ECONOMICS THEMES

Pattern and Structure of Defence Spending and its Impact on Economic Growth in Nigeria

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ABSTRACT

This paper examines the pattern and structure of defence spending and the impact on economic growth in Nigeria over the period 1980-2015. The study used the multiple regression specification to estimate the impact of defence expenditure on economic growth in Nigeria using the Aizeman-Glick (2003) model. A trend analysis for each of the variables of the study was conducted to observe the pattern of movements in the variables used as proxies for defence expenditure and economic growth in Nigeria over the study period. Result of the trend analysis reveals a common characteristic that exist in defence expenditure allocation decisions in Nigeria and that defence expenditure in Nigeria is largely a composition of the recurrent expenditure. Findings further reveal that defence expenditures during the period of study have both positive and negative impacts on the growth of Nigerian economy. While the impact in the short-run is negative, it is clearly positive in the long-run as shown in the estimated long run co-integrated coefficients and results of multiple regressions. Based on the findings, there is the need to plug leakages and increase defence allocation in the budget, to enhance the combat readiness of the Nigerian armed forces in order to create a peaceful environment for growth.

Key Words: Defence Spending, Economic Growth, Multiple Regression Models.

1.0 Introduction

Early Economists of the classical tradition including Wagner (1890) and later Smith (1980), recognize the role of defence spending in the economy when they argued that a free market-based economy function well only when the activities of government are limited to defence, security and maintenance of law and order. This argument was on the basis that the Military, on whom the power to defend the country against internal and external threats is vested, is part of the national economy and can be funded adequately only through the machinery of the State. However, the amount of budgetary resources that should be allocated to the defence sector in order to maintain its structure and personnel has generated much controversy in the literature. One strand of the argument is the view that expenditure on defence is unproductive and as such, budgetary allocation to the defence sector should be as minimal as possible. This view was shared by Dunne and Tian (2015), Olaniyi (2000), etc. In Nigeria, the problem of understanding the structure, pattern and impact of growth of defence spending on economic growth has engaged the attention of researchers over the years. This is against the backdrop that, though defence expenditure in Nigeria has been increasing over the years, there is no significant reduction in economic growth-retarding elements such as Boko-haram resurgence, threatening life and property in the eastern zone of Northern Nigeria. Many factors, including corruption in the military, have been cited as responsible for the abysmal failure of the defence sector, Eme and Anyandike (2013). In terms of structuring, defence expenditure is structured into recurrent and capital.

Furthermore, the size and pattern of budgetary allocation to the defence sector in Nigeria has fluctuated over the years. For example, defence expenditure as a percentage of the total Federal Government budgetary provision was 10.13 percent in 1974 and 11.99 percent in 1975. However, it fell to 9.79 per cent in 1986 and to 2.45 in 1992 and increased to 9.10 in 2002 during the civilian administration and maintained 7.23 and 7.74 in years 2005 and 2006 respectively. By 2011, 2012 it rose to 9.7 and 9.8 percent respectively and fell to 9.3 percent in 2013 and in 2015 stood at 9.8 percent. These fluctuations have continued till date. Therefore, with the increasing responsibility of Nigerian military in maintaining peace and tranquility in the West African sub-region and the world at large, the issues that need to be resolved are the size and funding of Nigeria's Armed Forces (**Anyanwu*et. al*. 2010)**. In relation to the impact of rising defence spending on economic growth in Nigeria, expectations are that the level of security in the country will be high. However, the result of previous studies on defence spending and economic growth relationship reveal mixed findings. For example, while Studies such as Eme and Anyandike (2013), Yildrinand Ocal (2014) find evidence of a positive relationship between defence spending and economic growth, findings of Saidu (2008) and Musayev(2015) reveal a negative relationship.

