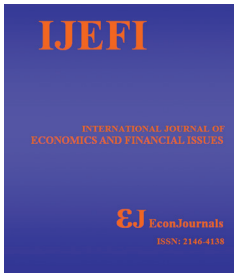

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Fiscal Deficit and Economic Growth in Nigeria: Ascertaining a Feasible Threshold

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ABSTRACT

This study investigates the effects of fiscal deficits on Nigeria economic growth from 1981-2014. The study established an optimal fiscal deficit level using the Threshold Autoregressive model. The empirical analysis supported the existence of a significant positive relationship between economic growth and the regressors – capital, labour, inflation rate, and trade openness. On the other hand, the study found that a significant negative relationship exists between fiscal deficits, financial depth and economic growth in Nigeria. The study established a threshold level of 5% which is conducive for economic growth at a lag of 1 year, for the Nigerian economy. Aligning this finding to the present reality, it is hence concluded that the Nigerian economy has been characterized by continuous fiscal deficits, which has not positively contributed to economic growth. The study, therefore, recommends that the government should increase capital spending and ensure that an optimal fiscal deficit bracket level of 5% is maintained.

Keywords: Fiscal Deficit, Growth, Threshold Autoregressive, Nigeria
JEL Classifications: E62, H62, O4

1. INTRODUCTION

The effect of fiscal deficits on economic growth has been the subject of extensive research over the past decades and still remains important till date. According to the World Bank (2000), countries that achieved noticeable economic growth were those that have attained significant decline in their debts. However, this view has been extended to assert that it is not growth per se, but the structure of growth that matters (Ravallion, 1999). World Bank (1998) defined fiscal deficit as excess of government spending over its revenue. It arises from government's expansionary fiscal policy that leads to revenue falling short of expenditure in a given fiscal year. The deficit is financed through domestic and external sources. Abubakar (2000) asserted that a moderate amount of budget deficit not exceeding 4% of GDP is not detrimental to the overall progress of economic growth in any country. However, it is not clear that there exists an automatic method that redistributes these benefits among all the members in a fair way.

The concept was developed by the Keynesian school of economic thought that states that government intervention is necessary when the government is unable to match her tax revenue with her public expenditure. According to this school of thought, an increase in government spending will help stimulate demand, increase domestic production, make the private sector better-off and then lead to economic growth. The aims of a budget deficit according to Dwyer (2011) includes: Full employment, price stability, better environment for public and private investment and poverty reduction. However, Awe and Shina (2012) asserted that fiscal deficit is not necessarily an issue, but its persistent growth in both developing and developed countries has made it an issue. Empirical study carried out by Isah (2012) on the impact of budget deficits on economic growth in Nigeria concluded that continuous budget deficits leads to crowding out of private investment. This happens as a result of the increase in interest rate and reduction in the amount of savings for private investors. The relative productivity of public and private capital can affect the pace of economic growth. As long as the return to public capital is below

the returns to private capital, budget deficits will negatively affect the economic growth rate (Isah, 2012).

The study carried out by Isah is said to be in line with the conventional wisdom of the neoclassical theory. When government expenditure increases due to productive expenses like education and health expenses, fiscal deficits can bring about economic growth in the long run (Ahmed, 2010). Isabel, Farhi, Nicolini and Teles (2013) asserted that a positive relationship exists between economic growth and fiscal deficits. A threshold is, however, needed if the benefits of fiscal deficits on economic growth are to be harnessed (Isabel, Farhi, Nicolini and Teles 2013). The idea of fiscal deficit is good for economic growth, but the reason why it has not improved the wellbeing of the people is the method through which it is financed. The government of developing countries should stop external borrowings, minimize domestic borrowings and borrow from only the capital market. Budget deficit financing is the issue of concern and not just the deficits. The government should aim at diversifying the economy and building their tax revenue base (Stevens, 2013).

Nigeria has consistently recorded budget deficits from 1980 to 2013, with rare cases of budget surplus occurring only in the years 1995 and 1996 (CBN, 2013). Statistics show that Nigeria's debt profile is currently on the rise. Her total debt stock increased by 10.2%, from ₦7.54 trillion as at December 31st 2012 to N8.32 trillion in September 2013. Further analysis showed that the ratio of the federal government's domestic to external debt as at September 2013 stood at 88:12 as opposed to the appropriate ratio of 60:40. As at September 2014, the total debt stock was at $69.6 billion or 13% of her GDP. As at June 2015, total debt stock was at ₦12.12 trillion (CBN statistics, 2013). Budget deficit financing is one of the causes of poverty in Sub-Saharan Africa and it is also a vital instrument for economic growth in Sub-Saharan Africa (James, 2009). However, one issue that has not been adequately addressed is a threshold level for fiscal deficit. Statistics shows that the African government has used several budget deficit financing strategies, but she has not been able to harness the benefits of budget deficit financing (UNDP Report, 2014). Thus, her human capital development is still low with an HDI of about 0.466 on the average, infrastructural development is still low as most of her intermediate inputs are imported and above all, poverty rate is still very high with about 54% incidence level (UNDP Report, 2014).

