

Effect of Budget Deficit on Some Selected Macroeconomics Variables in Nigeria

Ottih, Ikechukwu Ernest (Corresponding Author)

Department of Financial Management Technology,
Federal University of Technology,
Owerri, Imo State.

Prof. Nathaniel .C. Nwezeaku

Department of Financial Management Technology,
Federal University of Technology, Owerri

Ottih, Cynthia Kelechi

Department of Public Administration,
National Open University of Nigeria

Abstract

The study was carried out to investigate the effect of Budget Deficit on Some Selected Macroeconomic Variables in Nigeria. Specifically, the objectives include: to determine if budget deficit (DEF) influences inflation rate (INF) in Nigeria, to examine how budget deficit affects interest rate (INT) in Nigeria, to assess the impact of budget deficit on broad money supply (M2); and to evaluate if budget deficit affects gross domestic product (GDP). The study employed the General linear model in estimating the equation. Preliminary test of stationarity and co integration of variables was conducted using the Augmented Dickey Fuller (ADF) test, Johansen co-integration test, and Granger causality test. Empirical findings showed that there was a significant and negative influence of DEF on INT ($p < 0.05$). There was a negative and significant impact of DEF on M2 ($p < 0.05$). There was a negative and significant effect of DEF on GDP. Finally, the relationship between budget deficit and inflation rate was positive and insignificant. The study therefore concluded that there was a statistically significant ($p < 0.05$) impact of budget on macroeconomic variables, and that government should monitor on how these budget deficits are utilized and well handled.

Keywords: Budget deficit, Interest Rate, Inflation, money Supply and Gross Domestic Product

1. INTRODUCTION

1.1 Background information

One of the most widely discussed topics among economists and policymakers in both rich and developing countries is the budget deficit and its effects on macroeconomic indicators (Musa & Mawejje, 2014; Vamvoukas & Spilioti, 2015; Alam, Sadekin & Saha, 2020). Huge budget deficits, according to studies, have negative macroeconomic consequences such as high interest rates, current account deficits, inflation, trade deficits, and exchange rate volatility, all of which have an impact on growth and development (Musa & Mawejje, 2014; Vamvoukas & Spilioti, 2015). In general, three schools of thought exist when it comes to the economic consequences of budget deficits: Neoclassical, Keynesian, and Ricardian. It is noteworthy that one may find support for any imaginable normative perspective among these three schools of thinking. Whether one considers deficits to be good, bad, or irrelevant is thus

largely determined by the paradigm one chooses. There is no single paradigm that perfectly matches reality.

The impacts of the budget deficit could be positive, negative, or have no link with macroeconomic variables. Because most studies regress macroeconomic variables on the fiscal deficit or the deficit on macroeconomic variables, the budget deficit and its impact on any given economy could be attributed to varied methodology countries utilize and the quality of data used by different researchers (Sean & Michael, 2021).

The budget deficit refers to government expenditure exceeding government revenue over a period of time (Nkaku, 2015; Barone & Anderson, 2021). When a deficit occurs in a country, it becomes imperative to find a remedy for financing such deficits so as to eradicate its negative implications. Nigeria, as a growing/developing economy, has blamed the prolonged economic crisis as one of the major causes of the budget deficit as it has resulted in over indebtedness, a debt crisis, high inflation, poor investment performance and growth (Wosowei, 2013).

In Nigeria, increased government spending has resulted in increased fiscal imbalances, which divert cash away from private sector investment, slowing growth and lowering living standards (Mpia & Ogriko, 2014). Fiscal inequity places a significant burden on future generations, since employees may be required to subsidize unfunded social programs. As a result of budget deficits, the government accumulates debt, which is a stock of liabilities (Okoro & Oksakei, 2020). Because of the impact on revenues and spending, the budget deficit is sometimes associated with recession (Ibrahim, 2018).

Fiscal policy also refers to the component of government policy that deals with raising income through taxation and other means, as well as deciding on the quantity and pattern of expenditure in order to influence economic activity (Weinstock, 2021). This means that fiscal policy is concerned with taxation, public borrowing, public spending, and other sources of revenue targeted at influencing economic activity in order to attain specified macroeconomic objectives. Fiscal policy also seeks to influence economic activities through the use of the government budget, which might be in deficit, surplus, or balance. When government spending exceeds revenue, the result is a deficit (Weinstock, 2021). Governments around the world frequently engage in huge investment activities (fiscal deficits) in the hopes of not only enhancing domestic economic development but also positioning the economy on a path of long-term growth (Okoro & Oksakei, 2020).

