# AN EMPIRICAL ANALYSIS OF EFFECTS OF MILITARY SPENDING ON ECONOMIC GROWTH IN NIGERIA: A BOUND TESTING APPROACH TO CO-INTEGRATION 1989-2013

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**Abstract**: *The study examines the effect of military expenditure on output in Nigeria both in the short-run and in the long-run period. In addition, it verified whether military expenditure is an economically non-contributive activity using ARDL bounds testing approach to co-integration. Results showed that military spending has negative and significant effect on output in the short-run but positive and significant effect in the long-run. Labour and capital have positive and significant effects both in the long-run and short-run. In addition, labour has the highest coefficient (3.0709) in the long-run. The study concludes that government should reduce its expenditure on defense and concentrate more on human capital development, since military spending contributes nothing to output in the short-run.*
**Keywords**: *Military spending, Human capital, ARDL, Economic Growth, Inflation*
**JEL Classification**: *H5 I15 C22 O4 E31*

## 1. INTRODUCTION

The role of government in an economy cannot be over-emphasized. Two amongst these important duties as noted by Adam Smith are to protect the society from the violence and invasion of other independent societies and; protect every member of the society from the oppression of every member of it. This established the basis for the economic need of security in countries of the world. Security of persons and property from domestic or foreign threats is essential for the operation of markets and the incentives to invest and innovate. Lack of peace and security constitute a distortion in economic activities. These results in local and foreign investors being skeptical of investing in the economy leading to a dearth in capital in-flow, government attention is shifted from more productive sectors to defense sector and a great disorder in the socio-economic structure.

War and lack of security are some of the major obstacles to development (Dunne *et.al* 2004). This perhaps, accounts for the reason why many countries of the world desire and make effort towards maintaining peace and security in and outside their territories. Peace is an important precondition for economic development in the world. In the absence of peace and tranquility, there is little or no incentive for people to undertake productive investments in the legal economy, as the likelihood of return on investment is minimal. Many countries of the world commit huge resources such as human, mental and even financial to bring and maintain peace and tranquility in their country. National and international organizations have committed huge resources towards bringing and maintaining peace all over the world. The United Nation spends about $5billion naira yearly on peacekeeping all over the world (Carnahan et al, 2006). The organization budgeted US $7.84 billion for the period from July 2011 to 30 June 2012 which represents less than 0.5 per cent of global military spending (UN peacekeeping factsheet 2011).

The need for every nation of the world to install sustainable peace and security in and outside her territory conceives the chore of country's investment in military and other law enforcement agencies. Military spending is the amount of financial resources dedicated by anationor a state, to raising and maintaining armed forces. It often reflects how much an entity perceives the likelihood of threats against it, or the amount of aggression it wishes to employ. It also provides an idea of how much finances could be provided for the upcoming year. The size of a budget also reflects the nation's ability to fund military activities, with factors including the size of that economy, other financial demands on that nation and the willingness of that nation's government or people to fund such military activity. Military spending is an important issue for the international world. It is an expenditure by governments that has influence beyond the resources it takes up, especially when it leads to or facilitates conflicts (Collier 2006). At the same time most countries need some level of security to deal with internal and external threats, but these can certainly have opportunity costs as they can prevent money from being used for other purposes that might improve the pace of development (Dunne and Uye 2010).

High military expenditure is sometimes a response to active warfare. Collier (2006) argued that one of the major determinants of military expenditure in developing countries is internal rebellion. He opined that where civil war is ongoing, military expenditure is greatly elevated. Other determinants of military expenditure includes; past levels of military expenditure, geo-strategic consideration, the politics of the budgetary decision-making process, pressure from arms suppliers, beneficiaries and vested interests, financial and economic factors etc (Harris 2004; Collier 2006). Military expenditure defers from most other forms of government expenditures, it has the potential to provide an immediate benefit in the form of greater perceived security which might encourage investment spending in a country, but in itself such spending is a consumption item (Harris 2004). This corroborates the argument of Dumas (2002), who eloquently argued that military activity is an economically non-contributive activity in the modern world because it does not add to material well-being of people.

