



The Macroeconomic Determinants of Fiscal Deficit Financing in Nigeria: A Two-Stage Least Squares Approach

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Abstract

The Nigerian government has engaged in a persistent fiscal deficit despite the enormous earnings from oil sales. Public sector borrowing from domestic sources increased tremendously after the paydown of external debt in 2006. This research study examines the macroeconomic factors determining the massive growth in the country's fiscal deficit financing from 1981 to 2020. The study adopts the Pairwise Granger Causality and the Two Stage Least Squares (2SLS) approaches for data analysis. The study results in a show that economic growth is positive and significant in affecting domestic deficit financing. On the other hand, financial development, debt service and trade openness are negative and significant in affecting fiscal deficit financing. Although Inflation and exchange rates positively affect fiscal deficit financing, the effect is insignificant. Finally, while the impacts of private investment, government revenue and external borrowing negatively affect fiscal deficit financing, the effect is insignificant. The research study recommends more prudent utilization of the funds from domestic deficit financing on productive projects to the economy. The government must seek avenues to reduce the cost of borrowing to lower the burden of debt service on the economy. While the government must be weary of accumulating a massive volume of public debt for future repayment, they should take measures to improve tax revenue to reduce the reliance on borrowing as the source of funding the execution of fiscal deficit.

Keywords: Fiscal Deficit Financing, Economic Growth, Financial Development, Debt Service, Nigeria, Two-Stage Least Squares

I. Introduction

Many governments of developing countries worldwide have engaged in fiscal deficits over the years. Quite often, the fiscal deficit in these developing countries is occasioned by the weak revenue base created by the weak tax base in these economies. Governments may finance deficits from external or internal sources. Most developing countries started with the financing of deficits from external sources. Down the line, most developing countries soon discovered that these external sources were associated with several problems. Besides the fact that interest computation guidelines were difficult to comprehend, many countries soon suffered from foreign exchange problems and debt overhangs. Many of the borrowing developing countries fell into a debt trap because even if they managed to pay the interest and charges alone, the capacity to repay the principal was almost hopeless (Demiroglu&Karagoz, 2016).

Consequently, based on the unpleasant experiences associated with external debts, many developing countries began to look inwards to borrow from the domestic financial markets. However, the capacity to finance deficits from internal sources depends on the size and depth of the country's financial markets. Nevertheless, financial markets in most developing countries are shallow, and the available funds are primarily short-term



(Loayza&Pennings, 2020). As a result, governments borrowed funds from the domestic financial markets by selling government securities to the general public through the money and capital markets. Hence, the general trend to borrow internally from developing countries has created a situation where their current public debt grew faster than the growth rates of their economies (Elom-Obed et al., 2017).

While the use of deficit to finance development may lead to economic growth and improvements in the social welfare of the people when well utilized, several macroeconomic problems have been associated with fiscal deficit financing. Scholars have posited that sustained domestic deficit financing is accompanied by continuous inflationary pressures (Oyeleke, 2021). They argue that if government spending and taxes are exogenous, bond-financed deficits are often non-sustainable. The central bank would eventually monetize the government fiscal deficit and thus increase the money supply for the economy and Inflation in the long run (Muhammad, 2012).

Furthermore, some authors have also argued that government financing fiscal deficit from domestic sources directly competes with the private sector for the available credit in the economy. This competition increases interest rate and crowds out private investment in the economy (Traum& Yang, 2015). In addition, other studies have shown that domestic deficit financing expands aggregate demand and could increase imports while discouraging exports. This would negatively affect the country's foreign exchange, induce a trade balance deficit causing the twin deficit hypothesis (Dey&Tareque, 2022). Persistent financing of fiscal deficit from domestic sources would also cause a soaring of public debt and lead to a debt trap for the economy.

The Nigerian government has engaged in fiscal deficit financing for several decades after independence. Except for a few years, there were overall deficits in the government budgets each year from 1980 to 2022. Over the years, the level of fiscal deficit has increased. For instance, the fiscal deficit from N455 million in 1970 increased to N1.98 billion in 1980. Between 1990 and 2016, it increased from 22.12 billion to 2.208 trillion, and in 2020 has gone up to N7.118 trillion. The corresponding level of government revenue for the period was also high. From N166.60 million in 1970, government revenue from oil rose to N12.35 billion in 1980 and N1.59 trillion and N8.88 trillion in 2000 and 2011, respectively. In 2016 and 2020, government revenue increased to N5.618 trillion and N10.755 trillion, respectively (CBN, 2021). It is

curious that the astronomical increase in government revenue occasioned by the export of crude oil is accompanied by the persistent and sustained increase in the fiscal deficit.

