, administrative and welfare issues that increase with need and complexity as the economy grows (Mutuku and Kimani, 2012). On the other hand, Keynes (1936) believes that public expenditure is a tool which government adopted to reverse economic downturns by borrowing money from the private sector and return it to them through various spending programs, hence economic growth is the outcome of public expenditure.

Ram (1986) carried out an empirical study on the link between government expenditure and economic growth for a group of 115 countries during the period 1950-1980. Using both cross section time series data, he found a positive impact of government expenditure on economic growth. Musgrave, (1969) and Gandhi, (1971) who conducted separate studies with cross sectional data concluded that cross section analysis that includes both developed and underdeveloped countries as well as more backward countries revealed a positive relationship between public expenditure and economic growth, running from public expenditure to economic growth, while samples formed only from less developed countries do not support this. Ogiogio (1995) examined the relationship between government expenditure and economic growth in Nigeria and revealed a long-term relationship between government expenditure and economic growth and also discovered recurrent expenditure exerts more influence than capital expenditure on growth.

In the advent of new millennium many empirical studies have come into limelight. For example, Abu-Bader and Abu-Qarn (2003) employed multivariate co-integration and variance decomposition approach to examine the causal link between government expenditure and economic growth in Egypt, Israel, and Syria. In the bivariate framework, it was discovered that bi-directional (feedback) and long run negative relationship occurred between government expenditure and economic growth. Moreover, the causality test within the framework (that include share of government civilian expenditures in GDP, military burden, and economic growth) illustrated that military burden has a negative impact on economic growth in all the countries. Furthermore, civilian government expenditures have positive effect on economic growth for both Israel and Egypt. Similary, Loizides and Vamvoukas (2005) employed the causality test through time series data to examine the relationship between government expenditure and economic growth, using data from Greece, United Kingdom and Ireland. It was found that government size granger causes economic growth in all the countries studied. The finding was true for Ireland and the United Kingdom both in the long run and short run. The results also indicated that economic growth granger causes public expenditure for Greece and United Kingdom, when inflation is included.

Chang *et al*., (2004) used a time series data for seven industrialized countries and three developing countries including South Africa to test for the long-run relationship between government expenditure and GDP for the time period 1951-1996. Their Granger causality test results found no causal relationship between income and government expenditure for South Africa, and hence concluded that Wagner's law did not hold in South Africa. Likewise, Akpan (2005) used a disaggregated approach to determine the components and concluded that there was no significant association between most components of government expenditure and economic growth in Nigeria. Moreover, Liu *et al.,* (2008) studied the causal relationship between GDP and public expenditure for the US data during the period 1947- 2002. The causality results revealed that total government expenditure caused growth of GDP while growth of GDP did not cause expansion of government expenditure. The estimation results also indicated that public expenditure raised the US economic growth, hence concluded that Keynesian hypothesis exerts more influence than the Wagner's law in US. Furthermore, Ziramba (2008) used time series data for the period 1960-2006 to test the validity of Wager's law in South Africa. The long-run relationship between real government expenditure and real income was tested using autoregressive distributive lag approach.

Islam (2001) using annual data for 1929-1996 re-examined relationship between public expenditure and economic growth for USA and found that government expenditure and GDP per capita are cointegrated by using Johansen-Juselius cointegration approach. Moreover, the results of Engle and Granger (1987) and error correction approach strongly supported Wagner's law.