This study carried out an in-depth analysis of the structure and pattern of defence spending in Nigeria. This aspect needs to be re-examined to guide against likely misdirected policy intervention and inappropriate allocation to the sector. Against this backdrop, the objective of this paper is to examine the pattern and structure of defence spending and its impact on economic growth in Nigeria over the period 1980-2015.The rest of the paper is structured as follows: section two reviewed literature relevant to the study and captured the theoretical framework, while section three is the methodology. Section four presents and discusses the findings while section five, provides the conclusion and recommendations.

2.0Empirical Literature Review and Theoretical Framework

Dunne and Tian (2015) examine the impact of military expenditure on economic growth using the dynamic panel data method for the period 1988–2010. They find that military expenditure has a negative effect on growth in the short and long run. Yildirim and Öcal (2014) analyze the influence of military expenditure on economic growth for the time period 2000–2010 for a sample of 128 countries. Employing an augmented Solow model specification, the authors find that military expenditure has a positive effect on economic growth. Dunne (2012) studies the economic effects of military spending using a cross-country panel dataset spanning 1988–2006. The author also examines the Sub-Saharan Africa region that has suffered from a number of violent conflicts. The results indicate a significant negative short-run effect and insignificant long-run effect of milex on per capita income growth. Houa and Chena (2013) restrict analysis to 35 developing countries over the period of 1975–2009. They used the system Generalized Method of Moments (GMM) estimators and document a negative and significant effect of defense spending on economic growth in the sample countries. Alexander (2011), in his study examined the macroeconomic impact of defence expenditure on economic growth in Nigeria. Using a stimulation approach and two stage least square technique, he established that defence expenditure had a significant positive impact on output of oil and gas, agriculture and social services sector, but a negative effect on manufactured output in Nigeria.

Saidu (2008) uses simple regression methods on a time series data covering 1975 to 2005 to establish the relationship between defence expenditure and national development in Nigeria. The result shows a negative relationship between defence expenditure and national development over the period of study. Waya (2005) analyses the trends and patterns of defence spending and relates it to economic growth in Nigeria over the period 1980 to 2003, using the ordinary least square method of econometric analysis. Findings show that there is a significant positive impact of defence expenditures on Nigerian GDP growth rate.

Olaniyi (2000) uses the two stages least square method to determine the relationship between defence spending and economic development in Nigeria by examining the linkages between defence spending and the socio economic sectors of the Nigerian economy and determining the direction of causality. The analysis on a time series data for the period 1975 to 1995 shows that military capital expenditure has no significant effect on productivity and that military capital is less productive than civilian capital in the economy. Musayev (2015) re-examined the relationship between military spending and economic growth with a focus on the direct and indirect effects of conflict, corruption, and natural resources on economic growth. The author finds that the impact of military expenditure on growth is generally negative. However, the effect is not harmful for countries facing higher internal threats once corruption levels are accounted for. The empirical literature reviewed in this paper suggests that the impact of defence expenditure is quite extensive and largely negative on economic growth. However, some studies found positive impact of defence expenditure on economic growth while others were both positive and negative and inconclusive.

Under Keynesian demand side hypothesis growth in government expenditure leads to economic growth. Public expenditure is considered a policy variable which can be used to influence economic growth and development. Wagner treats public expenditure as an outcome, or endogenous factor of the growth of an economy, while Keynes regards public expenditure as an exogenous factor which can be utilized as a policy instrument to stimulate economic growth. This study adopted the Keynesian Demand Side Hypothesis as a guide. The adoption was on the basis that Keynes regards public expenditure as an exogenous factor which can be utilized as a policy instrument to stimulate economic growth. This conception tallies with the reality of the pattern and the trend of military expenditure in Nigeria over the years.

3.0 Methodology

3.1Sources and Methods of Data

Annual time series data for the period 1980 to 2015 was used in the study. While some were collected from the publications of the Central Bank of Nigeria (CBN), others were sourced from the publications of the national Bureau of Statistics (NBS). The data from these two sources were compared with those in other sources such as The Military Balance (a publication of the International Institute of Strategies Studies) and the year book of Stockholm International Peace Research Institute (SIPRI) in order to confirm their accuracy. The data figures were found to be slightly different and could not alter the researcher's reliance on the CBN and NBS data.

