Government Expenditure and Economic Growth in Nigeria, 1970-2010: ARDL Bounds Test Approach

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Abstract **This paper analyses the impact of public expenditure on economic growth in Nigeria during the period 1970 to 2010 making use of annual time series data. The study employs the bounds testing (ARDL) approach to examine the long run and short run relationships between public expenditure and economic growth in Nigeria. The bounds test suggested that the variables of interest put in the framework are bound together in the long-run. The associated equilibrium correction was also significant confirming the existence of long-run relationships. Our findings indicate the impact of total public spending on growth to be negative which is consistent with other past studies. Recurrent expenditure however was found to have little significant positive impact on growth. Therefore, government should increase its spending on infrastructure, social and economic activities.**

Index Terms*— government expenditure, economic growth, ARDL co-integration, Nigeria.** ***(key words)

I. Introduction

Ordinarily, the utilization of the resources of any economy, through public expenditure, should lead to poverty reduction, improvement in the standard of living of its citizens, mitigation of inequalities in income distribution and improve the general well-being and economic development of the economy. However, in spite of the visible attempts by the successive governments of Nigeria to apply her vast financial resources, there exists what has been referred to as "the paradox of plenty". Indeed, there has been rather a co-existence of abundant resources and wealth and extreme poverty in these economies unlike her developed counterparts. For example, a recent World Bank report estimated that 80 percent of oil revenues in Nigeria benefits only 1 percent of the population [1]

The country which ranked sixth in World oil output is ranked 151 out of 171 countries in human capital development (UNDP Index 2004). About 60 per-cent of the population live in abject poverty [2]. Before the debt forgiveness of 2006 the country was listed among the heavily indebted nations of the world with the external debt stock standing at a whopping $37.5 billion [1]. About 60 percent of the population lives on less than US$1 per day. This is in spite of astronomical increases in public expenditure over the years. For example, Nigeria's National budget has been increasing in leaps and bounds over the years.

Spending as a proportion of GDP is a measure of the level of direct government involvement in overall economic activity. Measuring spending as a proportion of GDP has at-least two benefits. First, it provides a comparable base for analyzing spending through time. Unlike nominal dollars, spending as a proportion of GDP provides a meaningful comparison between years of relative resource use. Second, spending as a proportion of GDP shows the relative extent of government intervention in the economy and therefore assists in analysis of social choice. GDP represents the resources available and spending represents the share of those resources allocated by government through the budget.

Available Central Bank of Nigeria (CBN) statistical data show that Nigerian total government expenditure (capital and recurrent) continued to rise throughout the country. For instance, while government capital expenditure on economic services, social and community services, and transfers increased from N15.5 million N1.4 million and N100.7 million respectively in 1970 to N809120.5 million, N120049.2 million and N211758.1 million respectively in 2009, recurrent expenditure on same services increased from N25.95 million, N43.55 million and N511.42 million respectively in 1970 to N340193.77 million, N346071.95 million and N622171.10 million respectively in 2009 [2]. Government expenditures on these and other services or sectors would be expected to generate a corresponding growth trend in the economy. This necessitates the research interest for empirical quantitative measure of effect of government spending on growth of the Nigerian economy. Consequently, this study dwells primarily on the expenditure side of public finance, and seeks to examine the relationship between government expenditure and economic growth in Nigeria for the period 1970 to 2010.

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II. METHODOLOGY

For the purpose of this study only secondary data are used. Conversely, the Secondary data were obtained from the CBN Annual and Quarterly Reports, the CBN Statistical Bulletin, published data on seminars, journals, magazines, newspapers and some information were also retrieved from the CBN websites in relation to the subject of this research.

This paper uses [6] bound tests approach to co-integration and error correction methods to analyze relationship between government expenditure and economic growth. The framework for the study has its basis on the Keynesian and endogenous growth models. The Keynesian model states that expansion of government expenditure accelerates economic growth.

Model Specification

The functional relationship as well as the econometric model for the study is specified below as;

$$GDP = f(CE, CE, TR)$$

This function expresses GDP as a function of Current expenditure (CE), Capital expenditure (CE) and Trade (TR). The model is therefore specified as:

$$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \mu$$

Where:
Y = dependent variable
β0 = equation constant
β1, β2 and β3 = coefficient of explanatory variables
X1, X2 and X3 = independent or explanatory variables
μ = error term.

III Results and Discussion

Unit Root Test Results

Prior to analyzing the estimated results using ARDL approach to cointegration, we first begin by investigating the non-stationarity (the presence of unit roots) in all the variables by applying the Augmented Dickey–Fuller (ADF) and Phillips-Perron (PP) tests. Even though the ARDL model does not required pre-testing variable to be done, [4] documents that, ARDL estimators may not be valid for any data series which is generated by I (2) or beyond, because [6] explicitly mentioned that, the ARDL bounds test is subject to assumption that the variable are integrated of order of I(0) or 1(1). Therefore, the testing the level of stationarity is still necessary.

Table 1 shows the unit root test result conducted on the variables. In the first step, the ADF and the Phillips-Perron test were conducted at level; where two variables (lgdp and llb) found to be no stationary. A further test for stationarity by first level of differencing shows the variables attaining stationarity all at one percent level of significance except Δlgdp (with constant and intercept) which s stationary at 5% level of significance.. Therefore, based on [1] we concludes that the variables included in the model could be used for ARDL approach to cointegration.

