Budget Deficit and Economic Growth in Nigeria

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Abstract

This paper examines the relationship between budget deficit and economic growth in Nigeria, from a linear and non-linear perspective, using annual time series data from 1981 to 2019. The linear model, which involves the use of an autoregressive distributed lag (ARDL) approach, was compared with a non-linear analysis, using a threshold autoregressive (TAR) model. The ARDL analysis reveals that the growth of national output is positively driven by the persistent budget deficit in Nigeria. This was substantiated by the TAR model which indicates that though budget deficit drives economic growth in Nigeria, the positive relationship holds only if the deficit does not exceed the optimal threshold, which is 2.02 per cent of GDP. Our analysis on the control variables shows that interest rate has negative and significant impact on economic growth, while exchange rate has no impact. We recommend that, government should lower interest rate and that expansionary fiscal policy should ensure that fiscal deficits do not exceed 2.02 per cent of the gross domestic product.

Keywords: Budget Deficit, Economic Growth, Linear and Non-linear, ARDL and TAR Models

JEL Classification: C22, E62, F43

I.   Introduction

The desire to achieve macroeconomic stability is a global phenomenon, considering the contagious effects of economic crises experienced among nations during the 2008/2009 global economic meltdown. However, it is the sole responsibility of every nation, particularly the developing economies (characterised by excess labour and raw material resources) to efficiently manage their fiscal accounts in a manner that will bring about macroeconomic stability and ensure inclusive and sustainable growth.

Despite the introduction of the private sector led economy in 1986 using the Structural Adjustment Programme (SAP), the government seems to be one of the highest employers of skilled and semi-skilled labour in Nigeria. This and other related scenario have left public authorities both at the national and sub-national levels with an ever-increasing administrative cost at the expense of developmental projects (Umaru, 2017). Whereas Nigeria recorded a balanced budget in 1995, followed by a fiscal surplus of ₦32.05 billion in 1996; the country has continued to run budget deficits in subsequent years (CBN, 2018). In 2018, over 77.0 per cent of the federal government budget went into recurrent spending (DMO, 2020). While the total government expenditure in 2018 stood at ₦7.54 trillion, only ₦1.68 trillion was actually voted for capital expenditure, whereas fiscal deficit for that same year stood at ₦1.95 trillion (DMO, 2020). The

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huge and persistent annual deficit, has translated into a growing public debt for the country. The desire to achieve sustainable growth may prove difficult if this scenario continues.

Economic growth is a quantitative expansion in the gross domestic product over a year, (Todaro & Smith, 2015). The growth rate of national output is one of the key performance indicators used in accessing the health status of an economy. Unfortunately, Nigeria's economic growth outcome in the recent past has been unimpressive. The highest growth rate from 1981 to date is 15.33 percent recorded in 2002 (World Bank, 2019). This figure fell significantly, to 6.44 percent in 2005, and remained around the same up to 2008 (World Bank, 2019). In 2012 however, the GDP growth rates further slumped to 4.23, and later to 2.65 percent in 2015 (World Bank, 2019).

The role of fiscal policy in ensuring macroeconomic stability in both developed and developing countries first gained momentum during the great depression of the 1930s and has resulted in a paradigm shift from the classical doctrine of self-balancing market-oriented economy to the Keynesian countercyclical government policy-oriented economy. Despite the theoretical justification for government intervention, most scholars from the New Economic Consensus (NEC) still view fiscal policy as distortionary to macroeconomic stability (Tcherneva, 2008). This theoretical debate has also been a subject of empirical investigations.

From the empirical point of view, some scholars (Oladipo & Ajisafe, 2015; Akinola, 2017; Edame & Okoi, 2015; Ubi & Inyang, 2018) in their analysis see the fiscal deficit as a driver of national output, whereas others argue that it is detrimental to economic growth, particularly in developing economies (Idris & Bakar, 2017; Ojo, 2014; Iqbal et al., 2017; Ali et al., 2018).

These divergent outcomes may not be unconnected with the methodological gap as observed in the work of Ojo (2014) and Sanya and Abiola (2015), which use the autoregressive distributed lag (ARDL) model for variables that were integrated of order two I(2). Other researchers used an ordinary least square technique on time series data, although without proper diagnostic tests (Maji & Achegbulu, 2012; Akinola, 2017; and Umeora, 2013). Furthermore, mixed findings regarding the exact relationship between budget deficit and economic growth as documented in the literature suggest the possibility of a non-linear nexus between the two macroeconomic variables.

Consequently, This paper aims to examine the relationship between budget deficit and economic growth in Nigeria, from 1981 to 2019. It also seeks to

determine the threshold level beyond which government deficit becomes injurious to economic growth in Nigeria. This will be carried out using linear and non-linear econometric techniques involving ARDL model and threshold autoregressive (TAR) which will determine the optimal threshold for deficit financing that is growth enhancing in Nigeria.

The rest of the paper is structured as follows: following the introduction, is section 2, which presents the literature review. Section 3 discusses the research methodology. The results are presented in section 4, while summary, conclusion and recommendations are presented in section 5.