The need for the study of fiscal deficit and economic growth was best captured by (Isabel, Farhi, Nicolini and Teles 2013). In the study, it was noted that continuous fiscal deficits creates distortions in the economy, thus leading to inflation, crowding out effect, poverty, decrease in welfare and affects economic productivity. The study suggests that the financing of deficits creates severe problems for poverty reduction in developing countries. The study however asserted that if fiscal deficits were increasing due to development expenditure, it can help reduce poverty in the long run through increased productivity and employment. The results of the work revealed a positive relationship between fiscal deficit and economic growth for Guinea with a 1 year lag. The threshold level for fiscal deficit conducive for economic growth for Guinea was identified at 3.0%.

The running of fiscal deficits in an economy at a particular time period is based on the idea that it stimulates demand, increase the level of productivity and then economic growth. However, the relationship between fiscal deficits and economic growth presents mixed results. Some empirical studies asserted that a positive relationship existed between fiscal deficits and economic growth (Adam and Bevan 2005; Gamber, 2010). However, these studies failed to include in the model variables that shows how fiscal deficits can bring about economic growth. This study, therefore, includes a financial reform variable to show the role of financial development in economic growth. Some empirical researches have shown that fiscal deficits have a positive effect on the economic performance of most African countries. While some other empirical studies have shown that fiscal deficits are not good for African countries as most of them have economies that are not diversified and so cannot benefit from fiscal deficits. Also, many studies have looked at the issue of fiscal deficits and economic growth in Nigeria (Danjuma and Bala, 2012). However, they have not adequately addressed the issue of threshold effect on fiscal deficit and economic growth in the Nigerian economy. From the review of literature, many studies have not adequately addressed the issue of threshold effect on fiscal deficit and economic growth in the Nigerian economy. This study therefore, adapts the Threshold Autoregressive (TAR) model with a view to capturing the threshold effects between fiscal deficits and economic growth in Nigeria. This study will also include political rights as a variable that captures institution, which is a necessary condition for benefits of fiscal deficit to be harnessed.

This study specifies an alternative model in the spirit of Pollin (2008), called the TAR model. This model specifies that individual observations can fall into discrete classes based on the value of an observed threshold value. It shows that Autoregressive (AR) models are estimated separately in two or more intervals. It takes into consideration the fact that determinants of growth are not automatic, but some political and economic conditions have to be satisfied. The general assumption of this model is that a process may behave differently when a variable exceeds a particular threshold. To test for the existence of a threshold relationship between fiscal deficit and economic growth, this study estimated the threshold model using ordinary least square (OLS) estimation technique and computed Residual Sum of Squares (RSS) for different thresholds of deficit ranging from K = 1% to K = 10% according to the TAR model proposed by Hanson (1999).

This study therefore builds on existing literature in this subject area, it contributes to the existing body of knowledge and offer suggestions that will aid the policy decision making process for economic growth in Nigeria. In view of the above, this study evaluates the relationship between fiscal deficit and economic growth in Nigeria. It estimates a threshold level of fiscal deficit that is beneficial to the wellbeing of Nigerians.

This study is structured into five sections. The second section is the review of literature, in which conceptual, theoretical, methodological and empirical issues that are related to this study are reviewed. Section three is a presentation of the theoretical framework and methodology of the study. It provides the theoretical underpinnings of the study and presents the empirical

model as well as the technique of estimation for the study. Section four represents the estimation and discussion of results. Section five concludes the study with a summary of findings, recommendations, policy implications, suggestions for further research, limitations of the study and conclusion.

2. REVIEW OF RELATED LITERATURE

The endogenous model explains long-run growth rate on the bases of endogenous factors. It did not make any attempt to criticize the neoclassical model; rather it expanded it by introducing endogenous technological progress. It was developed by Arrow, Lucas and Romer amongst other economists. Arrow's hypothesis was that at any moment of time, new capital goods incorporate all the knowledge than available based on accumulation experience. Romer took three elements in his model. Namely: Externalities, increasing returns in the production of output and diminishing returns in the production of new knowledge. In this model, new knowledge is the ultimate determinant of long-run growth which is determined by investment in research and development. In order words, Romer said that human capital stock in the process of innovation and adoption of new technology brought about rapid growth rate in an economy. Lucas (1988) said accumulation of human capital is the engine of growth. The model assumes technology to be constant and population growth as exogenous.

One of the earliest formal studies on the effects of fiscal deficits was by Diamond (1965), who postulated that a permanent increase in the proportion of nationally held debt to national income depresses the steady state capital-labour ratio. At the initial interest rate, people are unwilling the initial volume of physical capital and bonds, plus the new bonds. The rising interest rates motivate additional saving and reduce investment until capital market equilibrium is re-established. Thus he concluded that unrelenting government deficits crowd out private capital accumulation. His study however focused on permanent changes in deficits and does not shed light on the effects of temporary changes.