However, the effect of military expenditure on economic growth has been a critical issue in defense economics. Benoit (1978) asserted that an increase in the military expenditure can promote economic growth by increasing human capital capabilities through provision of education, through an expansion of aggregate demand, through increase security, and negatively through a crowding out of investment (Deger 1986). Furthermore, there are findings showing no relationship between military expenditure and economic growth (Galvin, 2003; Yildirim et al. (2005) and in some cases, there are mixed results (Kollias et al. (2004); Dakurah et al. (2000).

The huge financial commitment into military expenditure in Nigeria recently has been a thing of concern. Military expenditure in Nigeria has been on the increase over the last few decades. Defense expenditure for instance, as a percentage of the total Federal Government budgetary provision was 10.13 percent in 1974 and 11.99 percent in 1975. However, it declined to about 11.21 percent in 1976 but rose again to 14.69 in 1977 (Akpa 1997). In 1988, military expenditure in Nigeria was N1.2 billion, this constitute about 0.8% of the total GDP. It increased to N15.4 billion in 1996 and later N45.4 billion in 1999. Since then, the trend of military expenditure has taken an upward drift. In 2012, it rose to about N345 billion. This upward trend provoked public outcry in the country since the country has not been fighting major war, until recently with the advent of insurgency and terrorism. It is believed that the unprecedented upward trend of military expenditure is not justifiable given the level of insecurity in the country.

The discord as per the effect of military expenditure on security and economic growth, and the rising military expenditure in Nigeria in recent time has been a major concern for researchers and policy makers. This uncertainty prompted this paper to ask if military expenditure has any effect on security and economic growth in Nigeria and determine whether military expenditure is one of the economically non-contributive activities in Nigeria economy as argued by Dumas (2002). In addition, this paper will determine whether such effect (if any) is in the long- run or short-run period. Apart from this introductory aspect, the rest of the study is organized into four sections. Section 2 presents the theoretical consideration and also review relevant literature; while section 3 presents the empirical methodology, analysis, results of findings and discussion, while section 4 concludes and presents policy implications.

## 2. THEORETICAL CONSIDERATION AND LITERATURE REVIEW

The issue as to if government should intervene to correct for short-run fluctuations in economic activities has been of intense debate among economists. The Classical economists oppose government intervention while the Keynesian school of thought on the other hand advocates for the use of government fiscal policies to bring about increase in economic activities whenever there are economic recessions. The Keynesians believed that the assumed self regulating mechanism in the economy fails to lead the economy back to equilibrium thereby prescribing expansionary fiscal policies to avoid long recessions. Neoclassical models are generally supply side with a focus on the tradeoff between 'guns and butter. While Keynesian models on the other hand, see military spending simply as one component of government spending and focus on the demand side, although when used in econometric models an aggregate production function does given them a neoclassical flavor (Dunne *et. al*. 2001).

In the view of Dunne *et. al.* (2001), when undertaking the econometric studies of the military expenditure and growth, the simple Feder-Ram has something appealing to defense economists, this is its ability to explicitly treat externality effects of the military on the non-military sector. In the work of Biswas and Ram (1986), who first modified Feder (1983, 1986)'s model of the exports-growth nexus in developing countries for a cross-country study of the link between military spending and economic growth, numerous empirical contributions to the guns-and-butter debate have employed variants of the same approach. Denger and Sen (1986) represent the Feder-Biswas-Ram externality model as a splendid empirical workhorse to investigate the impact of military expenditure on growth. The approach is generally seen to provide a formal justification for the inclusion of military expenditure as an explanatory variable in a single-equation growth regression analysis, which is based on the neoclassical theory of growth (Mintz and Stevenson 1995), or at least fairly based on the neoclassical production-function framework (Biswas and Ram 1986).

