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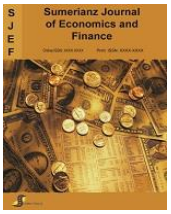


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# Inflationary Impact of Funding Options for Budget Deficits in Nigeria

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## Abstract

This paper investigates the inflationary impact of the various financing options for the federal government budget deficit which has accumulated overtime. Using Auto Regressive Distributed Lag (ARDL) methodology and quarterly data over the period 2000Q1 to 2017Q2, the study found significant relationship between inflation and the current financing options of the Government. Overall, the result of our ARDL model affirm that the impact of fiscal spending in Nigeria on inflation is captured more in the short-run since none of the variables is significant in the long-run. In addition, the use of Banking System Financing to fund government deficits has better potentials as the optimal choice because its impact on inflation is insignificant. Federal Government Bonds as a tool for financing budget deficits is also considered an optimal choice because though it causes inflation to rise by the second quarter, but its impact on inflation is expected to fizzle out in the long-run. Ways and Means Advances on the other hand, was shown to have the highest inflationary impact and as such, its use as a tool for financing government deficit should be discouraged. We, therefore, recommend a couple of appropriate policy options for financing budget deficits in Nigeria namely monetary financing and the issuance of federal government bonds. On the policy side, more efficient public expenditure management. Capital market, co-financing arrangements with pension funds and issuance of project-tied bonds, would be beneficial.
**Keywords:** Inflation; Budget deficit; Financing option; Nigeria; ARDL.

## 1. Introduction

Governments the world over, grapple continually with how to develop alternative sources for funding the budget. The situation is even more precarious because all budgets are constrained, and society's needs are boundless. The quest to meet these needs have often resulted in the accumulation of huge deficits by the fiscal authorities. For Nigeria, a major consequence of government financial operationsover the past decade, likewise shows that the federal government budget has been in deficit. With the exception of the fourth quarter of 2017 for example, the fiscal operations of government since 2003 resulted in large budget deficits. The budget deficit has accumulated overtime and continues to widen because of the shortfalls in government revenue arising from fluctuations in global crude oil prices and domestic production bottlenecks and increased government spending. The situation that made recourse to continuous borrowing inevitable, to meet government's financing needs during the past decade, was further aggravated during the 2016 economic downturn in Nigeria. Available statistics predating the 2005 Paris Club exit indicate that concessional borrowing predominantly financed Nigeria's budget deficits. The country had $18 billion (or 60 percent) of the $30 billion owed to the Club written off in special recognition of the ambitious home-grown economic reform – two-year Policy Support Instrument (PSI) programme for Nigeria, under the International Monetary Fund (IMF) intensified surveillance programmes (International Monetary Fund, 2005; The Guardian Newspaper, 2005). It was envisaged that the significant debt relief would ensure long-term debt sustainability and would represent an important contribution by Nigeria's Paris Club creditors to its economic development. It would also help Nigeria in its fight against poverty.

However, several challenges including governance issues, the sharp fall in oil prices especially in mid-2014 and the 2016 economic downturn in the country, opened a new vista in terms of both financing needs and opportunities. Increased government borrowing, both local and foreign have escalated such that the financing requirements for the budget deficits have begun to exceed available concessional lending facilities. The situation is further aggravated since the past decade, as the government continues to increase spending on basic infrastructure and other overheads. - a trend that could continue in the medium to long term should the current revenue challenges persist. The deficit has remained unabated and annual inflation has remained within the double-digit region since 2008.

In terms of distribution, we note from the available data that borrowing from foreign sources have not been significant since over 70 per cent of them are concessionary. From a public debt profile of US$28.04 and N794.89

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billion, for domestic and external, respectively, at the return of democratic government in 1999, both the external and domestic debts grew marginally to US$28.27 and N 898.25 billion in 2000. Public debts particularly external debt decreased to US$3.54 billion by 2006 following the Paris Club exit in 2005. Following the increasing need to refocus borrowing needs, domestic borrowing grew rapidly in subsequent years as domestic borrowing sources and options became more attractive. As expected, total public debt thus grew rapidly pounding the pre-Paris Club exit level and reaching N21.73 trillion (i.e. N5.79 trillion (or US$18.91 billion) and N15.94 trillion, for external and domestic debts, respectively) by December 2017. An optimal financing option has become imperative because of debt, debt repayments, interest cost, and its burden on future generations. Paying off public debt is as important as incurring such debts as the future generation would be forced to do so if we do not pay now. Taxes may have to be increased in the future for the upcoming generations to pay off the debt. In addition, increasing financial needs, left the federal government with no other options but to resort to continuous borrowing to meet its obligations. The significantly increasing level of domestic borrowing through issuance of interest-bearing government debt instruments affected domestic interest rates and fueled domestic prices. It has also increased the size of the fiscal deficit which if not controlled could lead to fiscal vulnerability and eventually, fiscal stress.

Therefore, the paper examines the various options for financing the federal government budget deficit including domestic and foreign borrowing. Specifically, the paper seeks to assess the inflationary impact of current financing options to either tax, print money, create money through the issuance of securities or borrowing externally or internally on the economy.

Following this introduction, the rest of the paper is structured as follows; Section 2 discusses some theoretical issues and reviews related literature. Section 3 provides the methodology and empirical analysis for the study while Section 4 provides the discussion of the results. Section 5 concludes the paper.

## 2. Theoretical Issues and Review of Related Literature

Budget financing occurs when a country raises money for meeting its obligations particularly, capital expenditures by selling debt instruments to individuals and/or institutional investors. It manifests whenever there is a difference between anticipated government receipts and projected level of spending during a budget cycle. In return for lending the money, the individuals or institutions become creditors and receive a promise that the principal and interest on the debt will be re/paid.