3.2 Model Specification and Estimation Procedure

The study used the multiple regression specification to estimate the impact of defence expenditure on economic growth in Nigeria. The model was adopted from the empirical work of Aizeman-Glick (2003) with modifications. The original Aizenman–Glick (2003) growth equation is specified as:

$$GY_i = c + a_1 DB_i + a_2 THR * DB + b_1 THR + \beta X_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.1$$

$a_1<0$, $b_1<0$, $a_2>0$ $a_2=b_2$

Where: GY_i=per capital real growth; THR_i = Threats; DB_i=military expenditure as a ratio of GDP and is also referred to as the defence burden; THR * DB = the interactive effect of threat and military burden or simply as a country's security consciousness; X_i = set of control variables. The Aizeman-Glick (2003), modified equation is as stated below:

$$RGDP = \beta_0 + \beta_1 CDXP + \beta_2 RDXP + \beta_3 PSXP + \beta_4 OHXP + \mu \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.2$$

Where: RGDP = real gross domestic product; CDXP = capital defence expenditure; RDXP = recurrent defence expenditure; PSXP = personnel expenditure; OHXP = overhead expenditure and μ = error term which is normally distributed. To capture non-linear properties and to correct for heteroscedasticity, the variables employed were all transformed into logarithms.

3.3. Unit Root Test

Two-unit root tests, the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP), were used in this study to investigate the stationarity status of the time series data set. The choice of two-unit root methods was informed by the imperatives of comparison and consistency. Usually, the unit root is conducted on individual variables and stated in three forms as model without intercept and trend, model with intercept but no trend and model with intercept and trend. The specified models are as shown below:

$$?Y_t = Y_t + \beta$$

4.0 Results and Discussion of Findings

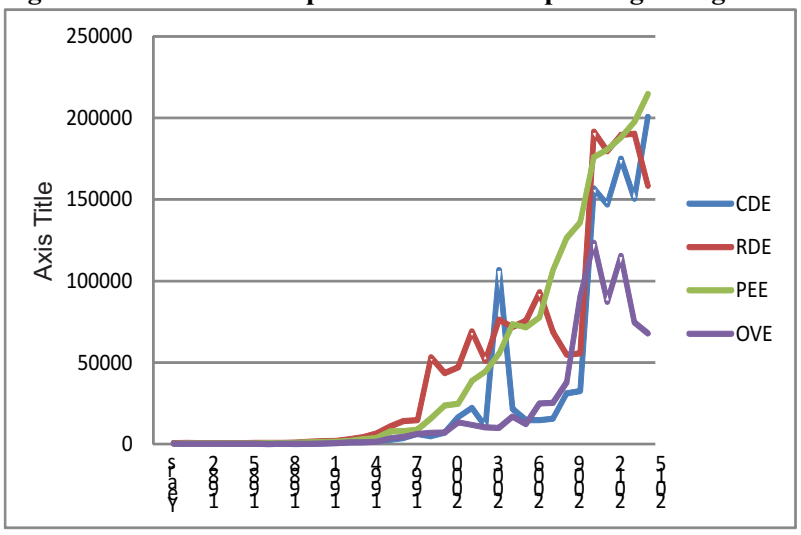
4.1 Pattern and Trend of Defence Spending in Nigeria