Studies have been conducted in the developed and developing countries on the relationship between military spending and economic growth, which have given varying result by defense economist. There has been serious contestation has to if military spending has effect on economic growth. Tiwari and Shahbaz (2011) investigated the effect of defense spending on economic growth using ARDL bounds testing approach to co-integration in augmented version of Keynesian model for Indian economy. They found out that there is long run relationship between the variables, and also there is positive effect of the defense spending on economic growth (also negative impact after a threshold point). Furthermore, there study also showed that there is bidirectional causal relationship between defense spending and economic growth using variance decomposition approach.

Halicioglu (2004) conducted a study on defense spending and economic growth. This corroborates the work of Tiwari and Shahbaz (2011). He demonstrated empirically that there exists a positive long run relationship between aggregate defense spending and aggregate output in turkey. Yildirim et. al. (2011) and Pieroni (2008) argued that there is positive relationship between military expenditure and economic growth. They also stated that disarmament does indeed provide an opportunity for improved economic performance. According to Dunne (2000) however, there are still problems in moving to lower levels of military spending and policies of conversion are required at a national and international level, including assistance from the developed world. Arif and Rashid (2012), using a unit root, cointegration and exogeneity tests between military expenditure and economic growth in 14 developing countries for the period 1981-2006 considering panel data analysis. According to them, military expenditure is an exogenous variable and it influences economic growth in these countries.

Hirnissa and Baharom (2009) tested the robustness of the causal effect and long-run relationships between military expenditure and economic growth in ASEAN-5 countries from the year 1965 to 2006. They concluded that only three out of five countries analyzed exhibited long run relationship. Dunne and Uye (2008) examined the link between arms spending and economic growth for developing countries and the benefits to be gained by reducing it, concluded that reducing arms and military spending need not be costly and can contribute to, or at the very least provide the opportunity for an improved economic performance in developing countries. Also as demonstrated by Halicioglu (2004) in his study on defense expenditure and economic growth in turkey using macroeconomic theory and multivariate co-integration procedure, there exists a positive relationship between aggregate defense spending and aggregate output in turkey.

In an attempt to find if there is any relationship between military expenditure and gross domestic product in Czech Republic, Danek (2013) asserted the military expenditures explain only 46% of the changes of GDP. That is military expenditure has no meaningful effect on growth. Also, the correlation coefficient showed that there is 68% negative relationship between the variables of the military expenditure and GDP. Military spending is an expenditure by governments that has influence beyond the resources it takes up, especially when it leads to or facilitates conflicts. While countries need some level of security to deal with internal and external threats, these have opportunity costs, as they prevent resources being used for other purposes that might improve the pace of development. These especially are important for the poorest economies (d'Agostino et. al 2010).

Also in their study on the causal relationship between military expenditure and economic growth for 68 developing countries for the period 1975-1995, Dakurah *et. al.* (2000) using granger causality testing procedures found some evidence of unidirectional causality from military expenditure to growth and from growth to military expenditure in a number of countries, as well as a feedback relationship in others. They however concluded that the lack of evidence of causal relationship between the two variables in this study and others before it might be due to violations of the basic assumptions inherent in these testing procedures. Wilkins (2004) conducted a study, using a panel data model estimation to examine the relationship between defense spending and economic growth using annual data for 85 countries over the period 1988 to 2002. The average defense burden for each of these countries is calculated and regional and global defense burdens are estimated using percentage shares of world GDP as weights. The global weighted average defense burden is found to have consistently fallen from 4.78% in 1988 to 2.95% in 2001; largely a result of the cold war ending and the arms race finishing in an earlier period. Also, The estimated empirical model explaining GDP growth as a function of defense spending, labour and capital suggests varying country specific effects for defense and, as might be expected, larger positive effects for labour and capital.

Some studies have also being conducted in Nigeria on military expenditure and economic growth. Eniola (2008) studied the relationship between the level of economic growth and defense expenditure in Nigeria between 1977 and 2006. He employed the supply model based on the production function proposed in Feder (1983) as extended by Biswas and Ram (1986). The result showed that there is a unidirectional causality running from economic growth to defence spending. In the study of the impact of security expenditure on the level of economic growth in Nigeria, Oriavwote and Eshenake (2013) used Error Correction Model and found out that the expenditure on defence has a negative impact on the level of economic growth. Though, with an indication of flawed expenditure budgeting and implementation in the defense sector, expenditure on internal security played important role in generating the desired level of economic growth in Nigeria.

