Deficit Financing and Economic Growth in Nigeria: A Preliminary Investigation

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Author's contribution

This whole work was carried out as original research work by author ASO. He designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Also, he managed the analyses of the study and the literature searches. He read and approved the final manuscript.

Original Research Article

ABSTRACT

The fact that Nigerian economy has experienced some setbacks over the last four decades despite the growth of public expenditure cannot be overemphasized. This study thus investigates the incessant rises in government expenditure and the implications of deficit financing on Nigerian economic growth. It traces various governmental efforts in revamping the economy between 1970 and 2010, a period of 41 years.

From the literature, it was discovered that deficit financing has become an important tool to correct distortions in an economy if it is put into the most judicious use. However, in Nigeria the reverse is the case as the economy has perpetually being at disadvantages in terms of macroeconomic performance, making it a contentious phenomenon. Thus, there is need for a study to investigate this.

The data for the study were obtained from the Central Bank of Nigeria Statistical Bulletin and were analyzed using the econometric technique of Vector Auto Regression (VAR). The findings show that deficit financing had not achieved the desired results in Nigeria as revealed by negative impact of deficit financing on economic growth. This can be adduced to the prevailing socio-cultural mal-adaptation coupled with perennial corrupt practices in the economy.

The study recommends that government should reduce wastage in public spending, ensure greater budgetary discipline and adopt a financial structural transformation. In addition, reviewing and rationalizing the existing government parastatals with a view of

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pruning down the number to a reasonable level was also recommended among others. This is necessary for effective expenditure control purpose.

1. INTRODUCTION

The history of deficit financing dated back to 1978 when the nation absorbed a $1billion Jumbo loan presumably needed for rehabilitation, reconstruction and development of the war-torn Nigerian economy. However, this was an aftermath of the Nigerian civil war that lasted till 1970. This action subsequently followed by massive borrowing by both federal and state governments and their institutions to revitalize the already doldrums economy.

 Nations, the world over had engaged in various strategies at reducing environmental impact and enhancing the use of natural resources. Thus, the use of natural resources more efficiently to generate economic activity that preserves and enhances environmental quality, reducing human impact on the environment is the green economy doctrine. What [1] referred to as clean energy economy; technologies that allow cleaner production processes, as well as the growing market for products which consumes less energy. It might include products processes and services that reduce environmental impact or improve natural resource use. An economic system that results in improved human well-being and social equity. This presupposes an economic development model based on sustainable development and environmental risks drastically reduced.

To achieve this in the long-run, there is the need for a short run production stimulation and building of local capacity. Making low-cost loans available for green economy in this wise cannot be overemphasized. This thus reemphasized the greater involvement of government at all level in developing nations of the world in providing enabling business environment for such to strive.

However, with the extended expansion of government expenditure in Nigeria over the years, the expected results remained elusive. Majority of Nigeria citizenry are still living in abject poverty, persistent high mortality rate, low life expectancy due to inaccessibility to medical facilities; with poor road network, shortage of food and essential nutrients for physical growth and embarrassing high rate of unemployment [2]. Thus, government resorted to internal and external borrowing to fill the resource gap.

Notably, many economic policies of the government, including the well celebrated SAP of 1986 were implemented with the help of deficit financing. Not only this, the financing of the so called oil subsidy, the perennial insecurity problems as well as other engagements of the government such as the 2007 and 2011 general elections were financed through deficit financing.

However, deficit financing is not without its problems, its several macroeconomic implications on the output growth cannot be overemphasized. The question of whether deficit financing had actually contributed positively or otherwise to economic growth is thus pertinent in the field of finance. One wonders the reason why poverty is vividly written in the face of individual citizenry in Nigeria with the sea of evidence in the literature on the positive impact of deficit financing on economic growth and investment? [3,4]. The outrageous

macroeconomic instability and imbalance in the Nigerian economy over the years had been attributed to the growth in fiscal deficit.

The inflationary pressure had been on an increase as a result of expansionary fiscal operations embarked upon by the government with the attendant injection of liquidity into the economy; the pressure on the balance of payments of the nation can all be said to be a function of fiscal deficit and deficit financing embarked upon by the government from time to time. With the consequential effect on both the real sector as well as other sectors of the economy, the reason therefore arise for the need to examine the implications of deficit financing on the growth potentials of the Nigerian economy. This is of course the focus of this study.

The study thus hypothesized no significant relationship between deficit financing and economic growth in Nigeria.

2. LITERATURE REVIEW

Budget as a statement of revenue and expenditure of an organization at a given time usually a year is required to be prepared, presented and signed by the right authority of every economy. Budget is a quantitative expression for a set time period of a proposed future plan of action by management [5,6,7]. Budget as a tool of financial planning and control aids every economy to plan for the development of the nation, socially and economically.

Budget deficit refers to a situation where the total expenditure of government exceeds total revenue. It is a financial situation that occurs when an entity has more money going out than coming in. The term is most used to refer to government spending rather than business or individual spending (investopedia). Today and even the past, budget deficit policy is famous instrument of fiscal policy used to increase the rate of economic growth of the country [8]. The term usually refers to a conscious attempt to stimulate the economy by lowering tax rate or increasing government expenditure (Encyclopedia Britannica).

Deficit financing arises each time the government has budget deficit. For the economy to grow as planned in a budget, shortage of revenue resulting from excess expenditure has to be financed by raising fund from other sources available to the government. [9] defines deficit financing as a planned excess expenditure over income, dictated by government policy, of creating fund to finance deficit by borrowing whether from local or foreign sources which must be repaid with interest within a specific period of time.

[10] see deficit financing as a situation in which the federal government's excess fund of outlays over receipt of revenue for a given period is financed by borrowed funds from the public.

Budget deficit as a way of financing was established after the two world wars, oil crises and current financial and economic crises. There are three ways to finance the deficit–taxes, borrowing and monetization (inflation tax). The most popular model of deficit finance is borrowing which is usually done by issuing of government bonds, [8].