The government has a spectrum of financing options (such as taxing, borrowing, creating/printing money etc.) that it could leverage on to finance its budget deficit. In discussing the optimal financing options for the budget deficit, appropriate measures would be to patronize those instruments that cost less to the public treasury and have less distortionary effects on the economy. The rate of interest is determined by market rates and the creditworthiness of the borrower. Thus, the burden of debt service (interest payments and amortization) at a point in time is the major determinant of any optimal financing options to be pursued. Theoretically, higher rates of interest suggest higher debt repayments as it helps to compensate the borrower for the increased risk. In such situations where the government intends to borrow huge sums of money, the government may be forced to offer higher interest rates to attract potential investors.

Based on the financing options available to the government, it could decide to either print money or create money through the issuance of securities to mop up excess reserves of deposit money banks hitherto caused by excessive government spending. In addition, the government can resort to the issuance of securities, sovereign bonds (either in domestic or foreign currencies) and treasury bills. It could also borrow from other governments or in some cases from supranational entities like the international Monetary Fund (IMF) and the World Bank or other international financial institutions.

Nevertheless, for countries like the United States of America, the United Kingdom and most other countries with legal control over the issuance of its currency (monetary sovereignty), government borrowings in the domestic currency are simply savings accounts held at the central bank. This is contrast to what is obtainable in the Eurozone. European Union countries within the Eurozone have ceded much of their monetary sovereignty to the European Central Bank (Cohen, 2000). Debt incurred through issuance of a currency connotes a different meaning from those acquired by a household because of the income constraints imposed on household debt obligations. Consequently, governments with monetary independence can as well, issue currency to finance spending. For such self-financing jurisdictions, the public debt is effectively an account of all the money that has been spent but not taxed back. In this wise, bonds and other high-grade securities issued by national governments and private organizations could suffice as the safest form of investment.

This section highlights a few theories that discuss the economic impacts of budget deficits would suffice. Velnampy and Achchuthan (2013), identify three schools of thought namely the Neoclassical, Keynesian and Ricardian schools. The Classical/Neoclassical School holds the view that in an economy with full employment of resources where borrowing and lending are allowed at the market interest rate, an increase in consumption indicates a drop in the level of savings/investment. Therefore, budget deficit funded by debt would increase current public expenditure, raise interest rates, cause national savings, and future investment to fall. This crowding out effect on private sector investment would have a negative impact on future capital formation as well as the level and pace of economic growth (Lwanga and Mawejje, 2014). In addition, the present economy as well as future generations would be saddled with the burden of increased public debt because of the debt financed expansion in government spending. Given the assumption of full employment, an additional expenditure funded by debt or by money creation would very likely lead to inflationary pressures in the economy (Nwaeke and Korgbeelo, 2016). Furthermore, for a small open economy, a rise in consumption expenditure may not affect interest rates in the global markets but could

cause foreign borrowing to rise thereby resulting to an appreciation of the domestic currency and a consequent rise in imports and fall in export; thus, deteriorating the economy's current account position. Overall, the classical ideology posits that, budget deficits and excessive deficit financing have negative impact on economic performance (Lwanga and Mawejje, 2014).

The Keynesians generally believe that government intervention in the economy is paramount to achieving stability in any economy. Concerning budget deficits, they postulate that deficit financing and other fiscal actions are essential for managing aggregate demand with a view to achieving best policy performance (Lwanga and Mawejje, 2014). According to this school of thought, the full employment assumption is not realistic. The Keynesians believe that a rise in government expenditure leads to an increase in aggregate demand, which leads to the engagement of idle resources and subsequently results to increased output. Therefore, if an economy is operating at below full employment level such that the output gap exists, the rise in government expenditure because of debt, would lead to a rise in output and income. Consequently, deficit financing is a good tool for creating additional employment when there is a deficiency in effective demand in the economy. It may also be employed after a recession to stimulate the economy and to serve as a buffer during cyclical fluctuations.

The Ricardian School on the other hand, argued that the effect of budget deficit on growth in an economy is neutral. They argue that deficit financing only results to a postponement of taxes. A rise in public debt resulting from a deficit would lead to future taxes with a present value that is equal to the value of the debt.

From the empirical literature, the effect of budget deficits on macroeconomic variables is a highly deliberated issue in many economies of the world. Conflicting results have emanated from various studies depending on whether they focus on developed, developing and underdeveloped economies.

The Classical notion is that a lower fiscal deficit reduces government borrowing which prompts a fall in interest rates. When interest rates fall, private sector investment rises; which then brings about economic growth (Velnampy and Achchuthan, 2013). Many empirical studies provide evidence for this ideology, for economic growth from 1978 to 2009. The study employed OLS methodology and found that fiscal deficit adversely affected Pakistan's economic growth during the period studied. For Uganda, Lwanga and Mawejje (2014), utilized the Vector Error Correction Model (VECM), pairwise Granger causality test and variance decomposition techniques from 1999 to 2011 and discovered that budget deficits were responsible for widening the current account deficit and raising interest rates thereby having negative effects on economic growth. Adeboye (2003), studied 64 developing countries, including Nigeria, using a non-parametric methodology and showed that crowding out effect of budget deficit on private sector investment in the Nigerian case had substantial impact on economic growth, employment, and the standard of living. The author recommended that the government should focus more on capital expenditure, which had the potential to boost economic growth and development.