In a related study, Olofin (2012) examined the relationship between the components of defense spending and poverty reduction in Nigeria between 1990 and 2010. Four models were estimated using Dynamic Ordinary Least Square (DOLS) method, two in which poverty index constructed from human development indicators serves as dependent variable and the others in which infant mortality rate serves as dependent variable. The result show that military expenditure per soldier, military participation rate, trade, population and output per capita square were positively related to poverty indicator and, military expenditure, secondary school enrolment and output per capita were negatively related to poverty level. The findings confirm the tradeoff between the well-being and capital intensiveness of the military in Nigeria, pointing to the vulnerability of the poor among the Nigerians.

## 3. MODEL SPECIFICATION, DATA DESCRIPTION AND ESTIMATION TECHNIQUE

Models for the transmission mechanism from defence expenditure to economic growth are based either in the supply or demand side of the economy. The supply side however, is based on the aggregate production function approach, while the demand side models are based on a variant of the variant of the Keynesian consumption function. For the purpose of carrying out the objective of this paper, it will employ the supply side model that uses the aggregate production function approach. The supply side model is based on the aggregate production function proposed in Feder (1983) and was extended by Biswas and Ram (1986) to include a defence expenditure variable.

Looking at a two sector economy with a defence (D) production function as

$$D = D(L_d, K_d) \quad (1)$$

and a civilian (C) production function

$$C = C(L_c, K_c, D) \quad (2)$$

where the $L_d, L_c, K_d$ and $K_c$ are labour and capital shares allocated to the defence and civilian sectors respectively. According to Biswas and Ram (1986), the inclusion of $D$ in equation (2) allows for an externality effect for the defence sector to the civilian sector. This externality effect can either be in form of a positive marginal product for defence in equation (2) or as a relative factor productivity differential for labour and capital in both sectors. The aggregate labour and capital supplies are:

$$L = L_d + L_c \quad (3)$$

and

$$K = K_d + K_c \quad (4)$$

And Y is total national income or output

$$Y = M + G \quad (5)$$

Taking the total differential of (5) and dividing by Y gives

$$\frac{dY}{Y} = \frac{\partial C}{\partial L}\frac{dL}{Y} + \frac{\partial G}{\partial K}\frac{dk}{Y} + \frac{\partial C}{\partial D}\frac{dD}{Y} \quad (6)$$

Multiplying the first term on the RHs of (6) by $L/L$ and the third by $M/M$ becomes

$$\tilde{Y} = F_l L\frac{L}{Y} + F_k\frac{dk}{Y} + F_d D\frac{D}{Y} \quad (7)$$

Equation (7) above is the simple form of the Feder Ram model and shows how economic growth depends on labour, capital growth and defence all weighted by their relative shares in output. The partial derivatives, F are then found as estimated coefficients.

Thus the estimated equation for the study derived from the Feder-Ram model is

$$lny = \propto_0 + \propto_1 lnl + \propto_2 lnk + \propto_3 lnD + ln\pi + \varepsilon \quad (8)$$

Where y is the real GDP

l = labour force proxy by school enrolment

k = Capital stock proxy by Gross Fixed Capital Formation

D = Defence Expenditure

$\pi$ = Inflation

ε = Error Term

$\propto_0$= Intecept

$\propto_1$,$\propto_2$and$\propto_3$ are parameter of estimate, where $\propto_1$,$\propto_2$, $\propto_3$> 0