The idea of deficit financing has its root in fiscal policy. To understand deficit financing, one must understand fiscal policy which is a major instrument of macroeconomic stability. Attempts by economists to explain fiscal policy impact on macroeconomic management began with the Classical and Keynesian schools of thought, as the former underscores the

invisible hand that regulate the markets, and that government needs to tamper with the economy; the latter recognizes the need for government intervention to correct the potential instability in the economy which the market system is incapable of adjusting. The belief in this philosophy especially in the post depression years sprouted the use of fiscal policy measures to achieve full employment, which is the ultimate goal of macroeconomic policy. This new turn in economic event formed a new era in economic thinking and policies. The uses of fiscal policy therefore brought into focus the government's active participation in the regulation and manipulation of aggregate economic activities. To this end, Keynesian devotees contend that changes in savings and investments are responsible for changes in business activities and full employment in an economy. They thus, advocate for the use of fiscal policy by government through deficit financing to tackle economic depressions [11] as quoted by [3]. Therefore, [11] described fiscal policy as those steps taken by government to influence macroeconomic activities through the management (manipulation) of government budget.

The lack of correspondence between public revenues and expenditures is directly responsible for deficit financing to fill the gaps [3]. More precisely deficit financing is that part of expenditure which is met by; (i) ways and means advances, (ii) drawing down of cash balances, and (iii) borrowing through the issue of treasury bill [12].

Succinctly, deficit financing means creation of extra purchasing powers in the hands of the government, which is then used for acquiring resources from the market.

According to [13], the first major impact of deficit financing is the net addition to demand without a corresponding addition to supply. Generally, deficit financing is aimed at increasing capital formation for accelerated economic growth and development.

Care should be exercised not to confuse deficit financing with debt financing. While deficit financing arises as a result of inability of government revenues to keep pace with rising government expenditures, debt financing is one of the ways of raising funds to finance the government budget deficit.

The various reasons for fiscal deficit are categorized as political considerations, economic issues and social factors [11]. As we cannot separate politics from economics in both developed and developing nations today, political considerations now outweigh economic considerations in most government decisions. For instance, the aims of policy makers and political leaders to meet the needs of the citizens as well as delivering dividends of democracy have often driven up expenditure. And in the long run, this will result in deficits as the case in Nigeria in the recent time. Deficit financing however, may also result from government inefficiency, reflecting widespread tax evasion or wasteful spending rather than the operation of a planned countercyclical policy.

On economic issue, when expenditure programmes are budgeted to match expected revenues, a sharp drop in actual revenue for any reason, like fall in export product prices, economic meltdown may happen in a fiscal year. This state of affairs could bring about a deficit not necessarily constitute the bulk of government revenue. Also, increase in the costs of goods and services required by the government can lead to fiscal deficit. Above all, deficit may also arise out of the desire to urgently finance economic infrastructure [14].

Besides, social factors may also be responsible for deficit financing. In Nigeria like other countries of the world, government is the major player in social sector. When there is

absolute need to raise expenditure over and above projected revenue, deficit will arise. This may be as a result of natural disasters, such as floods, earthquake, and famine. Other reasons such as poverty alleviation programme, health education may also put pressure on government leading to financing of fiscal deficit.

Whichever, the reason for deficit financing, research findings such as [15,16] revealed that deficit financing has not shown any improvement in economic infrastructure and activities. It has been observed that instead of committing the additional funds arising from deficit financing into productive investment to increase capital formulation, political leaders in Nigeria convert such funds for their private use thereby undermining the objective of deficit financing.

Deficits are financed from several sources; both domestic and foreign, such as banking non-banking institutions, loans from World Bank and international Monetary Fund (IMF).

Deficit financing through the various options will obviously have major implications for the economy. Excessive used of deficits will bring about macroeconomic imbalances. Government can borrow from non-bank investors or commercial banks. This is considered non-inflationary as it tends to replace private expenditure. If the non-bank investors get loans from the commercial banks against their fixed deposit and use it to lend to government, it would be inflationary. Besides, government can draw from its cash balances with the Central Bank; it is not inflationary.

However, when the government borrows from the Central Bank against its securities, the Central bank creates new money by resorting to the printing press. This would again result in a secondary reaction of expansion of bank credit. This type of deficit financing by loan from the Central Bank tends to be highly inflationary.

2.1 The Nigeria Experience

Large fiscal deficits are common features in most developing countries, including Nigeria. The economic consequences of such deficits are inflation, devaluation, deteriorating, economic growth rate, fiscal adjustment, which constitute important elements of the economic agenda [17]. Various means of financing deficit are opened to the Federal government. These means include taxation, borrowing from public, borrowing from banking system, printing of money and loans and grants.

The profile of the Nigerian budget deficits seems to have reached a level of serious concern to many and scholars in particular. The Nigerian government has been running huge deficits since the civil war years. The deficits as percentage of GDP have continued to be on the increase and one immediate result is the escalating public debt.

Budget deficits have a disastrous effect on monetary policy. Both theory and empirical research have provided evidence to show that large budget deficits increase real interest rate, lower investment and thereby slow down productivity growth and decrease income [17]. This is premised on the fact that even at borrowing, the larger part of the borrowed funds are often used to procure capital equipment in foreign currencies which constitutes addition to foreign debt. However, it depends on how the deficits are financed, it is observed that large budget deficits cause increase in money and inflation. Table 1 shows the trend in budget deficit financed in Nigeria over the period under study

2.2 Empirical Review

Studies of various kinds have been embarked upon on the subject matter of deficit financing over the years. However, differences emerged from the results of the various scholars. The need to highlight some of these in this study is germane.

[8] in his study described the implications of deficit financing in the light of; multiplier effect, crowding out effect and correlation between budget and trade deficit. He concluded that one of them are positive, and they increase the aggregate demand and national income while other negative in term that they crowd out the private sector from the capital market under increased demand for loanable funds.

[3] studied the impact of deficit financing on socio-economic activities in Nigeria between 1997 and 2007. They used Pearson product moment co-efficient of correlation to test the significance of the relationship between the deficit financing and economic activities and social community services. Their findings revealed that deficit financing has a positive and significant relationship with economic activities.

[18] examined the impact of government expenditures on private investment and also how the financing of budget deficit have not only affected the performance of private investment but also how it crowds out private investment in Nigeria. Econometric models were used in calculating the relative impact of deficit financing on private investment in Nigeria. His findings revealed a negative relationship between deficit financing and investment in the period under review.