Table4.1: Components and trends of Defence Spending in Nigeria

Years	Capital Defence Expenditure ₦-m	Recurrent Defence Expenditure ₦-m	Personnel Expenditure ₦-m	Overhead Expenditure ₦-m
1980	666.70	652.50	292	180
1981	415.20	725.10	397	282
1982	464.30	660.80	386	275
1983	554.80	535.40	338	198
1984	359.00	569.20	384	237
1985	319.10	656.60	394	263
1986	209.00	742.40	445	297
1987	18.30	717.70	597	114
1988	271.30	830.00	610	220
1989	124.10	957.30	737	220
1990	196.40	1410.50	1140	270
1991	411.10	1834.20	1355	479
1992	683.20	2023.40	1456	567
1993	1085.60	3085.40	2051	1034
1994	1286.80	4206.07	3110	1095
1995	2031.20	6597.60	3844	1500
1996	2670.10	10823.30	7804	3621
1997	3820.80	14206.33	7986	4517
1998	6,147.70	14,762.74	8881	6254
1999	4856.30	53155.44	15769	6903
2000	6954.90	43402.32	23639	7108
2001	16400	47069.24	24753	13313
2002	22093.6	69133.82	38652	11758
2003	10679.7	51064.29	44288	10286
2004	106571.1	76321.36	55498	9902
2005	21535.2	71670.04	73431	16902
2006	14686	75564.94	71444	12229
2007	14717.24	93080.85	77672	24926
2008	15601.11	68700	106670	25217
2009	31186	54842	126457	37852
2010	32567.2	55625.6	135675	90537
2011	156746.7	191579.3	175893	123457
2012	146787.05	179535.95	180567	87303
2013	174861.33	189567.67	187903	115292
2014	150479.78	190345.22	197456	74604
2015	200567.20	158257.80	214543	67739

