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THE IMPACT OF MILITARY SPENDING ON ECONOMIC WELLBEING IN NIGERIA

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ABSTRACT

The impact of military spending on domestic output is contentious and therefore requires further analysis on a country by country basis to determine its level of significance. Nigeria's military contributions to the Economic Community of West African States (ECOWAS) sub-region and the recent rise of various insurgencies, particularly, Jamāʻat Ahl al-Sunna lil-Daʻawah wa al-Jihād' (Boko Haram) – arguably the most fatal insurgent group – has increased Nigeria's military expenditure. This study investigates the impact of this increase in military spending on the economic well-being (measured by GDP per capita) of Nigerians using the Autoregressive Distributed Lag (ARDL) bounds testing approach to co-integration for the period from 1988 to 2017. The results suggest that there is a positive relationship between military spending and economic well-being in Nigeria. However, the impact on citizens' wellbeing is not instantaneous as the variable is only significant after the current year spending; which does not last longer than a year. The study therefore recommends that defense spending be strategic, and that all earmarked funds for defense be deployed appropriately so that increases in wellbeing can be more long-term as opposed to lasting for only one year.

Contribution/Originality: This study contributes to existing literature on military spending and growth. This study uses an adapted model.

1. INTRODUCTION

According to the Stockholm International Peace Research Institute (Tian *et al.*, 2019) total world military expenditure grew by $1.8 billion in 2018. It grew 2.6% higher than the projected $1.7 billion for 2017 which was the highest recorded amount since the Cold War. At over $600 billion, the United States remains by far the largest military spender accounting for 36% of the global share. Spending $250 billion on military expenditure, China is the second largest spender accounting for 14% of the global share. In total, military expenditure in Africa fell by 8.4% but regionally, military expenditure was higher, for the first time, in North Africa than in Sub-Saharan Africa, totaling $22.2 Billion and $18.4 billion, respectively. Nigeria, Sub-Saharan Africa's second largest spender after South Africa, increased its military spending to $2 billion (18%) in 2018.

The existing literature on the relationship between military spending and economic growth has had quite contentious viewpoints especially regarding developing countries. Scholars have contended that because military spending in developing countries diverts resources from other sectors of the economy that lead to growth, that it retards economic growth (Grobar and Porter, 1989; Olofin, 2012). The most prominent, and certainly, controversial analysis on the positive correlation between military expenditure and economic development was carried out by Emile Benoit in 1973. Using correlation analysis for less developed countries, he found that countries with heavy defense burdens had more rapid growth rates than countries that did not (Benoit, 1978). In other words, the increase in the growth rate of nondefense output was commensurate with increases in defense expenditure (Benoit, 1978).

Scholars such as Ball (1983) questioned the empirical rigor of Benoit's work—citing the issue of direct causality. She argued that there was little empirical evidence to support Benoit's claims that defense spending leads directly to development in other sectors of the economy. However, evidence from Germany post the treaty of Versailles and India in the 1960s after mainland China attacked the subcontinent proves otherwise, as increases in real consumption mirrored increases in defense expenditure (Benoit, 1978).

Benoit's main argument in his research on the relationship between military spending and economic growth is that military spending leads to spending in other sectors such as health, education, construction, etc., which ultimately lead to growth. He calls growth in these sectors non-defense output. In other words, defense or military spending can be a channel for growth in developing countries. And although most studies on the military spending-growth nexus find a negative or insignificant relationship between the two variables, they almost always conclude that resources should be diverted towards growth stimulating sectors – education, health, etc. But this conclusion ignores the spillover effect or externality – which Benoit emphasizes – that military spending might cause, i.e., the human and physical capital and technological capabilities required to establish a military as witnessed in South Korea, Singapore, Japan, and more recently, China (Yildirim and Öcal, 2016; U.S. Department of Defense Office of the Secretary of Defense, 2018).

Research has also shown that defense spending does not displace welfare spending (Huang and Ho, 2018; Zaman, 2019) but that in fact, defense spending can be viewed as welfare spending considering that it positively impacts employment and aggregate demand; which invariably leads to economic growth (Whitten and Williams, 2011; Williams, 2019).

Recent findings have supported Keynes' theory of a positive relationship between government expenditure and economic growth (Karahan and Çolak, 2019; Ogar *et al.*, 2019). And seeing as military spending is a part of government expenditure, the direct effect on income through the multiplier also extends to Benoit's findings on the positive and significant relationship between military spending and economic growth. Following Musgrave-Rostow's theory that countries in the early stages of development – where the markets are underdeveloped and plagued by market failures – require robust government involvement to stimulate aggregate demand so as to spur economic growth (Ifarajimi and Ola, 2017) validates an investigation on the extent to which military spending can be used as a channel for development in a developing country like Nigeria.

The argument that military spending diverts resources from other projects that lead to economic growth in developing countries especially, assumes that spending in the economy has reached Pareto optimality. The economy will not experience opportunity cost if spending and/or production is not on the Production Possibility Frontier (PPF). For an economy to be Pareto efficient, all factors of production – labor, capital, and technology, must be used efficiently. And in developing countries like Nigeria where efficiency is still problematic, this argument is not completely convincing. It is therefore expected, as is the case, that military expenditure will yield diminishing or negative returns to growth for advanced economies (D'Agostino *et al.*, 2017).