Nigeria's unpleasant experience with external borrowings, like most other developing countries, made the country shift attention to domestic borrowing from the country's internal financial markets. After the full paydown of external debts and exit from the London and Paris Clubs in 2006, the country has witnessed an upsurge in the volume of domestic borrowing to date (Bua et al., 2014). Domestic borrowing, which stood at a mere N8.95 billion in 1980, progressively rose to N1,526 billion in 2005 when Nigeria paid its external debts. From this point, domestic borrowing rose astronomically (by 806%) to N14,023 billion in 2016 and progressively to N19,242 billion in 2020 (CBN, 2021). The increase in domestic borrowing outperformed the increase in GDP (by more than 200%), which increased from N14,611 billion to N101,490 within the same period (a 595% increase). The natural question to ask is: why has the domestic borrowing by the Nigerian government grown in such astronomical proportion since the paydown of the country's external borrowing in 2006, during a period that witnessed huge earnings from crude oil exports? Consequently, examining the macroeconomic determinants of domestic deficit financing in Nigeria may be logical.

Some of the factors identified by various authors as the determinants of the fiscal deficit over the years include debt service, availability of borrowing sources, Inflation, other sources of government revenue, development of local financial markets and the government's propensity to borrow. Debt Service Obligation constitutes one of the critical influences on fiscal deficits. The persistent borrowing by government finance fiscal deficit could consume a large part of government revenue that could have been deployed for other development purposes. In weak financial markets, the interest charges associated with domestic borrowing would increase with the stock of debt since a large part of the total borrowing may comprise short-term debt instruments. Yusuf & Mohd (2021) observed that sustained public sector spending could stimulate an increased budget deficit and could cause disequilibrium that may result in massive debt service repayment. Coccia (2017) contends that extensive fiscal deficit on the part of governments is generally associated with high-interest rates. The increase in the real interest rates raises the interest payments on debt, which worsen



the fiscal deficit by increasing the cost of debt repayments.

Generally, with a sustained increase in spending, the government may have to increase fiscal deficit if the generated tax revenue is not in tandem with the increase in spending. However, there are other reasons why government spending may increase the fiscal deficit even after an increase in the revenue from taxes. Sparrow et al. (2020) posit that when social programs are deficient and inefficient there could be an increased government budget deficit even with a rise in tax revenue. Similarly, Ifere&Okoi (2018) attribute the rise in fiscal deficit over time to the activities of politicians, electioneering matters and the political system. Inadequate tax revenues, especially in developing countries, are a fundamental cause of fiscal deficit (Loayza&Pennings, 2020). The tax base is narrow, and poor tax payment compliance is a significant issue in these countries.

Diokno (2007) argued that Inflation might affect budget deficits in various ways. The first way is through real tax revenues -- inflationary conditions reduce the real tax revenues collected by the government, thus, pushing toward budget deficits. The second way is via the effect on nominal interest rates. Inflation increases the nominal interest rates and, consequently, debt servicing, thus increasing the budget deficit. The financial market's development level is also believed to be related to fiscal performance. A more developed financial market would have more readily available forms of money to buy goods and services without incurring costs. In addition, the World Bank suggests that a more developed financial sector has increased flexibility in adjusting to macroeconomic shocks to prevent banking or financial crises when governments borrow heavily from the financial system.

As a follow up to the issues mentioned above, this study is motivated by the desire to establish the relevant macroeconomic factors that influence fiscal deficit financing from domestic sources. This research work acknowledges that several empirical studies have been conducted to examine the borrowing activities of governments from external sources to fund fiscal deficit programmes in developing countries (Ndubuisi, 2017; Asogwa et al., 2018). However, not many studies have investigated the macroeconomic determinants of government public borrowing from internal sources to fund fiscal deficit programmes (Kutivadze, 2011). Therefore, this research study examines the macroeconomic determinants of

domestic deficit financing in Nigeria from 1981 to 2020.

The rest sections of this article is broken as follows: Section 2 presents the review of the relevant literature. Section 3 is preoccupied with theoretical framework and methodology. Section 4 highlights the empirical findings and discussion of results, while the section 5 concludes with the policy implications of the study.

II. Literature Review

2.1 Empirical Literature

Several studies deal with the various macroeconomic determinants of fiscal deficits in many countries worldwide. Accordingly, the empirical literature covers the relationship between fiscal deficit and financial development, economic growth, inflation and exchange rate.

The relationship between fiscal deficit, financial development and economic growth are strongly interwoven. Existing empirical studies have shown that, in most cases, they have bi-directional causality. Two strands of empirical literature exist on the relationship between fiscal deficit financing financial development and economic growth. The first strand of empirical literature posits that public sector government borrowing from the internal banks of an economy increases the interest rate, reduces the credit that is available to the private sector, and adversely affects the country's growth and development (Basti&Köksal, 2011; Altayliligil&Akkay, 2013; Mun& Ismail, 2015; Fatih&Ilgun, 2016; Saibu &Alenoghena, 2017; Abiodun, 2020; Aljanabi, 2020). The proponents of this position argue that, since private investment is essential to the real sector of the economy, the crowding out of credit to the private sector would adversely affect the country's growth and development. The second strand of literature on the fiscal deficit, financial development and economic growth literature opines that the increase in public sector borrowing from the domestic financial market would improve the accessibility of credit to the private sector based on the safe asset model (Kutivadze, 2011; Raza et al., 2014; Mbulawa, 2015; Akindipe, 2018; Omodero, 2019). Safe assets comprise a healthy securitized credit facility offered in support of government borrowing, improving the banks' liquidity and profitability. Moreover, in a portfolio risk diversification structure, safe asset loan offering affords the yardstick for banks to extend further credit to the more delicate private sector (Aghughu et al., 2022).