[17] empirically examined the relationship between budget deficit and inflation in Nigeria with the use of OLS estimates. The result showed that fiscal deficit and credit to the federal government are not significant in explaining the rate of inflation in Nigeria. It explained why treasury bills are used as a way of financing fiscal deficit.

On the impact of effect of deficit financing on the development of the Nigeria economy, [4], found among others, a significant relationship between budget deficit financing and economic growth.

[19] analyzed the dynamics of inflation in Bangladesh using vector autoregressive method over the period from July 1999 to august 2008. They found out that, the sample period, previous values of inflation are the most significant source of inflation in short term followed by net credit to the government. Armed with the above theoretical and empirical studies, the analysis of Nigerian case is thus instructive.

3. METHODOLOGY

Data used in this research work were purely secondary. The time series data were obtained from various issues of the Central Bank of Nigeria (CBN) Statistical Bulletin and Federal Bureau of Statistics (FBS). The relevant variables in use include; the Real Gross Domestic Product (RGDP), the gross capital formation (GCF) (as indexes of economic growth), the real interest rate (RINTR), inflation rate (INFR) and budget deficit (BDFCT), as variables indexing deficit financing.

3.1 Data Analysis and Model Specification

Methodological approach used in this study follows the works of [20,21,19]. The model specification captured the impact of deficit financing on economic growth in Nigeria. Thus, in order to investigate the response of macroeconomic variables to asymmetric and innovations in deficit financing implication on the growth of Nigerian economy, an unrestricted Vector Autoregressive (VAR) model is adopted. In the restricted VAR model, the vector of endogenous variables according to Cholesky ordering are budget deficit, inflation rate, gross capital formation, gross domestic products, and real interest rate, expressed in a linear equation form as;

$$yt = (bdfct_t, infrt_t, gct_t, rintr, gdp) \tag{1}$$

Where;

$bdfct_t$ = budget deficit
$infr_t$ = inflation rate
gcf_t = gross capital formation
$rgdp_t$ = real gross domestic product at constant prices
$rintr_t$= real interest rate
t = time period

The unrestricted VAR model of order P is specified as:

$$y_t = A_t \, y_{t-1} + \ldots\ldots.+ A_p y_{t-p} + \beta_{zt} + \varepsilon_t \tag{2}$$

Where y_t is a k vector of endogenous variables.

That is, BDFCT, INFR, RINTR, RGDP and GCF in this study. Z_t is a vector of exogenous variables, A_t.....A_p and β are matrices of coefficient to be estimated, P is the lag length and ε_t is a vector of innovation that may be contemporaneously correlated with each other but are uncorrelated with their own lagged values and uncorrelated with all of the right-hand side variables.

Thus, a VAR is a linear equation model in which each variable is in turn explained by its own lagged values, plus current and past values of the other variables. In this case, all variables are presented as dependent, thereby modeling every endogenous variable in the system as a function of lagged values of all the endogenous variables in the system.
Our unrestricted VAR in reduced form is presented as;

$$\alpha_t = \sum_{j=1}^{k} A i a_{t-1} + \varepsilon_t \tag{3}$$

Equation (1) above can be represented in a VAR linear form as;

$$bdfct_t = \alpha \circ i + \sum_{j=1}^{k} \beta_{1j} gcf_{t-j} + \sum_{j=1}^{k} \beta_{1j} inf_{t-j} + \sum_{j=1}^{k} \beta_{1j} rintr_{t-j} + \sum_{j=1}^{k} \beta_{1j} rgdp_{t-j} + \sum_{j=1}^{k} \beta_{1j} bdfct_{t-j} + \varepsilon_{1t} \tag{4a}$$

$$gcf_t = \alpha \circ i + \sum_{j=1}^{k} \beta_{2j} gcf_{t-j} + \sum_{j=1}^{k} \beta_{2j} inf_{t-j} + \sum_{j=1}^{k} \beta_{2j} rintr_{t-j} + \sum_{j=1}^{k} \beta_{2j} rgdp_{t-j} + \sum_{j=1}^{k} \beta_{2j} bdfct_{t-j} + \varepsilon_{2t} \tag{4b}$$

$$\text{infr}_t = \alpha \circ i + \sum_{j=1}^{k} \beta_{3j}\text{gcf}_{t-j} + \sum_{j=1}^{k} \beta_{3j}\text{inf}_{t-j} + \sum_{j=1}^{k} \beta_{3}\text{rintr}_{t-j} + \sum_{j=1}^{k} \beta_{3j}\text{rgdp}_{t-j} + \sum_{j=1}^{k} \beta_{3j}\text{bdfct}_{t-j} + \varepsilon_{3t} \qquad (4c)$$

$$\text{rintr}_t = \alpha \circ i + \sum_{j=1}^{k} \beta_{4j}\text{gcf}_{t-j} + \sum_{j=1}^{k} \beta_{4j}\text{inf}_{t-j} + \sum_{j=1}^{k} \beta_{4j}\text{rintr}_{t-j} + \sum_{j=1}^{k} \beta_{4j}\text{rgdp}_{t-j} + \sum_{j=1}^{k} \beta_{4j}\text{bdfct}_{t-j} + \varepsilon_{4t} \qquad (4d)$$

$$\text{gdp}_t = \alpha \circ i + \sum_{j=1}^{k} \beta_{5j}\text{gcf}_{t-j} + \sum_{j=1}^{k} \beta_{5j}\text{inf}_{t-j} + \sum_{j=1}^{k} \beta_{5j}\text{rintr}_{t-j} + \sum_{j=1}^{k} \beta_{5j}\text{rgdp}_{t-j} + \sum_{j=1}^{k} \beta_{5j}\text{bdfct}_{t-j} + \varepsilon_{5t} \qquad (4e)$$

β_1, β_2, β_3, β_4, and β_5 are matrices of coefficient to be estimated and ε_{it} is a vector of innovation (as defined above). j=1, 2… K, this is the lag length of each variable. The choice of lag length for this study is made using the Akaike Information Criterion (AIC).