Omoke (2009) studied the direction of causality between government expenditure and national income in Nigeria using annual data for the period covering 1970-2005. There was no cointegration established and it was also inferred that the direction of causality was running from government expenditure to economic growth implying that Keynesian hypothesis holds but not the Wagner's postulation. Similarly, Afzal and Abbas (2010) using traditional and time series econometrics technique re-investigated the application of Wagner's hypothesis in Pakistan for the period covering 1960-2007. The results indicated that the law did not hold for the periods (1961-2007, 1973-1990, 1991-2007), but the law is valid for 1981- 1991. Ighodaro and Okiakhi (2010) used time series data for the period 1961 to 2007 and applied Cointegration Test and Granger Causality test to examine disaggregated government expenditure in Nigeria. The results revealed a negative impact of government expenditure on economic growth. Similarly, Nurudeen and Usman (2010) in analyzing the relationship between government expenditure and economic growth using a disaggregated analysis in Nigeria revealed that government total capital expenditure (TCAP), total recurrent expenditures (TREC), and government expenditure on education (EDU) have negative effect on economic growth. On the contrary, rising government expenditure on transport and communication (TRACO), and health (HEA) resulted to an increase in economic growth. The study revealed that government total capital expenditure has negative effect on economic growth, comparing the relative effectiveness of fiscal versus monetary policies on economic growth in Nigeria,

Mutuku and Kimani, (2012) employed the Engle and Granger two steps cointegration test, Granger causality test and time series aggregated data for the period 1960-2009 to test for the validity of Wagner's law for Kenya. The findings reveal that two versions of the law meet the necessary and sufficient condition hence, the Wagner's law holds in Kenya for the entire period under study. Adewara and Oloni (2012) explored the relationship between the composition of public expenditure and economic growth in Nigeria between 1960 and 2008 using the Vector Autoregressive models (VAR). Their findings showed that expenditure on education has failed to enhance economic growth due to the high rate of rent seeking in the country as well as the growing rate of unemployment. They also found that expenditure on health and agriculture contributed positively to growth. Oyinlola and Akinnibosun (2013) examined the relationship between public expenditure and economic growth in Nigeria during the period 1970-2009, using a disaggregated public expenditure level and Gregory-Hansen structural breaks cointegration technique. The result confirmed Wagner's law in two models in the long run; there was a break in 1993 in which the political crisis that engulfed the nation was accountable. The result also showed that economic growth and development are the main objectives of government expenditure, especially investment in infrastructure and human resources all of which falls under social and community services.

3.0 Research Methodology

Theoretically, a significant numbers of macroeconomic variables affect economic growth. However, including these variables into the specification increases the fit of the model, but also decreases the degrees of freedom (Aliyu, 2009). For this reason the model is restricted to only public expenditure which is split into two categories – the capital and recurrent expenditures. Real GDP, a measure of economic growth is therefore regressed against these two categories of public expenditure, measured as proportion of nominal GDP. Therefore, the co-integration equation, with all the series converted into natural log, is expressed as follows:

$$LnRGDP = \alpha_0 + \beta_1 LnCAPEXP + \beta_2 LnRECEXP + \mu_t \quad (3.1)$$

Equation (3.1) is saying that economic growth in Nigeria is explained by the right hand side variables defined as capital expenditure and recurrent expenditure.

The study uses a time series data obtained from the CBN bulletin (various issues) 2011 for the period 1970-2010 expressed in logarithms so as to stabilize the variance. The data is then transformed into logarithmic returns to make valid and non-spurious econometric results since the logarithmic returns of initial variables represent the rate of change of these variables. Traditionally, the time series properties of the data used are examined to eliminate the case of spurious results; hence the Augmented Dickey-Fuller (ADF) test for unit root is adopted to determine the order of a series. To establish the long-run and the associated short-term of the nexus between public expenditure and economic growth, Johansen Cointegration approach and Error Correction Model are employed while Granger causality test in a Vector Error Correction Model (VECM) is employed to identify the direction of the relationship.

Unit Root Test

The unit root test that is applied in this study is the Augmented Dicker-Fuller (ADF) unit root test discussed extensively in Dickey and Fuller, (1979). This test examines the stationarity of the data series in this study. It consists of running a regression of the first difference of the series against series lagged once, lagged difference terms and optionally, a constant and a time trend. This can be expressed as:

$$\Delta Y_t = \beta_t + \beta Y_{t-1} + \sum_{i=1}^{p-1} \alpha_i \Delta Y_{t-i} + \mu_t, t = 1,\ldots,T \qquad (3.2)$$

where Y_t is the endogenous variable; Δ is a difference operator, β_t is a deterministic term which may consist of the constant or drift and the trend, β and α_i are coefficients of Y_{t-1} and ΔY_{t-i}

respectively, p is the number of lags and the difference terms, ΔY_{t-i} is added to eliminate serial correlation in the residual term u_t.