Auerbach and Kotlikoff (1987) completed strategy enactments in a more intricate neoclassical model. They noticed that the prompt effect of a transitory change in shortfalls possibly minute and maybe awful and may even persuade funds over the long haul. They recognized that riches impacts cumulate after some time, accordingly even transitory shortages in the end swarm out private capital arrangement. Folorunso and Falade (2013) employed the use of Pair-wise Granger causality results to examine the connection between fiscal deficit and public debt in Nigeria. Results from the study support the existence of a bi-directional relationship between the two macroeconomic variables. The results also suggested that domestic debt has a greater impact on fiscal deficit than external debt Bahmani (1999) used Johansen co-integration technique to examine budget deficit and investment considering quarterly data for the period of 1947-1992 concluded that, budget deficit crowd in real investment, which is in agreement with the Keynesian proposition. However, his findings was in conflict with the work of Vincent and Clem (2013) that examined the crowding-out effect of budget deficits on private sector investments within the Nigerian context, using data for the period of 19702006. The result indicated that budget deficits had a depressive effect on private investment in the country. The estimation results suggest that a 1% increase in fiscal deficit leads to 0.267% decline in private investment. The results also indicate that Nigeria's debt profile has had strong and negative impact on private investment in Nigeria.

Ranjan and Sharma (2008) showed that government expenditure exerted significant positive impact on economic growth in India during the period 1950-2007, and that the two sets of variables co integrated. This was in line with the earlier work of Barro (1979) who observed a positive and significant impact of budget deficit on economic growth. In the empirical study carried out by Najid (2013), the relationship between budget deficit and gross domestic product in Pakistan were investigated by employing a time series data for the period of 1971-2007. The result showed that there was bi-directional causality running from budget deficit to GDP and from GDP to budget deficit. This was a contrary view to the earlier work of Hayati (2012) which established a no link of relationship between budget deficit and economic growth in the long run in Malaysia. This result was also supported by a study carried out by Ghali (1997) in Saudi Arabia. A contradicting study result came from the work by Fatima (2012). The study finds negative relation between budget deficit and economic growth in Pakistan. This finding was supported by the work of Ghosh and Hendrik (2009).They reported that, ceteris paribus, an increase in budget deficits slows growth of the U.S. economy.

Bose (2007) found a positive relationship between budget deficit and economic growth in 30 developing countries. In contrary, Laudau (1983) examined the effect of government deficit on economic growth for a sample of 96 countries and found that government deficit exerts a negative effect on real output. The empirical work of Adam and Bevan (2004) was on the relationship between fiscal deficits and growth (GDP) for a panel of 45 developing countries. Based on the consistent treatment of budget constraints, the study found evidence of a threshold effect at a level of the deficit around 1.5% of GDP. The threshold not only involves a change of slope but also a change of sign in the relation regardless of the budget category excluded from the model, indicating that for an economy not on its steady state growth path, there is a range over which deficit financing may be growth-enhancing. This was supported by the work of Olugbenga and Owoeye (2007).

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Zaidi (2005) stated that during the eighties, poverty in Pakistan decreased due to high economic growth rates along with high remittances, and an active spendthrift public sector. In the

nineties, poverty started increasing after joining the IMF's Structural Adjustment Programme which emphasized on the reduction of fiscal deficit through tax increase, cut in development expenditure and reduction or removal of subsidies which are mostly on important inputs of daily life. On the other hand private investment and public sector investment are complementary as the latter pertain to infrastructures; the implications of the decline in public investment on growth are serious. But an increase in fiscal deficit decreases the development expenditure. Goodfriend and McCallum (2007) examined the role of fiscal policy in alleviating poverty in case of Nigeria. He used the general equilibrium model for the study and concluded that the government revenue also positively redistributes income but government expenditures are the important and effective tool of income redistribute and reduction in poverty. He further concluded that the fiscal policy should be formulated in such a way that it redistributes the income from the rich people of the society to poor ones.

Inequality is also an important factor in increasing poverty in developing countries as it adversely effects the economic growth. Many studies found high economic growth accompanied with increasing poverty while some of them also show that in period of low growth poverty reduces. Volker (2005) have done study on Tanzania's growth process and reduction in poverty that how the large scale privatization, liberalization and monetary and fiscal policy affect the poverty through different channel, like private investment and exchange market. He argues that economic reforms and macroeconomic stabilization, resulting in strong growth and low inflation which significantly impact poverty. Barro (1987) advanced the "crowding out" and "crowding in" argument within the Ricardian equivalence. He argued that an increase in fiscal deficits, say due to an increase in government deficit spending, has to be paid for either now or later, with the total present value of receipts fixed by the total present value of spending. Consequently, a reduction in today's taxes ought to be harmonized by an increase in future taxes, leaving interest rates and hence private investment unchanged.

Armey (1995) developed the Armey curve and introduced the idea of an optimal size of deficit. They pointed that the non- existence of government causes a state of anarchy and low levels of output per capita, because there is no rule of law and no protection of property rights. Consequently, there is little incentive to save and invest because the threat of expropriation exists. Nevertheless, at some point growth- enhancing features of government should no longer lead to output expansion. Also, as spending increases, additional projects financed by government becomes increasingly less productive and the taxes and borrowing levied to finance government impose increasing burdens. At some point, the marginal benefits from increased government spending become zero. Thompson and Rizova (2016) estimated that the optimal size of federal government spending based on the Armey curve in the United States in the period 1947-1997 was 17.45% of gross domestic product, meaning that federal spending of about 22.0% at the beginning of 1990s was roughly 20% larger from the standpoint of growth optimization, considering general government spending. Tanzi (2003) however suggested that general government spending in excess of 30% of national output reduces economic growth and produces practically no additional improvement in social measures of well-being.