Based on theoretical apriori, the following relationships are expected among the variables.

$$\frac{\delta\text{infr}}{\delta\text{bdfct}} > 0, \qquad \frac{\delta\text{gcf}}{\delta\text{bdfct}} > 0, \qquad \frac{\delta\text{rintr}}{\delta\text{bdfct}} > 0, \qquad \frac{\delta\text{rgdp}}{\delta\text{bdfct}} < 0$$

That is, it is expected that inflation, gross capital formation, interest rate exhibit positive relationship with budget deficit in Nigeria while deficit financing is expected to impact negatively on real gross domestic product.

Thus, the apriori expectation is that the relationship between budget deficit (deficit financing) and economic growth be mixed.

4. RESULTS AND POLICY IMPLICATION

The analysis of data employed and the interpretation of results in an attempt to examine the impact of deficit financing on economic growth in Nigeria are simple and straightforward. The computed results are from the data presented in Table 1 below.

The stationarity test using the Philip Peron test decision rule at different level and at 5% critical level revealed that all the variables contain no unit root (see Tables 2 a, b and c below).

In addition, the Johansen maximum-likelihood approach indicated that the hypothesis of no co-integration among the variables is rejected (see Tables 3 a and b), thus implying that a long-run relationship exists among the variables of budget deficit, real interest rate, real gross domestic product, inflation rate and gross capital formation. Thus, the appropriateness of Vector Autoregressive technique is justified. This is done to examine the impact of deficit financing on economic growth in Nigeria within the study horizon, 1970-2011.

The result of Pairwise granger causality tests conducted on the variables is shown in Table 4 below.

Table 1. Selected macroeconomic indicators influencing deficit financing in Nigeria between 1970 and 2011

Year	BDFCT ₦'million	INFR %	GCF ₦' million	RINTR %	RGDP ₦' million
1970	-15.3	13.8	1003.2	8.00	4219.0
1971	-51.0	16.0	1322.8	10.00	4715.5
1972	-139.8	3.2	1517.1	19.00	4892.8
1973	-274.9	5.2	1763.7	10.00	5310.0
1974	-502.5	13.4	1812.1	10.00	15919.7
1975	-1,229.3	33.9	2287.5	9.00	27172.0
1976	-2,518.5	21.2	2339.0	10.00	29146.5
1977	-3,610.5	15.4	2531.4	6.00	31520.3
1978	-1,768.0	16.6	2836.2	11.00	29212.4
1979	-936.5	11.8	3153.1	11.00	29948.0
1980	-3416.7	9.9	3620.1	9.50	31546.8
1981	-6,116.1	20.9	3757.9	10.00	205222.1
1982	-6,119.0	7.7	5382.8	11.75	199685.3
1983	-6,761.5	23.2	5949.5	11.50	185598.1
1984	-2,664.0	39.6	6418.3	13.00	183563.0
1985	-1,012.2	5.5	6804.0	11.75	201036.3
1986	-1,070.3	5.4	9313.6	12.00	205971.4
1987	-111.9	10.2	9993.6	19.20	204806.5
1988	-418.4	38.2	11339.2	17.60	219875.5
1989	-1,472.6	40.9	10899.6	24.60	236729.6
1990	-81.9	7.5	10436.1	27.70	267550.0
1991	-2,251.5	13.0	12243.5	20.80	265379.1
1992	-4,387.0	44.5	20512.7	31.20	271365.5
1993	-6,440.1	7.2	66787.0	36.09	274833.3
1994	-6,410.1	57.0	70714.6	21.00	275450.6
1995	-8,253.4	72.8	119391.6	20.79	281407.4
1996	-5,541,5	29.3	122600.9	20.86	293746.4
1997	-4,276.4	8.5	128331.8	23.32	302022.5
1998	-4,930.3	10.0	152409.6	21.34	310890.1
1999	1,094.0	6.6	154188.6	27.19	312183.1
2000	-598.5	6.9	157535.4	21.55	329178.7
2001	-23,408.2	18.9	162343.4	21.34	356994.3
2002	-54,719.5	12.9	166631.6	30.19	433203.6
2003	-66,162.6	14.0	178478.0	22.88	477533.0
2004	-11,113.3	15.0	249220.6	20.82	527576.0
2005	-58,948.4	17.9	269844.7	19.49	561931.4
2006	-43026.5	8.2	302843.3	18.41	595821.6
2007	-50,732.9	6.6	364008.5	18.36	634251.1
2008	-47,402.6	15.1	397395.2	18.24	674889.0
2009	-186,239.8	10.0	397395.0	18.24	NA
2010	-206,058.7	8.6	39829.0	14.00	NA
2011					NA

Source: 1. Central Bank of Nigeria Statistical Bulletin (various issues),2. Federal Bureau of Statistics (various issues), NOTE: BDFCT=Budget Deficit, INFR=Inflation Rate, GCF=Gross Capital Formation, RINTR=Real Interest Rate, RGDP=Real Gross Domestic Product

Table 2a. Stationary test for unit root at level

Variable	Test statistics (pp)	5% critical value	Level	S/NS
BDFCT	-1.0576	-2.9363	1(1)	NS
INFR	-4.4675	-2.9369	1(0)	S
GCF	-2.3262	-3.5266	1(1)	NS
RINTR	1.9297	-2.9369	1(1)	NS
RGDP	-1.7403	-2.9369	1(1)	NS

Source: Researcher's Computation (2013)

Table 2b. Test for unit root at first

Variable	PP test statistics	5% critical value	level	S/NS
BDFCT	-8.8617	-2.9389	2(0)	S
GCF	-8.3750	-3.5297	2(0)	S
RINTR	-4.0061	-2.9389	2(0)	S
RGDP	-0.9979	-2.9389	2(1)	NS

Source: Researcher's Computation (2013)

Table 2c. Test for unit root at second difference

Variable	PP Test Statistics	5% critical value	Level	S/NS
RGDP	-5.775	-3.5330	3(0)	S

Source: Researcher's Computation (2013)

Table 3a. Unrestricted Co integration rank test (test)

Hypothesis No. of CE(s)	Eigen value	Trace statistics	0.05 critical value	Probability
None[*]	0.720100	107.6278	69.81889	0.0000
At most 1[*]	0.495367	57.96822	47.85434	0.0042
At most 2[*]	0.402373	31.29521	29.79707	0.0334
At most 3[*]	0.226541	11.21844	15.49471	0.1984
At most 4[*]	0.030302	1.200033	3.841466	0.2733

