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THE IMPACT OF BUDGET DEFICIT ON ECONOMIC GROWTH IN AN EMERGING MARKET: AN APPLICATION OF THE ARDL TECHNIQUE



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ABSTRACT

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The motive of this thesis is to empirically examine the influence of the budget deficit on Nigeria's growth. This research is based on data from the Central Bank, World Bank and World Development Indicators of Nigeria from 1981 to 2016. To the best of my understanding, there has been no previous study to examine these relationships with all these indicators listed in Nigeria. This study, therefore, proposes to close this literature gap. The main findings are that, in the long term, The ARDL bounds test result reveals that there is a cointegrating relationship between variables. Furthermore, the study revealed that in the long run, gross domestic savings, interest rate, and budget deficit have significant relationship with economic growth while in the short run an only budget deficit and gross domestic savings have a positive influence on economic growth. Various diagnostic tests were carried out to determine whether the model is good. The study concludes that budget deficit has a significant impact on economic growth of Nigeria. Thus, the Keynesian theory is true for Nigeria. Finally, the study recommends that since higher gross domestic savings will lead to an increase in gross domestic investment thereby increasing economic growth. Therefore, there is a need to increase the interest rate to encourage savings in order to accumulate enough resources for investments. Therefore, in the long run, the nation's productivity level will increase.

Contribution/ Originality: This empirical analysis examined the impact of budget deficit on economic growth using Nigeria as a case study. The study contributes to the existing literature by employing several econometrics techniques to explore these dynamics.

1. INTRODUCTION

In the past decade, no economic policy problem has generated more debate than the effects of government budget deficits. Extraordinary fiscal inequities have occurred in different nations' economies. Such fiscal inequalities also influenced the extent of the challenges and led to new developments in the global economy in different countries. Shojai (1999) postulated that many economic planners were puzzled by the controversial nature of budget deficits. These fears about fiscal deficits led in all economic sectors to disruptive dislocation or movements. Budgeting is a policy process, which may take economic into account; budgetary actions require two phases: expenditure and income; the revenue side is accountable for government resources in the form of taxation by individuals or the private sector. While spending is concerned about how the government should allocate its resources to its public sector. Budget deficits were higher than government revenue, where public spending is

higher. On the other hand, when public receipts exceed public expenditure between public revenues and public expenditure, a budget surplus existed and borrowing could finance such shortcomings. In promoting economic activity in Nigeria, there was a deliberate gap. Different ideology politicians argue that cutting deficits is critical to Nigeria and other major economies ' future (Awe & Shina, 2012; Awosusi, Adebayo, & Adeshola, 2020; Eminer, 2015). However, the budget deficit from 2010 to 2017 as a percentage of gross domestic product was 1.3 percent on average (Central Bank of Nigeria (CBN), 2017). While economists are divided on this issue, many economists believe that shortfalls are damaging and possibly even disastrous. They quote several reasons when economists and policymakers criticize deficits. Consequently, despite near-unanimous concerns about shortfalls, there is considerable dispute about the economic effects of budget deficits. Research shows that Nigeria's fiscal deficit trend has increased over the years. For forty years since 1970, deficits have been recorded and deficits are meant to speed up economic activity through induced variables or aggregates during depression. Although in these phases, Nigeria's economy suffered deficits and operated less full employment, the essences of the deficits were in distress. According to Adebayo and Beton Kalmaz (2020) in Nigeria, the living standards of citizens are clearly reduced; economic growth is declining; there is poverty in the country; there is a relentless unfavorable balance of payments, an increase in public debt, a continued decline in foreign reserves, Sparing little or no, reducing exports, increasing inflation and continuing external economic dependence. The budget deficit has had an adverse impact on these macroeconomic variables (Adebayo & Akinsola, 2021). The question then arises whether the budget deficit will not lead to increase in economic growth. Should the Keynesian economists be acknowledged that its effects on the macroeconomic variables crowd private investment in the fiscal deficit, or should we put our hope in the neoclassical economists that its effects on interest rates and other variables crowd private investment in the fiscal deficit? Or can we accept that there is no positive or negative effect on the aggregate demand as put forward by the Ricardian school of thought. The study objective is to ascertain the long and short term link between budget deficit and growth. Huge economic problems seemed to have been well evaluated and in some instances rectified in the literature, so that any new attempt to address them may assume that the same old stories have been repeated. That is true of Nigeria's budget deficit. The literature relies on the causes, consequences, and remedies of Nigeria's budget deficit. Despite this, the problem remained here. However, it is necessary to justify another study in this area. The budget deficit itself is a highly dynamic process, which means that the budget deficit process may not be the same as it was 25 to 30 years ago in the last 10 years . Thus, this study add to the existing literature. The rest of the paper is organized as follows: the introduction is presented in the first part; the second part covers the literature review; the third part covers the data and methodology; the fourth part presents the interpretation and discussion of the results, while the last section covers the conclusion and policy recommendations based on the empirical findings.

