

Dynamic Relationship Between Budget Variance and Fiscal Policy in Nigeria: A Vector Autoregressive (VAR) Approach

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Abstract: The annual budget in Nigeria is meant to run from January to December each year. However, delay in budget approval has become a yearly routine resulting in significant budget variance often. Thus, the appropriation bill of the year 2020 was signed into law in the first week of the year to address the situation but was greeted with a shock from Coronavirus pandemic ravaging the whole world including Nigeria. The study, therefore, examined the causal relationship between budget variance and fiscal policy of government with the use of Vector Autoregressive (VAR) technique. The findings revealed that budget variance in Nigeria was as a result of distorted and inconsistent policy thrust of government in recent time. Nigerian Government should ensure that both capital and recurrent expenditure are effectively managed in such a way that it will drastically reduce (if not completely eliminated) variances and discrepancies occurring in the nation's budget.

Keywords: Budget variance, fiscal policy, expenditure, Gross Domestic Product (GDP).

1. Introduction

Macroeconomics is a field of study that examines how interventions in the economy have ripple effects on issues of aggregate demand and aggregate supply. Four basic issues arise from this: the need for the economy to be self-regulating or laissez faire, allowing for non-government interventions; the use of monetary policy; or the use of fiscal policy or a mixture of both fiscal policy and monetary policy to smoothen the effects of shocks in an economy is germane (Aigheyisi, 2015).

Fiscal policy is an important economic tool by which the government of any country affects economic growth and development. It is an instrument by which government affects the relative sizes of public and private sector which influence aggregate demand and the level of economic activity (O' Sullivan and Sheffrin, 2013). The basic instrument of the fiscal policy is the budget, which accumulates government revenues and transforms them into government expenditures. One of the prominent objectives of fiscal policy in developing economies like Nigeria is to achieve and maintain full employment in the economy. Therefore, to reduce unemployment and under-employment,

the State should spend sufficiently on social and economic overheads (Abata, Kehinde and Bolarinwa, 2012). These expenditures would help to create more employment opportunities and increase the productive efficiency of the economy.

Government fiscal policy is normally embedded in a statement called budget. In other words, the budget is basically the expression of government fiscal policy. The Federal budget of Nigeria is a written document that shows in monetary terms the planned (expected) government expenditure and the total revenues of the country from the two major sources – oil and nonoil - in the upcoming year (Aigbokhaevbolo and Oghuma, 2016). Besides being a statement of expected revenue and expenditure, budget is also an important instrument for actualization of socio-economic policy of government for economic growth. There is a need to emphasise that Nigeria does not only fail to implement its budget within the fiscal year but also rolls part of it to the following year. However, standard practice is to re-appropriate funds in the subsequent year so that they become part of the next year's budget and not to simply extend the budget year.

The volume of government expenditure and revenue utilisation is critical to economic growth normally expressed in growth in Gross Domestic Product (GDP) of a country. Changes in GDP of a nation to a large extent depend on her spending on capital expenditure particularly for improvement of economic infrastructure, spending on recurrent expenditure (Danmola, Olateju, and Abba, 2013).

Countries with more effective budget performance tend to achieve higher levels of economic growth by obtaining better credit ratings and attracting more investment, offering higher quality public services and encouraging higher levels of human capital accumulation. They also have the tendency of putting foreign aid resources to better use, accelerating technological innovation, and increasing the productivity of government spending. But, the difficulties posed by a volatile, unpredictable, and exhaustible source of fiscal revenue to fiscal management occasioned by budget preparation, budgetary control and budget implementation significantly influence budget variance (Ilemona and Sunday, 2018).

Following the review of related literature in this study, it was observed that most researchers focused attention on policy formulation and late approval of budgets, forms of government expenditure, relationships between government expenditure and economic growth as well as the influence of government recurrent and capital expenditure on economic growth. However, few studies reflected on the impact of budget variance which could possibly be a clog in the wheel of progress on the Nigerian economy. Hence, this study intends to examine the causal relationship between budget variance and fiscal policy of government in Nigeria with a view to finding their significant impacts on Nigerian economy.