Debt Service Obligation is a vital factor influencing fiscal deficit (Folorunso&Falade, 2013).



An increase in spending leads to a fund budget deficit and may cause the disequilibrium that results from wrong borrowing policies such as using expensive borrowing to finance the deficit. Furthermore, sustained government borrowing to finance fiscal deficits will increase the debt service obligation (Ardagna et al., 2007; Saungweme&Odhiambo, 2019). Consequently, the increase in debt service obligation would consume a large portion of the government revenue required for financing development. Therefore, the financial markets in developing countries need more depth such that a large percentage of government debt is held in short-term financial instruments.

Diokno (2007) posits that inflation may affect budget deficits in two crucial ways: The first way is through real tax revenues - inflationary conditions reduce the value of real tax revenues that the government collects, hence, inducing budget deficits. The second way is through the effect on nominal interest rates. Inflation increases nominal interest rates, increasing debt servicing and causing an increase in a budget deficit. Also, Agnello and Ricardo (2009) opine that inflation causes public deficit volatility, especially in developing countries with a high degree of openness (Paiko, 2012). Increased public-sector borrowing could influence inflation (Alexander, 2015; Oyeleke, 2021). They also maintain that higher public deficit volatility is typically associated with higher political instability and less democracy. Adopting a contradictory position, Tiwari et al. (2015) and Kaur (2017) argued that inflation is not an important cause of the fiscal deficit in India. Maintaining a similar position, Bordo& Levy (2021), in the study of the global economy, found that fiscal policy does not cause inflation. Instead, they posit that government expenditure and money supply are vital determinants of the country's mounting fiscal deficit. In single-country studies, some authors have argued that fiscal deficit is an important cause of inflation (Jalil et al., 2014; Eita et al., 2021; Vishal & Ashok, 2021).

Easterly et al. (1994) concluded that a robust relationship exists between the fiscal deficit,

the trade deficit, and the real exchange rate. While observing that fiscal deficit and the real exchange rate have a bi-direction causal relationship, the investment and saving behaviour determinants influence external deficit. Some authors have argued that trade deficit and exchange rate strongly affect fiscal deficit financing in an economy (Tang, 2014; Alam et al., 2022)

Most of the determinants of fiscal deficit financing identified from the various empirical studies include exchange rate, debt service (interest on debt), inflation, government revenue, trade openness, gross domestic product (GDP) and private investment. In addition, some empirical studies also identified non-economic factors, including political instability, weak fiscal institutions, democracy and corruption.

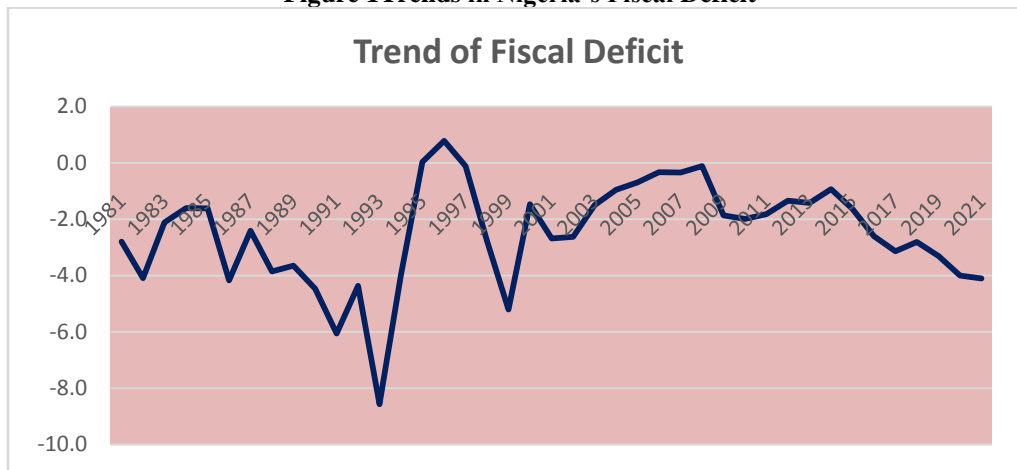
The gap in the literature is that the existing empirical studies in this area should have covered the macroeconomic determinants of domestic deficit financing in developing countries which is the main focus of this study.

2.2 Trends in Government Fiscal Deficit in Nigeria

The international oil market glut of the early 1980s (which marked the end of the Arab-Israeli War), coupled with the Nigerian government's zeal to continue maintaining its planned expenditure level in the face of falling revenues, resulted in chronic budget and BOPs deficits and colossal debt burdens (Adubi, 1994). An analysis of the fiscal operations of the Nigerian governments over the years shows the recurrence of the deficit as the main feature since the late 20th century (NCEMA, 1991), as cited by Adubi (1994). Thus, the trend in Figure 1 shows that the Nigerian government virtually ran a deficit budget for our entire analysis period. Except for 1995 and 1996, when the budget became optimistic, government budgets for the entire analysis period were negative. The highest point of the budget deficit was in 1990, with over N6 trillion. However, the lowest point was in 1996 with a positive of about N800 million.