Source: CBN Statistical Bulletin, Various issues

Figure 4.1: Trend of components of defencespending in Nigeria

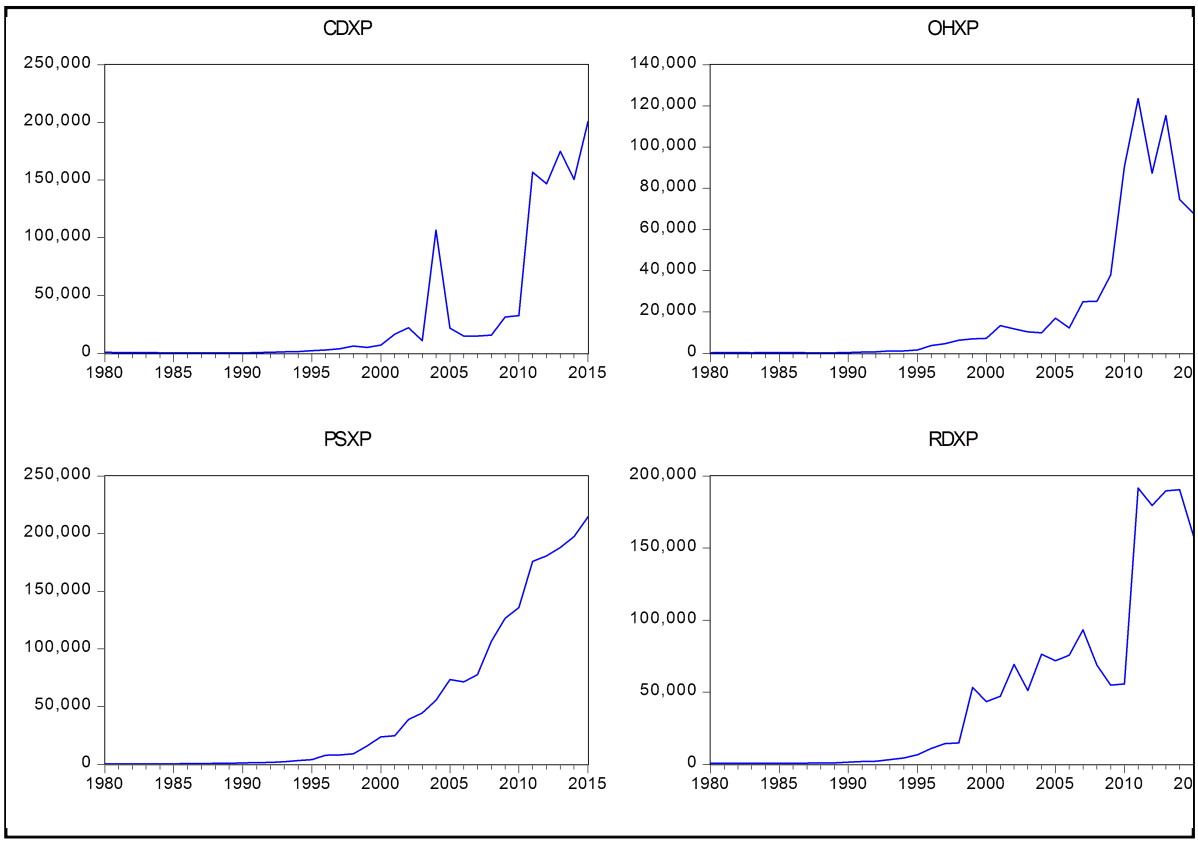


CDE= capital defence expenditure; RDE= recurrent defence expenditure; PEE= personnel expenditure, OVE= overhead expenditure

Source: Compiled by the Researcher from Table 2.1 using Excel 2010

The trend and pattern of the various components of defence expenditure in Nigeria has fluctuated over the years as depicted in table 4.1 and figure 4.1. Table 4.1 and Figure 4.1 above show the trend of defence expenditure for the period 1980 to 2015. The table 4.1 and the figure 4.1 reveal that the recurrent defence expenditure and the personnel expenditure take the highest part of the total expenditure to the defence sector. They both increase faster than others. Recurrent defence expenditure has been in excess of capital defence expenditure for all the years, except in 1980, 2004 and 2015 when capital defence expenditure was greater than the recurrent expenditure, amounting to N666.70, N106571.1 and N200567.20 respectively. This suggests that as total defence expenditure rises over time in Nigeria, recurrent defence expenditure rises proportionately.