However, some research findings have shown support for the Keynesian Hypothesis. Taylor *et al.* (2012) investigated deficit and growth relationship in the United States from 1961 to 2011 and showed evidence to support the Keynesian hypothesis. They employed a vector-autoregression (VAR) approach and their results confirmed the countercyclical response of deficit to growth and displayed that a higher deficit led to faster growth. In addition, Moraru and Nancu (2016) examined the influence of budget deficit and public debt on economic growth in Romania for the period 2002 – 2013. Using a Linear Regression Multifactorial Model, they found that budget deficit and economic growth had a positive relationship. The results showed that a one-percentage point increase in budget deficit led GDP to rise by 2.23 percentage points. Public debt, on the other hand, had a negative relationship with economic growth in Romania.

Supporting the Ricardian school of thought, Vuyyuri and Sakalya (2004) studied the interaction of budget deficit with other macroeconomic variables in India and showed that there was no significant impact of budget deficit on economic growth between 1970 and 2002, using the co-integration approach and Variance Error Correction Models (VECM) methodology. Similarly, Velnampy and Achchuthan (2013) gave evidence for its applicability in the Sri Lankan economy from 1970 to 2010. They applied Regression analysis, Correlation analysis and independent sample of one-way ANOVAs (F-test) and showed that there was no significant impact of fiscal deficit on economic growth during the period. Similarly, Dao and Bui (2016) made use of the Autoregressive Distributed Lag (ARDL) technique for Vietnam from 2003 to 2015 and found that budget deficit had no impact on economic growth. They however found that expenditures that were productive in nature had significant positive effects. While spending that was not productive and consumer price index, (inflation) had adverse effects on economic growth. Furthermore, Rahman (2012) investigated the relationship between budget deficit and economic growth in Malaysia from 2000 – 2011 and found support for the Ricardian equivalence hypothesis, stating that indeed budget deficit was not beneficial to growth in the economy. In the case of Nigeria and Ghana, Nkalu *et al.* (2016) explored the impact of budget deficits on interest rates, inflation, and economic growth from 1970 to 2013. The study used the seemingly Unrelated Regression (SUR) model, and Two-Stage Least Squares (2SLS) technique and discovered that the Ricardian Equivalence Hypothesis (REH) holds for both countries.

Tule *et al.* (2019), examined the efficacy of fiscal theory of price level in Nigeria using an autoregressive distributed lag model for the period from 2002 Q1 to 2017 Q4. The study tested the hypothesis of Leeper (1991) and Sims (1994) that the price level is not independently determined by the monetary authorities, but rather the extent of the relationship between monetary and fiscal authorities. The results show that the fiscal deficits have a positive and statistically significant impact on inflation in all models estimated, attributed to the high degree of fiscal dominance in Nigeria. Giving this findings, Nigerian economy needs to address the challenge of high fiscal imbalances.

# 3. Methodology and Data Analysis

## 3.1. Sources of Data

This study adopted quarterly series from 2000Q1-2017Q2. The data include; Consumer Price Index (CPI) Inflation, Banking System financing (BSF), Federal Government Bond (FGB), External Debt (EXD and Ways and Means Advances (WMA). The data were sourced from the Debt Management Office (DMO), the National Bureau of Statistics (NBS) and the Central Bank of Nigeria's (CBN) statistics database.

## 3.2. Variables Considered in the Study

1. **Ways and Means Advances (WMA)** - In addition to its function of mobilizing funds for the Federal Government, the WMA is a mechanism through which the Central Bank of Nigeria (CBN) under its credit policy provides the federal Government with cash to help it to address temporary budget shortfall or mismatches in the cash flow of its receipts and payments. Yes, when the Federal government expenditure exceeds its revenue the CBN finances the deficit through Ways and Means Advances subject (in some cases) to the limits set by existing regulations. Currently, the law provides for WMA of not more than 5 per cent of the previous year's revenue. The direct impact of Central Banks financing of deficits is the injection of excess liquidity into the economy or surges in monetary base leading to adverse effect on domestic prices and exchange rates.
2. **Federal Government of Nigeria Bond (FGNB):** These are debt securities (liabilities) of the Federal Government of Nigeria (FGN) issued by the Debt Management Office (DMO) for and on behalf of the Federal Government. Over 60 per cent of domestic debt stock by instrument is in FGN Bonds because, the Bonds are considered as the safest of all investments in the domestic debt market and as such, classified as a risk-free debt instrument. In addition, the interest income earned from the securities is tax exempt. Nigeria FGN Bond holding stood at N8.72 trillion (or 69.23%) as at end-2017.
3. **External Borrowing:** External borrowing constitutes another financing option for Nigeria. Until the 2005 Paris Club exit, it constituted a major source of financing in Nigeria. Nigeria's external debt includes due payments to international multilateral and bilateral institutions and organizations. Nigeria's total foreign debt was US$18.91 billion at end-2017.
4. **Banking System Financing:** Deposit money banks financing of the public debt is proxied by credit to government in the Central Bank of Nigeria monetary survey.
5. **Inflation:** The deficit-inflation link has been well discussed in contemporary literature, with many studies confirming a positive association between the variables. Financing budget deficit may lead to inflation especially if it is from the banking system. It has the capacity to increase both money supply and the purchasing power of economic agents. By implication, aggregate demand increases and eventually causes domestic prices to rise. High and prolong budget deficits lead to episodes of high nominal money growth and thus, higher inflation.