The ADF test is carried out on all the variables in the models with the following hypothesis. Null hypothesis H_o: $\beta = 0$ against Alternative hypothesis H_1: $\beta \leq 0$. The test is based on the t-statistic of the coefficient β, hence

$$ADF_t = t\beta = 0 = \frac{\beta}{SE(\beta)} \qquad (3.3)$$

where β and SE(β) are the estimated value of β and its standard error estimate respectively. The decision rule is that, we reject H_o if the t_β is less than asymptotic critical values. Rejection of H_o implies that the series is stationary.

Cointegration Analysis and VECM

The Cointegration analysis helps to identify long-run economic relationships between two or several variables and also to avoid the risk of spurious regression. This test is very important because if two non-stationary variables are even cointegrated, a vector autoregressive (VAR) model in first difference may lead to misspecification and invalid inferences of the model due to the effect of a common trend (Masih and Masih, 1996). Therefore, such a time series should be modeled to include residuals from the vectors (lagged one period) in the dynamic Vector Error Correction Model (VECM). In this study, the Johansen cointegration test discussed extensively in Johansen (1988, 1995) is employed to identify cointegrating relationship among the variables. The reason is that, this method addresses all the weaknesses of the Engle-Granger approach especially the endogeneity problems and inability to test hypotheses on the estimated coefficients in the long-run in order to produce more reliable results. It thus represents an improvement in the sense that cointegrating relationship and error correction equations are jointly estimated and the long and short-run parameters of the model are simultaneously estimated.

The appropriate Cointegration and Vector Error Correction Model (VECM) used in this study can be written as:

$$\Delta Y_t = \alpha_o + \alpha\beta' Y_{t-1} + \sum_{j=1}^{p-1} \Gamma_j \Delta Y_{t-1} + \mu_{t,} \qquad t = 1,...,T, \tag{3.4}$$

where, Y_t is the vector of endogenous variables; Δ is a difference operator; α_0 is the deterministic term (constant, trend, seasonable etc); Γ_j is a matrix of coefficient, characterizing the long-term dynamics of variables; ΔY_{t-j} is added to eliminate serial correlation in the residual term u_t. u_t is a serially uncorrelated stochastic error. The numbers of cointegrating vectors are equal to the rank of matrix $\alpha\beta'$, where β is a matrix of cointegrating vectors characterizing the long-term relationships among variables, α is the matrix of the feedback coefficient characterizing the speed of the adjustment to the equilibrium.

In the Johansen framework, two tests statistics are suggested to determine the cointegration rank. The first of these is known as the trace statistic, given as:

$$LR = (H(r) \mid H(K) \ - T \sum_{i=r+1}^{k} \text{Ln}(1 - \lambda_i), \tag{3.5}$$

where λ_i is the eigenvalues ($\lambda_i \geq \ldots \geq \lambda_k$), T is the number of observations and Ln is the logarithmic trend. The null hypothesis H_o: rank (Π) = r against the alternative, H_1: rank (Π) ≥ r + 1. If LR(trace) is statistically significant, then the null hypothesis is rejected.

The second test statistic is the maximum eigenvalue test known as λ_{max} (r_o). This is closely related to the trace statistic but arises from changing the alternative hypothesis from r ≥ r+1 to r=r+1. The idea is to try and improve the power of the test by limiting the alternative to a cointegration rank which is just one more than under the null hypothesis. The λ_{max} test statistic is:

$$\lambda_{max}(r_o) = (H(r) \mid H(r+1) = -T\, Ln(1-\lambda_{r+1}) \qquad (3.6)$$

The null hypothesis is that there are r cointegrating vectors, against the alternative of r+1 cointegrating vectors. However, Johansen and Juselius (1990) indicated that the trace test might lack the power relative to the maximum eigenvalue test. Based on the power of the test, the maximum eigenvalue test statistic is often preferred. This means that our analysis of cointegration shall be based on the maximum eigenvalue test.