Budget deficit operations involves the pursuit of fiscal deficit policy which is intended to stimulate the economy through the injection of “free money” from the Central Bank of Nigeria (CBN) or borrowing from financial institution or from the non-banking public (Okoro & Oksakei, 2020). This has the effect of increasing aggregate spending or demand for goods and services by the public and private sector of the economy. By extension employment and output are leveraged in the short, medium and long run. The relationship between budget deficit and macro-economic variables such as Gross Domestic Product (GDP), Interest rates, Exchange rate, Trade deficit, among others represents one of the most widely debated topics among economists and policy makers in both developed and developing countries (Sharm & Mittal, 2019). This relationship can either be negative or positive.

Budget deficits, according to Barone and Anderson (2021), imply an increase in the supply of government bonds. To make these bonds more appealing, the government offers them at a reduced price, resulting in higher interest rates. Interest rate hikes hinder private bond issuance, private investment, and private expenditure. As a result, the private sector's financial resources are being drained. Government deficit spending, according to Chen and Boyle (2021), is the primary source of inflation. These research back up the idea that the

Central Bank will be forced to monetize the deficit at some point in the future. The money supply and inflation rate rise as a result of such monetization.

Higher investment, according to Shetta and Kamaly (2014), may raise the marginal productivity of private capital, hence crowding in private investment. He went on to say that public capital and infrastructure capital, such as motorways, water systems, and airports, are likely to work in tandem with private capital. It is also claimed that increasing the budget deficit will put upward pressure on interest rates, resulting in capital inflows and a currency appreciation, both of which will exacerbate the current account deficit.

However, according to Sunday, Bereh, and Gopar (2020), the budget deficit has neither a positive nor a negative relationship with macroeconomic variables. He claims that movements in taxes and budget deficits have no effect on the real interest rate, the amount of investment, or the current account balance in his "Ricardian Equivalence Hypothesis" (REH). He claims that the present value of future tax payments is simply regarded as the worth of the new debt (deficits). This means that government deficits are not considered net wealth, and hence money demand is unaffected. As a result, interest rates and other macroeconomic variables are unaffected.

1.2 Problem statement

The macroeconomic effects of budget deficit financing are numerous. These consequences are determined by the economy's level of employment. Excessive budget deficits are likely to cause macroeconomic imbalances when employment is full. It will have a negative impact on the economy's output, growth, and inflationary pressures (M-Amin, 2015). This is true since it boosts deposit money banks' reserve base, resulting in excess liquidity in the financial system.

The economy may grow faster than the debt burden if deficits are diverted into investments in productive activities such as capital goods, training, or new technologies. This is due to the fact that the investment will result in long-term growth. As a result, deficits may help to achieve macroeconomic stability and growth. According to Osuka & Achinihu (2014), this criterion holds true if the entire deficit is around 3% of GDP (GDP).

Nigeria's fiscal operations have resulted in a continual overall budget deficit for many of the years under study (1980-2010), according to available evidence. Nigeria had 32 years of fiscal deficits out of the 34 years examined. With budget deficit financing through induced aggregate demand, economic activity is supposed to be accelerated. The question is whether deficit funding has exacerbated or alleviated the problem.

Despite the fact that Nigeria has been operating budget deficit financing for many years, she still finds herself in a situation of low employment, economic distress, a decline in standard of living, a decline in economic growth, an increase in public debt, a balance of payment problem, continued depletion of the foreign reserve, little or no savings, a decline and overdependence on oil exports, and an increase in public debt.

1.3 Objectives of the study

The aim of this study is to investigate the short and long run effects of budget deficits on selected macroeconomic variables in Nigeria. Specific objectives of the study are:

- i. To examine to what extent budget deficit has affected inflation rate in Nigeria.
- ii. To examine to what extent budget deficit has affected interest rate in Nigeria.
- iii. To examine to what extent budget deficit has affected money supply in Nigeria.
- iv. To evaluate to what extent budget deficit has affected economic growth in Nigeria.

1.4 Research Hypotheses

Ho₁; Budget deficits have no significant effect on inflation rate in Nigeria.