The arguments against military spending and growth also ignore the role of strategic resource allocation in the effective development of a defense industry that spills over development into other sectors of the economy as Benoit (1978) asserted. Military industrialization, like any industrial agenda, requires strategic and innovative uses of financial institutions. History has shown this. For instance, the industrial agenda in France under the reign of Napoleon III saw the creation of the Crédit Mobilier which drove industrial policy (Gerschonkron, 1962). And more recent economic success stories in countries like Brazil and China illustrate how the mobilization and strategic allocation of public savings are important in driving industrialization (Krieckhaus, 2002).

This study seeks to show whether Benoit's findings on the positive relationship between military spending and economic growth holds for Nigeria. Few studies on the relationship between military spending and economic growth in African countries exist. And in Nigeria particularly, such studies are scarce. To the best of our knowledge, no research has been done on the relationship between military spending and economic well-being in Nigeria using the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration tests (adapted from Khalid and Razaq (2015)) with per capita GDP as a proxy for economic well-being. Most studies have researched the impact of military spending on economic growth using GDP as a proxy for growth.

The rest of the paper is therefore structured as follows: Section 2 provides both the empirical and theoretical underpinnings of the relationship between military spending and economic growth across different countries; Section 3 outlines the methodology employed in investigating the relationship between military spending and economic wellbeing in Nigeria and provides the data sources used in the study; Section 4 presents and discusses the results; and, Section 5 concludes the paper.

2. LITERATURE REVIEW

According to the Classical school of thought, an increase in government spending which includes military expenditure is likely to retard economic growth. This is based on the theory that increased government spending signifies a lower level of private investment and domestic savings and lower consumption as a result of a very low aggregate demand. In other words, a higher level of military spending will lead to an increase in the interest rate, which will crowd out private investment. Conversely, the Keynesian school of thought holds that an increase in government spending nay military expenditure will stimulate demand and increase purchasing power and national output and create positive externalities (Ogar *et al*., 2019).

Empirical findings on the effect of military spending on economic growth have been controversial. Since Benoit (1973) found a positive relationship, there have been a lot of researchers that have debunked his findings using various theories and models, although inconclusively. Lim (1983); Deger and Smith (1983); Starr *et al.* (1984); Faini *et al.* (1984); Cappelen *et al.* (1984); Dunne and Mohammed (1995); Dunne *et al.* (2005); Abu-Bader and Abu-Qarn (2003); Galvin (2003); Atesoglu (2002); Halicioğlu (2004); Yildirim *et al.* (2005) and Sawhney *et al.* (2008) found negative correlations between defense spending and economic growth.

Khalid and Razaq (2015) whose methodology this study adapts used the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration tests for the period 1970 to 2011 to investigate the relationship between military expenditures and economic growth in the United States of America (USA). In line with the scholars above, they also found that a negative relationship exists between military spending and economic growth in United States of America (USA). Alptekin and Levine (2012) rejected the hypotheses that military expenditure reduces economic growth and that military expenditure is detrimental to growth in LDCs but accepted that military expenditure has a positive effect on growth and is non-linear, although just for developed economies.

Augier *et al.* (2017) used the Feder-Ram and augmented Solow models to investigate the relationship between defense and growth in China and found that the Feder-Ram model poorly explained economic growth in China. But the augmented Solow model showed that a 1% increase in defense expenditure raises the economic growth rate by approximately 0.15–0.19%. Zhang *et al.* (2017) investigated whether military spending promotes social welfare in the BRICS (Brazil, Russia, India, China, South Africa) and G7 (the US, Japan, Germany, the UK, France, Italy, Canada) countries and found that military spending enhances social welfare expenditures in developed countries, while the effect is ambiguous in emerging economies. The comparative analysis indicated that unlike in the G7 countries, the effect of the growth of military spending on the growth of social welfare expenditures is negative and shorter in the BRICS.

Hatemi-J *et al.* (2018) used asymmetric causality tests for top six defense spenders and found that the military expenditure growth-led hypothesis holds for China and Japan while the growth military expenditure-led hypothesis holds for France, Russia, Saudi Arabia, and the United States. Mahapatra *et al.* (2018) using GMM estimation found that for six South Asian Association of Regional Cooperation (SAARC) countries: Afghanistan, Bangladesh, India, Nepal, Pakistan, and Sri Lanka, defense spending has a positive and significant impact on economic growth.

Oladipo *et al.* (2018) found a significant and negative relationship between military spending and economic growth. Using the Autoregressive Distributed Lag (ARDL) modelling approach to cointegration and error correction model (ECM) to determine the relationships between oil revenues, defense spending and macroeconomic stability in Nigeria. They found that a significant inverse relationship exists between military spending, GDP per capita and macroeconomic stability where inflation and unemployment are used as proxies.

Khalid and Altaee (2015) used the autoregressive distributed lag and granger causality test to test for the economic effects of defense spending from 1970-2010. From the ARDL, they found a significant positive relationship in both short and long-term. The Granger causality result showed a unidirectional relation running from gross domestic product per capita to the defense expenditure. On the other hand, Compton and Paterson (2016) argue that the relationship between military spending and economic growth is conditional. Using sample data from more than 100 countries from 1988-2010, they found a negative relationship between military spending and economic growth although it is mitigated by the presence of good political and economic institutions.

3. METHODOLOGY

3.1. Data and Variables

The study used annual data from 1988 to 2017. The set of variables used were the real gross domestic product per capita (RGDP_PC), total government expenditure (less military expenditure) (G_EXP), military expenditure (M_EXP), savings rate (SR), inflation rate (INF) and the exchange rate (ER). The military expenditure was derived from the total government expenditure because of the significance of each of the variables in the study. This enabled us to know their individual impact on the dependent variable.