2. LITERATURE REVIEW

Several studies have analyzed the relationship that exist between fiscal deficit and growth in an economy utilizing different method. The theoretical foundations of the macro perspective are premised on two polite approaches to the link between fiscal deficit and growth in an economy. The neo-classical view promotes a adverse connection and the Keynesian postulate that fiscal deficit and economic growth have positive interrelationship (Rahman, 2012). The two main views show differ views because theoretically they are different. David Ricardo's theory, known as Ricardian equivalence, has been introduced. Budget deficit will not lead to increase aggregate demand, according to Ricardo, which would make the relation between budget deficits and short-term economic growth neutral (Sturaro et al., 2013). In different studies in different countries these theories have been tested using empirical methods. However, several studies conclude that supporting the neo-classical approach is not difficult to say. We have not outlined each study, but we have attempted, since explanation of the leading studies, to sum up all relevant studies by technique, theories and the results. The connection between

governments and private investment, economic expansion, was examined by Ener, Kiliç, and Arica (2013) in Namibia, using the endogenous growth model framework from 1970 to 2005 periods. The ADF and PP test of stationarity were employed, also, Cointegration analysis and error correction techniques were utilized. The results show that economic expansion has a positive relationship and public and private investment, imports, exports, economic freedom, labor and human capital in the long run. Economic growth and trade on the other hand have a negative and important short- and long-term relation to real exchange rates. In order to build this connection Eita and Mbazima (2008) examined the correlation between government income and expenditure using annual Namibian data from 1977 to 2007 and the adoption of the VECM, unit root tests and Granger causality testing techniques. The results reveal that there is a unique causality between government revenue and government expenses. This implies a fiscal deficit because of fiscal imbalances that can not be sustained by weak policies to reinforce government income. Keho (2010) has evaluated the causalities between budget and economic development in Keho's contributions to the deficit-growth relations in 7 member states of the West African Economic and Monetary Union (WAEMU), utilizing the Conservative Unit Root Test (ADF and PP), VAR and Granger causality test created by Toda and Yamato in 1995. The variables used for this study include actual GDP growth, a gross percentage of GDP on fixed capital and public deficit or surplus. Different results in each state produce a positive connection between budget deficit and growth, and in Benin, Burkina Faso and Mali there are two different causes. The relationship between deficit and growth in Niger is negative, while the causality between deficit and economic growth is one way of identifying it. In addition to the Granger causality test, the ADF test and Johansen co-integration methods, Oladipo and Akinbobola (2011) used 45 years (1970-2005) of secondary data in order to investigate the nature and direction of causality between fiscal deficit and inflation and the economic. Variables used are; inflation rate, real exchange rate, RGDP, and fiscal deficit. The outcomes of the study show no existence of a causal relationship between inflation and fiscal deficit, however, there is causality running from deficit to inflation. This implies a one-way causality running from fiscal deficit to inflation. Additionally, via fluctuations in the real exchange rate, in Nigeria economy, fiscal deficit, directly and indirectly, affect inflation. With an objective of determining the influence government expenditure, household expenditure and inflation have on economic growth of Namibia, Nyambe and Kanyeumbo (2015) utilized yearly data stretching from 1980 to 2011 and using the OLS technique. The result reflects a positive and significant link between economic growth and government expenditure, and household expenditure. However, the reverse is the case of inflation has it shows a negative relationship with economic growth. Buscemi and Yallwe (2012) by applying the various unit roots test; ADF, PP and KPSS, co-integration analysis and the VAR framework make inquiry into the influence of fiscal deficits on economic growth by paying attention to the three strongest developing economies; South Africa, China, and India. Buscemi and Yallwe through their result prove that there is a positive relationship between deficit and growth. Additionally, saving influence economic growth positively in the three emerging economies. In the United State of America, Taylor (2008) investigated the Deficit-Growth relationship by using yearly data stretching from 1961 to 2011 and adopting the unit root test, co-integration technique, and the VAR framework. The endogenous variable is economic growth while the exogenous variable is a budget deficit. The findings show that the Deficit-Growth relationship is significant and positive. The USA is among few countries that run deficit yearly and still maintain a yearly economic growth rate. Murwirapachena, Maredza, and Choga (2013) employing unit root test such as; DF, and ADF, Johansen co-integration test, VECM, and VAR try to get to the bottom of what determines budget deficit in South Africa and using annual data covering 30 years' period (1980 to 2010). The author's outcome reveals the cointegration among the variables in the long run and Deficit-Growth relationship is positive and significant. However, the reverse is the case for the Foreign Debt-Growth relationship. This means that an increase in foreign debt will reduce economic growth in South Africa. Tung (2018) investigated the effect of fiscal deficits on emerging economies: Vietnam's case study, using quarterly data from 2003 to 2016 and using econometrics techniques such as the ADF and PP test, multiple OLS and error correction mechanisms. Variables are the fiscal