2. Literature Review

This section reviews the recent empirical literature on the responses of economic activities to changes in the relationship between budget variance and fiscal policy in both the developed and developing nations of the world. These studies however indicated mixed findings from countries to countries.

The role of four categories of public expenditure in terms of promoting real GDP in South Eastern Europe was examined by Alexiou, (2019) and the results revealed that increases in “non-productive” Greek public consumption and personnel expenditure are not followed by increases in GDP. On the other hand, public investment spending appears to be linked to GDP with a positive long-run relationship where causality runs both ways. Meanwhile, the causality between fiscal policy and economic growth in U.A.E. examined by Ghali and Al-Shamsi (2017) provided evidence in support of existence of cointegration between government expenditure and GDP. The results also showed that causation ran from government expenditure to GDP.

Mihaela and Ozay (2014) appraised the fiscal policy in crises time with evidence from Romania and Turkey, and the study found out that pro-cyclical fiscal policy does not assist in dampening the GDP shock. While Enache (2019) investigated the relationship between fiscal policy and economic growth in Romania and the results of the estimation indicated weak evidence for the positive impact of the fiscal policy on the economic growth in the economy. Al-Zeaud, (2018) also investigated the impact of government expenditure on economic growth in Jordan occasioned by temporary oil production boom in 2005 which caused exceptionally large expenditure increase aimed at improving infrastructure and raising incomes. Jordan’s total expenditure increased by a cumulative 160 percent in nominal value (i.e. from 41 percent of non-oil GDP to 74 percent).

In Nigeria, government expenditure, as a tool of fiscal policy, has had varying impacts on the economy. The relationship between government expenditure and economic growth in Nigeria has attracted much attention in recent literature. The empirical findings of Olulu, Erhieyovwe and Andrews, (2014) revealed that government spending has significant negative impact on economic growth. Government spending was disaggregated to include investment, transfers, education, defense and other government consumption. The results of the study showed that general government consumption was significant and had a negative influence on growth.

A study on Nigerian budget implementation and control reforms which was described as tools for macroeconomic growth was carried out by Ifeanyichuku, Ezeamama, Joy and Mgbodile (2016). The study found out that poor project conceptualization design and planning practices by ministries, department and agencies accounted for low resource management. Thus, participatory monitoring and assessment of government project were identified as being lacked. Similarly, Ogbulu and Torbira (2018) examined the relationship

between budgetary operations and economic growth in Nigeria. The study revealed that five budgetary items: Non-oil revenue, economic, administrative, social services and transfer expenditures exerted significant effects on gross domestic product (GDP).

The findings thereof ranks Nigeria's fiscal performance was portrayed as sub-optimal but fairly satisfactory in an attempt to evaluate Nigeria's federal budget and its performance (Innocent and Christopher, 2017). The study assessed budget credibility as the international threshold and prescribed limit for budget deficit/GDP and a minimum of 50% score performance rating for regression economic performance was arrived at.

The impact of capital budget implementation on economic growth in Nigeria cannot be over-emphasised as Olatunji, Oladipupo and Joshua (2017) examined the relative effects of the implementation of capital expenditure on administrative, economic services and socio-community services on the growth of Nigerian economy. It was found that capital expenditure implementation is critical in maintaining and sustaining economic growth in Nigeria and adequate implementation of capital expenditure in the country was therefore recommended.

3. Methodology

The study adopted the modification of the works of Adefeso and Mobolaji (2018) and Ilemona and Sunday (2018). The theoretical relationship among budget variance (BDV) (which is the difference between budget estimate and actual expenditure), fiscal policy (FP) and price level (INFL) can be depicted from the framework above as

$$BDV_t = \alpha_0 + \beta FP_t + \theta INFL_t + \varepsilon_t \quad (1)$$

where,

BDV is budget variance; FP represents fiscal policy (measured as overall percentage of fiscal balance to GDP ratio); INFL stands for inflation rate and ε is the stochastic error term.