Data was sourced from Central Bank of Nigeria Statistics Department and Stockholm International Peace Research Institute 2018 report. The study adopted the methodology of Khalid and Razaq (2015) – the Augmented Keynesian Cross Model using the Autoregressive Distributed Lag (ARDL) bounds testing approach following the result of the unit root test.

3.2. Model Specification

Since the objective of this study was to examine the impact of military spending on economic wellbeing in Nigeria, the model for this study was based on the augmented Keynesian cross model as well as an adaptation of the model of Khalid and Razaq (2015) who examined the impact of military spending on economic growth in the United States of America (USA). Hence, the functional relationship between military spending and economic wellbeing variables were formulated as follows;

$$RGDP_{PC} = f(G_{EXP}, M_{EXP}, SR, INF \text{ and } EXR) \quad (3.1)$$

Where;

RGDP_PC = Real Gross Domestic Product Per Capita as a proxy for economic wellbeing

G_EXP = Total Government Expenditure (Less Military Expenditure)

M_Exp = Military Expenditure

SR = Savings Rate

INF = Inflation Rate

EXR = Exchange Rate

The behavioural form of Equation 3.1 is given as thus;

$$RGDP_{PC} = \gamma_0 + \gamma_1 G_{EXP} + \gamma_2 M_{EXP} + \gamma_3 SR + \gamma_4 INF + \gamma_5 EXR + \mu \quad (3.2)$$

Where;

μ is the error term.

It is expected that, $\gamma_1 > 0, \ \gamma_2 > or < 0, \gamma_3 < 0, \ \gamma_4 < 0$ and $\gamma_5 > or < 0$.

3.3. Estimation Techniques

Empirical analysis was carried out to avoid spurious results which made it essential for a unit root test to be carried out on each of the variables in the model to ascertain their order of integration. Therefore, this study began its analysis by conducting the unit root test using the Augmented Dickely Fuller (ADF) and Philip Peron (PP) tests. After this, the long-term relationship between the variables was examined using Autoregressive Distributed Lag (ARDL) Model.

The Autoregressive Distributive Lag Model (ARDL) was used instead of the popular approaches of Engle and Granger (1987) and Johansen and Juselius (1990) to cointegration so as to test whether or not a long-term relationship existed among the variables. The methodology developed by Pesaran *et al.* (2001) had the advantage of being valid with the variables of interest having equivocal order of integration, i.e., purely I(0), I(1) or I(0)/I(1) which was not acceptable in the above mentioned approaches. Again, Haug (2002) was of the opinion that the ARDL bounds testing approach was more suitable because it provided better results for a small sample size and the short and long-term parameters could also be estimated simultaneously.

This approach avoided problems resulting from analysis using non-stationary time series data and also enabled a sufficient number of lags to capture the data-generating process in a general-to-specific modelling framework (Laurenceson and Chai, 2003). Additionally, both the short- and long-term coefficients of the model were estimated simultaneously hence, the ARDL representation of Equation 3.2 was presented thus;

$$\Delta RGDP\_PC_t = \alpha_0 + \alpha_1 RGDP\_PC_{t-1} + \alpha_2 G\_EXP_{t-1} + \alpha_3 M\_EXP_{t-1} + \alpha_4 SR_{t-1} + \alpha_5 INF_{t-1} + \alpha_6 EXR_{t-1} + \alpha_7 \Delta RGDP\_PC_{t-i} + \alpha_8 \Delta G\_EXP_{t-i} + \alpha_9 \Delta M\_EXP_{t-i} + \alpha_{10} \Delta SR_{t-i} + \alpha_{11} \Delta INF_{t-i} + \alpha_{12} \Delta EXR_{t-i} + \mu_t \quad (3.3)$$

where Δ is the first-difference operator and α shows the long-term coefficients and short-term coefficients.

Hence, the null hypothesis (H_0) of no cointegration states that, H_0: $\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 = \alpha_9 = \alpha_{10} = \alpha_{11} = \alpha_{12} = 0$ and the alternative hypothesis of existence of cointegration states that $\alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq \alpha_7 \neq \alpha_8 \neq \alpha_9 \neq \alpha_{10} \neq \alpha_{11} \neq \alpha_{12} \neq 0$.

The above hypothesis was tested by comparing the calculated F-statistic with critical values from Narayan (2005) which were produced for small sample sizes between 30 and 80 observations on the assumption that all variables in the model were I(0) on one side and that all the variables were I(1) on the other side. Following the norms of hypothesis testing, if the calculated F-statistic was greater than the upper critical bounds value, the H_0 would be rejected and we would accept H_1. But if the F-statistic fell within the bounds, then the test would be inconclusive and if the F-statistic fell below the lower critical bounds value, then no co-integration would exist. Therefore, the Error Correction Model (ECM) represented in Equation 3.3 was presented thus;

$$\Delta RGDP\_PC_t = \beta_0 + \beta_1 \Delta RGDP\_PC_{t-i} + \beta_2 \Delta G\_EXP_{t-i} + \beta_3 \Delta M\_EXP_{t-i} + \beta_4 \Delta SR_{t-i} + \beta_5 \Delta INF_{t-i} + \beta_6 \Delta EXR_{t-i} + \rho ECT_{t-i} + \mu_t \quad (3.4)$$

Where the difference operator is denoted by Δ; the Error Correction Term (ECT) is derived from the short-term co-integrating relationship specified in the ARDL model in Equation 3.4. In Equation 3.4, ρ should be negative, less than one and significant.