deficit, economic growth, private investment and foreign direct investment as well as net exports. The empirical findings reveal strongly the negative long-term and short-term relationship between fiscal deficit and economic growth. Though, there has been a positive impact on economic growth in private investment, direct foreign investment, and net exports. This shows that in the long run and short-run budget deficit is harmful to the economic growth of Vietnam. Macroeconomic variables affecting budget deficit was probed by [Mudakkar, Zaman, Khan, and Ahmad \(2013\)](#) using time series data covering 31 years (1980-2011), utilizing techniques such as; ADF and PP to determine if there is unit root, Johansen cointegration test by using the Trace test and Max-Eugen value and OLS to ascertain whether there is a long-run relationship between deficit and other exogenous variables. The research results show that there is a strong relationship in the long term between fiscal deficit and real exchange rates, economic growth and bank credit. However, there is a negative relationship between budget deficit and consumer price index and insignificant in the case of foreign direct investment. [Fehiman \(2015\)](#) used a series of time series data for a period of time examined the effects of the budget deficit on economic growth using various econometric techniques such as: the DF test to determine whether there is a root units; the ARDL test on long-term and short-term relationship of exogenous and endogenous variables; and Granger Causality test on direction between dependent and independent variables. The results are consistent with the Keynesian perspective. Employing the traditional OLS technique, Johansen cointegration, and VECM, The short-term and long-term effects of the budget deficit on Nigeria's economic growth were critically examined by [Awe and Funlayo \(2014\)](#). Data from 1981 to 2011 were used. The OLS Regression Analysis shows that the budget deficit and economic growth have a negative relationship. The results of the Johansen technology of joint-integration show that Nigeria's fiscal deficit is closely interconnected with economic growth. In VECM the relationship between fiscal deficits and gross domestic product is negative, while in gross capital formation (investment) the relation to GDP is positive. In order to promote economic growth in the Nation, the study recommends adequate funding for the budget deficit. Zimbabwean's budget deficit and economic increase were critically examined in the period 1980 to 2015 by [Zuze \(2016\)](#) with the introduction of econometric techniques such as ADF and PP root test, VAR, decomposition of variance and pulse response, and the Granger causality test. Variables are integrated in I(1) according to the ADF and PP. The results of the study show that the relationship between budget deficits and economic growth is negative in Zimbabwe. In addition, the fiscal deficit also has a one-way causality. By using ARDL as a basis for checking long-term-and short-term relationships between dependent and independent variables, the ADF and PP test, [Rahman \(2012\)](#) looks at the interaction between Malaysia's budget deficit and economic growth using quarterly time series data between 2000 and 2011. The ARDL demonstrates a long-term link between deficiency and economic growth. However, between productivity spend and economic growth there is a long-term, positive relationship. Between 1981 and 2016, [Ali, Shina, and Tunde \(2018\)](#) reviewed the effects of economic deficits in Nigeria. The secondary data from the statistical bulletin of the Central Bank and the analysis of the stationary characteristics of the time series variables was performed by using ADF to analyze and evaluate regression with the ARDL technique. Domestic private investment, foreign currency, interest-rate and shortfall finance are the variables used. The estimate shows that government deficit funding over the years has had a significant impact on Nigeria's output growth. Thus, this view is consistent with the neoclassical view.