This study will adopt the Vector Autoregressive (VAR) technique as it is a forecasting tool for interrelated time series data system and for analysing random impact of disturbances on the system variance. VAR model overrides the need for structural modeling by treating endogenous variables in the system as a function of the lagged values of all endogenous variables in the system. The dynamic causal relationship of population and economic growth was captured by the model stated as follows:

$$BDV_t = \alpha_1 + \sum_{j=1}^k \theta_{1j} BDV_{t-j} + \sum_{j=1}^k \theta_{2j} FP_{t-j} + \varepsilon_{1t}$$

$$FP_t = \alpha_2 + \sum_{j=1}^k \rho_{1j} FP_{t-j} + \sum_{j=1}^k \rho_{2j} BDV_{t-j} + \varepsilon_{2t}$$

Where BDV represents the Budget variance and FP represents the overall percentage of fiscal balance to GDP ratio that is assumed to have direct impact on economic growth. K represents the optimal lag length to be selected by the various lag length selection criteria with a view to determining the stability of the variables through appropriate unit root techniques.

3.1. Measurement and Sources of Data

The study made use of annual time series secondary data over the study period. The description and measurement of variables and the sources of data are presented in Table 1 below.

Table 1: Description and Measurement of Variables

<i>Variables</i>	<i>Description</i>	<i>Measurements</i>	<i>Source of Data</i>
BDV	Budget variance	Overall percentage of budget estimate/ actual expenditure variance to actual expenditure ratio	
FP	Fiscal policy	Overall percentage of fiscal balance to GDP ratio	Central Bank of Nigeria Statistical Bulletin (CBN, 2018).
INFL	Changes in the prices of goods and services. It is an economic shock and determines the level of economic stability.	Inflation rate	

4. Data Analysis and Interpretation

To examine the causal relationship between budget variance and fiscal policy of government, the study made use of dataset comprising budget variance and fiscal policy from 1999 to 2019 with and Vector Autoregressive (VAR) technique was employed.

4.1. Unit Root Tests

The results of unit root tests are reported in Table 2. The study employed two unit root tests in order to have robust analysis. From the results of Augmented Dickey-Fuller (ADF) test, it was revealed that budget variance (BDV) was stationary at level and at 10% level of significance. Also, (FP) fiscal policy was stationary at first difference and at 1% level of significance. Also growth rate of population (GPOP) was stationary at levels and at 1% level of significance.

Similarly, the results of Philips-Peron (PP) Test showed that both budget variance (BDV) and fiscal policy (FP) were stationary at levels and at 1% level of significance. Since the results revealed that all the variables are stationary either at levels or at first difference but at different levels of significance, it becomes econometrically reasonable to conduct the cointegration test.

Table 2: Unit Root Tests Results

Variables	Augmented Dickey-Fuller (ADF) Test			Phillips-Perron (PP) Test		
	Level	1stDifference	Status	Level	1stDifference	Status
BDV	-2.826899*	-5.438514***	I(0)	-4.514505***	-4.175410***	I(0)
FP	-1.694685	-7.017260***	I(1)	-4.258343***	-7.017260***	I(0)
Critical values	Level	1 st Difference		Critical values	Level	1 st Difference
1%	-3.808546	-3.886751		1%	-3.808546	-3.831511
5%	-3.020686	-3.052169		5%	-3.020686	-3.029970
10%	-2.650413	-2.666593		10%	-2.650413	-2.655194

Source: Author's computation from the data extracted from Central Bank of Nigeria (CBN) Statistical Bulletin (2019)

Note: *** = 1%, ** = 5% and * = 10% levels of significance

ADF: automatic maximum lag length is based on Akaike Information Criterion (AIC)

PP: automatic maximum lag length is based on (Newey-West automatic) using Bartlett kernel Bandwidth

4.2. Johansen Cointegration Test

Following the results in the Table 2 which revealed that all the variables are stationary either at levels or at first difference and at different levels of significance, there is the need to determine the long-run relationship the variables. To achieve this, Johansen cointegration test was employed to determine the existence of long-run relationship between budget variance (BDV) and fiscal policy (FP) in Nigeria between 1999 and 2019. It was evidenced from the Johansen cointegration test results in the Tables 3a and 3b that the null hypothesis of no cointegration among the variables at 5% level of significance for the model specification was rejected.