4. ANALYSIS AND INTERPRETATION

4.1. Pre-Estimation Diagnostics

4.1.1. Descriptive Statistics

Table 4.1 shows the descriptive statistics of RGDP_PC, G_EXP, M_EXP, SR, INF and EXR. It shows that all the variables under consideration contained 30 observations. RGDP_PC had the highest mean value followed by G_EXP, M_EXP, EXR, INF and SR, respectively. The table also shows that, INF was mesokurtic as its value was greater than three while RGDP_PC, G_EXP, M_EXP, SR and EXR were platykurtic as their values were less than three. The probability of the Jarque-Bera showed that all the variables, except INF, were normally distributed.

Table-4.1. Summary Statistics.

	RGDP_PC	G_EXP	M_EXP	SR	INF	EXR
Mean	250161.8	1968.496	145.3900	6.804667	21.12367	101.8470
Median	227818.4	1122.085	80.45000	4.235000	13.05000	119.7700
Maximum	367180.7	6648.520	495.0000	18.39000	76.76000	305.7900
Minimum	166432.2	27.75000	1.200000	1.430000	0.220000	4.540000
Std. Dev.	74476.12	1947.436	162.1869	5.126243	19.64511	77.82221
Skewness	0.356677	0.736269	0.857020	0.969322	1.520917	0.502606
Kurtosis	1.458159	2.282036	2.184870	2.484176	4.080265	2.913412
Jarque-Bera	3.607683	3.354801	4.502959	5.030523	13.02466	1.272434
Probability	0.164665	0.186859	0.105243	0.080842	0.001485	0.529291
Sum	7504854.	59054.87	4361.700	204.1400	633.7100	3055.410
Sum Sq. Dev.	1.61E+11	1.10E+08	762833.5	762.0727	11191.97	175632.6
Observations	30	30	30	30	30	30

4.1.2. Trend Analysis

From Figure 4.1 the trend of RGDP_PC over the years showed an upward movement with intercept. For instance, from the period 1989 to 1999, the trend maintained a stable increase. From 2000 to 2017, it experienced another level of increase probably as a result of shock which could be caused by the policy in place and its effectiveness.

G_EXP depicted an upward movement without drift or intercept as the behaviour of the data over the period of years under study shows. In other words, it showed a series of little breaks and fluctuations in the trend of the data obtained over the years under consideration. In the case of M_EXP, the trend showed an upward movement with series of fluctuations and breaks over the years. It simply means M_EXP, over the period of study, had an upward but not a stable trend.

Also, in the case of SR, from 1989 to 1997, the trend depicted an unstable and downward movement with a series of breaks and intercept. From 1998 till 2017, it still showed a downward movement with little fluctuation. A visual analysis of INF revealed a random walk with drift. From the year 1989 to 2017, the random walk showed a series of breaks and shocks. Simply put, over the years under consideration, data on the inflation rate was not stable but rather, characterized by fluctuations.

The EXR trend also showed an upward movement from 1989 to 1998. In the year 1999, it experienced a shock which skyrocketed the value possibly as a result of a change in government and policy. The trend continued up to 2008. And from 2009, it experienced another increase which continued to the end of the period under study.