Source: Researcher's Computation (2013)

Table 3b. Unrestricted co integration rank test (maximum eigenvalue)

Hypothesis No. of CE(s)	Eigen value	Trace statistics	0.05 critical value	Probability
None*	0.720100	107.6278	69.81889	0.0000
At most 1*	0.495367	57.96822	47.85434	0.0042
At most 2*	0.402373	31.29521	29.79707	0.0334
At most 3*	0.226541	11.21844	15.49471	0.1984
At most 4*	0.030302	1.200033	3.841466	0.2733

Source: Researcher's Computation (2013)

Table 4. Pairwise granger causality test

Pairwise Granger Causality Test
Date: 06/02/13 time: 20:02
Sample: 1970 2011
Lags:

Null Hypothesis	Obs	F-Statistics	Prob
RINTR does not Granger Cause BDFCT BDFCT does	39	0.14790	0.8631
not Granger Cause RINTR		6.09219	0.0055
RGDP does not Granger Cause BDFCT BDFCT does	39	0.95612	0.3945
not Granger Cause RGDP		3.53132	0.0404
GCF does not Granger Cause BDFCT BDFCT does	39	1.61911	0.2130
not Granger Cause GCF		0.02288	0.9774
INFR does not Granger Cause BDFCT BDFCT does	39	1.40989	0.2581
not Granger Cause INFR		2.43701	0.1025
RGDP does not Granger Cause RINTR RINTR does	39	8.89816	0.0008
not Granger Cause RGDP		5.29388	0.0100
GCF does not Granger Cause RINTR RINTR does not	39	1.42443	0.2546
Granger Cause GCF		0.39576	0.7000
INFR does not Granger Cause RINTR RINTR does not	39	0.26078	0.7720
Granger Cause INFR		0.84790	0.4372
GCF does not Granger Cause RGDP RGDP does not	39	1.09329	0.0566
Granger Cause GCF		0.39576	0.6762
INFR does not Granger Cause RGDP RGDP does not	39	0.34479	0.7108
Granger Cause INFR		2.01630	0.1488
INFR does not Granger Cause GCF GCF does not	39	2.97847	0.0643
Granger Cause INFR		4.43801	0.0194

Source: Researcher's Computation (2013)

4.1 Vector Auto Regressive Analysis

The short-run dynamics of the relationship between deficit financing and economic growth indicators was estimated using VAR model. The VAR was estimated in both the bi-variate and multivariate forms. All variables are transformed into their growth rates to standardize the different units of measurement. Logarithm transformation could not be used because of the negative values of deficit financing.

The results are presented in Tables 5 and 6 respectively. The choice of the lag length was made using the Akaike and Schwartz information Criteria. The VAR was estimated based on 2 lags.

The result in Table 5, which shows the bivariate VAR model, indicates that most of the lags of variable are not significant. This should be expected possibly because of multicollirianty [22]. An examination of the RGDP regression shows that individually, the lags are not significant, but the R^2 (0.97) and F value are so high that we cannot reject the hypothesis that collectively all the lagged terms are statistically significant. For the BDFCT regression, the R^2(0.63) and F-statistics are also high to accept that they are statistically significant. The results suggest that the direction of shock transmission is greater from deficit financing growth rate to real economic growth rate.

Table 5. Bivariate VAR regression estimates

	BDFCT	RGDP
BDFCT(-1)	0.292921	-0.68136
	-0.18747	-0.4858
	[1.56250]	[-1.40255]
BDFCT(-2)	0.168307	-0.10491
	-0.19089	-0.49466
	[0.88171]	[-0.21209]
RGDP(-1)	-0.10593	0.925218
	-0.07442	-0.19286
	[-1.42335]	[4.79744]
RGDP(-2)	0.063002	0.058794
	-0.07396	-0.19165
	[0.85189]	[0.30678]
C	3499.013	15177.16
	-4005.75	-10380.3
	[0.87350]	[1.46211]
R-squared	0.633112	0.97316
Adj. R-squared	0.582506	0.969458
Akaike AIC	21.91198	23.81634
Schwarz SC	22.13644	24.0408

Source: Researcher's Computation (2013)

Moreover, the results of the multivariate VAR analysis in Table 6 confirm that there is shock transmission between economic growth and budget financing. Gross capital formation (GCF) growth rate having R^2 of 0.99 and real growth (RGDP) with an R^2 of 0.97 are more endogenous. That is, the impact of deficit financing, given real inflation rate and real interest rate is more pronounced to reduce real economic growth and gross capital formation which is investment.

4.2 Shock Transmission among Deficit Financing, Economic Growth and Other Variables

The next analysis is the short-run shock transmission among the variables. This analysis is done using the variance decomposition and impulse response which are measures of short-run dynamics of the VAR. The results are presented in Tables 7 and 8 below respectively.

The variance decomposition in Table 7 analyses the decomposition of the shocks received by each macroeconomic variable to its constituent sources. It is another way of describing causes and sources of variations or shocks to the variables. The 41 years period under study is summarized into a quartile, a four year period.

The contribution of economic growth (RGDP) to shocks in deficit financing was about 5% all through the four quarters. While that of RINT, RINF and GCF were less than 4% all through. The largest contribution to shocks in deficit financing was a feedback shock from its own lag. The greater contribution to shocks in real economic growth apart from feedback shocks was received from shock to deficit financing. Deficit financing created about 15% shock to the low economic growth in Nigeria. Also the average contributions of deficit financing to real interest rate, gross capital formation shock and real inflation rate shock over the four quarter period

are 5%, 34% and 7% respectively. That implies deficit financing exerts more pressure on the growth rate of real GDP and investment than it does to inflation and real interest rate.