3. RESEARCH METHODOLOGY

The aim of this study is to evaluate the impact of the budget deficit on Nigerian economic growth utilizing yearly data from 1980 to 2016. The following economic function, economic model and econometric model were formulated as follows in [Equations 1, 2 and 3](#);

$$GDP = f(B.D, GCF, GDS, INT.R) \quad (1)$$

$$LGDP = \beta_0 + \beta_1 B.D + \beta_2 LGCF + \beta_4 LGDS + \beta_3 INT.R \quad (2)$$

$$LGDP = \beta_0 + \beta_1 B.D + \beta_2 LGCF + \beta_3 LGDS + \beta_4 INT.R + \varepsilon_t \quad (3)$$

3.1. Description of Variables

Table 1 depict the descriptive variables used in the model are shown in the following table. The variables used were obtained from World Bank database and central bank of Nigeria database.

Table-1. Description of variables.

Variables	Measurements	Description	Sources
Budget Deficit	[(B.D)]	Budget Deficit as % of GDP	Centre for Global Development Database
Gross Domestic Savings	Log [(SAV)]	The logarithm of gross domestic savings	World Bank Database
Gross Capital Formation	Log [(GFCF)]	Logarithm values of Gross Fixed Capital Formation (constant \$ 2010)	World Bank Database
GDP	Log [(GDP)]	GDP (constant \$ 2010)	World Bank Database
Interest Rate	[(INT.R)]	Real Interest Rate	Central Bank of Nigeria

3.2. Co-Integration

It is also important, after determining their fixed level, to study the co-integration properties of the current series. Co-integration is because stationary variables may be linearly combined, but not stationarity and integrated in order I (0). The logic behind the co-integration technique is to determine whether two or more variables move closely together in the long run, even if the variables have a trend, the difference between them must remain constant (Adebayo, 2020). However, if variables are stationary at different levels, such as I(0) and I(1), the Johansen cointegration test cannot be used to check the long-term relationship. We therefore, use the ARDL-bound test to verify the long-term relationship. In view of the above reasons it is not possible to use the Johansen cointegration technique to check that the endogenous and exogenous variables have long-term linked. This study is therefore intended for the Pesaran, Shin, and Smith (2001) Auto-Regressive Distributed Lag Model (ARDL). Our primary aim is to verify the long-term or short-term relationship between ARDL support and growth. This technique enables us to identify and discuss the link between budget deficit and growth.

3.3. Auto-Regressive Distributed Lag Model (ARDL)

The Auto Regressive Distributed Layer (ARDL) model is a co-integration model used to ascertain the long-run cointegration among the variables used. The general ARDL is depicted in Equation 4;

$$Y_t = \gamma_0 + \sum_{i=1}^p \delta_i Y_{t-1} + \sum_{i=0}^q \beta'_i X_{t-1} + \varepsilon_{it} \quad (4)$$

Y_t represents the vector, (X_{t-1}) shows other Variables, I (0) or I (1) reflects order of the integration, β and δ are the endogenous variable coefficients and exogenous variables, γ means constant term, p and q Represent optimal lag order of the dependent variable and exogenous variables, ε_{it} = stochastic terms. In order to identify the co-integrated vectors in a series in which the fundamental series has a long single-long-term balance equation it is preferable to another co-integrative models. Before the co-integration testing, the model does not involve a unit root test since only I (0), I (1) or both should be included in the model. It should be noted that when the variable(s) has I (2), ARDL techniques cannot be used to check any form of relationship (Adebayo, 2020). The long-term

relationship is not captured with the presence of 1 (2). Therefore, the ARDL model of long-term relationship is depicted in Equation 5 as follows;

$$\Delta LGDP_t = \alpha_0 + \sum_{i=1}^l \partial_1 \Delta LGDP_{t-i} + \sum_{i=1}^l \partial_2 \Delta B.D_{t-i} + \sum_{i=1}^l \partial_3 \Delta LGCF_{t-i} + \sum_{i=1}^l \partial_4 \Delta LGDS_{t-i} + \sum_{i=1}^l \partial_5 \Delta INT.R_{t-i} + \varepsilon_{t-i} \tag{5}$$