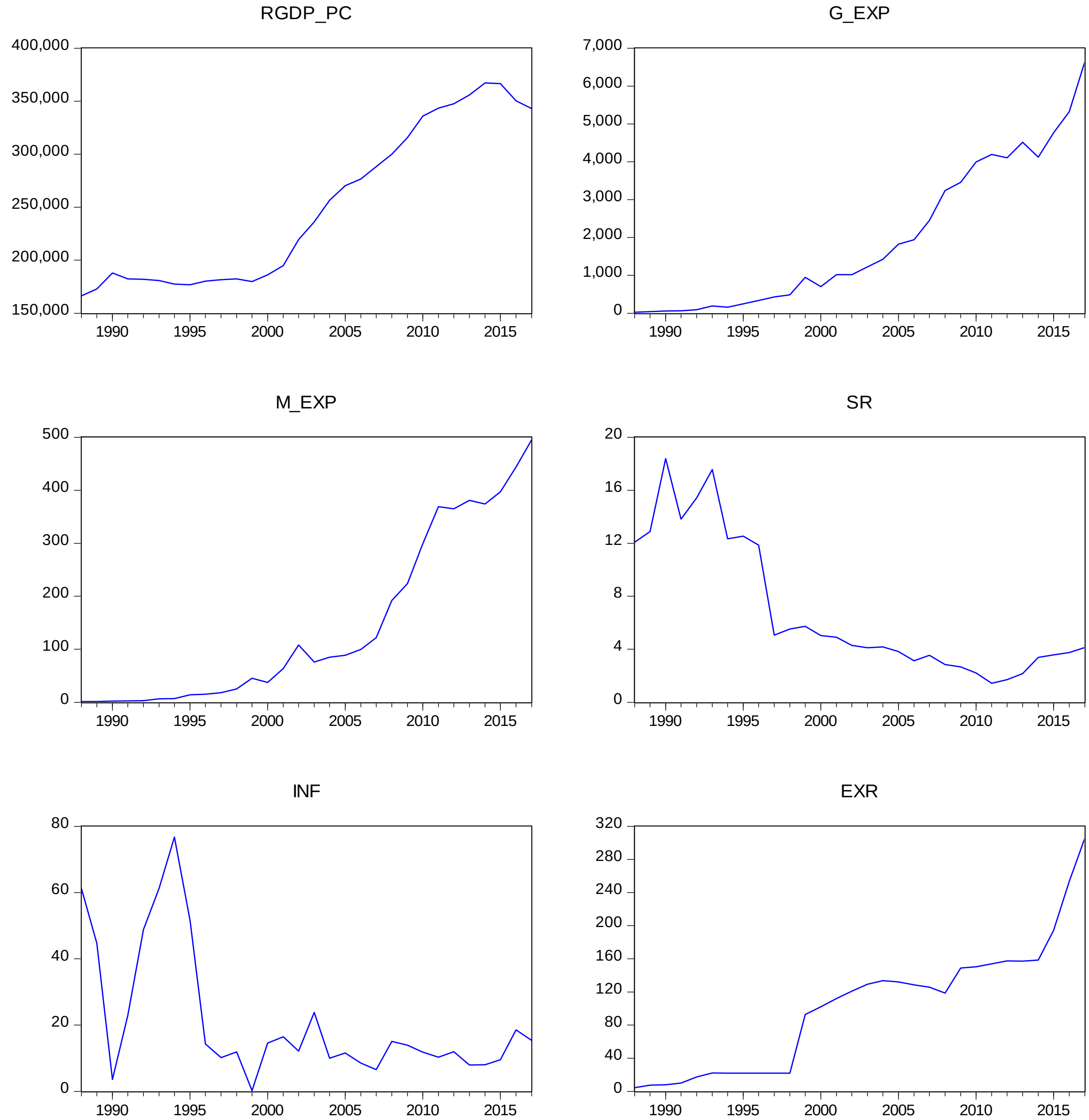

Figure-4.1. Trend Analysis of Macroeconomic Variables.

4.1.3. Unit Root Test

The stationarity properties of the variables in the model were examined using one of the standard unit root tests known as Phillips-Perron (PP). This was done to be able to ascertain the order of integration of each variable which would determine the selection of appropriate techniques of analysis to mitigate spurious results that are associated with non-stationary time series models.

The results from using the Phillip-Perron unit root test at its constant form in testing the stationarity of all variables in the model are presented in Table 4.2.

Using the PP test, Table 4.2 reveals that only government expenditure and inflation were stationary with constant. Hence, it was sufficient to conclude that government expenditure and inflation were integrated of order zero, i.e., I(0). After taking first difference, all other variables such as RGDP_PC, M_EXP, SR and EXR were stationary and therefore integrated of order one, i.e., I(1). Hence, with the mixture of the level of integration of the variables, we used the autoregressive distributive lag (ARDL) bounds testing approach as postulated by Pesaran *et al.* (2001) to test whether or not a long-term relationship existed between the variables.

4.2. Model Estimation

4.2.1. ARDL Bounds Test

The bound test approach to cointegration confirms if there is a long-term relationship among the variables in the model. This was done by testing whether or not their coefficients were equal to zero in our estimated model. The F-Statistic value from the bound test and the critical value bounds as revealed by the regression result using E-views 10 is presented in Table 4.3.

The ARDL bounds F test results shown in Table 4.3 confirmed that a long-term relationship existed between LRGDP_PC, the dependent variable in the model, and the independent (or explanatory) variables LG_EXP_2, LM_EXP, SR, EXR and INT for the period under consideration in Nigeria. This was because the calculated F statistic, 11.5, was greater than upper critical values at the 5% significance level. In other words, the null hypothesis of no cointegration could be rejected at the 5% significance level because the F test statistic was greater than the critical upper bound value I(1).

Table-4.2. Unit Root Test Result.

Phillip-Perron Unit-Root Test Statistics (At Level)									
Variables	**With Constant**			**With Constant & Trend**			**Without Constant & Trend**		
	t-statistic	**Prob.**	**Level**	**t-statistic**	**Prob.**	**Level**	**t-statistic**	**Prob.**	**Level**
LRGDP_PC	-0.5386	0.8694	NS	-1.5521	0.787	NS	2.4179	0.995	NS
LG_EXP_2	-7.8763	0	I(0)	-1.589	0.0027	I(0)	5.9216	0.0085	I(0)
SR	-1.23	0.6475	NS	-2.135	0.5058	NS	-1.3612	0.1571	NS
LM_EXP	-2.6836	0.089	NS	-1.0382	0.9225	NS	1.841	0.9817	NS
INF	-5.904	0.0071	I(0)	-5.9743	0.006	I(0)	-5.3059	0.0228	I(0)
EXR	1.6056	0.9992	NS	-0.4894	0.9782	NS	2.902	0.9985	NS
Phillip-Perron Unit-Root Test Statistics (At First Difference)									
	t-statistic	**Prob.**	**Level**	**t-statistic**	**Prob.**	**Level**	**t-statistic**	**Prob.**	**Level**
D(LRGDP_PC)	-5.5317	0.0001	I(1)	-5.4632	0.0022	I(1)	-5.0081	0.002	I(1)
D(LG_EXP_2)	-7.1069	0	I(0)	-10.3321	0	I(0)	-4.7022	0	I(0)
D(SR)	-6.7297	0	I(1)	-6.8055	0	I(1)	-6.5908	0	I(1)
D(LM_EXP)	-6.1712	0	I(1)	-7.4913	0	I(1)	-4.1425	0.0002	I(1)
D(INF)	-4.7461	0.0007	I(0)	-4.6098	0.0052	I(0)	-4.8324	0	I(0)
D(EXR)	-3.0639	0.0412	I(1)	-3.3798	0.0745	I(1)	-3.3425	0.021	I(1)

Note: NS represents Not Significant.

Table-4.3. ARDL Bounds Test Result.