II   Literature Review
II.1   Theoretical Review

Theories that attempt to explain the nexus between fiscal deficit and national output include; the Neo-Classical Theory, the Keynesian Theory and the Ricardian Equivalent Theory, among others. The neo-classical postulation is anchored on the assumption of full employment equilibrium. Expansionary fiscal policy increases aggregate consumption, but reduces savings. Savings will always be equal to investment at the full employment level. A persistent fiscal deficit, which implies more credit to the government and less to private investors, leads to higher interest rates, which crowd out productive private investment, and reduce national output. From the neo-classical point of view, government investment expenditure is considered less productive, than domestic private investment. Therefore, the output expansion resulting from deficit-induced consumption cannot fully offset the negative consequences of crowding out effects on private investment (Sen & Kaya, 2014).

A contrary view to the neo-classical belief is the Keynesian model, which advocates for a counter-cyclical fiscal policy in the short run to stimulate investment and output. Keynes (1936) and his cohorts based their postulations on the existence of unemployment and underemployment rather than full employment (Keynes, 1936). Under this framework, government spending, rather than the self-regulating market forces, is viewed as a critical tool for achieving full employment (Jahan, Mahmud, & Chris, 2014). Therefore, an increase in government expenditure which is a component of aggregate demand, will have minimal effect on interest rates due to the existence of underemployed human and material resources. Aggregate demand (household consumption expenditure, domestic private investments, government expenditure and net export) is the main driver of economic activities during a recession. Thus, fiscal deficit will always stimulate effective

demand for goods and services leading to increase in private investment, employment and general level of output, in multiple folds, through a mechanism called the government expenditure multiplier (Keynes, 1936; Sen & Kaya, 2014). Keynesian economists further explained that the magnitude of the multiplier depends on the marginal propensity to consume (MPC). Consequently, fiscal deficit in an economy with a strong consumption propensity will lead to a higher investment and output expansion than in an economy with a weak propensity to consume, (Sen & Kaya, 2014).

Contrary to the neo-classical and Keynesian views, the Ricardian equivalence approach developed by Barro (1989), argued that fiscal deficits or tax cuts do not affect aggregate demand, interest rate and investment. The hypothesis viewed fiscal policy as an ineffective tool of macroeconomic stabilisation. Barro (1989) observed that a deficit-induced government expenditure or a current tax cut would both lead to a higher tax in future. Therefore, the taxpayers will pay for current government expenditure eventually. He further explained that a consumer (who is assumed to be forward-looking) will plan his consumption expenditure based on his net wealth position. Consequently, any change in the present value of government spending will be accompanied by a corresponding change in the present value of tax. Similarly, a fall in government savings (current fiscal deficits) will be offset by a rise in the desired private savings leaving national savings unchanged. Therefore, fiscal policy has a neutral or no effect on investment and output.

II.2   Review of Empirical Literature

The relationship between budget deficit and economic growth has motivated empirical debate among scholars. Some are of the view that budget deficit, positively and significantly, impacts national output while others argue that the relationship is negative. However, some postulate that no relationship exists between the two macroeconomic variables. Most of these studies were carried out using panel data analysis on country specific basis.

For instance, Sanya and Abiola (2015) study the relationship between fiscal deficit and macroeconomic stability (measured by real GDP) in Nigeria using ARDL model and found that fiscal deficit has a negative and significant impact on national output. The paper concluded that deficit financing is a major cause of macroeconomic instability in Nigeria. However, the results of the ARDL model, presented in Sanya and Abiola (2015) may suffer from issues of reliability, since the unit root tests conducted indicate that all the variables included in their model were I(2).

In a related study, Ali et al. (2018) examine the impact of deficit financing on economic growth in Nigeria using annual data from 1981 to 2016. Their ARDL analysis indicate that deficit financing (measured by domestic deficit financing) has a negative and significant impact on national output (measured by real GDP).

Ezeabasili et al. (2014) examine the relationship between fiscal deficits and national output from 1970 to 2006 and opined that fiscal deficit has a negative impact on economic growth in Nigeria. Similarly, Idris and Bakar (2017) evaluate the effect of fiscal operation on macroeconomic growth in Nigeria using descriptive statistical analysis from 1980 to 2015. They argue that the fiscal operation (measured as a persistent budget deficit) has failed to provide an enabling environment for sustainable growth in Nigeria; and thus, recommended a reduction in the budget deficit.

Navaratnam and Mayandy (2016) investigate the impact of fiscal deficit on economic growth in five South Asian countries (Bangladesh, India, Nepal, Pakistan and Sri Lanka) using Johansson Cointegration and vector autoregressive models from 1980 to 2014. They find that fiscal deficit has a negative and significant impact on national output in all the countries except for Nepal where it has a significant positive impact. They further argue that fiscal deficit granger caused national output in Nepal, Pakistan and Bangladesh while the reverse was the case for India and Sri Lanka. They use VAR models on a country-by-country basis instead of adopting a more appropriate technique like fixed or random effect that is capable of bringing out the joint influence of the variables across the countries.