Where; Δ denotes the First difference operator, ∂ means the Short-term coefficients of variables, l reflects the Maximum lag order of the ARDL model, ε indicates the Error term. After the long-term relationship is established, the error correction model (ECM) is now incorporated in order to determine the existence of a short-term link between the dependent variable and its regressors using short-term coefficients and the error correction period (ECT). Hence, by incorporating the ECM model, thus the ARDL is depicted in Equation 6 as follows;

$$\Delta LGDP_t = \alpha_0 + \sum_{i=1}^l \partial_1 \Delta LGDP_{t-i} + \sum_{i=1}^l \partial_2 \Delta B.D_{t-i} + \sum_{i=1}^l \partial_3 \Delta LGCF_{t-i} + \sum_{i=1}^l \partial_4 \Delta LGDS_{t-i} + \sum_{i=1}^l \partial_5 \Delta INT.R_{t-i} + \phi ECT_{t-1} + \varepsilon_{t-i} \tag{6}$$

4. DATA ANALYSIS AND INTERPRETATION

4.1. Unit Root Test

The previous chapter discussed extensively the unit root test, including its importance and explained various types of unit root tests. For this study, ADF and PP root unit tests are used for the reasons of checking the reliable nature of the variable used in this study.

Table-2. Unit root test for ADF and PP by employing only intercept.

Unit root test with Intercept				
Variables	ADF		PP	
	Level	1 st diff.	Level	1 st diff.
InGDP	-0.023	-5.41*	-0.10	-5.40*
B.D	-4.06*	-8.628	-4.026*	-20.86
InGDS	-1.65	-8.29*	-1.38	-10.01*
InGCF	-0.72	-2.96**	-0.97	-5.12*
INT.R	-1.965	-6.180*	-1.759	-10.89*

Note: *, ** and *** denote significant levels at 1%, 5% and 10% respectively.

Table 2 reveal the summary of the unit root test using intercept. The ADF and PP unit root test reveals that InGDP, InGDS, INT.R, and InGCF are significant at 1% in I(1) with the exemption of ADF test of InGCF which is significant at 5% in I(1). This shows that variables integrated in I(1) have been found. Furthermore, the budget deficit is stationary at 1% significant level in I(0). This is an indication that all the variables are integrated at a mixed level i.e I(0) and I(1).

Table-3. Unit root test result for ADF and PP that are estimated by including trend and intercept.

Unit root test with Intercept				
Variables	ADF		PP	
	Level	1 st diff.	Level	1 st diff.
InGDP	-2.84	-6.06*	-3.18	-6.10*
B.D	-4.43*	-8.51	-4.380*	-19.718
InGDS	-3.45***	-8.23	-3.45***	-13.98
InGCF	-2.16	-2.96**	-3.84**	-5.42
INT.R	-2.786	-6.09*	-2.777	-11.75*

Note: *, ** and *** denote significant levels at 1%, 5% and 10% respectively.

Table 3 reveals the summary of the unit root test using intercept. The ADF and PP unit root test reveals that InGDP, INT.R, and InGCF are significant at 1% and 5% respectively in I(1), while B.D and InGDS are stationary at 1% and 10% significant level in I(0). This is an indication that all the variables are integrated at mixed level i.e I(0) and I(1). The best method to the use of variables is the ARDL methods to establish a short and long run link if they are stationary at a mixed level.

4.2. ARDL Bounds test

The ARDL bound demonstrates the long-term connection among the variables.

Table-4. ARDL Bound test.

Bounds test case III: Unrestricted intercept and no trend		
Model estimation	InGDP _{pc} = F(B.D, InGCF, InGDS, INT.R)	
Lag structure	(1, 2, 0, 1, 0)	
F-statistics	10.28*	
Significant level	Critical bounds levels	
	I(0)	I(1)
10%	2.12	3.23
5%	2.45	3.61
1%	3.15	4.43

The boundary test for the relationship between variables and their critical values for case III is shown in Table 4 (Unrestricted intercept and no trend). This test rule was established in line with F-statistics (10.28) in the last chapter, which exceeded the maximum critical limit of 1%. This means that there is a co-integration of variables; a long-term relationship between GDP and exogenous variables seems to exist. This means that the null hypothesis is thus disregarded.

