

# Fiscal Policy and Economic Growth in Nigeria: An ARDL, Bound Test and ECM Approach

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## Abstract

The aim of this study is to examine the relationship between fiscal policy and economic growth in which past studies have not fully explored in Nigeria. Data was collected from the Central Bank of Nigeria Statistical Bulletin from 1990 to 2017 and the study employed the Autoregressive Distributed Lag (ARDL) model and Error Correction Model (ECM) to address its objective. Consequently, the major findings that originated from the work could be submitted as follows. The result of ECM term confirmed that about 39% of the total disequilibrium in the previous year would be corrected in the current year. Therefore, it will take about two (2) years for the system to adjust back to its long run equilibrium path. Meanwhile, the estimated result shows that economic growth and government revenue have a significant positive relationship in Nigeria in the short run but the relationship becomes negative in the long run. However, recurrent expenditure has a significant negative relationship with economic growth in the short run but the relationship becomes insignificant in the long run. However, inflation rate has a significant positive relationship with economic growth in both short run and long run. Due to the findings that originated in this study, this paper makes the following recommendations for the policy makers in Nigeria that if the economic growth is the target of the policy makers, manipulating fiscal policy variables such as government revenue, capital expenditure and inflation rate appropriately will increase economic growth in the short run and the long run.

**Keywords:** Fiscal Policy; Economic Growth; ARDL.

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## INTRODUCTION

Most of the African countries, including Nigeria are confronted with various developmental issues like perpetual price-instability, high level of unemployment rate, persistent exchange rates volatility, inequitable distribution of income, unfavourable balance of payments, low growth rate and high level of abject poverty [1, 2].

In Nigeria, few of the most paramount macroeconomic policies that cannot be undermined are monetary policy and fiscal policy. For instance, the monetary policy is primarily formulated in Nigeria to maintain price and exchange rate stability in order to

achieve a sustainable economic growth and competitive external sector [3]. It instructive to state that the effectiveness or otherwise of monetary policy in achieving its target objectives is a function of operating economic environment, the institutional framework adopted, and the choice and mix of the instruments used.

Similarly, fiscal policy uses important parameters which span from taxation, budget and quotas. These parameters induce government revenue and expenditure with a view to achieving a sustainable economic growth which monetary policy also intends to achieve. It is expected that tax revenue will rise due to

the expansion of the economy all things being equal, even when the fiscal policy remains constant. Meanwhile, government expenditure could further increase as a result of an increase in revenue from taxes. This leads to more expansion of the economy given the fact that such spending is channeled into productivity activities that complement private investment. Therefore, fiscal policy could be used to stimulate the economy via manipulation of taxes and expenditure.

In Nigeria, despite the fact that there have been an increase in expenditure by different successive government in the last few decades, yet in 2013 the country registered an average per capita income which is lower than what was attainable at the end of the 1970s. In the same vein, GDP growth rate declined from 7.8% in 2010 to 0.8% in 2017 [4]. Nigeria is also among the countries experiencing lowest investment rate in the globe. Meanwhile, it has been argued that the pursuit of sound monetary and fiscal policies in conjunction with good governance has the capacity to propel a strong moderating inducement on the exogenous factors that have constituted an impediment to double digit growth rate in the Nigerian economy [5]. Moreover, increase in expenditure should address economic growth challenges and the worrisome level of unemployment rate in Nigeria, the reverse is the case. Total expenditure and rate of unemployment have a direct relationship over time in Nigeria. This is because recurrent expenditure consumes a greater percentage of the total expenditure in Nigeria. For instance, in 2000, 66% of the total expenditure went on recurrent which rose to 79% in 2010 [6]. This implies that less percentage of the total expenditure has been spent on capital projects that could address infrastructural deficit and consequently derive economic growth in the country. In view of the above it is pertinent for this study to critically examine the nexus between fiscal policy variables and economic growth in which past empirical studies have not fully explored in the recent time.