Table 6. Multivariate VAR regression estimates

	BDFC	INFR	GCF	RINT	RGDP
BDFC(-1)	0.171055	-0.00026	-0.39529	5.22E-05	-0.43357
	-0.22414	-0.00022	-0.1914	-7.70E-05	-0.63882
	[0.76317]	[-1.15946]	[-2.06528]	[0.67914]	[-0.67871]
BDFC(-2)	0.037328	0.000241	-0.64116	7.93E-05	-0.16428
	-0.24319	-0.00024	-0.20767	-8.30E-05	-0.69312
	[0.15349]	[0.99104]	[-3.08743]	[0.95057]	[-0.23702]
INTR(-1)	-84.0083	0.147283	360.8341	0.079542	8.094427
	-186.063	-0.18621	-158.886	-0.06385	-530.308
	[-0.45150]	[0.79097]	[2.27103]	[1.24577]	[0.01526]
INTR(-2)	26.26275	-0.34913	-149.196	-0.181	-188.324
	-236.412	-0.23659	-201.88	-0.08113	-673.807
	[0.11109]	[-1.47565]	[-0.73903]	[-2.23105]	[-0.27949]
GCF(-1)	-0.15643	0.000433	0.799191	-3.59E-05	-0.12589
	-0.22144	-0.00022	-0.18909	-7.60E-05	-0.63114
	[-0.70641]	[1.95324]	[4.22640]	[-0.47289]	[-0.19947]
GCF(-2)	0.027406	-0.0006	0.188328	1.29E-05	0.291899
	-0.24626	-0.00025	-0.21029	-8.50E-05	-0.70189
	[0.11129]	[-2.44668]	[0.89555]	[0.15298]	[0.41588]
RINT(-1)	-344.143	-0.67091	30.03161	0.567205	206.3657
	-535.935	-0.53635	-457.652	-0.18391	-1527.49
	[-0.64214]	[-1.25089]	[0.06562]	[3.08414]	[0.13510]
RINT(-2)	436.3138	1.583259	747.3702	0.002878	216.9142
	-495.343	-0.49572	-422.99	-0.16998	-1411.8
	[0.88083]	[3.19383]	[1.76687]	[0.01693]	[0.15364]
RGDP(-1)	-0.08483	-7.07E-05	-0.06974	1.30E-05	0.905858
	-0.07517	-7.50E-05	-0.06419	-2.60E-05	-0.21424
	[-1.12850]	[-0.93935]	[-1.08643]	[0.50221]	[4.22816]
RGDP(-2)	0.088562	9.25E-05	0.068178	1.85E-05	0.014516
	-0.0768	-7.70E-05	-0.06558	-2.60E-05	-0.21888
	[1.15322]	[1.20325]	[1.03965]	[0.70079]	[0.06632]
C	-531.434	9.16777	-12768.7	5.340377	17680.38
	-7131.32	-7.13681	-6089.67	-2.44717	-20325.3
	[-0.07452]	[1.28458]	[-2.09677]	[2.18226]	[0.86987]
R-squared	0.712101	0.559025	0.993766	0.748281	0.974522

Source: Researcher's Computation (2013)

Table 7. Variance decomposition results

Decomposition of BDFC:

Period	S.E.	BDFC	INFR	GCF	RINT	RGDP
1	12889.93	100	0	0	0	0
2	13665.88	92.92306	0.000197	1.033769	1.26983	4.773148
3	13938.7	90.6495	1.109488	2.011662	1.582516	4.646837
4	14200.37	88.35247	1.910677	3.694976	1.562527	4.479354

Decomposition of INFR:

Period	S.E.	BDFC	INFR	GCF	RINT	RGDP
1	12.89984	3.533773	96.46623	0	0	0
2	14.52419	3.147137	80.73158	9.678914	3.509995	2.932371
3	16.13124	2.786902	75.95685	8.371669	10.50664	2.377937
4	17.73367	7.334911	64.46267	9.372869	15.9767	2.852851

Decomposition of GCF:

Period	S.E.	BDFC	INFR	GCF	RINT	RGDP
1	11007.14	15.10374	0.646722	84.24954	0	0
2	14621.41	10.22405	7.428721	79.52496	0.004182	2.818083
3	20892.65	27.65197	3.686476	65.47937	1.294036	1.888151
4	26304.83	34.28841	2.396842	55.84806	6.159871	1.306815

Decomposition of RINT:

Period	S.E.	BDFC	INFR	GCF	RINT	RGDP
1	4.423285	1.017527	27.36103	0.006481	71.61496	0
2	4.967132	0.818043	22.03757	0.571713	75.73007	0.842598
3	5.855188	5.157502	32.80426	0.505347	57.67343	3.859459
4	7.013699	5.475789	35.42167	5.233295	44.23841	9.630839

Decomposition of RGDP:

Period	S.E.	BDFC	INFR	GCF	RINT	RGDP
1	36738.18	7.014226	0.125632	0.425131	0.652593	91.78242
2	51172.8	12.26811	0.144275	0.669562	0.793761	86.12429
3	62190.5	14.31537	0.740896	0.464767	1.208289	83.27068
4	70460.03	15.13747	0.901796	0.36342	1.541803	82.05551

Source: Researcher's Computation (2013)

Impulse response function is another method of analyzing the short run dynamics of relationships among a set of endogenous variables. It measures the response of a particular endogenous variable to one standard deviation shock or innovation to the other endogenous variables. It is another way of saying how a particular variable does responds to shocks in other variables. Table 8 below presents the Impulse Response analysis of the variables.

It is revealed that real GDP responded negatively to shocks in deficit financing throughout the four quarter period. Also Inflation rate and gross capital formation all responded negatively to shocks in deficit financing. This is reflected in the pattern of Impulse Response graph (Fig 1) below. The response of real interest rate to shocks in deficit financing was unstable: it was negative in the first two quarters and became positive in the last two quarters. It should be noted from the above analysis that economic growth did not responded negatively to deficit financing only. The respond of economic growth (RGDP) to shocks in growth of inflation and investment (GCF) was also negative. This trend is also depicted in Fig. 2 below.