## 3.3. The Model

We consider inflation's determinants as captured in the literature with a special emphasis on fiscal deficits in the model (BSF, FGB, EXD, WMA). Therefore, the model takes the following format as in Jalil *et al.* (2014). Inflation, Banking System Financing, Federal Government Bonds holdings, External Debt Stock and Ways and Means Advances expressed in log and linear equation as captured below:

$$\ln(CPI_t) = \delta_0 + \ln(\delta_1 \mathrm{BSF}_t) + \ln(\delta_2 \mathrm{FGBt}_t) + In(\delta_3 \mathrm{EXD}_t) + In(\delta_4 \mathrm{WMA}_t) + \mathrm{e} \quad (1)$$

Where CPI represents the log of Consumer Price Index as measure of inflation level; BSF stands for log of Banking System Financing; FGB is the log of Federal Government Bond; EXD is the log of External Debt; while WMA is the log Ways and Means Advances.

The coefficients in equation (1) demonstrate the reaction of level of inflation to changes in all the explanatory variables (determinants). Based on priori criteria, fiscal deficit variables are expected to be positive as defined by the theory.

Traditionally, governments resort to borrowing to match short-term falls in revenues through the issuance of bonds and monetary instruments or by borrowing from commercial banks or from non-banking public. There are both theoretical and empirical evidences that financing of budget deficits could lead to higher interest rates and the eventual crowding out of the private sector. Deficits usually have negative impact on the economy especially if they are prolonged. Against this backdrop, we define optimal funding options in this study as those channels that have lesser contributions to shocks in inflation or whose inflationary impact are minimal.

## 3.4. Modelling Technique

This study adopts the Auto Regressive Distributive Lag (ARDL) Bound testing model devloped by Pesaran and Shin (1998) which is an improvement on the existing literature on the related subject matter. This model is embraced because it's not only appropriate for modelling a time series particularly small samples analysis but also have inbuilt mechanism to overcome spurious outcomes using an ordinary least squared (OLS) model. However, according to Pesaran *et al.* (2001), other methods to cointegration have inbuilt restrictive assumptions. ARDL also has advantage of application regardless of the order of integration of the variables (I *(0)* or *I (1))*, though must not be 1(2*)* especially in determining the long-run relationships. The use of RADL approach does not only overcome the shortcomings of unit-root in regression, but also capable of correcting the serial correlation problem in time series data Laurenceson

and Chai (2003) and Pesaran and Shin (1998). Moreover, in cases where some parameters are endogenous, the use of ARDL also provides unbiased estimates of the long- run model.

To establish the long-run relationship (i.e. cointegration) between variables, the null hypothesis is tested against the alternative. As contained in Pesaran *et al.* (2001), decision is made when the critical value is compared with the calculated F-statistic. According to the principle, if the critical value falls below the computed F-statistics, null hypothesis of no cointegration is rejected, hence a conclusion that there is long-run relationship between the variables under investigation. On the flip, if the critical value has higher value than the computed F-statistic, the null hypothesis of no cointegration is affirmed. Meanwhile, inconclusive scenario is reached when the value falls between the lower and upper bounds.

In accordance with work of Pesaran and Shin (1998), the ARDL error correction version is modelled follows:

$$\Delta y_t = \varpi + \sum_{i=1}^{b-1} \Lambda_1 \Delta y_{t-i} + \sum_{i=0}^{b-1} \Pi_1 \Delta x_{t-i} + \Omega_1 y_{t-b} + \Omega_2 x_{t-b} + \varepsilon_t \quad (2)$$

From the equation (2), $\varpi$ represents parameter of constant vector, $\Lambda$ and $\Pi$ are the short-run variables; $y_t$ represents variables of endogenous vector, $x_t$ is a vector of the other explanatory variables as outlined above and $\Omega_1$ *and* $\Omega_2$ are the parameters of the long-run relationship, $\varepsilon_t$ is error term, assumed to be serially uncorrelated and homoscedastic. All the variables must be stationary, either at level or in their first difference. To check this property before proceeding to the full ARDL model, we used the Augmented Dickey Fuller (ADF) and Phillip Perron tests. The essence of ascertaining the stationarity status of the variables is to ensure that none of the variables turns out to be I(2), which could render the use of ARDL invalid.

### 3.5. ARDL and Bounds Testing Procedure

Accoding to Pesaran and Shin (1998), the ARDL has 2-stage processes of cointegration technique in the estimation of a long-run relationship between two variables. The Fisher F-test or standard Wald test is deployed in the first stage to ascertain the existence of cointegration amongst the variables (bounds testing). In this case, the null hypothesis is defined as the lagged regressors coefficients in the error correction model (equation 2) are zero i.e. $H_0: \Omega_1 = \Omega_2 = 0$ . This null is tested against the alternative hypothesis of $H_1: \Omega_1 \neq \Omega_2 \neq 0$. To proceed to the second stage of the estimation, the cointegration of the parameters must have been determined. The short-run and long-run parameters are estimated with the use of the two equations below:

Equation for a long-run model:

$$\widehat{\Omega}_1 y_t + \widehat{\Omega}_2 x_t = 0;\ y_t = -\frac{\widehat{\Omega}_2}{\widehat{\Omega}_1} x_t. \quad (3)$$

The long-run model is extracted from equation (2) where appropriate lags would have been selected for both the dependent and independent variables. This could have been done with the adoption of the appropriate information criterion upon determining the existence of long-run relationship at the first Stage.

The dynamic of short-run error correction equation for the coefficients is obtained from the following equation:

$$\Delta y_t = c + \sum_{j=1}^{k} \chi_j \Delta y_{t-j} + \sum_{j=0}^{q} \gamma_{1j} \Delta x_{t-k} + \varpi ecm_{t-1} + \nu_t \quad (4)$$

Deriving the error correction equation from (4), we obtained the following:

$$ecm_{t-1} = y_{t-1} - \frac{\widehat{\Omega}_2}{\widehat{\Omega}_1} x_{t-1} \quad (5)$$

Where $y_t$ and $x_t$ are previously defined; $\gamma_{1j}$ are the short-run parameters; $\varpi$ measures the speed of adjustment to a new equilibrium whenever there is a shock. It also provides another means of validating the existence of cointegration or long-run relationship among the variables. It is expected to be negative and significant and less than one in absolute value for the model to be stable.