## LITERATURE REVIEW

Agu *et al.* [7] employed ordinary least square (OLS) to determine the impact of various components of fiscal policy on economic growth in Nigeria between 1961 and 2010. The findings that came up in the study show that total government expenditures have tendency to rise with government revenue, but expenditures increase faster than revenue. Therefore, in public spending, it is important to note that the effectiveness of the private sector depends on the stability and predictability of the public incentive framework, which promotes or crowds out private investment Falade and Folorunsho [8] examined the relative effectiveness of fiscal and monetary policy instruments on economic growth sustainability in Nigeria with the application of error correction mechanism between 1970 and 2013. Data were sourced mainly from Statistical Bulletin published by the Central Bank Nigeria. The authors

discovered that the current level of exchange rate and its immediate past level, domestic interest rate, current level of government revenue and current level of money supply are the appropriate policy instrument mix in propelling growth of the Nigerian economy in the short and long run. Similarly, Ogege and Shiro [9] analyzed the dynamics of monetary and fiscal policies on economic growth in Nigeria. The study concluded that both monetary and fiscal policy brought about economic growth in the country. Ogbole, Amadi, and Essi [10] assessed a comparative impact of fiscal policy on economic growth in Nigeria during regulation and deregulation periods with the application of econometric technique. It was discovered from the paper that the effectiveness of fiscal policy in stimulating economic growth during and after regulation period was not the same. Consequently, Effiong [11] analyzed the link between fiscal, monetary policies and the development of the Nigerian stock market. The author argued that monetary and fiscal policy mix brought about a significant role on the development of stock market in Nigeria. Omitogun and Ayinla [12] critically verified the linkage between fiscal policy and the achievement of sustainable economic growth in Nigeria with the aid of Solow growth model and OLS technique. The authors opined that fiscal policy has not been effective in promoting sustainable economic growth in Nigeria. Enahoro [13] argued that fiscal and monetary policies facilitated operational efficiency financial institutions in Nigeria by causing a decline in financial indiscipline in both financial and fiscal systems. It was concluded from the study that fiscal and monetary policies orchestrated government to commit budgetary management that addresses anomalies in the financial system. Sanni *et al.* [14] submitted that none of the monetary and fiscal policies could be said to be superior to another. However, a proper mix of the policies could bring a better economic growth.

In the same vein, Chuku [15] adopted a vector auto-regression (VAR) model to investigate the monetary and fiscal policy interactions in Nigeria from 1970 to 2008. It was posited that monetary and fiscal policies have a counteractive interaction from 1980 to 1994, whereas no symmetric pattern of interaction was noticed between the two policies at other periods. Victor and Marcos [11] assessed how economic, political, and institutional factors constituted constraints to the implementation of fiscal policy in sub-Saharan Africa. The authors reported that there was a high tendency that planned fiscal adjustments or expansions are less likely to be implemented. Hilderbrand [16] analyzed the nexus between the value, interaction of both fiscal austerity and structural reforms. The author argued that structural reform process did not produce immediate results but reverse was the case of fiscal austerity. In another perspective, Adeoye [17] investigated aftermath effect of fiscal policy on economic growth in Nigeria from 1970 to 2002. It was

discovered from the paper that public investment had a negative effects on output growth in the country. This showed that public expenditure caused a crowding out effect on private investment in Nigeria.

In conclusion, literature on macroeconomic policy and economic growth is ongoing in Nigeria, and empirical studies about policy mix are inconclusive in the country. Hence, the relevance of this study

### Model Specification

RGDP = F (Infl, CE, RE, GR) -----1

If model 1 is linearized to form model 2

$LnRGDP_t = \alpha_i + \beta_0 Ln + \beta_1 Infl_t + \beta_2 LnCE_t + \beta_3 LnRE_t + \beta_4 LnGR_t + \mu_i$  -----2

### ARDL and ECM Model Specification

Various diagnostic tests such as unit root test and Bound Test performed on data used to capture the variables of interest necessitated the choice of ARDL and ECM in this study. Due to different orders of

## METHODOLOGY

The data for the empirical analysis in this paper are extracted from secondary sources. To be explicit, data for real GDP, inflation rate, government expenditure and revenue were sourced from CBN statistical Bulletin. E-Views software was employed for the running of the data.

integration of the variables i.e. I(1) and I(0), the paper utilizes autoregressive lag model to address its objective [18, 19]. In a general form, ARDL and ECM models could be specified as follows

$$\Delta LnRGDP_t = \beta_0 + \sum_{i=1}^p \beta_1 \Delta LnRGDP_{t-1} + \sum_{i=0}^p \beta_2 \Delta Infl_{t-1} + \sum_{i=0}^p \beta_3 \Delta LnCE_{t-1} + \sum_{i=0}^p \beta_4 \Delta LnRE_{t-1} + \sum_{i=0}^p \beta_5 \Delta LnGR_{t-1} + ECM_{t-1} + \sum_{i=1}^p \beta_6 LnRGDP_{t-1} + \sum_{i=0}^p \beta_7 Infl_{t-1} + \sum_{i=0}^p \beta_8 LnCE_{t-1} + \sum_{i=0}^p \beta_9 LnRE_{t-1} + \sum_{i=0}^p \beta_{10} LnGR_{t-1} + \mu_i \text{ -----(3)}$$

Where RGDP proxy's economic growth, Infl denotes inflation rate, CE is used to represent government capital expenditure, RE means government recurrent expenditure, GR connotes total government revenue,  $ECM$  measures the speed of adjustment between short run and long run relationship and  $\mu_i$  is error term.  $t=1990-2017$ .