The study adopts Auto-Regressive Distributed Lag (ARDL) approach for testing the existence of co-integration relationship among the variables as developed by Pesaran *et.al.* (2001). The approach has certain econometric advantages in comparison to other single cointegration procedures (Engle and Granger, 1987; Johansen, 1988; Johansen and Juselius, 1990). Firstly, endogeneity problems and inability to test hypotheses on the estimated coefficients in the long-run associated with the Engle-Granger (1987) method are avoided. Secondly, the long and short-run parameters of the model in question are estimated simultaneously. Thirdly, the econometric methodology is relieved of the burden of establishing the order of integration amongst the variables and of pretesting for unit roots. The ARDL approach to testing for the existence of a long-run relationship between the variables in levels is applicable irrespective of whether the underlying regressors are purely I(0), purely I(1), or fractionally integrated. Finally, as argued in Narayan (2005), the small sample properties of the bounds testing approach are far superior to that of multivariate cointegration (Halicioglu, 2007). The approach, therefore, modifies the Auto-Regressive Distributed Lag (ARDL) framework while overcoming the inadequacies associated with the presence of a mixture of I(0) and I(1) regressors in a Johansen-type framework. The ARDLrepresentation of equation (8) above is expressed as follows:

$$\Delta y_t = \gamma_{11} + \sum_{i=1}^{p} \gamma_{1i}\, \Delta y_{t-1} + \sum_{i=0}^{p} \gamma_{2i}\ \Delta l_{t-i} + \sum_{i=0}^{p} \gamma_{3i}\, \Delta k_{t-i} + \sum_{1=0}^{p} \gamma_{4i} \Delta D_{t-i} + \sum_{1=0}^{p} \gamma_{5i} \Delta \pi_{t-i}$$

$$+\varphi_{10\,y_{t-1}} + \varphi_{11}\, l_{t-1} + \varphi_{12}\, k_{t-1} + \varphi_{13}\, D_{t-1} + \varphi_{14} \pi_{t-1} + \varepsilon_{2t} \quad (9)$$

Where $\varepsilon_{2t}$ and Δ are the white noise term and the first difference operator, respectively. The ARDL method estimates $(p+1)^k$ number of regressions in order to obtain the optimal lag length for each variable, where p is the maximum number of lags to be used and k is the number of variables in the equation. An appropriate lag selection based on a criterion such as Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC). The ARDL co-integration method is based on the F or Wald-statistics. The F-test is used for testing the existence of long run relationship among. The null hypothesis is tested by considering the Unrestricted Error Correction Model in equation (9) while excluding the lagged variables $\Delta y_t$, $\Delta l_t$, $\Delta k_t$, $\Delta D_t$ and $\Delta I_t$ based on the Wald or F-statistic. The asymptotic distribution of the F-statistic is non-standard under the null hypothesis of no co-integration relationship between the examined variables, without recourse to whether the underlying explanatory variables are purely I(0) or I(1). The null hypothesis of no co-integration (H0: $\varphi 10 = \varphi 11 = \varphi 12 = \varphi 13 = \varphi 14$ ) is therefore tested against the alternative hypothesis (H1: $\varphi 10 \neq \varphi 11 \neq \varphi 12 \neq \varphi 13 \neq \varphi 14$ ). Thus, Pesaran et al. (2001) compute two sets of critical values for a given significance level. One set assumes that all variables are

I(0) and the other set assumes they are all I(1). If the computed F-statistic exceeds the upper critical bounds value, then the $H_0$ is rejected. If the F-statistic is below the lower critical bounds value, it implies no co-integration. Lastly, if the F-statistic falls into the bounds then the test becomes inconclusive. Consequently, the order of integration for the underlying explanatory variables must be known before any conclusion can be drawn.
If there is evidence of co-integration among the variables, the following long-run model is estimated:

$$\Delta y_t = \gamma_1 + \sum_{i=1}^{p} \beta_{1i}\, \Delta y_{t-1} + \sum_{i=0}^{p} \delta_{1i}\ \Delta l_{t-i} + \sum_{i=0}^{p} \theta_{1i}\, \Delta k_{t-i} + \sum_{1=0}^{p} \sigma_{1i} \Delta D_{t-i} + \sum_{1=0}^{p} \varphi_{1i} \Delta \pi_{t-i} + \mu_t \quad (10)$$