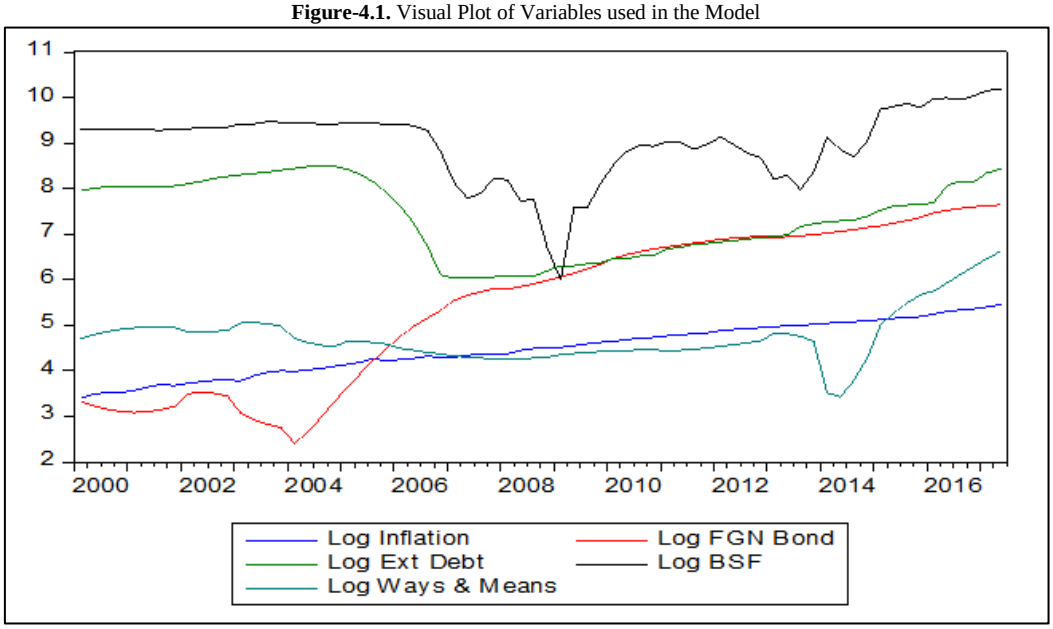
### 3.6. Stability Checks

In accordance with Brown *et al.* (1975), a stability verification check should be carried out on any model to avoid spurious results. They recommended both the cumulative sum (CUSUM) and cumulative sum of square (CUSUMSQ) on recursive regression residual. However, the plots must fall within 5% critical bounds of significance to accept the stability of the model. Based on the first set of n observations which is updated recursively and plotted against the breakpoints, the test is based on the cumulative sum of recursive residual, and CUSUMSQ also follows the same procedure.

## 4. Results and Discussions

We discuss the robustness of the empirical results using Auto Regressive Distributive Lag Model (ARDL) as devloped by Pesaran and Shin (1998) as discussed. The Pesaran and Shin (1998) cointegration technique involves a 2-stage procedure in the estimation of the long-run relationship. In the first stage, the existence of cointegration amongst the variables (bounds testing) is tested using the standard Wald or Fisher F-test. We can only proceed with the second stage of estimation, only if establish that the variables are cointegrated. Figure 4.1 depicts the visual preview of the series under evaluation. This is what is popularly known in time series analysis as eyes ball test. The visual plot is an informal test that gives a glimpse of the behavior of the variables.

**Figure-4.1.** Visual Plot of Variables used in the Model




The graphical representation above shows that the variables contain trend and volatile and it's a pointer to the need to conduct further test to ascertain the stationarity status of the parameters for valid and reasonable econometric analysis and to ensure that none of the variables in question is 1(2) as this may no longer be valid for the adopted methodology.

## 4.1. Unit-Root Tests

Preliminary analysis such as the unit-root test was performed to establish the stationarity status of the data series to avoid spurious results during estimation. Unit root evaluation were carried out using the Augmented Dickey Fuller (ADF) test. Table 4.1 shows the results of the test in which all the variables are integrated of order one 1(1).

**Table-4.1.** Unit Root Test

| Variable | Augmented Dickey Fuller (ADF) Test | | | Phillips Perron Test Statistic (PP) | | |
|---|---|---|---|---|---|---|
| | Levels | First Difference | Order of Integration | Levels | First Difference | Order of Integration |
| CPI | 1.583464 | -4.915082*** | I(1) | 6.046280*** | -3.159362 | 1(0) |
| BSF | 0.388461 | -6.310013*** | I(1) | -0.740692 | -4.486400*** | 1(1) |
| FGB | 0.996509 | -3.637291* | I(1) | -0.193280 | -3.573559** | 1(1) |
| EXD | -1.529698 | -2.490481** | I(1) | -1.116225 | -3.190138 | 1(1) |
| WMA | 1.767476 | 2.080969** | I(1) | 5.794302*** | -0.546817 | 1(0) |

**Source:** Author's Computation

Note that the values in the Table 4.1 represent probability values. The null hypothesis for Augmented Dickey Fuller (ADF) and Phillips Perron (PP) is that an observable time series is not stationary (i.e. has unit root). If the probability values are less than 0.05 then the null hypothesis is rejected while the alternative hypothesis is accepted at 5 per cent level of significance. Therefore, from Table 4.1, the ADF tests revealed that all the variables are integrated at I(1) i.e. they are stationary at first difference. To avoid spurious estimations using I(1) variables in the stochastic model, all the variables were included in their differenced state. Meanwhile, the Phillips Perron Statistic test indicate mix reaction within its ranks as some variables were stationary at levels and others at levels. The PP test is carried out to further ascertain the robustness of the model. It is important to also note that none of the variables are integrated at order 1(2) in both the ADF and PP tests which may automatically render the ARDL method unsuitable for this analysis. This, therefore, pave the way for the conduct of Bound Testing to determining the long run relationships among the parameters.