Similarly, Iqbal et al. (2017) examine the relationship between fiscal deficit and economic growth using the ARDL/bound testing approach to test the existence of co-integration on a series of data sets from 1972 to 2014. They argue that fiscal deficit has a negative and significant impact on national output in Pakistan and attributed the relationship to the fiscal deficit/GDP ratio which was far above the threshold level of 5.57 per cent. To reverse this trend, they recommend that the fiscal deficit/GDP ratio should be maintained within threshold level. The analysis was robust, but lacks post estimation tests to further ensure the robustness of the model.

Ojo (2014) examines the impact of deficit financing on economic growth in Nigeria from 1970 to 2010 using VAR model and argues that budget deficit has negative impact on national output. The main shortcoming of the analysis is that

the variables have different orders of integration, thus ARDL approach would have been more appropriate than VAR model. Furthermore, there was no post-estimation diagnosis to ascertain the robustness of the results. However, Aero and Ogundipe (2018) used ARDL for a similar study in Nigeria and also suggest that fiscal deficit has a significant negative influence on national output.

In contrast to the aforementioned, Oladipo and Ajisafe (2015) investigate the impact of deficit budget on national output from 1980 to 2012 using co-integration technique with a VAR model. They argue that, though budget deficit has been shown to have positive and significant impact on GDP, the impact has not succeeded in reducing poverty in Nigeria, because a large chunk of the deficit is used to finance consumption expenditure rather than the capital project. Although, the variables show no evidence of co-integration, the authors went ahead to estimate the long run relationship, which is not necessary.

Similarly, Umaru and Gatawa (2014) examine the links between fiscal deficit and a disaggregated government spending on national output in Nigeria using data from 1970 to 2011. They argue that total deficits financed spending not only induces real GDP positively but also granger causes national output uni-directionally.

Maji and Achegbulu (2012) report a strong and positive relationship between fiscal deficit and economic growth in Nigeria using ordinary least square (OLS) method of analysis. Similar outcome was also discovered in Pakistan (Goher, 2011). Ojong et al. (2013) in a related study, using data spanning from 1980 to 2008, employ OLS technique and discover that deficit budget has positive and significant impact on national output in Nigeria. However, the methodology applied is questionable because OLS technique is inappropriate for a time series data with the unit root problem associated with the series.

Edame and Okoi (2015) compare the impact of public deficit on economic growth under the Military and democratic system of government in Nigeria using the Chow Endogenous Break Test and conclude that fiscal deficit is growth inducing only under the democratic system. Ubi and Inyang (2018) further substantiated this by carrying out a descriptive appraisal of the impact of prolonged fiscal deficit on macroeconomic variables in Nigeria. Their findings suggest that fiscal deficit affects national output positively.

Umeora (2013) scrutinises the link between budget deficit and macroeconomic variables in Nigeria using the OLS technique and discovers that public deficit is positively related to national output. This was further complemented in a study

by Akinola (2017) who also investigated the impact of budget deficit on macroeconomic performance in Nigeria from 1970 to 2013. The OLS result suggest that fiscal deficit is positively and significantly related to economic growth measured by per capita income. Their analysis, however, looks spurious, given that OLS is not suitable for series characterised by stationarity problems.

Buscemi and Yallwe (2012) carry out a panel study on the effect of fiscal deficit on sustainable growth and national savings in emerging economies consisting of China, India and South Africa from 1990-2009. Their analysis using generalised method of moment (GMM) shows that Fiscal deficit has positive effects on national output in the emerging economies. However, the time coverage is, rather, small and no post estimation test was conducted to ascertain the goodness of fit of the model.

However, some empirical studies have shown no relationship between fiscal deficit and economic growth. For instance, Vuyyuri and Seshaiah (2004) examine the impact of budget deficit on macroeconomic variables in India from 1970 to 2002. Using co-integration technique with VEC model, they argue that fiscal deficit has no impact on national output. Wosowei (2013) in a related research, studied the impact of budget deficit on macroeconomic variables, in Nigeria, from 1980 to 2010, He observed that fiscal deficit has no significant impact on gross domestic product. Andoni and Osmani (2017) observed the same scenario from 1993 to 2015 in Albania, using ARDL model.

In addition, Tan (2006) analyses the relationship between fiscal deficit, inflation and economic growth in Malaysia, from 1966-2003, using Johansen Cointegration with VAR. The study suggests that no long run relationships exists between fiscal deficit and economic growth. Nevertheless, his variables have different orders of integration, suggesting that ARDL would have been more suitable than VAR model.

Similarly, Kesavarajah (2016) examines the growth effect of fiscal deficit for Sri Lanka from 1970 to 2015, using the VAR model and states that fiscal deficit (as a ratio of GDP) has no significant impact on GDP directly. He, however, argues that considering interest rate and GDP relation in Sri Lanka, fiscal deficit may have an adverse effect on GDP indirectly and therefore, recommends a gradual reduction in public deficit to achieve a desirable level of national output.

Adam and Bevan (2002) examine the threshold level of fiscal deficit for 45 developing countries, using the bootstrap method. Their analysis put the optimal threshold of fiscal deficit to be about 1.5 per cent of GDP. They however pointed

out that the sign and magnitude of a unit change in fiscal deficit around the threshold level depend on the government expenditure increase or revenue reduction resulting from the deficit financing.