Null Hypothesis: No long-term relationships exist				
Test Statistic	Value	K		
F-statistic	11.50664	5		
Critical Value Bounds				
Significance	I0 Bound	I1 Bound		
10%	2.08	3		
5%	2.39	3.38		
2.50%	2.7	3.73		
1%	3.06	4.15		

4.2.2. Lag Selection Criteria

The information criterion presented in Table 4.4 shows that ARDL (2, 3, 2, 3, 3, 3) was appropriate for the model in this study. This explained the advantage of an ARDL methodology as it was not necessary for all the variables to have the same lag(s) contrary to that of VAR in which all variables are given the same lag(s). The optimal lag selection must be considered as this could have led to misspecification and autocorrelation if ignored.

Table-4.4. Lag selection criteria.

AIC*	BIC	HQ	Adj. R-sq	Specification
-6.17928	-5.12342	-5.86532	0.998469	ARDL(2, 3, 2, 3, 3, 3)
-6.14543	-5.13756	-5.84574	0.998578	ARDL(2, 3, 1, 3, 3, 3)
-6.12152	-5.01766	-5.79329	0.998117	ARDL(2, 3, 3, 3, 3, 3)
-6.01193	-5.00406	-5.71224	0.998375	ARDL(2, 2, 2, 3, 3, 3)
-5.99707	-4.94121	-5.68311	0.998163	ARDL(2, 2, 3, 3, 3, 3)
-5.93544	-5.02355	-5.66429	0.998475	ARDL(2, 3, 1, 3, 3, 1)
-5.92992	-4.97004	-5.6445	0.998372	ARDL(2, 1, 2, 3, 3, 3)
-5.92552	-4.96564	-5.64009	0.998365	ARDL(2, 3, 2, 3, 3, 1)
-5.89319	-4.93331	-5.60776	0.998311	ARDL(2, 2, 3, 3, 3, 1)
-5.88428	-4.9244	-5.59885	0.998296	ARDL(2, 0, 3, 3, 3, 3)

Note: * Means that ARDL model selected by the selection criteria.

4.2.3. Long-term Dynamics of ARDL Cointegration

The ARDL long-term estimation of the impact of military expenditure on economic wellbeing in Nigeria is presented in Table 4.5.

Table-4.5. Estimated ARDL Long-term Model Result.

Dependent Variable: LRGDP_PC				
Selected Model: ARDL(2, 3, 2, 3, 3, 3)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LRGDP_PC(-1)	1.280367	0.144418	8.865716	0.0003
LRGDP_PC(-2)	-0.43793	0.14392	-3.04286	0.0287
LG_EXP_2	0.074121	0.033476	2.214166	0.0777
LG_EXP_2(-1)	-0.03508	0.038673	-0.90697	0.406
LG_EXP_2(-2)	-0.06203	0.042502	-1.45946	0.2043
LG_EXP_2(-3)	-0.0509	0.043564	-1.16846	0.2953
LM_EXP	0.031618	0.031029	1.018984	0.355
LM_EXP(-1)	0.119568	0.028765	4.156675	0.0089
LM_EXP(-2)	-0.01456	0.019289	-0.75486	0.4844
SR	0.001069	0.004943	0.216174	0.8374
SR(-1)	0.014424	0.004552	3.168933	0.0248
SR(-2)	0.021844	0.005065	4.312372	0.0076
SR(-3)	-0.00982	0.003755	-2.61565	0.0473
INF	-0.00505	0.000956	-5.28587	0.0032
INF(-1)	0.002259	0.000625	3.612536	0.0153
INF(-2)	-0.00224	0.000672	-3.3269	0.0208
INF(-3)	-0.0024	0.000775	-3.10208	0.0268
EXR	-0.0016	0.000239	-6.67588	0.0011
EXR(-1)	0.001346	0.000338	3.97676	0.0106
EXR(-2)	-0.00031	0.000365	-0.85364	0.4323
EXR(-3)	0.000437	0.000278	1.571936	0.1768
C	1.873592	0.619032	3.026646	0.0292
R-squared	0.999706			
Adjusted R-squared	0.998469			
F-statistic	808.2738			
Prob(F-statistic)	0.000000			
Diagnostic Tests				
Test Statistics			**LM Version**	
A. Serial Correlation (0.4354)			X^2_{auto} = 1.111244	
B. Functional Form (Ramsey Reset) (0.3744)			X^2_{RESET} = 0.998763	
C. Normality (0.48695)			X^2_{Norm} = 1.439182	
D. Heteroscedasticity (0.8937)			X^2_{Het} = 0.477305	

Note: ***, ** and * indicate significance at 1%, 5% and 10% level of significances. Figures in parenthesis are probability values.

The result presented in Table 4.5 shows that the one period lag of per capita spending had a positive significant impact on economic wellbeing (LRGDP_PC) while the two period lag showed a negative and significant impact. The current value of government expenditure was positive and significant in explaining economic wellbeing. This was an indication that more of government expenditure was on recurrent items which could only have an immediate impact on the wellbeing of the citizens as opposed to capital expenditure which would have had a long-term impact. Military spending showed a positive and insignificant impact on per capita GDP (economic wellbeing) in its current value but the one period lag showed a positive and significant impact. In other words, economic wellbeing responded to military expenditure with a lag of twelve months which meant that Nigerians would start feeling the impact of military spending on their wellbeing (per capita income) after one year. However, the impact did not last longer than a year which has great future implications for continuous and strategic military spending on the part of government.