In order to estimate the cointegration and long run relationship among variables, as suggested by [5] and [6] we can choose a minimum order of lag in ARDL model and proceed with the estimation. The data covers thirty nine (39) years and used both the Schwarz Bayesian Criterian (SBC) and Akaike Information Criterion (AIC) to determine the optimal number for lag to be included. As emphasized by [3], the selected lag most not have serial correlation and has to minimize SBC or AIC.

As shown in Table 2 lag 3 has the minimum order base on SBC follow by lag 2 but they all have serial correlation at Lim1, and Lim1 and 2 respectively, therefore, the optimal lag is lag 1 since it has no evidence of correlation and it is the lag length that minimize AIC.

The calculated F statistics for the cointegration test as well as the critical values for the unrestricted error correction model (VECM) are displayed in Table 3 above, K and N represents the number of repressors' and observations respectively, using small sample size (between 30-80) suggested by [6] the value of statistic (9.005) is higher than the upper bound critical value of all the three significance level using unrestricted intercept and no trend. This implies that the null hypothesis of no co-integration cannot be accepted at all the three significance levels and therefore, the co-integration exists among the variables and the null hypothesis of no integration is statistically rejected because the variables in the VECM models are integrated.

The estimation results of the ARDL selected model (1, 0, 1, 0) base on Schwarz Bayesian Criterion (SBC), reveal that 99% of variation in GDP is explained by the independent variables (LRE, LCE, LLB, $LGDP_{t-1}$, LCE_{t-1}) in which LGDP depends on. However, the model indicates that, all the variables have positive relation with the dependent variable (LGDP) but have insignificant impact, LGDP and LCE of last year lag period will increase the current year lag by 80% and 8% respectively, because their benefits could not be determine in the current year. LRE, LCE and LLB have little contribution to the economic growth.

In order to check the stability of the long-run coefficients, the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMSQ) tests suggested by [5] are used. The CUSUM and CUSUMSQ statistics are updated recursively and plotted against the break points. If the plots of CUSUM and CUSUMSQ statistics stay within the critical bounds of 5% level of significance, the null hypothesis of all coefficients in the given regression are stable and cannot be rejected.

iv. CONCLUSION

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The preferred growth equation can be used for policy decision-making purposes, such that the impact of policy changes considering the explanatory variables of growth equation will not cause major distortion in the level of per capita GDP in Nigeria, since the parameters in this equation seem to follow a stable pattern during the estimation period.

Table 1: Augmented Dickey-Fuller (ADF) and Philips Perron (PP) Unit Root Test Result

Series	Constant		With Trend	
	ADF	PP	ADF	PP
LGDP	-0.212260	-0.212260	-1.576110	-1.576110
LRE	-1.442683	-1.442683	-5.526636***	-5.526636***
LCE	-1.938676	-1.938676	-4.427301***	-4.427301**
LLB	0.957956	0.957956	-2.253694	-2.253694
ΔLGDP	-3.938742***	-5.399896***	-3874808**	-5.323698***
ΔLRE	-10.58417***	-15.08370***	-10.16692***	-15.89947***
ΔLCE	-6.290683***	-10.32767***	-6.285298***	-10.27792***
ΔLLB	-5.447762***	-8.711825***	-5.907385***	-9.118898***

Note: The critical values for constant (and trend) at 1%, 5%, and 10% level of significant are -3.610453 (-4.211868), -2.938987 (-3.529758), and -2.607932 (-3.196411) respectively.***,** and * denote significance at 1%, 5%, and 10% respectively. ADF test the null hypothesis of 'not stationary' against the alternative of 'stationary.

Like ADF, the PP unit root test has the null hypothesis of 'not stationary' against the alternative, which is 'stationary' *, ** and *** indicate the level of significance at 10%, 5%, 1% respectively. The respective critical values at 1%, 5% and 10% are -3.610453, -2.938987 and -2.607932 for (constant) and -4.211868, -3.529758 and -3.196411(with trend).

Table 2: Long Run Level Relationship Test (Bounds Testing Approach)

Test Statistic	value	Lag	Significance level	Bounds Critical Value (intercept and no trend) Unrestricted. K=3 and n=39	
F-statistics	9.005	1		1(0)	1(1)
			1%	4.310	5.544
			5%	3.100	4.088
			10%	2.592	3.454

Critical values are from [6].

Table 3: ARDL Selected Model (1,0,1,0) Based On Schwarz Bayesian Criterion

VARIABLES	COEFFICIENT
Constant	-0.681(0.596)
$LGDP_{t-1}$	0.80728(0.000)***
LRE_t	0.4215(0.286)
LCE_t	0.008(0.832)
LCE_{t-1}	0.086(0.019)**
LLB_t	0.542(0.403)
LM	2.080(0.149)
Ramsey RESET	0.008(0.928)
HETEROSCEDASTICITY	1.940(0.164)
JARQUE BERA	22.644(0.000)***
R-SQUARE	0.99588

Note: ** and *** show significance level at 5% and 1% level respectively. Ramsey RESET shows the misspecification using the square of the fitted values, JARQUE BERA indicates normality test of skewness and kurtosis of residuals, HETEROSCEDASTICITY is based on the regression of squared residuals on squared fitted values.

III. References

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