Slimani (2016) examines the threshold of fiscal deficit in 40 developing countries from 1990 to 2012, using Hansen (1997) method. The findings suggest that a double threshold effect exist for fiscal balances for the countries, and that the optimal threshold of fiscal deficit is 4.8 per cent, while the threshold for fiscal surplus is 3.2 per cent. He, however, added that the sign of relationship between government deficit and national output is determined by the level of aggregate investment in the economy (Slimani, 2016).

In a related study, Onwioduokit (2012) attempts to establish a growth-inducing threshold level for fiscal deficit in West African Monetary Zone countries (Gambia, Ghana, Guinea, Nigeria and Sierra Leone) and stated 5.0 per cent as the optimal threshold. He, however, argues that the threshold level varies across countries. A year later, this claim was further corroborated in a study by the same author who analysed the optimal threshold for fiscal deficit in Sierra Leone and discovered it to be 7.0 per cent of the GDP (Onwioduokit, 2013).

Aero and Ogundipe (2018) conduct a threshold analysis of fiscal deficit to economic growth in Nigeria from 1981 to 2014, using the threshold autoregressive model. They find the optimal threshold level of fiscal deficit to GDP in Nigeria to be about 5 percent. Onwioduokit and Bassey (2014) estimate the optimal threshold level of deficit for Gambia from 1980 to 2009 using the Threshold Autoregressive TAR Model with Hansen Approach of Residual Sum of Squares (RSS) and find increases of fiscal deficit beyond 6 percent of GDP, have negative impact on national output.

III   Data and Methodology
III.1   Data

The variables included in our growth model are economic growth measured as the growth rate of GDP, budget deficit measured as total budget deficit as a ratio of GDP, interest rate measured as prime lending rate, and exchange rates measured as the rate of exchange of Naira to US dollar. Annual data spanning 1981 to 2019 are obtained from the Central Bank of Nigeria Statistical Bulletin.

III.2   Methodological Framework

This study is anchored on the Keynesian theory on employment, interest and money. The theory advocates for a counter-cyclical fiscal policy to stimulate

investment and output in the short run due to the existence of unemployment and under-employment. The choice of this theory is also informed by its relevance to the Nigerian economy considering the high level of unemployment and under-employment of human and material resources that can be properly harnessed for sustainable growth.

III.3   Model Specification

This paper employs an autoregressive distributed Lag/Bound Testing approach. The ARDL model is a robust econometric technique for testing the existence of a level relationship between a dependent variable and a set of independent variables (Pesaran, Shin, & Smith, 2001). Its uniqueness comes from its ability to give valid estimation between variables irrespective of their order of integration, provided it does not go beyond I(1) making it more robust compared to other approaches like Johansen or Engle-Granger cointegration techniques. With the view to investigate the optimal threshold of fiscal deficit conducive for economic growth in Nigeria, we use the Threshold Autoregressive model proposed by Tong (1990) and popularised by Hansen (1997) for analysing a class of non-linear econometric relationship between the variables.

The relationship between fiscal deficit and economic growth in Nigeria is specified in a simple linear model expressed in equation 1 where *GDP, GFD, INT* and *EXR* stand for gross domestic product, gross fiscal deficit, interest rate and exchange rates respectively. As mentioned earlier, our model is anchored on the Keynesian theory of employment, interest and money, which advocates for a counter-cyclical fiscal policy. Hence, it is expected that GFD should have a positive influence on GDP while high interest and exchange rates should negatively influence national output. The functional form of the equation linking budget deficit and economic growth is specified as follows:

$$GDP_t = f(GFD_t, INT_t, EXR_t) \tag{1}$$

For the sake of econometric analysis, the above simple linear model is transformed into an autoregressive distributed lag model to suit the bound testing approach to cointegration. The adoption of the ARDL/bound testing approach was informed by the outcome of our Augmented Dickey-Fuller and Philip Perron unit root tests which indicated that some of the variables in the model are I(0) while others are I(1). The ARDL model is, therefore, suitable for the study. Adopting the specifications used in Ali et al. (2014) and Andoni and Osmani (2017), we specify the following equations:

$$\triangle GDP_t = \beta_0 + \sum_{i=0}^{m} \beta_1 \triangle GDP_{t-1} + \sum_{i=0}^{m} \beta_2 \triangle GFD_{t-1} + \sum_{i=0}^{m} \beta_3 \triangle INT_{t-1} + \sum_{i=0}^{m} \beta_4 \triangle$$
$$EXR_{t-1} + \alpha_1 GDP_{t-1} + \alpha_2 GFD_{t-1} + \alpha_3 INT_{t-1} + \alpha_4 EXR_{t-1} + \tau ECM(-1) + \mu \tag{2}$$

where:

Dependent Variable		**Parameters to be estimated**	
GDP:	Gross domestic product	$\beta_0 - \beta_4$:	Coefficients for short run relationship
Independent Variables		$\alpha_1 - \alpha_4$:	Coefficients for long run relationship
GFD:	Gross fiscal deficit	m:	Maximum lag length
INT:	Interest rate	Δ:	Difference operator
EXR:	Exchange rate	μ:	Stochastic disturbance
t:	time trend throughout the analysis		

τ: *The coefficient of the error term (the speed of adjustment parameter)*

It is expected that β₀ and β₁>0, β₂ and β₃<0. τ *is expected to be* < 0 and statistically significant.