- Ho₂; Budget deficits have no significant effect on interest rate in Nigeria.
Ho₃; Budget deficits have no significant effect on money supply in Nigeria.
Ho₄; Budget deficits have no significant effect on economic growth in Nigeria

2. LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Budgeting and budget deficit

Budgeting is seen as an important control tool since it may aid in the formation of developmental policies and guide the government in establishing policies based on available resources. Planning is successful when actual expenses match predicted expenditures. Understanding how to fund the fiscal deficit is especially important because various debt financing approaches have distinct economic consequences. Borrowing from the central bank to meet debt financing needs is inflationary, whereas borrowing from commercial banks has the potential to drown out private sector investment, according to economic theory (Nwanna and Umeh, 2019).

In its most basic form, deficit spending happens when a government's expenditures exceed its receipts over the course of a fiscal year, resulting in a budget deficit. The term "deficit spending" is often associated with a Keynesian economic stimulation plan in which the government borrows money and spends it to increase demand and stimulate the economy (Chen & Boyle, 2021).

Both developed and developing countries are affected by and concerned by budget deficits. High interest rates, in the public's opinion, are generated by large-scale budget deficits, which crowd out private investment, stifle capital formation, and stifle economic growth and productivity. Also, in the event of large-scale deficits, the ability of monetary authorities to control inflation, because inflation erodes confidence in the system, slows growth, and generates social tensions among fixed-income earners. The majority of governments use deficit finance as a legitimate means of attaining their economic objectives (Antwi, Zhao & Atta Mills, 2013). However, Eminer (2015) argues that the budget deficit is caused by excessive government spending or a failure to collect tax income, or both, and that the budget deficit or higher expenditure has no detrimental impact on the economy. He went on to say that greater government spending, if diverted to economic initiatives rather than political goals, may have a positive impact on the economy. According to Aslam (2016), a large budget deficit may be an unavoidable policy if the deficit is efficiently utilised to boost macroeconomic growth.

2.1.2 The relationships between budget deficits and macroeconomic performance

The relationship between government budget deficits and macroeconomic performance has been studied by researchers and policymakers all around the world. Budget deficits have reached new heights in several emerging economies, such as Nigeria (Oladipo & Akingbola, 2011). The history of deficit financing, on the other hand, can be traced back to Nigeria's use of Keynesian-inspired public expenditure to boost economic performance. Keynes recommended deficit spending to alleviate or end a recession. He believes that boosting government purchases will aid a market for company production by providing revenue, which will encourage demand for business output through a multiplier effect when an economy has significant unemployment. Despite the justification of growth, the Nigerian economy has faced issues in terms of efficacy and debt buildup as a result of the deficit spending policy (Akamobi & Unachukwu, 2021).

The persistence of deficits was expected to have a detrimental influence on macroeconomic indexes. Various governments having major control over economic activities, and the budget deficit as their principal tool, think that deficits must be maintained in order to encourage economic growth. SAP was established by the government in 1986 with the hopes of

reducing deficit spending through changing the economy. However, it does not appear that this has been achieved, as the deficits continue to rise year after year. It is impossible to overestimate the influence of such deficit spending on a wide variety of macroeconomic indicators (Oladipo & Akinbobola, 2011). Economists, on the other hand, disagree regarding the budget deficit's impact on private investment and economic growth. Some think that it will encourage investment, while others contend that it would discourage it. Many critics of the budget deficit argue that it would boost interest rates, driving private investment away from productive industries since many investors will prefer to invest in higher-yielding government bonds because they are safer (Checherita & Rother, 2010; Calderon & Fuentes, 2013; Akamobi & Unachukwu, 2021).

2.1.3 Deficit Financing and Inflation

In both wealthy and emerging countries, recurrent government budget deficits and debt have become important concerns (Awe & Shina, 2012). Inflation has been rising, wreaking havoc on the economy by shifting the price of consumer goods and services (Awe & Shina, 2012). When there is a budget deficit, the government borrows money from commercial and merchant banks, as well as non-banking individuals, and issues short-term bonds and monetary instruments, as well as foreign borrowings (Chukwu et al., 2020). According to them, using deficit financing to pursue fiscal policies generally leads to a rise in economic risk. Inflation is still one of the most important economic variables that can skew economic activity in both rich and developing countries (Chukwu et al., 2020).

For the obvious reason that inflation imposes costs on the economy, most central banks throughout the world have made low and stable inflation a core mandate. A high rate of inflation causes portfolio investment to shift from real money to real assets in a developing country like Nigeria, where capital and financial systems are mostly underdeveloped (Chukwu et al., 2020).