Figure 1 Trends in Nigeria's Fiscal Deficit



Sources: Extracted from Central Bank of Nigeria Annual Statistical Bulletin (2021)

While trying to finance the deficit budgets during the period, the Nigerian government borrowed the public sector from domestic and foreign sources. As a result, total government debts in Nigeria grew from N13.2 billion in 1981 to N444.6 billion in 1991. In 1992 it was N722.2 billion but rose and got to an all-time high in 2004 with N6,260.6 billion. In 2005 and 2006, Olusegun Obasanjo's administration negotiated and paid off the country's external debts (London Club and Paris Club). As a result, at the end of 2006, the country's total debts were down to N2,204.7 billion. After that, however, the trend commenced a gradual build-up from domestic borrowing, and in 2010, total debts rose to N5,241.7 billion. The rise in total debts continued and reached N9,535.5 billion in 2014. At the end of 2020, Muhammadu Buhari's administration has taken total debt to an all-time high of N35,097.79 billion.

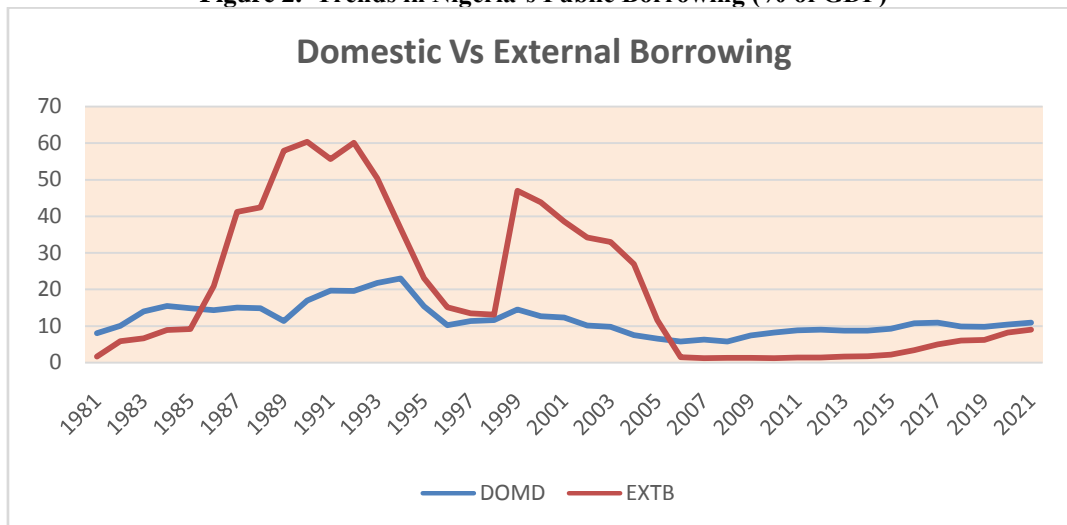
2.3 The Structure of Public Debt in Nigeria

In 1980, the country's total debts were dominated by domestic debts. At the same time, domestic debts comprised 83% of total debts;

external debts comprised 17%. Nigeria's total debt in 1981 was 26% of GDP. From Figure 2, the entire 1980s decade for Nigeria witnessed a consistent and dramatic increase in Nigeria's external borrowing. In 1985, the composition of total debts had shifted such that domestic debt had dropped to 62% while external debts rose to 38%. As a result, total debts in 1985 had risen to 62% of GDP. In 1990, Nigeria's external debts started to dominate total debts, with N299 billion being 78% of total debts, while domestic debts were N84 billion and 22%. In 1990, the growing total debt profile had become astronomical and reached 135% of GDP. Borrowings from the Paris Club dominated Nigeria's external debts in 1990. The dominance of Paris Club in the country's external debts was maintained by 1995 with a figure of N477 billion, while external debts continued to rise to N717 billion, making 60% of total debts. Same 1995, domestic debts with N478 billion comprised 40% of total debts. With the rise in Nigeria's GDP, total debts, though increasing, were now 60% of GDP in 1995.



Figure 2. Trends in Nigeria's Public Borrowing (% of GDP)



Source: Extracted from Central Bank of Nigeria Annual Statistical Bulletin (2021)

In 1999, there was a new dimension as external debts soared to N2,977 billion, with Paris Club borrowing alone accounting for 73% of external borrowing with N1,885 billion. While external debts comprised 77% of total debts, domestic debts were 24%. In this year, the value of total debts was 72% of GDP. Between 1999 and 2005, external debts still heavily dominated the volume of total debts. In 2005 the Olusegun Obasanjo administration paid all outstanding debts to the Paris Club and London Club. From 2006, domestic borrowing took over the dominant position in the country's total debts (See Figure 2). Once again, the country's domestic debts overgrew from N1,525 billion in 2005 to N4,552 billion in 2010, increasing by 300%. Between 2010 and 2014, domestic debts grew again by 174%. In 2014, the total value of domestic debts grew to N7,904 billion, making 83% of total debts and 9% of GDP. The total debt in Nigeria in 2015 was N10.65 billion, which is 11.2% of the country's GDP.