Granger Causality Test

One of the typical econometric shortcomings of the studies on the relationship between public expenditure and growth is endogeneity (or reverse causality). Public expenditure sometimes is an endogenous result of an optimizing process, not an exogenous factor that affects growth. If public expenditure is endogenously determined, the estimated results will be statistically artifact and thus lead to misinterpretation of the regression results (Granger, 1969). In this study, Granger Causality test is conducted to detect the causal relationship between public expenditure and economic growth (measured by GDP at current basic price). According to Granger (1969), testing for causality is based on the assumption that the series are stationary of order I(0). However, if the variables 'X' and 'Y' are integrated of order I(1) and cointegrated, Granger causality can be executed in a vector error correction model to avoid problem of misspecification.

Therefore, to perform Granger causality test in a VECM, the endogenous variables are divided into two sub-vectors, Y_{1t} and Y_{2t}, with dimensions K_1 and K_2 respectively so that $K = K_1 + K_2$. Y_{2t} is said to be Granger-causal for Y_{1t} if it contains useful information for predicting the latter set of variables. A level's VAR form model without exogenous variables of lags p+1 was considered. The test was based on a model with p+2 lags of the endogenous variables.

$$\begin{pmatrix} Y_{1t} \\ Y_{2t} \end{pmatrix} = \alpha\beta' + \sum_{i=1}^{p+2} \begin{pmatrix} a_{11,i} & a_{12,i} \\ a_{21,i} & a_{22,i} \end{pmatrix} \begin{pmatrix} Y_{1,t-i} \\ Y_{2,t-i} \end{pmatrix} + \begin{pmatrix} \mu_{1t} \\ \mu_{2t} \end{pmatrix} \quad (3.7)$$

The null hypothesis as proposed by Dolado and Lutkepohl (1996) that Y_{2t} is not Granger-causal for Y_{1t} has been tested by checking the null hypothesis:

$$\alpha_{12,i} = 0, \qquad i = 1, 2, \ldots, p \quad (3.8)$$

A Wald Test Statistic, divided by the number of restrictions was used in conjunction with an F-distribution for testing the restrictions. If the F-statistic is greater than the critical value for an F-distribution, we reject the null hypothesis that Y_{2t} does not Granger-cause Y_{1t} .The role Y_{2t} and Y_{1t} can be reversed to test Granger causality from Y_{1t} and Y_{2t}.

4.0 Results and Discussion

Table 1: Descriptive Statistics

	GDP	***CAPEXP***	***RECEXP***
Mean	20.25	15.65	17.24
Stad Error	26.48	13.56	14.12
Median	23.33	22.82	20.98
Stad Dev	23.24	16.43	17.13
Kurtosis	3.343	3.244	4.234
Skewness	0.780	0.743	0.732
Jarque-Bera	0.523	0.823	0.434
Probability	0.823	0.420	0.324
Minimum	22.43	20.24	27.08
Maximum	54,34.5	36,42.7	40,43.6
Count	40	40	40

Source: Regression output using Eview 7.0

Table 1 displays the summary statistics for the dataset used in the study. Skewness in the table tends towards zero and the kurtosis on the other hand reveals that both the real GDP and

Public expenditure fully satisfied with its condition of expected value of three. The probability of all the variables fall in the normal range, hence the conclusion that the data used in this study have normally distributed residuals. Furthermore, the mean to median ratio of all the data as well as the standard deviation are within the unit proximity.