Due to the conflicting findings documented in the empirical literature on the link between fiscal deficit and economic growth in Nigeria, where some studies find a positive relationship, while others record either negative or no significant relationship, we proceed to consider a non-linear estimation of our growth model. This approach is in line with studies such as Oladipo and Ajisafe (2015), Akinola (2017), Edame and Okoi (2015), Idris and Bakar (2017), Ojo (2014), Iqbal et al. (2017), and Ali, Mandara and Ibrahim (2018), which hint the possibility of a non-linear relationship between fiscal deficit and economic growth.

According to Tong (1990), many observable phenomena may not be properly explained if researchers restrict their analysis to a linear model. In view of this, the model for the optimal fiscal deficit threshold can be expressed using a threshold autoregressive (TAR) model specified below following Onwioduokit and Bassey (2014):

$$GDP_t = \alpha_0 + \alpha_1 GDP_{t-1} + \alpha_0 + \alpha_2 GFD_t \left[DM_t(GFD_t < K^*) \right] + \alpha_3 GFD_t$$
$$\left[DM_t(GFD_t > K^*) \right] + \alpha_4 INT_{t-1} + \alpha_5 EXR_{t-1} + \mu_t \qquad (3)$$

where:

DM_t; Dummy variable with value 1 if $GFD_t < K^*$ or 0 if otherwise

K^*; The optimum fiscal deficit threshold to be estimated

α_2; Effect of fiscal deficit below the threshold level

α_3; Effect of fiscal deficit above the threshold level

The procedure for the TAR model begins with the running of OLS estimates of equation (3) above. This is followed by computing the residual sum of squares (RSS) for a chosen range of fiscal deficit thresholds (for example from K^*=1 to

K^*=10). The optimum threshold is the one with the minimum RSS value (Onwioduokit & Bassey, 2014).

IV.   Results and Discussion of Findings
IV.1   Descriptive statistics

The average growth rate of GDP for the year under review was 3.18. The skewness of -0.87 indicates that economic growth series is moderately skewed (see Table 1). The average total deficit finance is -2.31per cent of GDP with a standard deviation of 5.53 and skewness of 0.30 indicating a fairly symmetric distribution (Bulmer, 1967).

Table 1: Descriptive Data Analysis

Variables	Obs.	Mean	Std. Dev.	Skewness	Kurtosis
GDP	39	3.175	5.534	-0.870	4.540
Budget deficit	39	-2.311	1.628	-0.306	2.494
Interest rate	39	1.577	4.628	0.204	3.668
Exchange rate	39	88.662	87.193	0.799	2.964

Source: Authors' Computation.

To test for the stationarity of the time series data set, the Augmented Dickey-Fuller unit root test (Dickey & Fuller, 1979) and Philip Perron test (Philip & Perron, 1988) are employed considering the study period. The ADF and PP tests are more suitable when the sample period is more than 25 but less than 50 (Arltova & Fedorova, 2016).

The ADF and PP unit root results indicate that the null hypothesis, which says the respective variables are not stationary at their level values, was rejected for all the series except for the exchange rate. The conclusion emanating from the analysis is that all the variables are I(0) except for exchange rates which is I(1) (see Table 2).

Table 2: Unit Root Tests of Dependent and Independent Variables

Variables	ADF		Philip-Perron	
	At level I(0)	At first diff. I(1)	At level I(0)	At first diff. I(1)
GDP	-3.935***		-4.120***	
DF	-2.988**		-3.063**	
INT	-3.046**		-3.484**	
EXR	-1.728	-4.217***	1.517	-4.174***

Significant at 1% (***), 5% (**) and 10% (*).

Source: Authors' Computation.

IV.2   Autoregressive Distributed Lag (ARDL) Results

The mixture of the order of integration of the series justifies the ARDL/Bounds testing approach. Also, two lags of the Akaike Information Criteria (AIC) which is the criteria with the minimum residual value were selected for the inferential analysis following the outcome of the pre-estimation test. For the cointegration analysis, the F statistic (4.389) is greater than the upper bound of critical value (3.992) at a 5.0 per cent level of significance as indicated in Table 3 below. Consequently, the null hypothesis of no cointegration between budget deficit and economic growth in Nigeria was rejected, implying that there is a long run relationship between budget deficit and economic growth in Nigeria.

Table 3: Bound Test Results Budget deficit and GDP

Dependent variable	Function	F-Statistics
GDP	$F_{GDP}(GDPDF, INT, EXR)$	4.389
Asymptotic Critical Value for Rejecting Null Hypothesis		
Critical value F	At 5%	At 10%
Lower bound	2.609	2.114
Upper bound	3.992	3.281
Significant at 5% (**) and 10% (*).		

Source: Authors' Computation.