It can be observed that Nigeria's total debt to GDP position exceeded the 30% threshold during the 80s, 90s and early 2000 decades. At the end of 2020, the country's total borrowing stood at N35,097.79 billion, making 20% of GDP. Out of the total public sector borrowing for 2020, domestic borrowing maintains dominance at N19,242.56, making 54% of total public sector borrowing.

III. Theoretical Framework and Research Methodology

3.1 Theoretical Framework

Scholars have proposed several theories to explain the economic determinants of fiscal deficits. These theories focus on the factors which may influence the size and direction of fiscal deficits in the economy over the years. Some of the theories considered in this study are discussed as follows:

The positive theory of fiscal deficits and government debt in a democracy is proposed by Grillo et al. (1991). The theory argues that budget deficits and debt accumulation by the government can only serve two purposes: i) provide a pathway for income redistribution across generations and over time and ii) provide the means to minimise the deadweight losses of taxation that are associated with government provision of public goods and services. The theory argues that democratic governments may incur more expenditure on social goods in the quest to satisfy the citizens, thereby increasing budget deficits. With the rise in deficits, they borrow to finance the gap making governments incur debts to be repaid by future generations. The process ends up redistributing income among generations. The theory argues that a budget deficit increases the burden of future tax and domestic debt.

Cukierman & Meltzer (1989) pioneered the political theory of government debt. The theory opines that budget deficits focus on the intergenerational redistributive aspect of government debt. They found that contrary to



bequest-constrained individuals, they do not mind transferring resources from future generations to finance present consumption via such negative bequests. These individuals will advocate immediate tax rate reductions without an accompanying decrease in current government expenditures (Cecchetti et al., 2011). Thus, in a democratic system, the more significant the share of bequest-constrained individuals in the population, the more likely it is for the government to run more massive deficits. Accordingly, with an increase in the expected rate of economic growth, there will be an increase in budget deficits as the spread of the income distribution or expected longevity tends to increase the population share of bequest-constrained individuals.

The neoclassical view of optimising fiscal policy is a concise approach that represents the equilibrium condition of fiscal policy administration. At the very heart of this model is the tax-smoothing theory of fiscal policy and public debt developed by Barro (1979) when he noted that government, which is a "benevolent social planner", seeks to maximise the utility (welfare) of the representative agent, by financing a certain amount of spending in every period through taxes on labour income (cited in Uppal, 2011). Domestic deficit financing is integral to the fiscal policy

administration and tax smoothing process. The theory argues that governments incur public debt to smoothen shock-induced variations in tax rates, thereby minimising the excess burden associated with taxation. Tax smoothing implies that governments set tax rates to minimise the cost of inter-temporal tax distortions. Therefore, fiscal deficit policies and actual tax administration processes are designed to reflect the optimisation of an inter-temporal activity spread over a long period by administrators to minimise the effects of an excessive tax burden on the citizens during a given period (Barro, 1987). The neoclassical approach to fiscal policy equilibrium may portend solid implications for the macroeconomic determinants of tax administration, inflation and seigniorage. Suppose the tax rate smoothing process constitutes the optimal choice of tax administration on citizens over time. In that case, the same activity may apply to distortionary taxation (including seigniorage). Therefore, the choice between seigniorage and income taxes may be considered based on the comparative effects of the relative social marginal costs of income tax versus seigniorage (Mankiw, 1987). The tax smoothing model may be presented to underscore the choice between inflation taxation and direct income taxation, as demonstrated by Srebrnik&Strawczynski (2016).

Suppose money demand is given as follows:

$$\frac{M(t)}{P(t)} = kY(t) \quad (01)$$

Where:

M(t) represents the money supply in one period. P(t) refers to the price level, and Y(t) represents the general level of output. While seigniorage taxes is S(t), total taxes are represented by (T(t), and $\tau Y(t)$ refers to the sum of income taxes. Therefore:

$$T(t) = \tau Y(t) + S(t) \quad (02)$$

The income tax rate is represented by τ . Hence, real seigniorage taxation can be defined as:

$$S(t) = \pi \left(\frac{M}{P}\right) = \pi kY(t) \quad (03)$$

The inflation rate is represented by π . The government budget constraint may now be defined as:

$$\int_0^{\infty} e^{-rj} G(t+j) dj + B(t) = \int_0^{\infty} e^{-rj} T(t+j) dj \quad (04)$$

While G(t) refers to the real government expenditure at period t, T(t) represents all real taxes (plus seigniorage taxation), B(t) refers to the value of total government debt, and r represents the real interest rate.