4.3. Long and short run Coefficient of the ARDL

The long-term estimates of the ARDL test are shown in the Table 5. The result indicates that at 1% level of significance, the lagged dependent variable (InGDP (-1)) is significant, thereby having a positive effect on GDP. This indicates that keeping other factors constant 0.5071 increases in the current GDP is because of a 1% increase in GDP_{pc} from the previous period. This view is in accordance with the finding of Pickson, Enning, and Siaw (2017). The study also revealed that the GCF is not significant; this goes against the view of Tung (2018). As indicated by the table above, when other things are held constant, 1% increase in the budget deficit will increase GDP by 0.016887. Many researchers (Obi & Nurudeen, 2009; Oladipo & Akinbobola, 2011) agrees with this view. This shows that the Keynesian theory is true for Nigeria. Furthermore, 0.148712 increases in GDP is as a result of a 1% increase in LGDS. This study complies with the ideology of Buscemi and Yallwe (2012). Finally, when all other factors are held constant, a 1% increase in INT.R will increase RGDP_{pc} by 0.015820. The next thing is to analyze the short-term relationship between GDP_{pc} and other exogenous variables in this chapter.

Table-5. The Long-run result of the ARDL model.

Variable	Coefficient	T-Stat (Prob)
LGDP(-1)	0.5071	(5.1718)*
BD	0.0168	(2.7186)**
LGCF	0.0922	0.5453
LGDS	0.1487	(3.2741)*
INT_R	0.0158	(3.3533)*
C	0.5772	0.4526

Note: *, ** and *** denote significant levels at 1%, 5% and 10% respectively.

Table 6 below reflects the dynamics of the short run between GDP and the independent variables. Only gross domestic savings and budget deficits have a positive and significant relationship with GDP from the table above. Thus, at 1% significant level, 1% increase in gross domestic saving will lead to 0.148712 increase in GDP when all other factors are kept constant. Additionally, when all factors are kept constant, at 1% significant level, 1% increase in the budget deficit will increase GDP by 0.148712. As mentioned in the previous chapter, our ECM was meant to be negatively and statistically significant. This model supports Nigerian study variables' long-term relationship. The ECM is -0.49, which means that the adjustment rate is 49%. That means that almost 49% of the discrepancy in the current year can adjust. This shows that the balance is convergent for the longer term.

Table-6. The short-run result of the ARDL model.

Regressors	Coefficient	T(Prob)
C	0.5770	8.0332*
D(B.D)	0.0168	(3.4200)*
D(LGDS)	0.1487	(3.6899)*
ECM	-0.4928	(7.3456)*
R ²	0.70	
Adj R ²	0.66	
F-stat	17.15	

Note: *, ** and *** denote significant levels at 1%, 5% and 10% respectively.

4.4. Diagnostic Tests

Table 7 depicts the diagnostic tests conducted. The R², which is considered to be the determination coefficient, is estimated to be 0.98 or 98 percent, showing that approximately 98 percent of the changes in the dependent variable can be explained by independent variables, but the remaining 2 percent will be accounted for by the other omitted variables and the error term. The equation, therefore, shows that the independent variables have a high explaining power, which is also supported by a highly adjusted R². F-stat is a significant overall or joint test of the model parameters. F-Statistic is 229 together with its probability value of 0.000, we can conclude that the statistically significant result is verified. The Durbin-Watson was reported to be 2.25. There is, therefore, no correlation in our estimation model. The test of normality used the Jarque-Bera test, which is given as 2.06 with a probability value of 0.34, which is important for the decision rule. Since the test is statistically insignificant, there is no reasonable rejection of the null hypothesis. This confirms that errors or residuals are usually distributed on average. The LM serial correlation test of Breusch-Godfrey was performed to determine whether there is a serial correlation. The Breusch-Godfrey serial correlation LM test was 0.62 and its probability value was 0.52, which means that we do not reject the null hypothesis, which implies that the errors are not correlated in series. The Durbin-Watson test is also corroborated. The F-statistics generated by the Breusch-Pagan heteroscedasticity test is 1.7 and the corresponding probability value is 0.13. The null hypothesis is not rejected. It implies that heteroscedasticity is not present. The F-stat is 2.729384 for the Ramsey RESET test and the corresponding probability value is 0.1121. We do not reject at any level of significance the null hypothesis. This shows that the functional form is correct and appropriate, i.e. the model is not incorrect. The diagnostic tests carried out justified the efficiency, consistency, and accuracy of the model used.