The ARDL specification of the short-run dynamics can be derived by constructing an error correction modelof the form:

$$\Delta y_t = \gamma_2 + \sum_{i=1}^{p} \beta_{2i}\, \Delta y_{t-1} + \sum_{i=0}^{p} \delta_{2i}\ \Delta l_{t-i} + \sum_{i=0}^{p} \theta_{2i}\, \Delta k_{t-i} + \sum_{1=0}^{p} \sigma_{2i} \Delta D_{t-i} + \sum_{1=0}^{p} \varphi_{2i} \Delta \pi_{t-i} + \omega ECM_{t-1} + \mu_t \quad (11)$$

where $ECM_t$ is the error correction term and is defined as:

$$ECM_t = \Delta y_t - \gamma_2 + \sum_{i=1}^{p} \beta_{2i}\, \Delta y_{t-1} + \sum_{i=0}^{p} \delta_{2i}\ \Delta l_{t-i} + \sum_{i=0}^{p} \theta_{2i}\, \Delta k_{t-i} + \sum_{1=0}^{p} \sigma_{2i} \Delta D_{t-i} + \sum_{1=0}^{p} \varphi_{2i} \Delta \pi_{t-i} \quad (12)$$

All coefficients of the short-run equation are coefficients relating to the short-run dynamics of the model's convergence to equilibrium and $\omega$ in equation (11) above represent the speed of adjustment. With the dearth of a reliable data on labour force in Nigeria, this study uses secondary school enrolment as a proxy for labour force (l). Gross fixed capital formation is used as a proxy for capital (k), inflation ($\pi$) and D will be the military expenditure. Data are sourced from Central Bank of Nigeria Statistical Bulletin, 2013 edition and the Stockholm International Peace Research Institute (SIPRI) Military Expenditure Database, 2014 edition.

## 4. ESTIMATION AND INTERPRETATION OF RESULTS

The test for the stationarity status of all variables to determine their order of integration is necessary before proceeding with the ARDL bounds test, although the bounds testing procedure is not predicated on prior information about the order of integration of the series under investigation. This is however expedient to ensure that the variables are not I(2) stationary so as to avoid spurious results. Inferences in the bounds testing procedure through the computed F-statistics for bounds testing are based on the assumption that the variables are level or first-differenced stationary. For this purpose, the ADF and PP methods are used to determine the stationarity of the variables and the results are presented in table 1.

**Table 1 Summary of Unit Root Test**

| Variables | Augmented Dickey- Fuller | | | Philip - Perron | | |
|---|---|---|---|---|---|---|
| | Levels | 1st Difference | Remarks | Levels | 1st Difference | Remarks |
| $\ln k_t$ | -1.326089 | -8.128335* | I(1) | -1.603202 | -4.236256 | I(1) |
| $\ln y_t$ | 0.093418 | -4.394309* | I(1) | -1.344492 | -3.612199** | I(1) |
| $\ln \pi_t$ | -6.269051* | - | I(0) | -3.603202 | - | I(0) |
| $\ln l_t$ | 0.397467 | -2.891347** | I(1) | 0.647297 | -2.921038** | I(1) |
| $\ln D_t$ | -2.269619 | -6.253881* | I(1) | -3.357541 | -6.261240* | I(1) |

*/ ** represent stationary at 1and 5 percent level respectively.

The Unit root test on all variables was carried out using the Augmented Dickey-Fuller(ADF) and Philip-Perron (PP) tests with intercept only and the result was presented in Table 1. The result showed that all the variables except inflation were non-stationary at levels. That is, they were not integrated at order zero but they became stationary after first differencing. The PP unit root test results as reported in Table 1 confirmed results from ADF test.

**Table 2 ARDL Bounds test for Cointegration**

| Model | F-Statistic | |
|---|---|---|
| F(L, k, D, $\pi$) | 8.5050 | |
| Critical Values | Upper Bound | Lower Bound |
| | K=5; n = 25 | |
| 10% | 3.4397 | 2.1761 |
| 5% | 4.2063 | 2.7254 |

Narayan (2005): Critical values for the bounds test: case III: unrestricted intercept and no trend. The critical values reported in Pesaran et al. (2001) are based on large sample sizes; thus, it cannot be used for small sample sizes. Narayan (2004 a, b) generates and reports new sets of critical values for small sample sizes.