**Table-4.2.** Short-Run ARDL Model

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| CPI | 0.734845 | 0.125408 | 5.859656 | 0.0000 |
| BSF | 0.004328 | 0.003219 | 1.344686 | 0.1842 |
| FGB | 0.009710 | 0.013605 | 0.713691 | 0.4784 |
| EXD | 0.000159 | 0.000215 | 0.738058 | 0.4636 |
| WMA | 0.017298 | 0.006039 | 2.864465 | 0.0059 |
| C | -0.586811 | 2.346260 | -0.250105 | 0.8034 |

From the ARDL short-run table, all the coefficients are positive in line with the theory. The results also indicate that only the WMA is significant in the model. The outcome implies that a 1 percent increase in the coefficients of

BSF, FGB, EXD and WMA will raise the level of inflation by 0.004328,0.09710, 0.009710,0.017298 per cent respectively. Overall, the short-run result shows significant response of inflation to fiscal spending.

**Table-4.3.** Long-Run ARDL Model

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.885523 | 2.065528 | 0.428715 | 0.6696 |
| CPI | -0.021237 | 0.031853 | -0.666712 | 0.5074 |
| BSF | 0.002039 | 0.003329 | 0.612485 | 0.5425 |
| EXD | 0.000113 | 0.000231 | 0.488585 | 0.6269 |
| WMA | 0.008869 | 0.005899 | 1.503501 | 0.1378 |
| FGB | 0.022211 | 0.010976 | 2.023653 | 0.0473 |

In the Long-run as displayed in Table 4.3, the results exhibit positive reactions from the all the parameters but none of them is significant. The results indicate that a one per cent rise in the coefficients of BSF, EXD, FGB and WMA will increase the level inflation in Nigeria by 0.002039%, 0.000113%,0.008869% and 0.022211% per cent respectively. This is a further affirmation that inflation is not only a monetary phenomenon but also attributable to fiscal deficit as outlined by Leeper (1991), Sims (1994) and Jalil *et al.* (2014). The results also affirm that the impact of fiscal spending in Nigeria on inflation is captured more in the short-run since none of the variables is significant in the long-run. In this case and based on the result, we can conclude that the response of inflation to fiscal deficit as captured by BSF, EXD, FGB and WMA is more of a short-run phenomenon that the long-run in Nigeria. In the long-run, the impact is minimal and insignificant.

## 4.3. Bound Test for the Existence of a Long- Run Relations

**Table-4.4.**

| Test Statistic | Value | Signif. | I(0) | I(1) |
|---|---|---|---|---|
| F-statistic | 9.638045 | 10% | 2.2 | 3.09 |
| k | 4 | 5% | 2.56 | 3.49 |
| | | 2.5% | 2.88 | 3.87 |
| | | 1% | 3.29 | 4.37 |

**Note;** *, **, *** and **** represent 10, 5, 2.5 and 1% level of significance respectively.

After the order of integration has been established, we then tested the long run relationship the between variables using the bounds test. From Table 4.4, the result of the bounds test demonstrates a strong evidence of a long-run relationship between the variables when compared with the Pesaran *et al.* (2001) critical value at the lower and upper bounds. The F-statistic in the model is greater than both the lower and the upper bounds critical value, hence the conclusion that there exists long-run relationship between Inflation and fiscal deficit parameters (BSF, FGB, EXD, WMA). It implies that the series are related and can be combined in a linear fashion.

## 4.4. Short - Long-Run Error Correction Mechanism

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D(CPI(-1)) | -0.274629 | 0.119666 | -2.294966 | 0.0256 |
| D(CPI(-2)) | -0.350033 | 0.110000 | -3.182106 | 0.0024 |
| D(CPI(-3)) | -0.344475 | 0.114700 | -3.003263 | 0.0040 |
| D(FGB) | 0.013578 | 0.011929 | 1.138301 | 0.2599 |
| D(FGB(-1)) | 0.022438 | 0.013354 | 1.680322 | 0.0986 |
| CointEq(-1)* | -0.002055 | 0.000278 | -7.405537 | 0.0000 |

The short-run estimates are in line with the long-run calculations, and the noteworthy point from the short-long run estimate is the error correction mechanism. The error correction term of the model is significant at 1 per cent. This led credence to the existence of a short-run relationship and it measures the short-long run speed of adjustment to its long-term path. The coefficient of the error correction mechanism is the adjustment mechanism that captures the disequilibrium in inflation as proxy by consumer price index (CPI) which is reflected in the next quarter. The short-run parameters measure the speed of adjustment to a new equilibrium whenever there is a shock. In this case, the error correction term of -0.002055 is statistically significant and negative in compliance with error correction principle. The figure indicates that it takes the speed of an average of two quarters to adjust from the short-run disequilibrium to a long-run path if there is a shock.

## 4.5. Diagnostic Test

Diagnostics tests were carried out on the models, the presence of serial correlation was rejected, indicating that the model is well specified. We also failed to reject for the presence of homoscedasticity meaning that the model is homoscedastic. It confirms that the error term doesn't vary much with changes in the value of the explanatory variables.