Table 8. Impulse response function results

Response of BDFC:					
Period	**BDFC**	**INFR**	**GCF**	**RINT**	**RGDP**
1	12889.93	0	0	0	0
2	2718.364	-19.1949	-1389.47	-1539.96	-2985.66
3	1606.516	-1468.07	-1406.34	838.5357	337.7354
4	1429.218	1302.804	-1882.16	-276.07	66.49314
Response of INFR:					
Period	**BDFC**	**INFR**	**GCF**	**RINT**	**RGDP**
1	-2.42495	12.66986	0	0	0
2	-0.87094	3.12722	4.518613	-2.7211	-2.48715
3	-0.78297	-5.22951	-1.16904	4.464937	0.043605
4	-3.97681	-2.25197	-2.77337	4.785805	1.668511
Response of GCF:					
Period	**BDFC**	**INFR**	**GCF**	**RINT**	**RGDP**
1	4277.761	-885.184	10103.18	0	0
2	-1886.35	3885.613	8242.495	-94.5548	-2454.52
3	-9942.03	458.2969	10761.34	2374.777	-1489.02
4	-10796.0	-702.3	10030.85	6080.653	894.7589
Response of RINT:					
Period	BDFC	INFR	GCF	RINT	RGDP
1	-0.44618	-2.31372	0.03561	3.743233	0
2	-0.05241	-0.28964	-0.37388	2.161628	0.455949
3	1.25153	-2.41022	-0.17943	1.043019	1.056058
4	0.962024	-2.48561	-1.54955	1.410473	1.847824
Response of RGDP:					
Period	BDFC	INFR	GCF	RINT	RGDP
1	-9729.88	-1302.17	-2395.41	2967.829	35196.33
2	-15052.8	-1443.06	-3434.46	3460.905	31882.86
3	-15245	-4987.71	-664.891	5093.78	31069.7
4	-14065.8	-4014.4	258.5105	5460.048	29208.15

Source: Researcher's Computation (2013)

Table 9. The interpretation

Table 1					
	Response	**Result**		**Response**	**Result**
1	BDFCT to BDFCT	1 (12430)	2	BDFCT to INFR	1 (– 2113)
3	BDFCT to GCF	1 (4736)	4	BDFCT to RINTR	1(–718)
5	BDFCT to RGDP	1 (–3268)			
Table 2					
1	RGDP to BDFCT	1(–9103)	2	RGDP to INFR	1 (242)
3	RGDP to GCF	1 (–5909)	4	RGDP to RINTR	1(3542)
5	RGDP TO RGDP	1 (36425)			

Source: Researcher's Computation (2013)

The Impulse Response graph with its analytical table as presented below are also of immense benefit in our analysis:
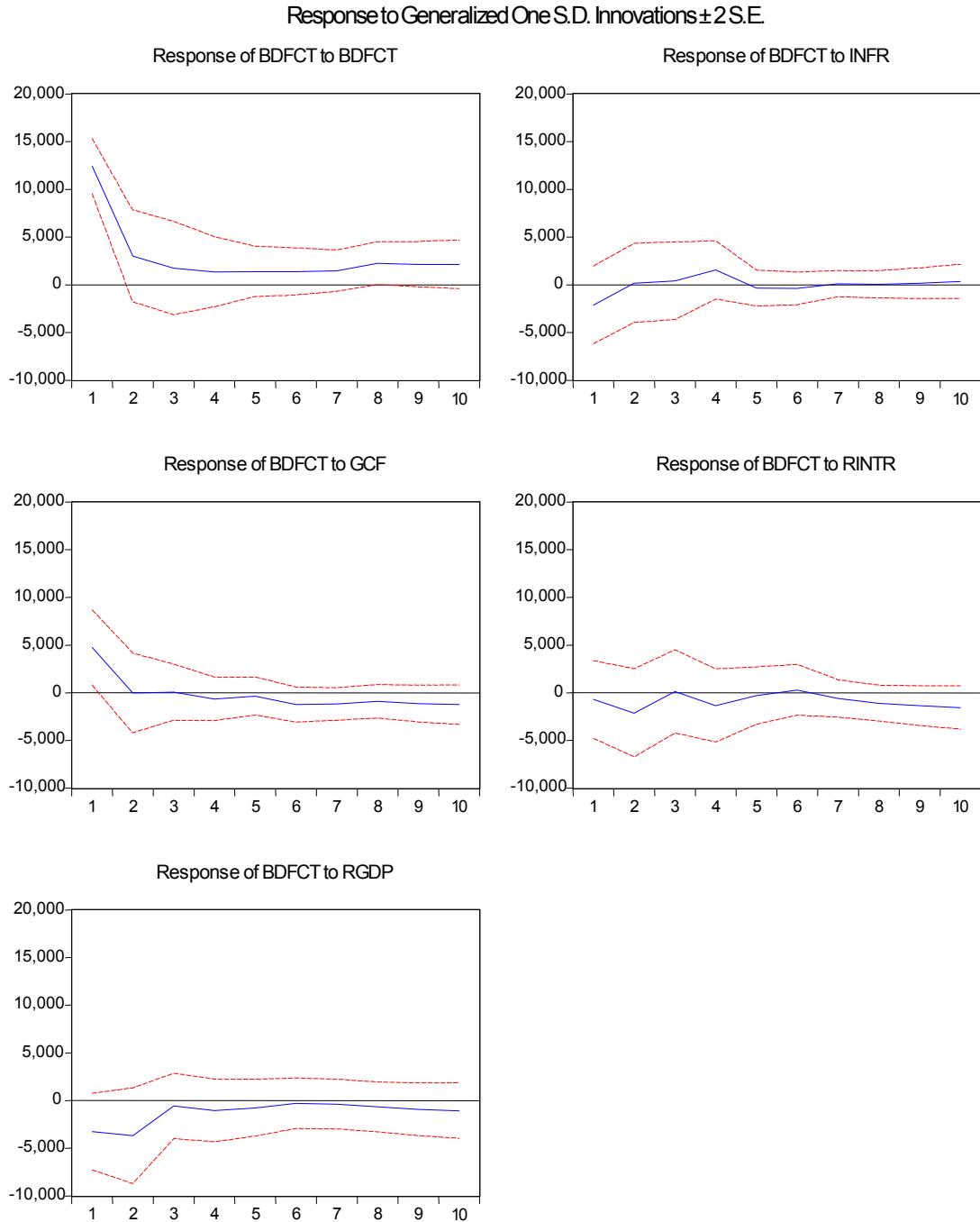