Figure 4.2: Trend of Defence Expenditure in Nigeria from 1980-2015

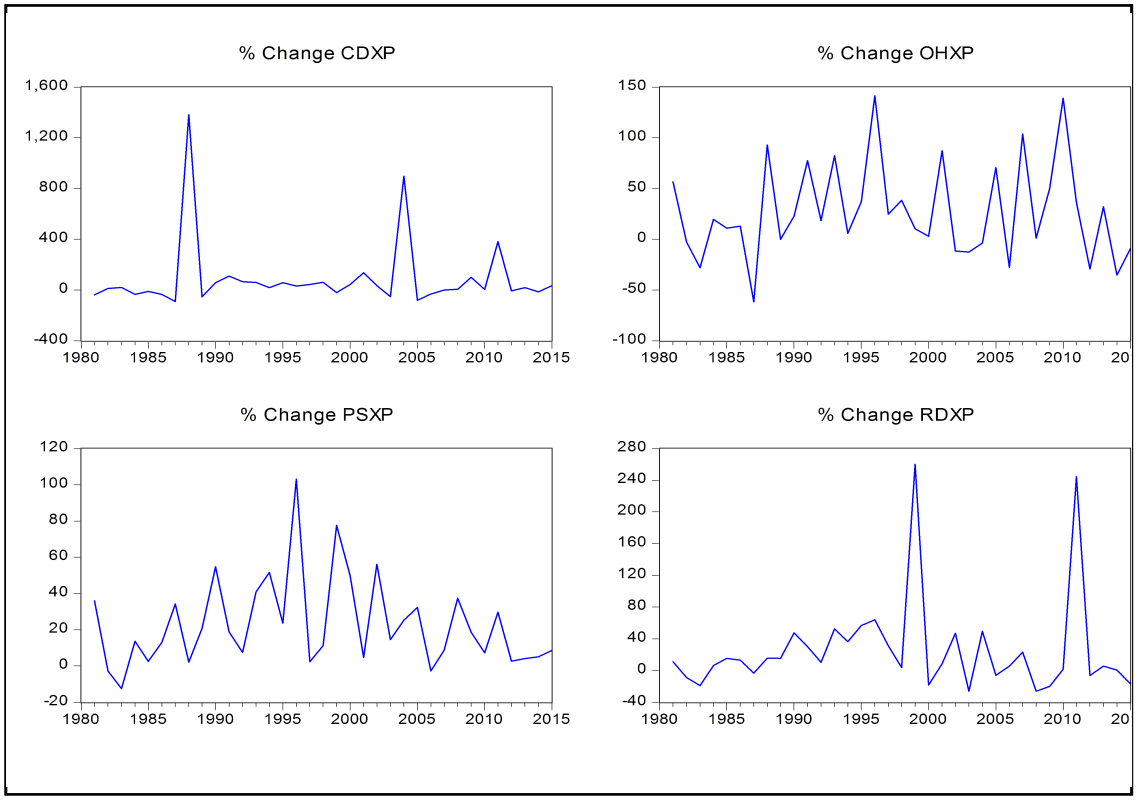


Note: CDXP = Capital Defenceexpenditure;
RDXP = *Recurrent Defence Expenditure,*
PSXP = Personnel Expenditure;
OHXP = overhead Expenditure

Source: Computed by the researcher using Eviews version 9

Figure 4.2 show the trend of government annual defence expenditure for the period 1980 to 2015 and they are in real terms. From the Figure, CDXP, RDXP, PSXP and OHXP have revealed similar trends over the years. Defence expenditure for all the categories (CDXP, RDXP, PSXP and OHXP) was very low and almost zero before 1995 but rises gradually in the mid-2000s and steadily in the mid-2010s. After rising to a peak around 2013s, it falls but very slowly into mid 2015s. This probably, could be attributed to the increasing activities of the militant group in the Niger-delta region as well as Boko-Haram insurgence in the north eastern part of Nigeria.

Figure 4.3: Trend of Defence Expenditure as a percentage share of GDP in Nigeria, 1980 -2015



Source: Computed by the researcher using E-views version 9

Figure 4.3also show the trend of government annual defence expenditure for the period 1980 to 2015. It reveals the values of defence spending as a percentage share of GDP in Nigeria. From the Figuresdefence expenditures for CDXP and RDXP show similar trends while PSXP and OHXP reveal similar trends over the years. What could be logically deduced from the results of the trend analysis is that a common characteristic could be found in defence expenditure allocation decisions in Nigeria. In addition, the structure of defence expenditure in Nigeria is largely a composition of the recurrent expenditure. On this basis, there is a significant trend in the pattern and structure of defence spending in Nigeria over the study period.

Table 4.2: Unit Root Test of Stationarity; H_0: The Series has a Unit Root

Variables	ADF Levels	ADF Difference	PP Levels	PP Difference	Remarks
LCDXP	-0.359[1]	-8.195[1]**	-0.208[1]	-8.195[1]**	**I (1)**
LRDXP	-0.715[1]	-6.551[1]**	-0.507[1]	-7.184[1]**	**I (1)**
LPSXP	-0.162[1]	-6.387[1]**	-0.336[1]	-6.407[1]**	**I (1)**
LOHXP	-1.006[1]	-6.310[1]**	-1.088[1]	-6.298[1]**	**I (1)**
LRGDP	-1.173[1]	-4.039[1]**	-1.247[1]	-4.039[1] **	**I (I)**
ADF Critical Value at 5% = -2.95;			**PP Critical Value at 5% = -2.96**		

** indicates significant at 5%

[1] Indicates that a maximum lag length of 1 was included in the tests.

Source:Computed by the researcher using E-views version 9

Table 4.2 shows the result of Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) tests conducted to ascertain the stationarity status of the data. The test was conducted using a lag length of one decided by the lag selection criteria in Table 4.3. For both ADF and PP at levels, all the variables are non-stationary since their calculated values, in absolute terms, are less than the critical values at 5%. However, at first difference, the variables are stationary at 5% for both ADF and PP. Hence, all the variables could be said to be stationary at the same level and are integrated of order one [I (1)]. Thus, the presence of a unit root in the series suggests that it is necessary to test for co-integration.