**Table-5.** Breusch-Godfrey Serial Correlation LM Test:

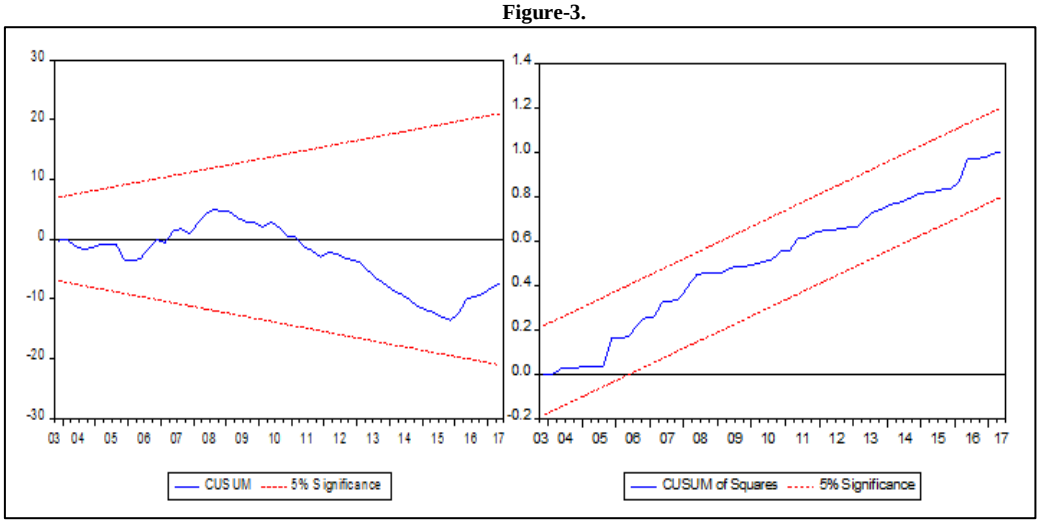
| **F-statistic** | **1.210096** | **Prob. F(2,53)** | **0.3063** |
|---|---|---|---|
| Obs*R-squared | 2.882211 | Prob. Chi-Square (2) | 0.2367 |

**Table-6.** Heteroskedasticity Test: Breusch-Pagan-Godfrey

| **F-statistic** | **1.246974** | **Prob. F(10,55)** | **0.2831** |
|---|---|---|---|
| Obs*R-squared | 12.19811 | Prob. Chi-Square (10) | 0.2720 |
| Scaled explained SS | 11.65247 | Prob. Chi-Square (10) | 0.3090 |

### 4.6. Stability test

**Figure-3.**




The stability of long-run coefficients is used to form the error-correction term in conjunction with the short-term dynamics. Some of the problems of instability could stem from inadequate modelling of the short-run dynamics characterizing departures from the long-run relationship. Hence it is important to incorporate the short-run dynamics for consistency of long-run parameters. In view of this, we apply the CUSUM and CUSUMSQ tests developed by Brown *et al.* (1975).

The plots of the CUSUM and CUSUMSQ statistics are within the critical 5% critical bounds. This means that the model is stable implying that the coefficients from the regression can be used for policy analysis as well as decision making purposes.

Overall, the result of our ARDL model indicates that the impact of fiscal spending in Nigeria on inflation is captured more in the short-run since none of the variables are significant in the long-run. In addition, the use of Banking System Financing to fund government deficits has better potentials because its impact on inflation is insignificant. Federal Government Bonds as a tool for financing budget deficits is also considered an optimal choice because though it causes inflation to rise by the second quarter, but its impact on inflation is expected to fizzle out in the long-run. Ways and Means Advances on the other hand, was shown to have the highest inflationary impact and as such, its use as a tool for financing government deficit should be discouraged. External debt stock accounts for the second largest shocks to inflation. It followed Ways and Means Advances from the third quarter up to the twelfth quarter. This implies that focusing on fiscal adjustment on Ways and Means Advances and External debt stock without a more than proportionate effort in achieving financial systems stability, would be inflationary with the attendant consequences for monetary policy implementation. For the Federal Government to achieve maximum success in funding its deficit and the impact on the real economy, the policy approach would be to encourage more use of Banking System Financing along with FGN bonds. Thus, as Nigerian Economic Summit Group NESG (2012) and noted, government should explore the use of pension funds to provide long-term financing at reduced interest rates and thus free the pressure to borrow at high interest rates from banks to finance such projects.

## 5. Conclusion and Policy Implications

Our interest in this study is to empirically test Inflationary impact of budget deficits in Nigeria and the various for funding options for the federal government budget deficits during the period 2000- 2017, using quarterly data. The purpose is to identify funding channels with lesser burden on the economy and the taxpayer who bear the burden of debt repayments, while at the same time enable the government to honour its obligations. The results affirm that the impact of fiscal spending in Nigeria on inflation is captured more in the short-run since none of the variables is significant in the long-run. This support the view that fiscal policy in Nigeria was sustainable during the period. From our analysis, it is obvious that inflation in Nigeria is the outcome of the interaction between fiscal and monetary operations. We observed that the recourse to borrowing to finance the budget is a common feature in several countries, particularly, emerging markets and developing economies. From our analysis, there are various funding options for the federal Government of Nigeria. These may be exigent but not optimal in view of the inflationary impact on the economy. For consumers, large budget deficits could lead to increase in money supply and

inflation. Overall, we hold the view that financing budget deficit can significantly influence the level of economic activities. It could also help to achieve macroeconomic stability. However, apart from enhanced budget discipline and transparency in public expenditure management, government must devote efforts towards the deployment of resources to those sectors that are more result oriented.