2.1.4 Budget Deficits and Interest Rates

The price of credit is the price that balances the desire to hold money in the form of cash with the accessible quality of each (Ezeabasili, Mojekwu, & Herbert, 2012). Mundel-Flemming assumed that an increase in budget deficit produces an increase in interest rate due to exchange rate appreciation and capital inflows (Odionye & Uma, 2013). Despite the theoretical relationship between budget deficit and interest rate, there is no widespread agreement (Odionye & Uma, 2013). The Ricardian Equivalent hypothesis (REH) and the Conventional Keynesian statement are two opposing positions (CKP). Budget deficits are irrelevant, according to Ricardo, because a rise in the government's budget deficit is effectively equivalent to an increase in future tax responsibilities. Because it is assumed that lower taxation now will be offset by higher taxation hereafter, budget deficits have no effect on macroeconomic factors (Chukwu et al., 2020).

Despite and given the relationship between budget deficit and interest rate, the stated interactions between the two variables in Nigeria's economy are not visible from trend evidence, and this remains uncertain despite the fact that this topic has been thoroughly investigated. Inconclusiveness may stem from the composition of the composed type of empirical studies, which take into account various data and estimation techniques utilized in Nigeria and other economies throughout the world (Odionye & Uma, 2013).

2.1.5 Budget Deficits and Investments

Interest rates rise as a result of the large budget deficit, which leads to a decline in domestic private investment (Chukwu et al., 2020). According to Ezeabasili and Nwakoby (2013), several researches have looked at the impact of fiscal deficits by testing for the Keynesian

premise or the Ricardian equivalence hypothesis. Other than Nigeria, the majority of these studies are focused on developed countries and other conditions. Just a few instances from the literature are Ibrahim (2018), Sunday et al. (2020), Okoro & Oksakei (2020), Akamobi & Unachukwu (2021), and Yusuf & Mohd (2021). Public investment or public capital, public deficits, corporate tax and investment incentives, and the user cost of capital or real interest rate are four important ways through which fiscal deficits affect private investment (Ezeabasili & Nwakoby, 2013).

2.1.6 Budget Deficits and Economic Growth

The impact of expansionary budget deficit on economic growth has sparked a debate about whether a long-term budget deficit boosts or depresses national output, particularly in developing countries. The outcome is likely to be determined by how the deficit is funded and distributed between capital and recurring expenditure (Umaru & Gatawa, 2014). The Nigerian economy's budget imbalance has become a prominent and institutionalized component. Budget deficits are not a new problem in Nigeria; they have been there for more than three decades. Government fiscal operations are widely regarded as a tool for economic management and play an important role in boosting economic growth (Odhiambo, Momanyi, Othuon & Aila, 2013).

Large budget deficits have a significant impact on national savings and have the potential to stifle private investment. Higher interest rates contribute to the crowding out, as enterprises seeking to borrow for investment projects fight for a limited pool of available money. They bid up the interest rate they are willing to pay in the process. Higher borrowing rates deter some businesses from pursuing their investment plans, resulting in a decrease in investment and growth (Chukwu et al., 2020).

2.2 Theoretical Framework

This study is anchored on the following theories stated below.

2.2.1 The Neoclassical Theory

The neoclassical theory sees government budget deficits as a shift of resources from the private to the public sector that has little or no impact (Sunday et al., 2020). They also argued that because the private sector is more efficient than the public sector, a transfer of this magnitude could be detrimental. According to the neoclassical school, fiscal deficits and macroeconomic variables have an inverse relationship. Fiscal deficits, they claim, raise interest rates, hinder the issuance of private bonds, private investments, and private expenditure, raise inflation, and cause a similar increase in the current account deficits and finally slows the growth rate of the economy through resources crowding out. However, individuals planning their consumption over their full cycle are considered by the Neoclassical school. Fiscal deficits boost present consumption by transferring taxes to future generations. The neoclassical school maintains that higher consumption implies a loss in savings since resources are fully used. To restore equilibrium in the capital markets, interest rates must rise. Higher interest rates lead to a drop in private investment, domestic output, and a rise in the overall price level (Yusuf & Mohd, 2021).

In the present study, the neoclassical theory serves as a yard stick to describe and measure macroeconomic variables as affected by budget deficit.