The long run estimate from the ARDL model result shows that deficit financing has a positive and significant impact on economic growth in Nigeria (See Table 4). This is because the null hypothesis, which stipulates budget deficit has no impact on economic growth, was rejected at a 5.0 per cent level of significance. The coefficient of budget deficit of 1.686 indicates that a percentage increase in the budget deficit will lead to a 1.686 percentage increase in economic growth. This implies that budget deficit positively induces the growth rate of National output. This is in line with the findings of Oladipo and Ajisafe (2015), Maji and Achegbulu (2012) and Umeora (2013) but contradicts that of Sanya and Abiola (2015), Ali et al. (2018) and Navaratnam and Mayandy (2016). The contradiction may not be unconnected with the methodological gaps identified in the previous studies. For instance, Sanya and Abiola (2015) used the ARDL approach for a model consisting of the I(2) variable while Navaratnam and Mayandy (2016) use VAR model for a panel study consisting of five Asian countries.

The interest rate on the other hand has a negative and significant impact on economic growth. This followed the rejection of the null hypothesis at a 1.0 per cent level of significance. The higher the interest rate the lower the growth rate of the national output. The coefficient of interest rate of -0.457 implies that a

percentage increase in the interest rate will lead to a 0.457 percentage decrease in economic growth. This further substantiates the findings of Adesoye and Balogun, (2015), Richard and Ogiji (2016) but contradicts that of Harswari and Hamza (2017) which was a panel study and that of Ali et al. (2018) that used the ARDL model without establishing the presence of cointegration among the variables. The exchange rate surprisingly has no significant impact on economic growth in Nigeria.

Table 4: Result of Estimated Long-run Coefficients (Model I) GDP

Independent variables	Coefficient	Standard Error	Test-Ratio
GFD	1.686**	0.777	2.170 [0.038]
INT	-0.457***	0.143	-3.197 [0.003]
EXR	-0.002	0.012	-0.343[0.894]
Significant at 1% (***), 5% (**) and 10% (*). The values in parenthesis are probability values.			

Source: Authors' Computation.

The short run estimates further corroborate the outcome of the long run relationship between budget deficit and economic growth (See Table 5). That is, budget deficit has a significant and positive impact, interest rate has a negative and significant impact, while exchange rate has no impact on economic growth in Nigeria. The error correction term not only has the expected negative sign but is also statistically significant at a 1.0 per cent level with the speed of adjustment of 60.20 per cent (See Table 5).

Table 5: Result of Estimated Short-run Coefficients (Model I) dGDP

Independent variables	Coefficient	Standard Error	Test-Ratio
Differenced of…			
GFD	1.015**	0.415	-2.443 [0.020]
INT	-0.275***	0.079	-3.489 [0.001]
EXR	-0.990	0.007	-0.135 [0.893]
Ecm(-1)	-0.602***	0.134	-4.467 [0.000]
Significant at 1% (***), 5% (**) and 10% (*). The values in parenthesis are p -values.			

Source: Authors' Computation.

IV.3   Threshold Autoregressive (TAR) Results

The result of the Threshold Autoregressive (TAR) model presented in Table 6 indicates -2.024 as the optimum budget deficit threshold for GDP expansion in Nigeria. At this threshold level, the parameter of budget deficit is 1.014 and it is significant at 5.0 per cent. Therefore, the null hypothesis which specifies that

there is no optimum budget deficit threshold for economic growth in Nigeria is rejected. This implies that only a budget deficit below 2.02 per cent of the GDP has a positive and significant impact on economic growth in Nigeria. When fiscal deficit is above the threshold level the estimated parameter is -1.260. This is statistically insignificant considering the p-value which stands at 0.281. As such the null hypothesis that fiscal deficit above the threshold level has no significant impact on GDP could not be rejected. This implies that there is no significant relationship between budget deficit and economic growth in Nigeria for a deficit above the threshold of -2.02 per cent. For the non-threshold variables in the model, interest rate once again has a negative and significant impact on GDP at 1.0 per cent, while exchange rate has no significant impact on GDP in Nigeria.

Table 6: Deficit Financing Threshold for GDP in Nigeria

Independent variables	Coefficient	Standard Error	Test-Ratio
Budget deficit < K = -2.024			
GFD	1.014	0.445**	2.276 [0.029]
Budget deficit = K = -2.024			
GFD	-1.260	1.150	-1.066 [0.281]
Non-Threshold Variable			
Constant	-9.447	2.842***	-3.324 [0.002]
INT	0.763	0.151***	5.049 [0.000]
EXR	0.005	0.008	0.560 [0.580]
Significant at 1% (***), 5% (**) and 10% (*). The values in parenthesis are probability values			

Source: Authors' Computation.

After determining the optimum budget deficit threshold for GDP in Nigeria, the two models were subjected to post-estimation diagnostic tests. The results for serial correlation and autoregressive conditional heteroscedasticity are in table 7. Both the ARDL and TAR models passed the adequacy tests. This is because the null hypothesis which says there is no serial correlation could not be rejected. This is due to the p-values of the Langragian Multiplier (LM) and F-statistic tests which are 0.179 and 0.219 for the ARDL Model, and 0.416 and 0.481 for the TAR model. The same scenario characterises the heteroscedasticity test. We could not reject the null hypothesis that the model is homoscedastic following the probability values of both Lagrangian Multiplier (LM) and F-statistic tests of 0.766 and 0.800, respectively, for the ARDL model and 0.113 and 0.114 for the TAR model. The diagnostic tests for the ARDL and TAR models indicate that both models are adequate.