Table 4.3: Selection of Lag length for Co integration Test.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1917.157	NA	8.76e+42	113.0681	113.2925	113.1446
1	-1777.069	230.7331	1.02e+40*	106.2982*	107.6450*	106.7575
2	-1680.115	131.1738*	1.65e+38	102.0656	104.5347	102.9076*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error; AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Source:Computed by the researcher using E-views version 9

Before carrying out the co-integration test, it is necessary to determine the appropriate lag length for the test. The optimal length of lag selection for the co-integration test, based on the six information criteria, is reported in Table 4.3. From Table 4.3, three of the five information criteria, the FPE, AIC and SC, which are most widely used, suggest that a lag length of one is optimal for the test. Consequently, this study used a lag length of one for the test of co-integration ranks and for the subsequent diagnostic tests.

Table 4.4: Result of Test for Co -Integration Rank

No. of CE(s)	λ_{Trace}	5%	λ_{max}	5%
None *	215.9	69.82	99.24	33.88
At most 1*	116.7	47.86	0.812	56.79
At most 2	18.61	24.28	14.23	17.80
At most 3	4.382	12,32	3.969	11.22
At most 4	0.413	0.584	0.413	4.130

Trace test indicates 1cointegratingeqn(s) at the 0.05 level;
Max-eigenvalue test indicates 1 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
λ_{Trace} = Trace Statistic,; λ_{max} = Maximum eigenvalue
Source:Computed by the researcher using E-views version 9

Table 4.4 shows the result of Johanson co-integration test. The test was conducted using a lag length of one decided by the lag selection criteria reported in Table 4.3. The test revealed that there are two co-integration equations in the system, implying that the variables of the study have a long-run equilibrium relationship. The implication of this result is that even when the variables disequilibrate in the short-run, they tend to equilibrate over the long-run and move together in a balancing manner. It is also evident from the co integration results that there is no presence of full rank since the subtraction of the number of co integrating equations and the variables under study do not equal to zero, implying that the model is good and in functional form.

Table 4.5: Estimated Long-run Co-Integration Vectors

Variables	Coefficients	t-values
LRGDP	1.00	
LCDXP	0.223	6.660
LRDXP	0.114	3.234
LOHXP	0.569	8.823
LPSXP	0.050	1.165

Source: Computed by the researcher using e-views version 9

The result of the estimated long run co-integration vector is reported in Table 4.5 and it indicates that the estimated coefficients of long-run for all the variables have positive signs. Similarly, all the coefficients are highly statistically significant except PSXP. A unit increase in CDXP increases real GDP by about 22 percent. Similarly, while RGDP increases by about 11 percent and 57 percent respectively following a unit increase in RDXP and OHXP, it again, increases by about 5 percent when PSXP increases by one unit. This finding disagrees with Anyanwu et al (2010) that military spending is still grossly inadequate as the impact of various regimes on military spending is negative. However, the result corroborates Waya (2005) of a positive relationship between defence expenditure and economic growth.

Table 4.6: Estimated Vector Error Correction Model(VECM)

Variables	Coefficients	t- Values
D(LCDXP(-1))	-0.016	3.369
D(LRDXP(-1))	-0.160	2.819
D(LPSXP(-1))	0.127	0.940
D(LOHXP(-1))	0.297	4.032
D(LRGDP(-1))	0.504	2.271
ECM_t	**-0.236**	**2.389**
Diagnostic Test	**Statistics**	**P-values**
R-squared	**0.518**	
LM test	**0.794**	**0.780**
ARCH test	**0.016**	**0.900**
Jacque-Bera	**99.77**	**0.000**

Source: Computed by the researcher using e-views version 9

From the Table 4.6, the estimated error correction term is consistent with the expected negative sign and significant at 5% level. This suggests that there is feedback adjustment from short-run to long-run equilibrium between the real GDP and the independent variables. In other word, the economy responds to deviations from equilibrium in a balancing manner and as such, if the short run variables (RGDP, CDXP, RDXP, PSXP and OHXP) deviate from equilibrium, they tend to re-adjust themselves back to equilibrium in the long run.