Table-7. Diagnostic test for ARDL model.

Tests	Results
R ²	0.98
Adjusted R ²	0.98
F-statistics (Prob-value)	229 (0.0000)*
Durbin-Watson	2.25
J-B normality test (Prob-value)	2.06 (0.35)
Breusch-Godfrey LM test (Prob-value)	0.65 (0.52)
Breusch-Pagan Heteroscedasticity test (Prob-value)	1.76 (0.13)
Ramsey RESET (Prob-value)	0.61 (0.44)
CUSUM Test	Stable at 5% level
CUSUM Square Test	Stable at 5% level

4.5. Testing of Hypotheses

Table 8 shows the result of the hypotheses formulated, the criteria for acceptance and decision.

Table-8. Hypotheses table.

Null Hypotheses	Criteria for acceptance	Decision
The Keynesian theory is not true for Nigeria	The zero hypothesis is rejected if the p-value is above 1 percent, 5 percent and 10 percent.	Since the p-value of the budget deficit (0.000) is less than the 1%, 5% and 10% significant level, we fail to accept the null hypothesis. Therefore the Keynesian theory is true for Nigeria
Gross domestic savings are not significantly linked to Nigerian economic growth.	The zero hypothesis is rejected if the p-value is above 1 percent, 5 percent and 10 percent.	Since the p-value of gross domestic savings (0.0016) is less than the 1%, 5% and 10% significant level, we fail to accept the null hypothesis. Therefore, the gross domestic savings have a significant impact on the economic growth of Nigeria
Gross capital formation has no significant link to Nigeria's economic growth.	The zero hypothesis is rejected if the p-value is above 1 percent, 5 percent and 10 percent.	Since the gross capital formation p value (0.17) is above 1%, 5% and 10%, we do not refuse the null assumption. Gross capital formation thus has no substantial impact on economic growth in Nigeria.
The interest rate has no important connection with Nigeria's economic growth.	The zero hypothesis is rejected if the p-value is above 1 percent, 5 percent and 10 percent.	Since p value is less than 1%, 5 and 10% for interest rate (0.0016), we reject the null hypothesis. The interest rate therefore has a major effect on economic growth in Nigeria

5. CONCLUSION AND RECOMMENDATION

The primary motive of this study is to ascertain the impact of budget deficit on economic growth in Nigeria. In actualizing this motive, we utilize annual data obtained from database indicators from the World bank covering the period from 1981 to 2016. In this study, GDP per Capita was used as the dependent variable and independent variables were used are gross capital formation, gross domestic savings, budget deficit and interest rate. To verify whether the variables used were stationary, ADF and PP unit root tests were employed showing to be stationary at different levels for the independent variables and at first difference I(1) for the dependent variable. In establishing the study's long-run relationship between the variables used, ARDL bound cointegration technique was employed. The ARDL bound cointegration test confirms a cointegration relationship between GDP Per Capital and Gross Capital Formation, Interest Rate, and Gross Domestic Saving. Results show that B.D, GDS, and INT.R has a positive long-run impact on GDP while GCF has positive however, insignificant relationship with GDP. Additionally, only GDS, and B.D have positive and significant influence on economic growth in the short run. Since the B.D is positive, we conclude that the Keynesian theory is true for Nigeria. The model has been diagnosed using normality tests; Ramsey reset testing, heteroscedasticity testing and serial correlation tests. The results demonstrate that the model is compatible and effective. The CUSUM and CUSUMSQ were used to test the stability of the model. It shows that the model is stable at the meaning level of 5 percent. The following policies are

recommended on the basis of the results of this study; (a) the study discovered that a higher-level gross domestic savings will lead to an increase in gross domestic investment thereby increasing economic growth. Therefore, there is a need to increase interest rate to encourage savings in order to accumulate enough resources for investments. Therefore, in the long run, the nation's productivity level will increase; (b) Though interest has a positive impact on growth, in order to ensure the availability of credit and accessibility of private sectors in the economy, interest rates should be implemented through appropriate policy and macroeconomic environments. In addition, encouraging investors to access banks 'investment funds by lowering interest rates must support growth in the real sectors of the economy; (c) On the expense side, by revising administrative systems founded under its decentralization plan the government must reduce its overall recurrent expenditure bill.

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