Fig. 1. Impulse response
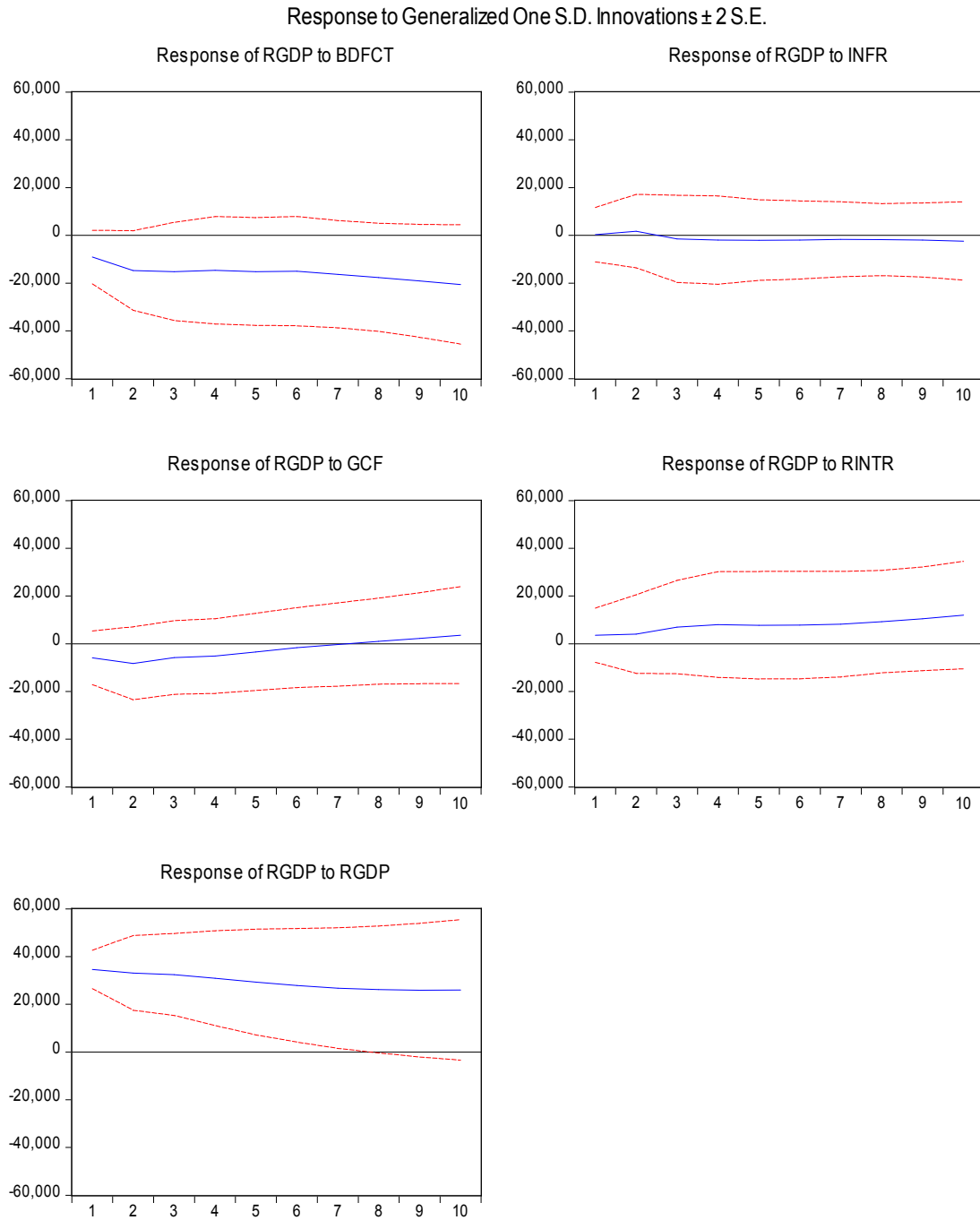*Source: Researcher's Computation (2013)*

Response to Generalized One S.D. Innovations ± 2 S.E.

Fig. 2. Impulse response graph
Source: Researcher's Computation (2013)

5. CONCLUSION AND POLICY RECOMMENDATION

The result of the bivariate VAR model indicates that most of the lags of variable are not significant. The high level of R^2 and F value in the VAR regression estimates of both RGDP and BDFCT however, gave convincing results that collectively all the lagged terms are statistically significant.

This corroborates the opinion of [4]. They, using Ordinary Least Square regression technique in their analysis opined that there exists a significant relationship between budget deficit financing and economic growth in Nigeria.

In addition, the result suggests that the direction of shock transmission is greater from deficit financing growth rate to real economic growth rate. The impact of deficit financing is more pronounced to reduce real economic growth and gross capital formation from the results of the multivariate VAR estimates (Table 6), given real inflation rate and real interest rate.

The variance decomposition analysis shows the decomposition of the shocks revealed by each macroeconomic variable to its constituent sources. It was revealed that the greater contribution to shocks in real economic growth apart from feedback shocks was received from shocks to deficit financing. Thus, deficit financing exerts more pressure on the growth rate of real GDP than other variables; creating about 15% shock to the low economic growth in Nigeria. This implies that deficit financing impacts negatively on economic growth. Thus contradicts [3] and [17]. The duo found in the result of their analysis a positive relationship between deficit financing and economic growth.

The results of the impulse response function in support of the variance decomposition analysis showed that the real GDP responded negatively to shocks in deficit financing throughout the four quarter period (Table 8). This is also the case of response of GCF (investment) to shocks in deficit financing. This corroborates the findings of [18], Generally, the results as expected confirm our apriori expectation of negative relationship between deficit financing and economic growth in Nigeria.

One would have expected that the huge deficit financing by the government which metamorphose into enhanced money supply and credit expansion in the economy would have resulted in greater aggregate demand and accelerate industrial development.

However, this stance eludes the nation as large proportion of the deficit financing goes to general administration, consumption and non-productive activities by the government. Not only that, the endemic corruption plaguing the nation which has perverted the ruling class lives much to be considered.

It is thus recommended that greater budgeting discipline that will reduce wastage in government expenditure should be encouraged. It is reasonable therefore that the ongoing privatization and commercialization policy which would eliminate the huge subvention grants to the concerned public parastatals should be strengthened. Diversification of the economy from oil to productive manufacturing sector should be encouraged.

While one may recommend that deficit financing in Nigeria be discouraged, or kept in a very low level, greater part of government expenditure should be expended in the upliftment of infrastructural facilities that would have positive impact on the entire citizenry.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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