Table 2 reports the results of the ADRL bounds cointegration tests. It shows the calculated F-statistic when the regression is normalized on the economic growth. The search for co-integrating relations has been restricted to growth variable as the dependent variable based on the fact that the study strictly utilized a growth regression model. The computed *F*-statistic (8.5050) is higher than the upper critical bound at 5% and 10% critical values as indicated in Table 2. This provided evidence to reject the null hypothesis of no co-integration at 5% and10% significance level for the growth model. It can therefore be concluded from the ARDL bounds test that there is a long-run relationship among the variables. Following the establishment of long-run co-integration relationship among the variables, the long-run and short-run dynamic parameters for the variables were obtained. The empirical results of the long-run model are presented in Table 3.

**Table 3 Estimated ARDL Long-Run Coefficients. Dependent Variable: GDP ARDL(1, 0, 0, 1, 0)[a]**

| Regressor | Coefficient | t-statistics | P-value |
|---|---|---|---|
| $\ln D_t$ | 1.5973 | 2.0517 | 0.045 |
| $\ln k_t$ | 0. 0102 | 2.1294 | 0.036 |
| $\ln l_t$ | 3.0709 | 3.2734 | 0.013 |
| $\ln \pi_t$ | 2.2900 | 1.6391 | 0.118 |

a. Selected based on Schwarz Bayesian Criterion

The estimated coefficients of the long-run relationship between military spending and economic growth produced mixed results in line with thediversity of evidence of existingliterature. The long-run ARDL estimates (1.5973) indicate positive and significant result at 5% level of significance. This result conforms to the results of studies like Tiwari and Shahbaz (2011), Halicioglu (2004), Yildirim *et. al.* (2011) and Pieroni (2008) that there exists a positive and significant long run relationship between military spending and output. Labour and Capital are two other inputs that contribute to economic growth. Their estimates (0.0102 and 3.0709) have positive and significant results at 5% level of significance. The results show that labour is the highest contributor to economic growth in Nigeria. In addition, it can be deduced that government spending in the long-run does not enhance inflation in the long run. This supports the argument of Tiwari and Shahbaz (2011) that increase in government spending would induce inflation after exceeding the threshold point.

**Table 4 Error Correction Representation for the Selected ARDL Model ARDL (1,0,0,1,0)[a]**

| Regressors | Coefficients | t-statistic | P-value |
|---|---|---|---|
| $\Delta\ln D_t$ | - 0.2202 | - 2.3049 | 0.017 |
| $\Delta\ln k_t$ | 0.1497 | 6.2856 | 0.000 |
| $\Delta\ln l_t$ | 0.0156 | 3.1762 | 0.003 |
| $\Delta\ln \pi_t$ | -0.0315 | -3.2735 | 0.002 |

| | | | |
|---|---|---|---|
| Ecm(-1) | -0.0137 | -2.9304 | 0.006 |

[a]Selected based on Schwarz Bayesian Criterion

Table 4 gives the results of the short-run dynamic coefficients associated with the long-run relationships obtained from the ECM equation. The error correction term in the model is highly significant and correctly signed. This indicates adjustment to long-term equilibrium in the dynamic model. Bannerjee et. al. (1998) posits this as an evidence of a stable long-term relationship. The coefficient of error correction term is (0.0137). This implies that deviations from the long-term growth rate in output adjust quickly. Furthermore, as expected, military spending in the short- run has negative and significant effect at 5% level of significance on output and that this induces inflation in the short-run. The results showed that 1% increase in military spending will reduce output by 22%. This, on the other hand, will promote inflation in the economy.