The coefficient of ECMt indicates an annual speed of adjustment from long-run disequilibrium of about 24% per annum. This suggests that about 24% of the disequilibrium errors, which occurred the previous year, are corrected in the current year. Furthermore, as shown in Table 4.6, the lagged values of LRGDP positively and significantly influenced the behaviour of current RGDP. The result revealed that 1 percent increase in RGDP during the previous one year increases the current RGDP by about 50 percent. While CDXP and RDXP have negative but significant impact on RGDP, PSXP and OHXP have positive effects and are statistically significant at 5% except PSXP. The negative impact of defence spending on RGDP agrees with Saidu (2008) that government expenditures on Defense are retarding the growth in the short run. It also agrees with Anyanwu et. al. (2010).

The diagnostic statistics also fit the model fairly well. The R-square of the model shows that about 52 percent of the variation in dependent variable (RGDP) is explained by the combined effects of all the independent variables used in the study, suggesting that about 48% variation in RGDP is accounted for by other factors not included in the model. The high probability value of the LM test revealed that there is evidence of absence of autocorrelation in the data set. Furthermore, the probability of the F-statistic for ARCH test is as high as 0.9 implying that the series data are homoscedastic. However, the result failed the normality test with a low very low probability value for Jaque-Bera as reported in Table 4

Table 4.7: Multiple Regression Model

Variable	Coefficient	Std Error	t-Statistic	Prob.
CDXP	0.075	0.039	1.913	0.064
OHXP	0.248	0.068	3.615	0.001
PSXP	0.187	0.047	4.027	0.000
RDXP	0.004	0.047	0.090	0.929
R-squared	0.958976	Mean dependent var		16636.71
Adjusted R-squared	0.955130	S.D. dependent var		26127.36
S.E. of regression	5534.411	Akaike info criterion		20.17980
Sum squared resid	9.80E+08	Schwarz criterion		20.35574
Log likelihood	-359.2363	Hannan-Quinn criter.		20.24121
Durbin-Watson stat	2.066279			

Source: Computed by the researcher using e-views version 9

Like the estimated long run coefficients in Table 4.5, the results of multiple regressions in table 4.7 have positive signs as indicated in the R2 and DW statistics. Similarly, all the coefficients are highly statistically significant except RDXP. A unit increase in CDXP increases real GDP by about 3 percent. Similarly, while RGDP increases by about 6 percent and 5 percent respectively following a unit increase in OHXP and PSXP, it again, increases by about 4 percent when RDXP increases by one unit. This finding agrees withWaya (2005) that a positive relationship exists between defence expenditure and economic growth.

5. Conclusion and Recommendation

This study examines the pattern and structure of defence spending and its impact on economic growth in Nigeria over the period 1980-2015. Findings reveal that a common characteristic exist in defence expenditure allocation decisions in Nigeria and that defence expenditure in Nigeria is largely a composition of the recurrent expenditure. Findings further revealed that defence expenditures during the period of study have both positive and negative impacts on the growth of Nigerian economy. While the impact in the short-run is mixed, it is clearly positive in the long-run. This is evident from the estimated short-run and long-run co-integrating equations as well as the long-run multiple regression

models. Unexpectedly however, the positive impact of defence expenditure on economic growth is so low that it may not allow appreciable level of economic prosperity in Nigeria. The reasons for these may not be unconnected to the corrupt practices in the military such as fiscal indiscipline, embezzlement and diversion of public resources by the military officials for personal use. These factors have contributed in no small amount to retarding economic growth in Nigeria.

Based on the findings, there is the need to increase defence allocation in the budget and check corruption in the military in order to enhance the combat readiness of the armed forces in Nigeria so as to fight the internal and external aggressions that retards the growth of the Nigerian economy. No amount that is spent on defence would be too much bearing in mind the multiplier effects of security of lives and properties.

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