Meanwhile, term  $\beta_1-\beta_5$  is measures short run parameters/ coefficients meanwhile  $\beta_6 - \beta_{10}$  measures long run parameters. It is expected that  $\beta_1 - \beta_{10} > 0$ .

## RESULTS AND DISCUSSION

Table-2: Descriptive Statistics of Annual Data Series (1990-2017)

Descriptive Statistics	LNExch	LnRGDP	Infl,	LnCE	LnGR	LnRE
Mean	4.300743	42.44046	18.71679	26.43649	28.23554	27.22300
Median	4.815250	31.28159	12.55000	26.69591	28.61158	27.67558
Maximum	5.857933	346.1660	72.84000	27.81334	30.03949	29.06108
Minimum	2.084156	30.60445	5.380000	23.90340	25.30925	24.31288
Std. Deviation	1.061811	59.52657	17.42350	1.174559	1.540107	1.565270
Skewness	-0.709526	5.003169	1.958346	-0.788727	-0.573464	-0.481538
Kurtosis	2.095351	26.03362	5.646040	2.485971	1.957561	1.860208
Jarque-Bera	3.304115	735.7866	26.06566	3.211354	2.802474	2.597748
Probability	0.191655	0.000000	0.000002	0.200754	0.246292	0.272839
Sum	120.4208	1188.333	524.0700	740.2217	790.5951	762.2440
Sum. Sq. Deviation	30.44095	95672.15	8196.619	37.24887	64.04208	66.15188
Observation	28	28	28	28	28	28

Source: Authors' Computation (2019)

Data series is near symmetry the above table presents descriptive statistics of the data employed for empirical analysis in this paper. This provides a crucial information about the distribution of the sample series. The estimated results in the table shows that the values of mean and median of the variables exchange rate, capital expenditure, recurrent expenditure and government revenue are almost identical apart from real

GDP and inflation which show a slight difference. This proves that the distribution of the. Because distribution of data series is said to be perfectly symmetrical if the values of mean, mode and median of such data series are the same [20]. The value of Kurtosis of the variables are not far from 3 except that of real GDP. This is also attests to the symmetrical nature of the data series employed for the analysis.

**Table-2: Unit Root Test**

Variables	ADF Test			PP Test		
	Level	1 <sup>st</sup> Difference	Remarks	Level	1 <sup>st</sup> Difference	Remarks
LnRGDP	-2.976263***		I (0)	-2.976263***		I (0)
LnExch	-2.976263***	-2.981038***		-2.976263***	-2.981038***	
LnRE	-2.976263***	-2.981038***	I (1)	-2.976263***	-2.981038***	I (1)
LGR	-2.976263***	-2.981038***	I (1)	-2.976263***	-2.981038***	I (1)
LCE	-2.976263***	-2.981038***	I (1)	-2.976263***	-2.981038***	I (1)
Infl	-2.976263***	-2.981038***	I(1)	-2.976263***	-2.981038***	I(1)

Source: Authors` Computation (2019) \*\*\* %5 level

This study employs a time series data for its analysis. However, non-stationarity of data constitutes a problem in time series data analysis because it could reduce the validity of economic forecast based on such data. In order to overcome the above problem in this study an attempt has been made to utilize the standard Augmented Dickey-Fuller (ADF) and Phillips-Perron

(PP) tests to examine the stationarity or otherwise of the data. Consequently, the results of the estimated Augmented Dickey-Fuller (ADF) and Philip Perron tests in the above table indicate that all the macroeconomic data in this work were not stationary in their level form, except real GDP which was stationary in its native form.