2.2.2 The Keynesian Theory

According to Keynesian theory, government expenditure boosts economic growth (Sunday et al., 2020). By referring to the expansionary consequences of budget deficits, the Keynesians present a counter-argument to the crowd-out effect. They say that budget deficits normally

lead to an increase in domestic output, which in turn makes private investors more enthusiastic about the economy's future direction, causing them to invest more. The crowding-in effect is what it's called. It's worth emphasizing that the traditional Keynesian perspective differs from the normal neoclassical paradigm in two major ways. For starters, it allows for the potential of some economic resources being idle. Second, it assumes the existence of a huge number of people who are cash-strapped. Because of the second assumption, aggregate consumption is extremely sensitive to fluctuations in disposable income. Many traditional Keynesians believe that deficits do not have to stifle private investment. Rising aggregate demand, according to Ibrahim (2018), enhances private investment profitability and leads to a higher amount of investment at any given interest rate. As a result, while deficits raise interest rates, they may also improve overall savings and investment. He argues, thus that deficits have not crowded out investment. There has been a lot of crowding.” Shetta and Kamaly (2014) developed a theoretical framework for analyzing the issue of private capital being “crowded in” by public capital. He demonstrates that public capital attracts private capital through two channels: its impact on labor and savings marginal productivity, and (gross) complementarity /substitutability between public and private capital.

Keynesian Theory serves as a stepping stone in the present study for a better understanding of budget deficit and its expansionary consequences on economic growth.

2.3 Review of Empirical Studies

Epaphra (2017) examined the relationship between budget deficits and selected macroeconomic variables in Tanzania with data spanning from 1966 to 2015. The study made use of Vector Autoregression (VAR) - Vector Error Correction Model (VECM), and variance decomposition techniques to. According to the findings, there is a considerable negative association between Tanzania's real GDP, exchange rate, and budget deficit. Further research found that foreign financing of the budget deficit was higher than domestic financing, with high servicing costs sapping revenues that could have been utilized to fund development.

Ahmed and Alamdar (2018) studied the effects of budget deficit and corruption on private sector investment in Pakistan. Between 1985 and 2015, annual time series data were utilized to evaluate the long- and short-term relationships between the variables. The cointegration test was performed using the Johansen and Juselius (1990) technique, whereas the short-run analysis was performed using the Error Correction Model. The findings revealed, among other things, that Pakistan's budget deficit does indeed choke out private investment.

Ibrahim (2018) conducted an empirical study to check the sensitivity and validity of the Keynesian and Neoclassical propositions and the Ricardian equivalence hypothesis. To determine the short and long-run effects of the budget deficit on money demand, the researchers used cointegration analysis and ECM technique. The results of the cointegration test indicated that the variables in the money demand model have a strong and stable long-term relationship. Furthermore, the ECM model's estimates revealed the existence of a short- and long-term, positive and significant relationship between money demand and the budget deficit, implying that both Keynesian and Neoclassical perspectives are valid for Nigeria.

Nwanna and Umeh (2019) examined the effect of budget deficit on Nigeria's economic growth between 1981 and 2016. The study employed Ordinary Least Square (OLS) estimation technique coupled with Augmented Dickey Fuller (ADF) unit root test, Johansen Co-integration test and normality test in the analyses. The findings show that funding the budget deficit with external debt has a considerable negative impact on Nigeria's economic growth, whereas domestic debt has a significant positive benefit, but debt servicing has no influence on growth.

Ezeanyeji, Imoagwu and Ejefobihi (2019) investigated the relationship between public debt and inflation in Nigeria for the period 1981 to 2017. The investigation used the Augmented Dickey-Fuller (ADF) test, co-integration test, and Error Correction Model (ECM). The findings found that in Nigeria, governmental debt, exchange rate, and money supply all had a positive and considerable impact on inflation. In addition, in Nigeria, the rate of real GDP growth had a negative and statistically negligible impact on inflation.

Chukwu, Otiwu, and Okere (2020) assessed the influence of budget deficit on macroeconomic variables of Nigeria, covering the period, 1980-2012. The Augmented Dickey-Fuller (ADF) test, co-integration test, and Error Correction Model were employed in the inquiry (ECM). Government debt, currency rate, and money supply all had a positive and significant impact on inflation in Nigeria, according to the research. Furthermore, the rate of real GDP growth in Nigeria had a negative and statistically insignificant impact on inflation. Budget deficits have a large negative link with GDP growth, real private investment, inflation, and the real exchange rate, while having a significant positive relationship with real interest rates. As a result of these findings, the study found that budget deficit financing has not resulted in the desired growth in the Nigerian economy.