Devereux and Love (1995) investigated the impact of government deficit spending in a two-sector endogenous growth model developed by King and Rebelo (1990). They extended the model to accommodate an endogenous consumption leisure decision. The authors concluded that there is a positive relationship between lump sum financed government deficit spending and growth rates. Although, government spending raises the long run growth rate; it reduces welfare since government deficit spending is a less than perfect substitute for private spending.

Yavas (1998) showed that an increase in the size of fiscal deficit will increase the steady state level of output if the economy is at a slow steady state, and will decrease the steady state level of output if the economy is at a high steady state. He emphasized that in underdeveloped countries, a significant portion of the deficit is directed to building of the infrastructure of the economy and this type of expenditure will have a stimulating effect on private sector production. While the developed countries already have most of their infrastructure built and a major part of their deficit spending is on welfare programme and social services. Therefore, the positive effect of spending on these programmes on private output will not be as great as that of expenditures on infrastructure. Ndung'u (1995) looked at the link between budget deficit, the rate of inflation and money supply growth on the one hand, and money printing and the rate of inflation on the other. He used Multivariate Granger Non- causality tests, and reported that at least in the case of the Keynesian economy; fiscal deficits affect monetary base growth. He concluded that fiscal deficits affect growth in monetary base, money printing affects the rate of interest and hence, the rate of inflation and in addition, excess money printing affects the rate of inflation.

Obi and Nurudeen (2009) looked at the effects of fiscal deficits and government debt on interest rates in Nigeria, by applying the Vector Auto-regression approach. The results of the estimation show that the explanatory variables account for approximately 73.6% variation in interest rate in Nigeria. The estimation data also shows that fiscal deficits and government debt are statistically and economically significant. They concluded that deficits financing leads to huge debt stock and tend to crowd out private sector investment, by reducing the access of investors to adequate funds, thereby raising interest rates. The rise in interest rate reduces investment demand and output of goods and services. These in turn reduces national income as well as employment rate and the overall welfare of the people would reduce. Adams and Bevan (2001) looked at the relationship between fiscal deficits and growth in a panel of forty five (45) developing countries. The estimation strategy involved a standard fixed effect panel data estimation and bi-variate linear regression of growth on fiscal deficits using pooled data. They also discovered the existence of a statistically significant non-linearity in the impact of budget deficits on growth. They however said that this non-linearity reflected the underlying composition of deficit financing.

Anyanwu (1998) deviated from past studies that focused more on the effects of deficits and concentrated on the impact of deficits

financing. He used regression analysis for pooled cross-section and time series for Nigeria, Ghana and the Gambia. The results did not reveal a significant positive association between overall fiscal deficits (and its foreign financing) and domestic nominal deposit interest rates. He concluded that the concern of economists in the sub-region should shift from the deficits itself to the manner of financing the deficit. Ahmed and Miller (2000) assessed the effects of disaggregated government expenditure on investment using OLS, fixed-effect and random effect methods. They concluded first that the openness variable has a positive effect on investment only for developing countries. For developed countries, openness does not significantly affect investment. Their second conclusion was that expenditure on transportation and communication 'crowd in' investment for developing countries only. The third conclusion was that tax-financed government expenditure in general, "crowd out" investment more frequently than debt-financed government expenditure.

Ezeabasili et al. (2012) carried out an empirical analysis of fiscal deficits and inflation in Nigeria covering the period 1970-2006. The study made use of co-integration as its method of estimation and its results concluded that a positive but insignificant relationship exists between fiscal deficits and inflation in Nigeria. Awe and Shina (2012) studied the connection between budget deficit and inflation in Nigeria over the time frame of 1980-2009. Their study employed the use of Vector Error Correction Mechanism (VECM) in determining the extent of correlation between the two macroeconomic variables. The result of the study showed a significant causal relationship from budget deficit to inflation while the causal relationship from inflation to budget deficit was found to be insignificant.

Onwioduokit (2005) similarly employed the use of VECM in his empirical enquiry. Results from the study showed that fiscal deficits cause inflation while inflation does not necessarily lead to fiscal deficits in Nigeria. His study concluded that finding appropriate ways in financing budget deficits is what should be of utmost concern to policy makers. De Haan and Zelhorst (1990) as cited in Bakare et al. (2014) investigated the relationship between budget deficit and money growth in developing economies. The conclusion of the study disputed the argument that budget deficits lead to monetary expansion and thus inflation. Oladipo and Akinbobola (2011) employed Granger causality pair-wise test in ascertaining the causal relationship between budget deficit and inflation. Results from the study suggest that while there is a causal link from budget deficit to inflation, there is no causal relationship from inflation to budget deficit in Nigeria. In contrast, Ogunmuyiwa (2011) in his research concluded that causality runs from inflation to budget deficits in Nigeria. Covering the period 1970-2009, Anayochukwu (2012) made use of the autoregressive distributed lag model and the Granger causality test in empirically ascertaining that fiscal deficits trigger inflation in Nigeria.

Folorunso and Falade (2013) employed the use of Pair-wise Granger causality results in examining the connection between fiscal deficit and public debt in Nigeria. Results from the study support the existence of a bi-directional relationship between the two macroeconomic variables. The results also suggested that domestic debt has a greater impact on fiscal deficit than external debt. Catao and Terrones (2003) made use of panel technique in their work in examining the relationship between deficits and inflation in 107 countries, using data that covered the period 1960-2001. Results from their study showed that a strong and positive association exists between deficits and inflation among high-inflation and developing country groups but not among low-inflation advanced economies.