The trace statistics revealed that there are cointegrating relationships between the variables as one cointegrating equations were found to exist at the 5% level of significance. Similarly, the unrestricted cointegration Max-Eigenvalue statistic reports that there exists one cointegration equation at 5% level of significance. This implies that the variables have long-run relationship.

Table 3a: Johansen Cointegration Test Results: Unrestricted Cointegration Rank Test (Trace)

Hypothesised No of CE(s)	Eigenvalue	Trace statistic	5% critical value	Prob**
None *	0.719118	30.34787	15.49471	0.0002
At most 1 *	0.340433	7.491095	3.841466	0.0062

Source: Author’s computation from the data extracted from Central Bank of Nigeria (CBN) Statistical Bulletin (2019)

Note: Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 3b: Johansen Cointegration Test Results: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesised No of CE(s)	Eigenvalue	Max-Eigen statistic	5% critical value	Prob**
None *	0.719118	22.85678	14.26460	0.0017
At most 1 *	0.340433	7.491095	3.841466	0.0062

Source: Author’s computation from the data extracted from Central Bank of Nigeria (CBN) Statistical Bulletin (2019)

Note:

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

4.3. VAR Granger Causality Tests

The causality between budget variance and fiscal policy in Nigeria was investigated by VAR Granger Causality/Block Exogeneity Wald Tests. The

cointegration tests conducted in this paper showed that there exist at least two cointegration equations at 5% level of significance between the variables. This implies that there exist long-run relationships between the variables included in the estimated VAR models in Nigeria during the study period. The results of the estimated VAR Granger Causality/Block Exogeneity Wald Tests were presented in Table 4.

Table 4: Results of VAR Granger Causality Tests

<i>Dep. Variables</i>	<i>Independent Variables</i>		<i>Inferences</i>	
	<i>BDV</i>	<i>FP</i>	<i>BDV</i>	<i>FP</i>
BDV	-	68.38411***	N	X
FP	3.578934	-	N	N

Source: Author's computation from the data extracted from Central Bank of Nigeria (CBN) Statistical Bulletin (2019)

Note: ***= 1%, ** = 5% and * = 10% levels of significance

X indicates presence of causality;

N indicates absence of causality

The results from the Table 4 showed the presence of causality between the variables used. In the first column of the table, the results revealed that there exists absence of causality between the variables. It can be observed that budget variance does not Granger-cause fiscal policy. This implies that there is no any causation from budget variance to fiscal policy.

The second segment of the table revealed that fiscal policy in Nigeria Granger-caused budget variance at 1% level of significance (FP → BDV) and not the other way round. This could be attributable to distorted and inconsistent policy thrust of government in recent time. This is in contrary to the empirical findings of Alexiou,(2019)which revealed that public investment spending appears to be linked to GDP with a positive long-run relationship where causality runs both ways.Again, the results of this study are partly in line with the work of Ghali and Al-Shamsi (2017) which provided evidence in support of existence of cointegration between government expenditure and GDP and also showed that causation ran from government expenditure to GDP.

5. Conclusion

The finding of this paper revealed that budget variance in Nigeria was necessitated by distorted and inconsistent policy thrust of government in recent time. Nigerian government seems to lack the political will to effectively enforce its desired policy thrust on the citizenry with the aim of reducing the persistent variance in the nation's budget. An effective application of fiscal policy in Nigeria has a great potential if it receives adequate attention from both individual and corporate entities. Nigerian Government should therefore

ensure that both capital and recurrent expenditure are effectively managed in such a way that it will drastically reduce (if not completely eliminated) variances and discrepancies occurring in the nation's budget.

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