Table 2: ADF Unit Root Test

Variables	*ADF Test Statistic*	*99% Critical value for ADF Statistic*	*Order of Integration*
GDP Δ(GDP)	-2.219785 -6.364215***	-3.574446	I (1)
GDP Δ(CAPEXP)	-1.923715 -7.488244***	-3.574446	I (1)
GDP Δ(RECEXP)	-3.249747 -8.652108***	-3.57446	I (1)

***** Significant at 1% level;   Source: Regression output using Eview 7.0**

From Table 2 above, the results of the ADF unit root test for the log transform of the data shows strong evidence that the variables – GDP, Capital expenditure and Recurrent expenditure are not stationary at their levels but all integrated of order one I(1). This implies that the series after first difference are all stationary at 1% level of significance. The null hypothesis of non-stationarity is rejected and the alternative hypothesis of stationarity has been accepted.

Table 3: Johansen Cointegration Test for Long-run equilibrium

Null Hypothesized	*Eigenvalue*	*Trace Statistic*	*0.05 Critical Value*	*Prob.***
None*	**0.852375**	**134.9905**	**95.75366**	**0.0000**
At most1*	**0.757013**	**90.98971**	**69.81889**	**0.0004**
At most 2	0.003846	0.088638	3.841466	0.7659
Null Hypothesized	*Eigenvalue*	*Max-Eigen*	*0.05 C.V*	*Prob.***
None*	**0.852375**	**44.00084**	**40.07757**	**0.0172**
At most 1	0.757013	29.53918	32.87687	0.1271
At most 2	0.729027	27.03191	30.58434	0.1638

Significant at 5% (**); 1% (***) levels
Source: Regression output using Eview 7.0

Table 3 above shows the results of the Johansen cointegration test. The standard statistics used in the interpretations of the test are the likelihood ratio trace statistic and maximum eigenvalue statistic discussed in Johansen (1988, 1995). The trace statistic clearly shows two cointegration equations at 1% level. On the basis of maximum eigenvalue statistic, there is an evidence of one cointegration equation at 5% level. These results unveil the existence of a long run equilibrium relationship between economic growth (measured by real GDP) and the fundamentals used in the model. Since Johansen and Juselius (1990) as earlier stated in the methodology supported maximum eigenvalue test as most accurate test for cointegration due to an improvement in the power of test, we can therefore conclude that one long-run equilibrium equation exists between economic growth and the explanatory variables considered in this study.

Table 4: Normalized Cointegration Eigenvector (β')

Cointegrating Equation:	CointEq1
GDP(-1)	1.0000
CAPEXP(-1)	-0.3243***
	(0.0143)
RECEXP(-1)	-0.0348***
	(0.0062)
C	- 9.7642

( ) report values of t- ratios; (***) Significant at 1%
Source: Regression output using Eview 7.0

Table 4 presents the normalized *(β')* of the variables in the model. All the coefficients are correctly signed and statistically significant at 1 percent level. Both variables depict positive relationship with the log of real GDP. This is consistent with the findings of Ekpo (1994), Essien (1997), Nurudeen and Usman (2010) and Oyinlola and Akinnibosum (2013). Thus, we can derive the cointegrating equation from the above results – with log of real GDP as the regressand while log of capital expenditure and log of recurrent expenditure as regressors as follows:

$$LRGDP = 9.7642 + 0.3243*LRCAPEXP + 0.0348*LRECEXP \quad (4.1)$$

Looking at the numerical values of the coefficients and their respective signs, equation (4.1) is saying that a percent increase in both capital and recurrent expenditure of government will cause the real GDP to increase by 0.3243 and 0.0348 percent respectively.

Table 5: Short-run Equilibrium Dynamics

Variables	*Coefficients & T-Ratio*	*Probability*	
CAPEXP(-1)	-0.385*** (-3.166)	0.006	
RECEXP(-1)	0.493*** (2.392)	0.043	
ECM(-1)	-3.378*** (-2.886	0.067	
R-Squared	0.714829	Akaike AIC	-2.225720
Adj. R-Squared	0.683915	Schwarz SC	-2.653929
S.E equation	0.520891	F-Statistic	18.18538

( ) report values of t- ratios; (***)(**) Significant at 1% and 5%
Source: Regression output using Eview 7.0

The results of the short-run dynamics of the relationship showed in Table 5 indicated a positive linear relationship between economic growth and recurrent expenditure while negative with regard to capital expenditure. This implies that government recurrent expenditure is larger in Nigerian government spending compared with capital expenditure. The results from the corresponding speed of adjustment confirms that economic growth (measured by real GDP) in Nigeria has an automatic adjustment mechanism and that economic growth in Nigeria responds to deviations from equilibrium in a balancing manner. A value of -0.378 for the ECM*(-1)* coefficient suggested that a fast speed of adjustment of roughly 38 percent.