The government's objective is always to minimise the value of losses arising from inflation and distortionary taxes on income. To achieve this, we comply with the proposal that deadweight losses are quadratic in the inflation and tax rates. Therefore, the problem before the tax authority becomes:

$$\text{Min } E_t \int_0^{\infty} \{e^{-rj} [(\tau(t+j))^2 + \alpha (\pi(t+j))^2]\} dj \quad (05)$$

Subject to equation (04),

The solution generates the model for the determinants of fiscal deficits. As demonstrated in Barro (1979), the model implies that budget deficit may be given by:



$$DEF(t) = [G(t) - G^p(t)] - \tau(t)[Y(t) - Y^p(t)] \quad - \quad - \quad (06)$$

Equation (06) regards budget deficit as a temporary measure that arises concerning the permanent trend of government spending regarding the moment's exigency. Thus, in such moment of exigency, national output ($G^p(t)$) may be temporarily low in relation to the general trend in the income level of the economy $Y^p(t)$. Therefore, budget deficit should be a temporary phenomenon.

The model identifies fiscal deficit determinants, including national output, tax policy/ government revenue and inflation. However, other authors (Christenson, 2005; Farajova, 2011; Tiwari & Kumar, 2011) have argued that other macroeconomic variables like debt service, foreign debt, government expenditure GDP and exchange rate have substantial effects on the trend of fiscal deficits.

3.2 Research Methodology

3.2.1 Analytical Framework

It is proper to select a functional form that recognises the relationship between the variables in our data set to achieve the objective of this study and effectively analyse the economic determinants of fiscal deficits in Nigeria. The estimation procedure in the study consists of three steps: The first step is to test for the unit root in the data set to determine the order of integration using ADF – Fisher test. The second step is to conduct the causality test (Granger Causality) to establish the instrumental variables to be used in the model. The third step involves estimating the model using the two-stage least squares (2SLS) regression method run over the sample period 1975 - 2016. The data set utilised for this study is obtained from the Central Bank of Nigeria's Annual statistical bulletin for 1999 and 2016.

3.2.2 Choice of the Estimation Techniques

The endogenous variable possesses a theoretical relationship with some exogenous variables. Hence, it is necessary to carry out the causality test to determine the variables to be used as in the list of instrumental variables to be specified. All the variables are lumped as endogenous variables, and the granger causality

test is conducted to find the exact position of causality between the variables in the data. When there is a two-way relationship between the study variables and domestic borrowing (DOMB), such as specified endogenous variables can be regarded as exogenous. The study then assumes that all the exogenous variables in the data set are uncorrelated with the disturbances (μ) and are used as instruments in the model.

Two-stage least squares (2SLS) is a particular case of instrumental variables regression. The basic idea behind 2SLS is to replace the (stochastic) endogenous explanatory variable with a linear combination of the predetermined variables in the model and use this combination as the explanatory variable in place of the original endogenous variable. The 2SLS method is a version of the instrumental variable method of estimation. The linear combination of the predetermined variables is an instrument, or proxy, for the endogenous regressor.

One regression model assumption is that the right-hand side variables are not correlated with the error term. Ordinary Least Squares (OLS) and weighted Least Squares become biased and inconsistent when this assumption is breached. For simplicity, the variables that are correlated with the residuals are referred to as endogenous variables. The predetermined or exogenous variables are uncorrelated with the residual term. The primary approach is to utilise instrumental variable regression for analysis in cases where right-hand side variables are correlated with the residual terms.

The standard requirement in the instrumental variables approach is to find the set of variables, termed instruments, such that they are: first, correlated with the explanatory variables in the equation, and second, uncorrelated with the disturbance term. These instruments, when estimated, are used to remove the existing correlation between right-hand side variables and the disturbances. Hence, there is no separate estimation stage in 2SLS as both stages are estimated simultaneously using instrumental variables techniques (Gujarati & Sangeetha, 2007).

3.2.3 Specification of the Model

For specification purposes, we let Z represent the matrix of instruments and declare y and X as the dependent and explanatory variables. Therefore, the linear TSLS objective function is given by:

$$\varphi(\beta) = (y - X\beta)' Z(Z'Z)^{-1}Z'(y - X\beta) \quad - \quad - \quad - \quad 01$$

In matrix notation, the coefficients computed in 2SLS general form are given by:

$$a_{2SLS} = (X'Z(Z'Z)^{-1}Z'X)^{-1}X'Z(Z'Z)^{-1}Z'y \quad - \quad - \quad - \quad 02$$



$\sum LGFCF$, $\sum LGOVR$, $\sum LDBSV$, $\sum LINFL$, $\sum LEXRT$, and $\sum LEXPT$ openness is sourced from the World Bank database (WDI).

The a-priori assumptions for the model based on (equation 9) are: $\beta_0 > 0, \beta_1 < 0, \beta_2 > 0, \beta_3 < 0, \beta_4 < 0, \beta_6 > 0, \beta_7 < 0, \beta_8 < 0$ & $\beta_9 < 0$; Where $\beta_i > 0$ implies a positive relationship between the endogenous variable and exogenous variables, that is, an increase in these exogenous variables will lead to an increase in domestic deficit financing overtime, whereas $\beta_i < 0$ implies negative relationship, that is an increase in these exogenous variables will lead to a decrease in domestic deficit financing overtime.