Table 7: Result of the Diagnostic Test for ARDL and TAR Models

Breusch-Godfrey Serial Correlation LM Test:			
		ARDL	**TAR**
L M Version	CHSQ(2)	3.468 [0.179]	1.752 [0.416]
F Version	F(2,31)	1.599 [0.219]	0.750 [0.481]
Autoregressive Conditional Heteroscedasticity Test of Residuals			
		ARDL	**TAR**
L M Version	CHSQ(4)	0.532 [0.766]	7.478 [0.113]
F Version	F(4,33)	0.225 [0.800]	2.024[0.114]
The values in parenthesis are probability values			

Source: Authors' Computation.

V.   Summary, Conclusion and Recommendations

This study empirically analysed the relationship between budget deficit and economic growth in Nigeria from both linear and non-linear perspectives using time series data from 1981 to 2018. The linear model, which involves the use of an autoregressive distributed lag approach, reveals that the growth of national output in Nigeria is significantly influenced by budget deficit maintained by the Federal Government. This was further substantiated by the non-linear analysis using a threshold autoregressive model. The analysis shows that though budget deficit induces economic growth in Nigeria, such inducement will only be meaningful when the deficit is below 2.02 per cent of the GDP.

Furthermore, the control variables captured in both the linear and non-linear analyses show that interest rate has a negative impact on economic growth. We discover that a percentage increase in prime lending rate reduces the growth of the national output by 0.45 per cent from the linear perspective and 0.76 per cent for the non-linear analysis. The exchange rate however has no impact on national output in Nigeria.

The conclusion emanating from the foregoing analysis is that there is a positive relationship between budget deficit and economic growth in Nigeria regardless of whether a linear or non-linear model was used. However, for the non-linear model, this positive relationship holds only if the deficit to GDP ratio is below the estimated threshold value. Hence, the optimal threshold of 2.02 per cent gives the government and its policymakers a clear signal on when to stop financing budget deficit.

Fiscal deficit is a major driver of growth in Nigeria. However, the fiscal authorities should ensure the deficit is narrowed such that it does not cross the optimal

threshold. This could be achieved through improved tax collection and fiscal consolidation.

High interest rate, on the other hand, retards growth, Hence, the need for monetary authority to reduce the cost of credit, especially the prime interest rate to boost national output. The direct intervention of the Central Bank of Nigeria to boost domestic production and productivity via single-digit interest rate loans, guarantee schemes and rebate programmes are efforts in the right direction. If these are properly channeled it will increase the national output, hence, the tax base and pave way for fiscal consolidation.

References

Adam, C. S., & Bevan, D. L. (2002). Fiscal deficits and growth in developing countries. *University of Oxford: Discussion Paper Series*(120), 511-597.

Aero, O., & Ogundipe, A. A. (2018). Fiscal deficit and economic growth in Nigeria: Ascertaining a feasible threshold. *International Journal of Economics and Financial Issues, 8*(3), 296-306.

Akinola, F. (2017). The economic performance of budget deficit in Nigeria. *Research Journal of Finance and Accounting, 8*(8), 128-135.

Ali, M. B., Mandara, B., & Ibrahim, M. A. (2018). Impact of deficit financing on economic growth in Nigeria. *Global Journal of Management and Business Research, 18*(3), 28-36.

Andoni, M., & Osmani, M. (2017). Assessment of relationship between inflation, growth and fiscal deficit in Albania - an econometric approach. *European Scientific Journal, 13*(13).

Arltova, M., & Fedorova, D. (2016). Selection of unit root test on the basis of length of the time series and value of AR(1) parameter. *Statistik, 96*(3).

Barro, R. J. (1989). Ricardian approach to budget deficits. *Journal of Economic Perspectives, 3*(2), 37-54.

Buscemi, A., & Yallwe, A. H. (2012). Fiscal deficit, national saving and sustainability of economic growth in emerging economies: A dynamic GMM panel data approach. *International Journal of Economics and Financial Issues, 2*(2), 126-140.

CBN. (2018). *CBN Statistical Bulletin.* Abuja: Central Bank of Nigeria.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association, 74*(366), 427-431.

DMO. (2020). *2018 Annual Report and Statement of Account.* Abuja: Debt Management Office.

Edame, G. E., & Okoi, O. B. (2015). Fiscal deficits and economic growth in Nigeria: A chow test. *International Journal of Economics and Financial, 5*(3), 748-752.

Ezeabasili, V. N., Tsegba, I. N., & Ezi-Herbert, W. (2014). Economic Growth and Fiscal Deficits: Empirical Evidence from Nigeria. *Economics and Finance Review, 2*(6), 85-96.

Goher, F. (2011). Testing relationship of private investment and GDP with fiscal deficit. *International Conference on Financial Management and Economics* (pp. 367-272). Singapore: IACSIT Press.

Hansen, B. E. (1997). Inference in TAR model. *Studies in Nonlinear Dynamics and Econometrics, 2*(1), 1-14.

Harswari, M. H., & Hamza, S. M. (2017). The impact of inerest rate on economic development: A case study of Asian countries. *International Journal of Accounting & Business Management, 5*(1), 180-186.