**Table-3: ARDL Bounds Test**

Sample: 1992 2017		
Included observations: 26		
Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	k
F-statistic	5.712113	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Authors` Computation (2019)

Having established that the pre-estimation test of data employed for this work shows that the dataset is a combination of I(0) and I(1). Meaning that the dataset is a combination of stationarity and non-stationarity data. It is instructive to determine the existence or otherwise of the long run equilibrium relationship among these set of variables with the application of Bound Test [19, 18]. Consequently, table 3 confirms a presence of cointegrating relationship among the

variables in the model since the Null hypothesis of no long run relationship could not be accepted because the upper and lower Critical Value Bounds at all level of significance is less than the value of F-Statistic. Hence, it could be submitted that real GDP and other macroeconomic variables in the model have a long run relationship. This justifies the need to estimate both short run and long run relationship among these variables in this paper.

**Table-4: Parsimonious Short Run and Long Run Regression Estimates**

Dependent Variable: LnRGDP

Short Run	coefficient	T-statistics	Long Run	coefficient	T-statistics
DLnRGDP(-1)	-0.520527	-4.915069	LnRGDP(-1)	0.157342	0.354443
DLnGR	64.16151	2.068742	LnGR	66.53996	1.405613
DLnRE	-51.34061	1.857096	LnRE	-37.97695	-0.299985
DLnCA	1.222305	0.121464	LnCA	10.43340	0.6237
DInfl	5.188582	7.307590	Infl	5.045912	5.428183
ECM	-0.397019	2.227675	R-squared	0.658845	
R-Squared	0.900568		A.R-squared	0.454152	
Adj.R-Squared	0.822442		DWstat	1.797389	
DWstat	2.031963				

Source: Authors` Computation (2019)

The table above presents the result of both the short and long run relationship between economic growth and other macroeconomic variables. All explanatory variables have the expected sign both in the short and the long run except recurrent expenditure. Also, the error correction model (ECM) which shows the speed of adjustments back to equilibrium in the estimated model is negative and significant. The speed of adjustment for correcting disequilibrium from the previous year to equilibrium in current year is 39% as shown by the coefficient of ECM. In another words, this implies that an approximately 39% of disequilibrium from the previous year's shock converge to the long-run equilibrium in the current year.

Similarly, the estimated result shows that government revenue and economic growth have a significant positive relationship in Nigeria in the short run but the relationship becomes negative in the long run, though not significant. This finding is in line with the submission of Falade and Folorunsho [8], Ogege and Shiro [9] in related studies but different methodologies in Nigeria. However, recurrent expenditure has a significant negative relationship with economic growth in the short run but the result becomes insignificant in the long run. The negative impact of recurrent expenditure on economic growth in Nigeria could be as a result of huge part of this fund that goes on debt servicing on annual basis. Meanwhile, capital expenditure has an insignificant positive impact on economic growth both in the short run and long run. The reason for an insignificant result might be as a result of investment on white elephant projects by the Nigerian government or embezzlement of funds benchmarked for capital projects by the public office holders in the country. In addition, inflation rate has a significant positive relationship with economic growth in both short run and long run. This implies that inflation rate contributes to economic growth in Nigeria over time.

Therefore, government revenue and capital expenditure have a positive impact on economic growth in Nigeria; this study submits that fiscal policy has the tendency to stimulate economic growth in the country. This conclusion is supported by the propositions of Nworji, Okwu, Obiwuru, and Nworji [21] Medee and Nenbee [23], Wu, Tang, and Lin [23] and Philip [24]. But contradicts the submission of Omitogun and Ayinla [9]

## CONCLUSION AND RECOMMENDATIONS

This paper has examined the relationship between fiscal policy and economic growth in Nigeria between 1990 and 2017 using Bound Test, ARDL and ECM model. The findings of this study could be summarized below; the error correction term showed that about 39% of the total disequilibrium in the previous year due to shock was corrected in the current year. Government revenue and economic growth have a

significant positive relationship in Nigeria in the short run but negative in the long run, though not significant. However, recurrent expenditure has a significant negative relationship with economic growth in the short run but the result becomes insignificant in the long run. Capital expenditure has an insignificant positive impact on economic growth both in the short run and long run. Furthermore, inflation rate has a significant positive relationship with economic growth in both short run and long run. It could be concluded that government revenue and capital expenditure have a positive impact on economic growth in Nigeria, Therefore, this study submits that fiscal policy has the tendency to stimulate economic growth in the country. As a result of the findings that emerged in this study, it is imperative that the following recommendations are made for the makers in Nigeria that if the economic growth is the target of the policy makers, manipulating fiscal policy variables such as government revenue, capital expenditure and inflation rate will increase economic growth in the short run and the long run. Also, capital expenditure should be channelled towards more productive sectors of the economy to ensure a sustainable economic growth in the country.

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