The data for this work is sourced to cover the period 1981 to 2020 making 40 observations. While the data on domestic borrowing, external borrowing, government revenue and debt service is sourced from the Central Bank of Nigeria database, the data on economic growth, gross fixed capital formation, financial development, inflation, exchange rate and

IV. Empirical Result and Analysis

4.1 Unit Root Test Result

The first step in this study is to determine the order of integration. Next, it is necessary to test for stationarity in the variables to guide against spurious results, which may affect the accuracy of the formulated model. The study adopts the Augmented Dickey-Fuller (ADF) unit root test to test for the presence of unit root in the data. The summary of the results is presented in Table 1, shown as follows. The results confirm the existence of unit root at level. It implies that the data series were not stationary at level. The test is repeated at first difference with a maximum lag of one.

Table 1 Unit Root Test

Null Hypothesis: Unit root (individual unit root process)				
Series: LDOMB, GDPR(-1), LGFCF, LGOVR, LMNSS, LEXTB, LDBSV, INFL, EXRT				
Sample: 1981 2020				
Total number of observations: 358				
Method			Statistic	Prob.**
ADF - Fisher Chi-square			191.615	0
ADF - Choi Z-stat			-11.969	0
Intermediate ADF test results D(UNTITLED)				
Series	Prob.	Order of Integration	Max Lag	Obs
D(LDOMB)	0.0000	I(1)	1	40
D(LGDPR)	0.0000	I(1)	1	39
D(LGFCF)	0.0004	I(1)	1	40
D(LGOVR)	0.0000	I(1)	1	40
D(FDEV)	0.0005	I(1)	1	40
D(LEXTB)	0.0000	I(1)	1	40
D(LDBSV)	0.0000	I(1)	1	40
D(LINFL)	0.0000	I(1)	1	39
D(LEXRT)	0.0072	I(1)	1	40
D(LTOPE)	0.0035	I(1)	1	40

Therefore, the ADF test statistic with maximum lag of one confirms that the variables *DOMB, GDPR, FDEV, GFCF, GOVR, EXTB, DBSV, INFL, EXRT* and *TOPE* are all integrated (stationary) at order one (I(1)). The probability results indicate that the variables are all statistically significant at 0.01, 0.05 and 0.10 levels of significance.



4.2 Causality Test Result

Granger causality was used to conduct a pairwise causality test using lag two. The test is conducted based on a null hypothesis which states that each explanatory variable does not 'Granger cause' domestic borrowing and vice versa. The causality test results are shown in Table 2. The results indicate that while causality flows from domestic borrowing to output growth, reverse causality also flows from output growth to domestic borrowing. Hence, bi-directional causality flows between domestic borrowing and output growth since the estimated probabilities are

less than 0.05 level of significance. Also, we accept the existence of bi-directional causality flowing between domestic borrowing (DOMD) and economic growth (GDPR) and domestic borrowing (DOMD) and financial development (FDEV) based on the estimated probabilities with values less than 0.05 levels of significance. Furthermore, the causality results between domestic borrowing and the other explanatory variables: GFCE, GOVR, EXTB, DBSV, INFL EXRT and TOPE, indicate that the relationship is either unidirectional or no causality based on the estimated probability values.

Table 2 Pairwise Causality Test Result

Pairwise Granger Causality Tests				
Lags: 2				
Null Hypothesis:	Obs	F-Statistic	Prob.	Decision
LGDPGR does not Granger Cause LDOMB	34	3.22574	0.0501	Reject
LDOBM does not Granger Cause LGDPGR		4.96715	0.0140	Reject
LGFCF does not Granger Cause LDOMB	34	4.03485	0.0284	Reject
LDOBM does not Granger Cause LGFCF		0.45646	0.6380	Accept
LGOVR does not Granger Cause LDOMB	34	4.52632	0.0195	Reject
LDOBM does not Granger Cause LGOVR		1.30657	0.2862	Accept
LFDEV does not Granger Cause LDOMB	34	6.7046	0.0040	Reject
LDOBM does not Granger Cause LFDEV		4.31522	0.0229	Reject
LDBSV does not Granger Cause LDOMB	34	0.19379	0.8249	Accept
LDOBM does not Granger Cause LDBSV		8.8452	0.0010	Reject
LINFL does not Granger Cause LDOMB	34	0.58146	0.5655	Accept
LDOBM does not Granger Cause LINFL		8.38293	0.0013	Reject
LEXTD does not Granger Cause LDOMB	34	2.14948	0.1347	Accept
LDOBM does not Granger Cause LEXTD		0.77818	0.4686	Accept
LEXRT does not Granger Cause LDOMB	34	0.02007	0.9801	Accept
LDOBM does not Granger Cause LEXRT		1.0117	0.3761	Accept
LTOPE does not Granger Cause LDOMB	34	4.1352	0.0297	Reject
LDOBM does not Granger Cause LTOPE		1.0117	0.3761	Accept

4.3 Two-Stage Least Square Regression Result

Equation (09) is estimated because the unit root test shows that the series becomes stationary at the first difference (I(1)). Furthermore, the instrumental variables were selected based on the variables with bi-directional causality from the outcome of the pairwise causality test result. Thus, the equation to be estimated becomes:

$$LDOBM_t = \beta_0 + \beta_1 LGDPGR + \beta_2 LGFCF_t + \beta_3 LFDEV_t + \beta_4 LGOVR_t + \beta_5 LINF_t + \beta_6 LEXRT_t + \beta_7 LDBSV_t + \beta_8 LEXTB_t + \beta_9 LTOPE_t - - - - (10)$$