Idris, M., & Bakar, R. (2017). Fiscal operations and macroeconomic growth: The Nigerian experience. *International Journal of Business, Management and Social Research, 3*(1), 162-178.

Iqbal, N., Din, M., & Ghani, E. (2017). The fiscal deficit and economic growth in Pakistan: New evidence. *The Lahore Journal of Economics, 22*, 53–72.

Jahan, S., Mahmud, A. S., & Chris, P. (2014). What is Keynesian economics? *Finance and Development, 1*(2), 53-54.

Kesavarajah, M. (2016). Growth effects of fiscal deficits in Sri Lanka. *Central Bank of Sri Lanka – Staff Studies, 14*(1).

Keynes, J. M. (1936). The general theory of employment, interest, and money. *London, Macmillan Publication*.

Maji, A., & Achegbulu, J. O. (2012). The impact of fiscal deficits on economic growth in Nigeria. *Journal of International Business and Management, 4*(2), 127-132.

Navaratnam, R., & Mayandy, K. (2016). Causal nexus between fiscal deficit and economic growth: Empirical evidence from South Asia. *International Journal for Innovation Education and Research, 4*(8).

Ojo, A. S. (2014). Deficit financing and economic growth in Nigeria: A preliminary investigation. *British Journal of Economics, Management & Trade, 4*(11), 1624-1643.

Ojong, C., Owui, H., & Effiong, C. (2013). Effect of budget deficit financing on the development of the Nigerian economy: 1980-2008. *European Journal of Business and Management, 5*(3).

Oladipo, S. O., & Ajisafe, R. A. (2015). Dynamic interactions among budget deficit, economic growth and poverty level towards capacity building strategy for sustainable development and poverty alleviation In Nigeria (1980-2012). *Journal of Emerging Trends in Economics and Management Sciences (JETEMS), 6*(7), 169-174.

Onwioduokit, E. A. (2012). An empirical estimation of the optimal level of fiscal deficit in the West African Monetary Zone. *Journal of Monetary and Economic Integration, 12*(1), 1-33.

Onwioduokit, E. A. (2013). Threshold analysis of budget deficit and economic growth in Sierra Leone. *West African Financial and Economic Review, 10*(1), 93-121.

Onwioduokit, E. A., & Bassey, G. E. (2014). Fiscal deficit and economic growth in the Gambia: A search for threshold. *Developing Country Studies, 4*(19), 162-181.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*(3), 289-326.

Phillips, P. C., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika (1988), 75*(2), 335-346.

Richard, E. O., & Ogiji, F. O. (2016). Impact of deficit financing on economic stability in Nigeria: Analysis of economic growth. *Journal of Applied Finance & Banking, 6*(1), 111-125.

Sanya, O., & Abiola, L. N. (2015). Fiscal deficit and economic growth, Nigeria experience. *International Journal for Innovation Education and Research, 3*(11).

Sen, H., & Kaya, A. (2014). Crowding-out or crowding-in? Analysing the effect of government spending on private investment in Turkey.

PANOECONOMICUS, 6, 631-651.

Slimani, S. (2016). Threshold effects of fiscal policy on economic activity in developing countries. *International Journal for Business and Social Research, 6*(3).

Solomon, M., & Wet, W. A. (2004). The effect of a budget deficit on inflation: The case of Tanzania. *South African Journal of Economics and Management Sciences, 7*(1), 100-115.

Tan, E. C. (2006). Fiscal deficits, inflation and economic growth in a successful open developing economy. *Review of Applied Economics, 2*(1), 129-139.

Tcherneva, P. R. (2008). The return of fiscal policy: Can the new developments in the new economic consensus be reconciled with the post-keynesian view? *The Levy Economics Institute, Working Paper*(539).

Todaro, M. P., & Smith, S. C. (2015). *Economic development* (12th ed.). (D. Battista, Ed.) Pearson Education Limited.

Tong, H. (1990). Non-linear time series: A dynamical system approach. (P. Armitage, & T. Colton, Eds.) *Ecyclopedia of Biostatistics*, 3020-3024.

Ubi, P., & Inyang, J. (2018). Fiscal deficit and Nigeria's economic development. *International Journal of Economics, Commerce and Management, 6*(5).

Umaru, A. D. (2017). Deficit financing, price and economic stability in Nigeria: A bound testing approach. *CBN Bullion, 41*(3), 20-27.

Umaru, A. D., & Gatawa, A. U. (2014). Fiscal deficit and economic growth in Nigeria (1970-2011): A disaggregated approach. *Journal of Research in National Development (JORIND), 12*(1).

Umeora, C. E. (2013). An analysis of the relationship between fiscal deficits and selected macroeconomic variables in Nigeria, 1970–2011. *Journal of Business and Management, 12*(6), 19-27.

Vuyyuri, S., & Seshaiah, S. V. (2004). Budget deficits and other macroeconomic variables in India. *Applied Econometrics and International Development, 4*(1).

World Bank. (2019). *The World Bank: Data*. Retrieved April 7, 2019, from The World Bank: https://data.worldbank.org/indicator/FP.CPI.TOTL?locations=NG

Wosowei, E. (2013). Fiscal deficits and macroeconomic aggregate in Nigeria. *Arabian Journal of Business and Management Review, 2*(6).