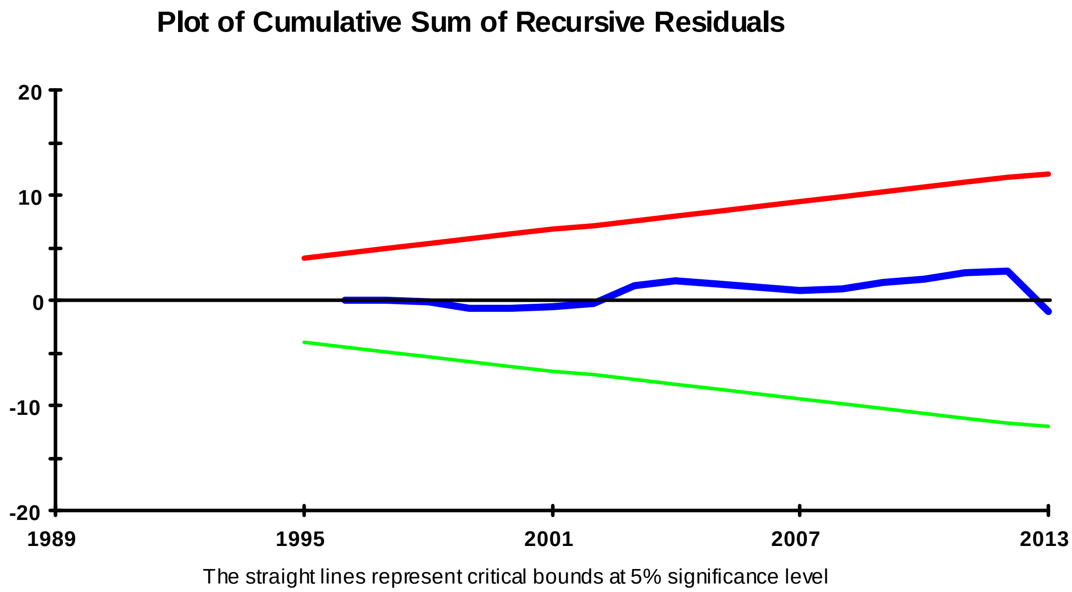
Specification problems associated with serial correlation, functional form, normality or heteroscedasticity were checked with diagnostics tests, including the test for serial correlation (LM test), heteroscedasticity (ARCH test), normality (JB (N)) and functional form. The results are presented in table 5 below.

**Table 5 ARDL – VECM Model Diagnostic tests Test Statistics LM (χ)**

| Test Statistics | LM($\chi^2$) |
|---|---|
| Serial Correlation | $\chi^2$(1) 20.3333[0.000] |
| Functional Form | $\chi^2$(1) 25.8714[0.000] |
| Normality | $\chi^2$(2) 0.76473[0.682] |
| Heteroscedasticity | $\chi^2$(1) 1.5815[0.209] |

Table 5 indicates the underlying ARDL equation passes the diagnostic tests. The stability of the long-run coefficients, along with the short run dynamics of the estimated ARDL model were confirmed with the test of CUSUM. Table 6 presents the plots of the CUSUM based on the Schwarz Bayesian criterion. As can be seen in Figure 1, the plot remains within critical bounds at 5% significance, accepting the null hypothesis that all coefficients and the ECM are stable.

**Figure 1 Plot of Cumulative Sum of Recursive Residuals**




## 5. CONCLUSION AND POLICY IMPLICATIONS

The study examines whether military expenditure is one of the economically non-contributive activities as argued by Dumas (2002) in the Nigerian context. It also investigates the effect of military spending on economic growth, both in the short-run and long-run periods, in Nigeria. The study employs Autoregressive Distributed Lag approach to Co-integration on secondary data from 1989 to 2013. Results showed that military spending has negative and significant effect on output in the short-run but positive and significant effect in the long-run. Labour and capital have positive and significant effects both in the long-run and short-run. In addition, labour has the highest coefficient (3.0709) in the long-run. Inflation has negative and significant result in the short-run but positive and non-significant result in the long-run. The outcomes of the result imply government should reduce its spending in maintaining peace and order in the country but rather increase its spending on human capital development and accumulation of capital since these are the major drivers of economic growth. The study concludes that military expenditure is an economically contributive activity as against Dumas (2002) argument. However, policy makers should encourage budgetary allocation in support of accumulation of capital and human capital development.

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