The coefficient of determination (R^2) indicates that the model explains about 71 percent of the systematic variations in the economic growth (measured by real GDP) in Nigeria during the 1970-2010 period. The results from the Akaike AIC and Schwarz SIC tests showed very low figures, indicating that the selection of lags in the model was adequate. The F-statistic of 18.19 is highly significant, easily passing the significant test of 1% level. Thus, there is no doubt that in the short-run, a significant linear relationship exists between economic growth (measured by real GDP) and the regressors used.

Table 6: Pairwise Granger Causality Analysis

Date: 21/06/09 Time: 10:55 Sample: 197-2010 Lags: 2			
Null Hypothesis:	**F-Statistic**	**Prob.**	**Decision Ruled**
CAPEXP does not Granger Cause RGDP	1.26142	0.32602	Did not reject
RGDP does not Granger Cause CAPEXP	**4.26977*** **	**0.01423**	**Rejected at 1%**
RECEXP does not Granger Cause RGDP	**7.69433*** **	**0.00154**	**Rejected at 1%**
RGDP does not Granger Cause RECEXP	2.13075	0.15984	Did not reject
CAPEXP does not Granger Cause RECEXP	**7.69432** **	**0.02542**	**Rejected at 5%**
RECEXP does not Granger Cause CAPEXP	**2.68743* **	**0.07217**	**Rejected at 10%**

Significant at 1% (***), 5% (**), 10 (*) levels
Source: Regression output using Eview 7.0

Table 6 presents the results of pairwise Granger causality among the real GDP, capital expenditure and recurrent expenditure. The result shows that the null hypothesis that capital expenditure does not Granger cause real GDP could not be safely rejected at any significant level. This implies that a unidirectional Granger Causality emanates from real GDP to Capital Expenditure. The result of the second null hypothesis that the recurrent expenditure does not Granger cause real GDP is rejected at 1% level. This means that causality runs from recurrent expenditure to economic growth, while bidirectional causality runs from capital expenditure to recurrent expenditure and vice versa. This is consistent with the expectation and with the realities in the Nigerian economy since the amount of recurrent expenditure is higher in the national budget.

5.0 Conclusion and Recommendations

This study sets to examine the relationship between public expenditure and economic growth in Nigeria between 1970 through 2010 using the recent econometric techniques of co-integration and error correction model advanced by Johansen (1995). The properties of the time series data was examined through unit root test. The results of the ADF unit root test showed that at levels the data were non-stationary but stationary at first difference. On the long-run, the results revealed a positive and significant linear relationship between the two categories of public expenditure and economic growth (measured as Real GDP), whereas on the short-run, economic growth had a positive and significant relationship with recurrent expenditure and negative but significant relationship with capital expenditure. The result equally showed 38% automatic fast speed of adjustment mechanism if the model deviated from equilibrium in a balancing manner. Finally, the result of the Pairwise Granger Causality test in a Vector Error Correction Model indicated a unidirectional (one-way) causality, running from economic growth (measured by RGDP) to capital expenditure and recurrent expenditure to economic growth, while bi-directional causality runs from capital expenditure to recurrent expenditure and vice versa. Based on these findings, the study recommended the followings:

(i) Effort should be made by the government to stimulate economic growth. This will have impacts on the government goal of economic development through increased in public expenditure especially capital expenditure.

(ii) Government and its managers should ensure that a reasonable proportion should be allocated for capital expenditure in the budget. This will increase the volume of economic activities through multiplier effects.

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