It can be concluded from the theoretical review that each of the theories explaining economic growth and fiscal deficit and its financing have conflicting ideas. Several empirical studies have made use of one of each to explain their work and each work has yielded different results. It can also be concluded from the empirical studies reviewed that there are some similarities and differences between these studies dealing with the impact of public investment on private investment and economic growth. The similarities are that some of them focus either on cross-section or static analysis and make use of the same estimation techniques. For example, Barro (1991), Kelly (1997) and Nelson (2000), among others estimated their economic models using the OLS method. Also, many other studies resulted in a similar conclusion in both developed and developing countries and lent support to the existence of a significant crowding-in effect of private investment by public investment, through the positive impact of infrastructure on private investment productivity. An example is Ahmed and Miller (2000). Studies like Ghali (1998) among others found a negative relationship between fiscal deficits and overall welfare.

3. MODEL SPECIFICATION

The analytical framework adapted for this work follows essentially the Keynesian framework and borrows extensively from Onwioduokit and Bassey (2013). In a simple Keynesian framework, desired aggregate demand relationship is specified in the goods market in the following behavioural equations:

$$Y=C+I+G+(X-M) \quad (1)$$

Y: Is total output at a particular time period; C is total consumption; I is total investment; G is total government expenditure and (X−M) represents net exports.

In a time series context, output is influenced by its own past level. The equation can be written as:

$$Y\_t=\alpha_0+\alpha_1 Y_{t-1}+\alpha_2 e_t+\alpha_3 DEF_t+\alpha_4 \pi_t \quad (2)$$

Where Y_t = output changes at a particular time, lagged by 1 year. $\alpha_1,\alpha_4<0$ and π=inflation. The equation represents the long run relationship between output growth and fiscal deficits.

From the supply side of the economy, output is a function of capital stock and labour. The Cobb-Douglas production function gives a growth model that can be written as:

$$y = AK^{\beta_1}L^{\beta_2} \quad (3)$$

Where y is output, K is capital stock; L is labour force growth; Δ is change and β's represent coefficients.

The variables used in this study are based on extant studies and the theoretical position discussed above. To capture economic growth which is the dependent variable, this study made use of the growth rate of real GDP. In specifying the independent variables, this study made use of the theoretical framework from both the supply and demand sides of the economy. The independent variables include: Interest rate, capital stock, inflation rate, money and quasi-money as a percentage of GDP, labour force, government expenditure on education as a percentage of total government expenditure and fiscal deficit as a percentage of GDP. The functional form of the model adopted for this study can be written as:

$$RGDP_t=f(GFCF_t,Lab_t,Def_t,Inf_t,OPN_t,FD_t) \quad (4)$$

Where $RGDP_t$ is Growth rate of real GDP, $GFCF_t$ is Gross fixed capital formation as a ratio of GDP, (proxy for growth in capita stock), Lab_t is Labour force, Def_t is Fiscal deficit per GDP (excluding grants), Inf_t is inflation rate, OPN_t is Trade openness, and FD measures financial depth.

Expressing the model in its econometric linear form, we have:

$$Y_t=\alpha_0+\alpha_1 GFCF_t+\alpha_2 lab_t+\alpha_3 Def_t+\alpha_4 Inf_t+\alpha_5 OPN_t+\alpha_6 FD_t+e_t \quad (5)$$

Where: $\alpha_0$is the intercept depicting economic growth when the explanatory variables are equal to zero and Y_t is output.$\alpha_1,\alpha_2,\alpha_3,\alpha_4,\alpha_5,\alpha_6$are the coefficients or parameters of the explanatory variables. The inclusion of the stochastic or error term (e_t) in the above model is to capture the impact of other variables that are not included in the model.

In summary, the a priori expectations can be written as: $\alpha_1,\alpha_2,\alpha_3,\alpha_4,\alpha_5,\alpha_6>0$

3.1. Specification of the TAR Model

The TAR model proposed in this study specifies that individual observations can fall into discrete classes based on the value of an observed threshold variable (Lee and Wong, 2005). It is used to answer the question on optimal fiscal deficit. They are estimated separately in two or more intervals of values as defined by the dependent variable. Following the framework of Li and Li (2008), based on the general framework provided and the foregoing variables identified, the threshold growth equation is explicitly specified as follows:

$$y_t=\varphi_0+\varphi_1 y_{t-1}+\varphi_2 Def_t\left[I_t\left(Def_t<K^*\right)\right]+$$
$$\varphi_3 Def_t\left[I_t\left(Def_t>K^*\right)\right]+\varphi_4 GFCF_t+$$
$$\varphi_5 Lab+\varphi_6 Inf_t+\varphi_7 OPN+\varphi_8 M2/GDP+e_t.$$

Where: I_t is a dummy variable with a value of 1, if Def_t> K*or 0 otherwise, K*is the threshold level of fiscal deficit/GDP which is to be calculated at 1% to 10%,φ_2 is the effect of fiscal deficit below the threshold level, $\varphi_3$is the effect of fiscal deficit above the threshold level. Other variables are as previously defined.