Based on the findings, we recommend that in terms of the appropriate intervention, the fiscal authorities should explore a couple of other appropriate policy options for financing budget deficits. Some of these include monetary financing, capital market, co-financing arrangements with pension funds and issuance of project-based bonds and judicious public expenditure management, amongst others. In addition, the federal government could also reduce the burden of deficit financing by adhering to some basic fiscal rules that would keep the deficit at agreed thresholds like the 5 per cent of the previous year's revenue for Ways and Means Advances to the Federal Government and 40 per cent of the debt-to-GDP ratio. At the same time, the government should guide its borrowing needs using other criteria like the coverage ratio - debt-to-revenue/income ratio. Lastly, policy dialogue and collaboration between the monetary and fiscal authorities on borrowing plans and conditions, would also be important. Such engagements should also aim at reaching new terms for which Nigeria can use to improve its public expenditure management strategy and to reducing the deficit.

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# Appendix

| **ARDL Long Run Form and Bounds Test** | | | | |
|---|---|---|---|---|
| Dependent Variable: D(CPI) | | | | |
| Selected Model: ARDL(4, 0, 0, 2, 0) | | | | |
| Case 2: Restricted Constant and No Trend | | | | |
| Date: 12/13/19 Time: 17:01 | | | | |
| Sample: 2000Q1 2017Q2 | | | | |
| Included observations: 66 | | | | |
| Conditional Error Correction Regression | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 1.329238 | 1.866424 | 0.712184 | 0.4794 |
| CPI(-1)* | -0.002055 | 0.034640 | -0.059327 | 0.9529 |
| BSF** | -0.000136 | 9.96E-05 | -1.363592 | 0.1783 |
| EXD** | 0.000525 | 0.000341 | 1.541175 | 0.1290 |
| FGB(-1) | 0.003027 | 0.003076 | 0.984002 | 0.3294 |
| WMA** | 0.012890 | 0.003882 | 3.320501 | 0.0016 |
| D(CPI(-1)) | -0.274629 | 0.129416 | -2.122065 | 0.0384 |
| D(CPI(-2)) | -0.350033 | 0.117355 | -2.982678 | 0.0043 |
| D(CPI(-3)) | -0.344475 | 0.122632 | -2.809010 | 0.0069 |
| D(FGB) | 0.013578 | 0.014232 | 0.954039 | 0.3442 |
| D(FGB(-1)) | 0.022438 | 0.015119 | 1.484112 | 0.1435 |
| * p-value incompatible with t-Bounds distribution. | | | | |
| ** Variable interpreted as Z = Z(-1) + D(Z). | | | | |
| Levels Equation | | | | |
| Case 2: Restricted Constant and No Trend | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| BSF | -0.066110 | 1.115335 | -0.059274 | 0.9529 |
| EXD | 0.255378 | 4.312071 | 0.059224 | 0.9530 |
| FGB | 1.472839 | 23.38601 | 0.062979 | 0.9500 |
| WMA | 6.272159 | 106.3540 | 0.058974 | 0.9532 |
| C | 646.8096 | 10042.63 | 0.064406 | 0.9489 |
| EC = CPI - (-0.0661*BSF + 0.2554*EXD + 1.4728*FGB + 6.2722*WMA + 646.8096 ) | | | | |
| F-Bounds Test | | Null Hypothesis: No levels relationship | | |
| Test Statistic | Value | Signif. | I(0) | I(1) |
| F-statistic | 8.378636 | 10% | 2.2 | 3.09 |
| k | 4 | 5% | 2.56 | 3.49 |
| | | 2.5% | 2.88 | 3.87 |
| | | 1% | 3.29 | 4.37 |

| **ARDL Error Correction Regression** | | | | |
|---|---|---|---|---|
| **Dependent Variable: D(CPI)** | | | | |
| Selected Model: ARDL(4, 0, 0, 2, 0) | | | | |
| Case 2: Restricted Constant and No Trend | | | | |
| Date: 12/13/19 Time: 17:04 | | | | |
| Sample: 2000Q1 2017Q2 | | | | |
| Included observations: 66 | | | | |
| ECM Regression | | | | |
| Case 2: Restricted Constant and No Trend | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(CPI(-1)) | -0.274629 | 0.119666 | -2.294966 | 0.0256 |
| D(CPI(-2)) | -0.350033 | 0.110000 | -3.182106 | 0.0024 |
| D(CPI(-3)) | -0.344475 | 0.114700 | -3.003263 | 0.0040 |
| D(FGB) | 0.013578 | 0.011929 | 1.138301 | 0.2599 |
| D(FGB(-1)) | 0.022438 | 0.013354 | 1.680322 | 0.0986 |
| CointEq(-1)* | -0.002055 | 0.000278 | -7.405537 | 0.0000 |
| R-squared | 0.640870 | Mean dependent var | | 3.034396 |
| Adjusted R-squared | 0.610942 | S.D. dependent var | | 2.741693 |
| S.E. of regression | 1.710117 | Akaike info criterion | | 3.997509 |
| Sum squared resid | 175.4701 | Schwarz criterion | | 4.196569 |
| Log likelihood | -125.9178 | Hannan-Quinn criter. | | 4.076167 |
| Durbin-Watson stat | 1.835043 | | | |

| * p-value incompatible with t-Bounds distribution. | | | | |
|---|---|---|---|---|
| F-Bounds Test | | Null Hypothesis: No levels relationship | | |
| Test Statistic | Value | Signif. | I(0) | I(1) |
| F-statistic | 8.378636 | 10% | 2.2 | 3.09 |
| k | 4 | 5% | 2.56 | 3.49 |
| | | 2.5% | 2.88 | 3.87 |
| | | 1% | 3.29 | 4.37 |