The savings rate had a positive impact from its current value to the three period lags, and though not significant in its current period, the one period to the three period lags showed a significant impact on economic wellbeing. Inflation in the current period showed a negative and significant impact while the period lags, i.e., two and three, showed a positive and significant impact. The exchange rate, which was significant in its current and one period lag, showed a negative impact initially and later, a positive impact.

The coefficient of determination (R^2) showed that 99% of the variations in LRGDP_PC were explained by the explanatory variables in the model which was above 50% and even after taking into consideration the degree of freedom, the adjusted coefficient of determination (adjusted R^2) still showed that, 99% of the variations in the LRGDP_PC were explained by the explanatory variables. The F-statistic value (probability) of 808.2738 (0.0000) confirmed the fitness of the coefficient of model and showed an overall significant level of the explanatory variables jointly in explaining LRGDP_PC.

4.2.4. Short-term Dynamics and Error Correction Representation of ARDL Cointegration

The confirmation of the long-term relationship required estimating the error correction mechanism according to Sargan (1964) as popularized by Engle and Granger (1987). The result of this is shown in Table 4.6:

One and two period lags of the LRGDP_PC and LG_EXP_2 showed a positive and significant impact on economic wellbeing in the short-term. Military expenditure also showed a positive and significant impact on economic wellbeing. The current value of the savings rate though positive was not significant while the one and second period lags showed a negative and positive significant impact, respectively. The current value of inflation was negative while the lags were positive and all depicted a significant impact on the dependent variable. The exchange rate impact was negative and significant throughout except for the one period lag. The coefficient of the error correction term suggested an 18% speed of adjustment to any disequilibrium in the long-term. In other words, the estimated ECT (-1) was equal to 0.18 which stated that the departure from the equilibrium was adjusted by 18% per year. It was also negative, significant and less than one which meant that information from this could be relied upon for policy decisions.

4.3. Post-Estimation Diagnostics

The results were subjected to several econometric tests; heteroscedasticity, serial correlation, normality and stability tests (Gujarati and Sangeetha, 2007; Greene, 2008). The Breusch-Pagan-Godfrey, Breusch-Godfrey Serial Correlation LM Test, Jarque-Bera, Specification tests (Ramsey RESET test) and CUSUM tests were the econometric tools employed for the tests. Summarized in Table 4.5 are the estimated diagnostic indicators which show that the model's residuals are normally distributed with no significant presence of serial correlation, heteroskedasticity, and multicollinearity. The model was therefore properly specified as the above characteristics were desirable properties of OLS models. Since the model exhibited all the characteristics of an OLS model, we concluded that the model was not only well specified but also very reliable for use in economic analysis and forecasting. The CUSUM and CUSUM of Squares tests showed the stability of the model. The diagrams in Figure 4.3 and Figure 4.4 are evidence of this stability. The estimates were deemed stable over the period since the residual plot did not fall outside the 5% significance boundaries.

Table-4.6. ARDL Error Correction Regression.

Dependent Variable: D(LRGDP_PC)				
Selected Model: ARDL(2, 3, 2, 3, 3, 3)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LRGDP_PC(-1))	0.437927	0.051079	8.573456	0.0004
D(LG_EXP_2)	0.074121	0.013814	5.365736	0.003
D(LG_EXP_2(-1))	0.112932	0.016308	6.924761	0.001
D(LG_EXP_2(-2))	0.050902	0.013402	3.798135	0.0127
D(LM_EXP)	0.031618	0.008799	3.593359	0.0157
D(LM_EXP(-1))	0.01456	0.010683	1.362945	0.2311
D(SR)	0.001069	0.001663	0.642578	0.5488
D(SR(-1))	-0.01202	0.001518	-7.9211	0.0005
D(SR(-2))	0.009822	0.001366	7.18768	0.0008
D(INF)	-0.00505	0.000375	-13.4832	0
D(INF(-1))	0.004639	0.00036	12.88753	0.0001
D(INF(-2))	0.002404	0.000299	8.040484	0.0005
D(EXR)	-0.0016	0.00013	-12.3332	0.0001
D(EXR(-1))	-0.00013	0.00015	-0.83499	0.4418
D(EXR(-2))	-0.00044	0.000134	-3.26488	0.0223
ECT(-1)	-0.15756	0.011836	-13.3117	0
A. Serial Correlation X^2_{auto} = 1.111244 (0.4354)				
B. Functional Form (Ramsey Reset) X^2_{RESET} = 0.998763 (0.3744)				
C. Normality X^2_{Norm} = 1.439182 (0.48695)				
D. Heteroscedasticity X^2_{Het} = 0.477305 (0.8937)				

Note: ***, ** and * indicate significance at 1%, 5% and 10% level of significances.