The summary of the a priori expectations are as follows:$\varphi_1;\varphi_2;\varphi_5;\varphi_5;\varphi_5;\varphi_5>0$ and φ_3; $\varphi_4<0$.

3.2. Technique of Estimation

This study employs empirical analysis in ascertaining the effect of fiscal deficit on economic growth in Nigeria. The study makes use of the Johansen Co-integration technique as well as the VECM techniques. The empirical analyses begin with examining the time series property by conducting the unit root test of all the variables. The Augmented Dickey-Fuller (ADF) unit root test was used to perform this action. The second step is the co-integration test. The Co-integration method of Johansen and Juselius (1990) was used to perform the co-integration test. This helps in determining the long-run relationship between fiscal deficits and economic growth in Nigeria. The third step is the VECM. This method tested for short-run dynamics and correction of errors generated in each period within the model.

After the completion of the first three steps, the TAR model was estimated. As have been stated earlier, a threshold assumes that a process is disrupted beyond a particular point. An Autoregressive model is one that includes one or more lagged values of the dependent variable among its explanatory variables. It portrays the time path of the dependent variable in relation to its past value (s). The TAR model shows that Autoregressive (AR) models are estimated separately in two or more intervals as defined by the dependent variable. This model therefore, helps ascertain what happens to economic growth (dependent variable) between two or more intervals of fiscal deficits and the past values of economic growth (dependent variable). Alternatively, it ascertains the rate of increase or decrease in economic growth, when the values of fiscal deficits are above or below some levels. From the result of this, the study will ascertain the optimal level of fiscal deficits. A major shortcoming, however, of this model is the choice of threshold values to use and the order (s) of the AR model.

To test for the existence of a threshold relationship between fiscal deficit and economic growth, the study estimates the threshold model using OLS estimation technique and computes RSS for different thresholds of deficit ranging from K = 1% to K = 10% according to the TAR model proposed by Hanson (1999). The RSS with the smallest value is then picked as the optimal fiscal deficit. After identifying the optimal level for deficit, to determine the level of significance at this level, this study conducted an h-test; to check for serial correlation and a normality test.

3.3. Data Sources and Measurement

The data used for the study were sourced from World Development Indicators (WDI) of World Bank Publication 2014 (Table 1).

4. DISCUSSION OF RESULT

This section focuses on the presentation of the estimation, analysis and interpretation of data for the purpose of this study. This ascertains the reliability of the theoretical postulations regarding the relationship between fiscal deficits and economic growth in Nigeria and thus presents the estimation results for the TAR model using the OLS method in order to ascertain the threshold of fiscal deficits that is beneficial to economic growth.

4.1. Test for Unit Roots

The test for unit root was carried out on all the variables in the model, as it is essential to determine the stationarity of all the variables in the series. Most economic and business data are known to exhibit non-stationary property which makes prone to a spurious or nonsense result. To avoid this, all variables are required to be stationary at levels or at first difference most preferably for the Johansen co integration analysis. The results of the test are presented in the Table 2.

When tested at first difference, all variables proved to be stationary at 1% level of significance, with the absolute value of the ADF test statistics greater than the Critical value at the required level of significance.

4.2. Johansen Co-integration Test

In order to establish the presence of a long run relationship among these variables, a co-integration test was carried out using the Johansen Co-integration technique and the results are shown in Table 3.

From the Table 3, the Trace test shows three co-integrating equations among the variables. The Trace statistics indicates that the null hypothesis of no co-integrating equation was rejected in favour of the alternative hypothesis at 0.05%, indicating an evidence of long-run relationship among the explanatory variables (Ogundipe and Apata, 2013; Ogundipe et al., 2014).

From Table 4, we have the following equation:

$$RGDP_t=0.00343GFCF_t+70.7994LAB_t-7.454323DEF_t+0.62714INF_t-2.5609FD_t+285.5OPN_t$$

From the Table 4, it is clear that the explanatory variables GFCF, LAB, INF and OPN are positively related with RGDP, while DEF and FD exert an inverse relation on RGDP. A unit increases in capital stock (GFCF) results in 0.0034 unit increase in the rate of economic growth (RGDP) in the long run. Likewise, the significance of the t-statistic at 5% level (3.61) shows that capital stock (GFCF) is an important and significant determinant of economic growth. However, considering the weak response rate as posed by the magnitude, we can say that the contribution of capital stock to economic growth in the Nigerian economy is quite low. This weak response can be tied to the low infrastructural development in Nigeria, both physical and human investment occupied the weakest rank of government priorities in Nigeria. In furtherance, labour force exerts a positive influence on economic growth. A unit increases in labour force results in 70.7 unit increase in economic growth in the long run. This conforms to the a priori expectation of the study. Though, labour force is weakly significant but contributes a large chunk to economic growth in Nigeria. The evidence cannot be unconnected with the labour intensive nature of the Nigeria economy.