Substituted Coefficients:

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$$L\text{DOMB} = 7.203 + 0.025L\text{GDPR} - 0.901L\text{GFCF} - 0.124L\text{GOVR} - 1.385L\text{PRSC} - 0.815L\text{DBSV} - 0.187L\text{EXTB} + 0.125L\text{INFL} + 0.178L\text{EXRT} - 0.416L\text{TOPE}$$

The estimated outcome of the model indicates that the parameters are partially in line with our a priori expectations. Five of the eight parameters are inversely related to domestic borrowing in line with the a priori expectations, as shown in Table 3. In addition, the results show a good fit in line with the probability value of F and the non-negative constant term for domestic borrowing (0.35), no matter the changes in the explanatory variables.

Four of the nine parameters (GDPR, FDEV, DBSV and TOPE) are significant in explaining the trend in domestic borrowing. If output growth (GDPR), Inflation (INFL) and exchange rate (EXRT) increase by one per cent, domestic borrowing (DOMB) will move in the same direction, increasing by 0.33percent, 0.13percent and 0.18percent, respectively. On the

other hand, if gross fixed capital formation (GFCF), government revenue (GOVR), financial development (FDEV), debt service (DBSV), external borrowing (EXTB), and trade openness (TOPE) reduce by one per cent, domestic borrowing (DOMB) will move in the reverse direction increasing by 0.90percent, 0.12percent, 1.39percent, 0.82percent, 0.19percent and 41percent respectively.

The adjusted R-Squared shows that the variations in the explanatory variables explain 59 per cent of the variation in domestic borrowing. Durbin Watson statistics of 1.7 indicates that the data is mildly autocorrelation-free.

From the result, the variables that are significant in explaining the trend in domestic borrowing are financial development and debt service.

Table 3 Two-Stage Least Squares

Dependent Variable: LDOMB				
Method: Two-Stage Least Squares				
Sample: 1981 2020				
Included observations: 40				
Instrument specification: GDPR LGFCF LGOVR LPRSC LDBSV LEXTB LINF LEXRT C				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPR	0.3381	0.0969	3.4893	0.0015
LGFCF	-0.9011	0.6693	-1.3462	0.1874
LGOVR	-0.1239	0.5115	-0.2422	0.8102
LFDEV	-1.3853	0.5914	-2.3426	0.0253
LDBSV	-0.8152	0.2704	-3.0153	0.0049
LEXTB	-0.1868	0.2875	-0.6497	0.5204
LINFL	0.1249	0.2925	0.4272	0.6720
LEXRT	0.1776	0.5173	0.3434	0.7335
LTOPE	-0.4183	0.1345	-3.049	0.0048
C	7.2034	2.8457	2.5313	0.0163
R-squared	0.6673	Mean dependent var		0.8798
Adjusted R-squared	0.5867	S.D. dependent var		1.7606
S.E. of regression	1.1319	Sum squared resid		42.2780
F-statistic	8.2753	Durbin-Watson stat		1.6887
Prob(F-statistic)	0.0000	Second-Stage SSR		42.2780
J-statistic	0.0000	Instrument rank		9.0000



V. Conclusions and Recommendations

The study examines the effect of macroeconomic variables on domestic deficit financing in Nigeria. Two-Stage Least Squares (TSLS) approach was used to estimate the effects of gross domestic product, gross fixed capital formation, government revenue, money supply, debt service, external borrowing, exchange rate and trade openness on domestic deficit financing. The analyses covered the period 1981 to 2020 using time series annual data. Some conclusions can be drawn from the stylised facts presented using graphical analysis.

Domestic borrowing increased with the decision to reduce external borrowing in Nigeria after the paydown of debts owed to Paris and London Club. The structure of domestic debt holding indicates the diversification of the investor base towards institutional investors and individuals. The structure of government domestic borrowing has evolved in favour of longer-tenured funds (FGN bonds) from shorter-tenured funds (Treasury bills and Treasury bonds), which dominated the market.

The variables most significant in explaining the trend in domestic borrowing are economic growth, financial development, debt service and trade openness. While economic growth had a positive and significant effect on domestic deficit financing, the effect of financial development, debt service and trade openness was negative and significant. In addition, although the effects of inflation and exchange rate on domestic deficit financing are negative, such effects are insignificant. On the other hand, the effects of private investment, government revenue and external borrowing are negative and insignificant on domestic deficit financing.

Based on the findings, this study recommends more prudent utilisation of the funds from domestic deficit financing. First, the government should be more prudent in selecting borrowing sources to further reduce the adverse effect of debt service on government revenue. The government should be cautious about accumulating an enormous volume of public debt. The larger the volume of public debt, the more significant the burden of debt service and principal repayment. Finally, the government must take measures to improve tax revenue to reduce the reliance on borrowing as the source of funding to execute fiscal deficit.

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