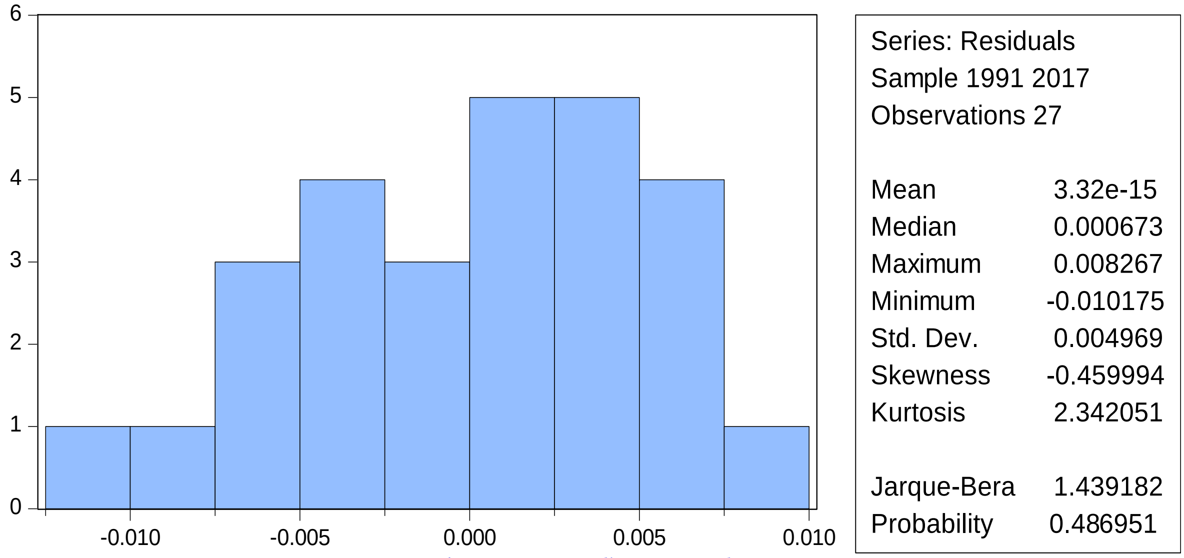

Figure-4.2. Normality Test Result.

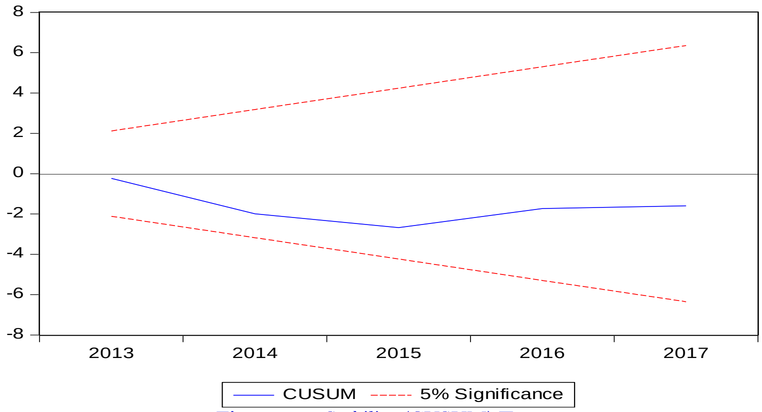

Figure-4.3. Stability (CUSUM) Tests.

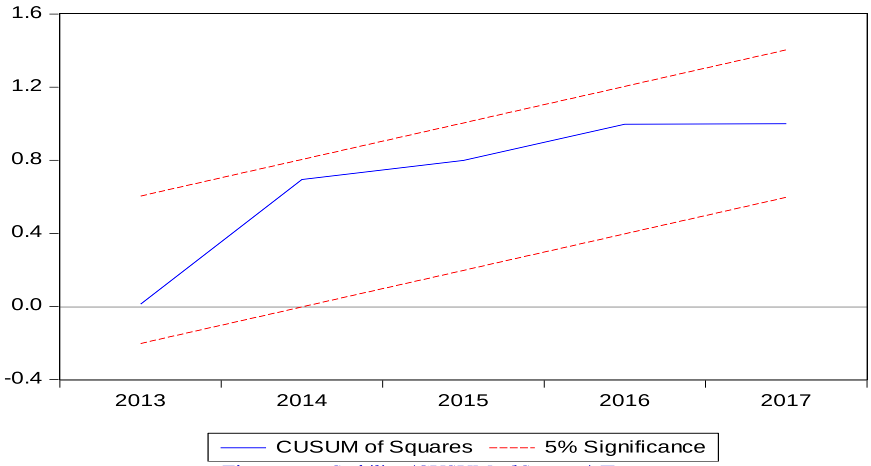

Figure-4.4. Stability (CUSUM of Squares) Tests.

5. CONCLUSION AND IMPLICATIONS FOR POLICY

This study examined the impact of military spending on per capita GDP (economic wellbeing) in Nigeria from the period from 1988 to 2017. A functional relationship was developed to capture this objective which examined real gross domestic product per capita (RGDP_PC) to proxy welfare from growth as a function of government expenditure, military expenditure, savings rate, inflation and the exchange rate. The study used the Autoregressive Distributed Lag (ARDL) Model and the result from the empirical analysis revealed that military expenditure had a positive and significant impact on economic wellbeing in Nigeria after the first year.

This can be justified by the increasing rate of budgetary allocation to defense as a result of insurgencies in the country over the years. However, the impact on citizens' wellbeing was not instantaneous as the variable was only significant after the current year spending; which did not last longer than a year.

This highlights the fact that constant military spending brings about spillovers or positive externalities that lead to the economic well-being of Nigerians after a one year lag. These externalities could be due to confidence from local businesses and foreign investors (which increases business activity) and reparations paid to victims of insurgencies; which increase spending power and invariably well-being in the short-term, however minimal. Regardless, this result showed that military spending can be a channel for development in Nigeria and that strategic military spending can lead to infrastructural and social development seeing as building a strong military requires, inter alia, investments in education, infrastructure, technology, and health. However, more research needs to be carried to determine how military spending actually leads to development. The findings from this study were in line with those of Benoit (1973; 1978) and Khalid and Altaee (2015) but they contradicted those of Khalid and Razaq (2015). Hence, it is recommended that defense spending be strategic, and that all earmarked funds for defense be deployed appropriately so that increases in wellbeing can be more long-term as opposed to lasting for only one year.

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