Fiscal deficit (DEF) shows a negative relationship with economic growth in the long run. This is however not in line with the a priori

Table 1: Data sources and measurement

Variable	Definition	Measurement	Source
$RGDP_t$	Growth rate of Real Gross Domestic Product.	Annual percentage	WDI, 2014
$GFCF_t$	Growth in fixed capital formation.	Annual percentage	WDI, 2014
Lab_t	Total labour force	Billion	WDI, 2014
OPN_t	Trade openness	Annual percentage	WDI, 2014
INF_t	Inflation rate using Consumer Price Index (CPI).	Annual percentage	WDI, 2014
DEF_t	Cash surplus/deficit per GDP.	Annual percentage	WDI, 2014
FD_t	Broad-quasi money per GDP	Annual percentage	WDI, 2014

Source: Authors' compilation

Table 2: Test for stationarity at first difference

Variables	ADF test statistic	Critical values at 1%	Order of stationarity	Remarks
$RGDP_t$	8.571125	3.653730	I (1)	Stationary
$GFCF_t$	3.173871	2.981038	I (1)	Stationary
LAB_t	10.18773	3.653730	I (1)	Stationary
DEF_t	7.005079	3.653730	I (1)	Stationary
INF_t	5.262925	3.653730	I (1)	Stationary
FD_t	5.184980	3.653730	I (1)	Stationary
OPN_t	5.909062	3.661661	I (1)	Stationary

Source: Computed by Authors using Eviews 7. A variable is stationary when the absolute value of ADF is greater than the absolute value of its critical value.

Table 3: Tests for co-integration among the series

Hypothesized No. of CE (s)	Eigen value	Trace statistic	0.05 Critical value	P**
None*	0.923058	203.8084	139.2753	0.0000
At most 1	0.698877	121.7381	107.3466	0.0041
At most 2	0.662363	83.33045	79.34145	0.0242
At most 3	0.507811	48.58539	55.24578	0.1693
At most 4	0.352106	25.90081	35.01090	0.3326

Source: Authors compilation from Eviews 7

expectation. A one unit increase in fiscal deficit will bring about a 7.454 unit decrease in economic growth in the long run. However, fiscal deficit as a variable explaining growth is significant at a t-statistic of 6.9812. This result is similar to the evidence obtained by Chimobi (2011) with Chimobi and Igwe (2010). The evidence would have accentuated from the long stretch and incessant fiscal deficits experienced in the Nigerian economy, which its financing has not translated into economic prosperity rather sprout several linkages that continued to sink scarce economic resources. The benefits of fiscal deficit cannot be harnessed by an economy that is not properly diversified as deficits have to be financed through borrowings which might in turn increase the fiscal deficit rate.

Alternatively, economic growth exhibits a significant and positive response to inflation, as a unit increase in inflation results in 0.62 increases in economic growth in the long run. This implies that the average level of inflation falls within the board acceptable to stimulate economic growth. The indicator of financial depth, though significant but exerts a negative impact on economic growth. This contracts the a priori expectation, and only confirms the relatively weak strength of intermediation of the financial sector in providing required credits to the deficient productive sector of the economy. In the same manner, trade openness contributes significantly and positively to economic.

4.3. The Vector Error Correction Model

The VECM presents the model containing the error adjustment mechanism (ECM). The ECM examines the speed of adjustment of the variables from the short run dynamics to the long run. Therefore, the coefficient of the ECM is known as the speed of adjustment factor. This shows how fast the system adjusts in order to restore equilibrium, in the event of shocks. The ECM is expected to be statistically significant, with negative coefficient and lies between 0 and 1. The significance of the ECM is determined by the t-statistic, which must be greater than or approximately equal to 2, to be significant. When these conditions are met, co-integration is said to be sustained in the long run.

The three important criteria used for Vector Error Correction include; first, the sign of the coefficient must be negative for it to be meaningful, the sign of the coefficient shows if there is convergence or divergence of the variables to the same long run equilibrium path after disequilibrium. Second, the t-statistic, which checks the significance of a variable such that if the t-statistic is equal or >2, the variable is statistically significant and if it is <2, such variable is statistically insignificant. Third is that the Error Correction Mechanism (ECM) must lie between 0 and 1.

From the result in Table 5, the error correction model can be interpreted as follows: We can say that about 76% of short run errors were corrected along the equilibrium path. The value is rightly signed, showing that there is convergence towards equilibrium path in the long run. Therefore, the speed at which the model adjusts to the stationary equilibrium path following disturbances in the model is about 76%. This implies therefore, that the speed of adjustment is high. Alternatively, this suggests that short run errors are short lived in the model.

4.4. Analysis of the TAR Model

The results based on repeated estimation of the TAR model for the different values of expected threshold (k) are given in Table 5. The first column labelled K, gives the range over which the search for a threshold is conducted. The dummy variable I_{1t} represents the effect of deficit beyond the chosen threshold (K) value. While G_{2t} represents the effects for a deficit higher than the threshold value.

From the Table 6, the minimization of RSS can be seen at the threshold point of 5.0%, where the RSS records the lowest value of 19.74. To further confirm this result, the adjusted R^2 from the estimation at 5.0% yields the highest value of 85.06%. From the Table 6, the coefficient of deficit dummy for deficit above threshold (G_{2t}) carries a positive sign, indicating that when deficit is higher than -5.0%, the effect on economic growth may be positive in Nigeria. While the negative sign of the D_{1t} shows that deficit >−5.0% may be detrimental to economic growth in Nigeria. Thus, the threshold level for fiscal deficits in Nigeria is identified at 5.0%. This result is however different from the result of the empirical literature of Onwioduokit and Bassey (2013). Their empirical study showed an accepted threshold percentage of 6.0% for Gambia. For the Nigerian economy, the 5% threshold level for fiscal deficit will cause growth to increase by about 1.54%. When the threshold level of fiscal deficit exceeds this acceptable level, economic growth in Nigeria will decrease by about 0.78%.

Table 4: Normalized Co-integrating Coefficients

1 Co-integrating Equation(s): Log likelihood: −567.7720						
Normalized co-integrating coefficients (standard error in parentheses)						
RGDP	GFCF	LAB	DEF	INF	FD	OPN
1.000000	−0.003430	−70.79940	7.454323	−0.627142	2.560849	−285.5
	(0.00095)	(0.95415)	(1.06656)	(0.13976)	(0.34574)	(25.37)
T-statistics	−3.61052	−1.84591	6.98912	−4.48728	7.40686	−11.25

Source: Author's compilation from Eviews 7

Table 5: Vector error correction model

Statistics	RGDP	GFCF	LAB	DEF	INF	FD	OPN
ECM (-1)	−0.7656	−75.947	0.0071	−0.156	−0.2427	0.6577	0.0034
ERROR	(0.1912)	(46.8967)	(0.0054)	(0.0951)	(0.5051)	(0.1967)	(0.0029)
T-STATISTIC	[−40032]	[−1.6194]	[1.3148]	[−1.6495]	[−0.4804]	[3.3424]	[1.1593]

Source: Author's compilation from Eviews 7. Standard errors in () and t-statistics in []

Table 6: Nigeria's fiscal deficit conducive for economic growth

K (%)	Coefficient		RSS	Adjusted R^2
	D_{1t}=effect of deficits below K	G_{2t}=effect of deficits above K		
1	−0.80456	1.56446	33.22	0.54
2	−0.80452	4.37482	29.47	0.63
3	−0.64573	0.34671	44.45	0.45
4	−0.56744	1.76452	27.56	0.47
5	−0.78064	1.54332	19.74	0.85
6	−0.76452	0.47883	38.87	0.43
7	−0.76441	2.34896	49.56	0.23
8	−0.63456	1.34674	53.02	0.44
9	−0.56441	1.97654	30.22	0.76
10	−0.23721	−1.45781	33.67	0.53

Source: Author's computation from Eviews 7. K^*= Maximum rate of fiscal deficit for the Nigerian economy

Table 7: The Nigerian diagnostic test at 5% threshold level

Test type	Statistic	Value	P	Remarks
Normality	Jarque-Bera	1.017054	0.7743	Normally distributed residuals
Serial correlation (LM)	F-statistic	0.013672	0.8567	No serial correlation
Heteroscedasticity	F-statistic	0.07458	0.8845	No heteroscedasticity
Stability	Cusum squares	Within bands		Stable

Source: Author's compilation from E-views 7

As at 2014, the percentage of fiscal deficit was about 2%. It can therefore be said that the Nigerian economy is still within the acceptable range of fiscal deficits. However, to ensure that these fiscal deficits positively improve economic growth, the factors increasing government spending should yield adequate returns on infrastructure, education, health and other capital projects.

4.5. DIAGNOSTIC TESTS RESULTS

Diagnostic tests were conducted at the 5.0% acceptable threshold. From Table 7, the residuals for all the estimated equations were found to be normally distributed and stable. No serial correlation and heteroscedasticity were seen in the equation. Thus, we can say that the estimates are reliable and consequently, can be relied upon for policy formulation purposes.

5. CONCLUSION AND RECOMMENDATION

The study sought to find out relationship between fiscal deficits and economic growth in Nigeria over a time span of 1981-2014 and to ascertain that an optimal fiscal deficit level exists for the Nigerian economy. The study presents a review of conceptual issues, theoretical, empirical and methodological issues observed in past literature. It adopted the Keynesian theory of economic growth, which was further used to specify the TAR model.

The evidence from the Johansen co integration analysis shows a significant negative relationship between fiscal deficit and economic growth in Nigeria over the long run. The a priori expectations of capital stock, labour, inflation rate and openness were met. However, the a priori expectations for fiscal deficit and financial depth were not met. All the variables were however statistically significant based on the values of their t-statistics. The ECM showed a good speed of adjustment of short run errors along the equilibrium path. Its negatively signed coefficient implies that there is a convergence towards the equilibrium path in the event of disequilibrium due to shocks. Specifically, there is a 76% correction of short run errors over the long run equilibrium path.

Also, in the occurrence of fiscal deficits in the Nigerian economy, the threshold should not be more than 5% as this is the level conducive for economic growth. In achieving this, the Nigerian government should adopt policies capable of expanding industrial output such as price control and rationings to ensure that fiscal deficits does not lead to a very high rate of inflation. Also, Fiscal and monetary policy should be integrated in a way that neither the public nor the private sector is handicapped due to finance shortage.

In the same manner, Government should decisive, proactive and concise about capital investments in order to avoid abandoned projects. Also, financing of such investment should be within the optimal fiscal deficit level. This will in turn cause the fiscal deficit to bring about a positive impact on economic growth. Alternative sources of revenue should be hastily implemented. This will help the Nigerian economy in financing her expenditure and in paying her debts when borrowings are made. Finally, a Surveillance team should be put in place to ensure that the budget is adhered to and that there are no corrupt practices. This will reduce waste of resources and embezzlement of funds that could have been put to good use.

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