Okoro and Oksakei (2020) investigated the consequences of federal government fiscal deficits on the macroeconomic variables in Nigeria. The study discovered a substantial long run association between fiscal deficit and selected macroeconomic variables in Nigeria using the Auto-Regressive Distributed Lag (ARDL) technique. It was discovered that the federal government deficit has no substantial impact on Nigeria's foreign reserves in the short run, and that federal government deficits have no major impact on inflation in Nigeria over the study period. This assumes that increasing the budget deficit will boost aggregate demand, output, and long-run inflation, however real interest rates may have to rise to bring the securities market back into balance. The test conducted to see if there is a causal relationship between federal government deficits and lending rates in Nigeria revealed a significant causal relationship between federal government deficits and lending rates, indicating that the fiscal deficit is crowding out private sector credit in Nigeria.

Akamobi and Unachukwu (2021) in their study explored the macroeconomic effects of budget deficit in Nigeria. It aims to investigate the impact of Nigeria's budget deficit on private and public investment by employing the ADF unit root test and ARDL model, as well as the Granger Causality test, short-run diagnostics, and stability, with annual time series data spanning 37 years from 1981 to 2019. Private investment (Gross Fixed Capital Formation) as a percentage of GDP, public investment measured as the ratio of government capital expenditure to GDP, budget deficit, money supply measured as a ratio of GDP, inflation rate measured by annual year-on-year inflation rate, interest rate, and labor force participation rate are among the variables used. According to the conclusions of the study, Nigeria's budget deficit has a favorable and considerable impact on economic growth. The study found that the government's budget deficit had little impact on investment. According to the report, Nigeria's budget deficit has a negative and minor influence on private investment.

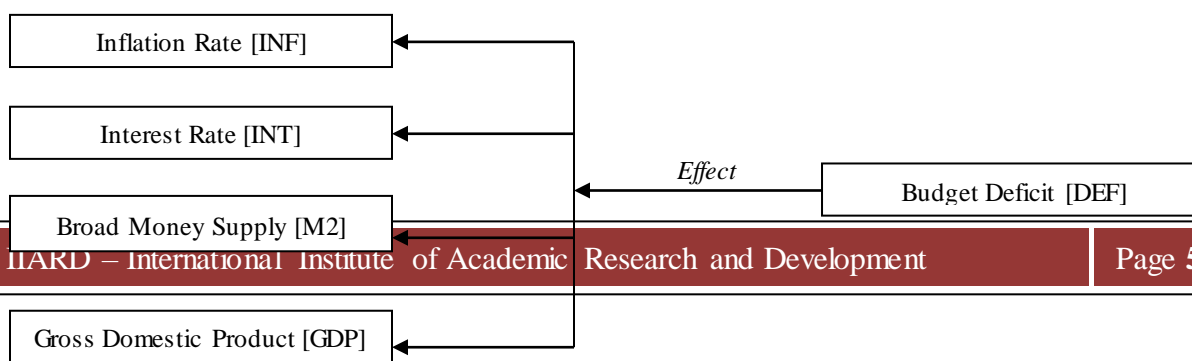
2.4.1 Analytical Framework

Dependent variables

[Macroeconomic variables]

Independent variable

[Budget Deficit]



3. METHODOLOGY

3.1 Research Design

This study investigated the Impact of Budget Deficit on the performance of some selected macroeconomic variables in Nigeria and covered the period from 1990 to 2019 and shall adopt an ex post facto research design in order to explain the relationship between the independent and dependent variable. The ex post facto design is a quasi-experimental study examining how an independent variable, present prior to the study in the participants, affects a dependent variable. A quasi-experimental study simply means participants are not randomly assigned.

3.2 Source of Data

The data for this research will be obtained mainly from secondary sources, particularly from Central Bank of Nigeria (CBN) publications such as CBN annual reports and statements of accounts of various years, CBN statistical bulletins (2019), CBN briefs and data from the National Bureau of Statistics (NBS), relevant journals, magazines, Journals, annual reports and other related research documents, and textbooks on financial system in Nigeria.

3.3 Method of Data Collection

The data for this study were collected online from CBN Statistical Bulletin (2019). In that, the focus was mainly on the key variables identified to include Budget deficit (DEF), Inflation rate (INF), Interest rate (INT), Money supply (M2), and Gross Domestic Product (GDP).

3.4 Method of Data Analysis

The method adopted for data analysis is the General linear model. This was conducted to ascertain the level of relationship between the study variables. The model is an extension of simple linear regression. It is used when there is need to predict the value of two or more other variables. In this study, the variables to predict are called the dependent variables (which include INF, INT, M2 and GDP). The variable that is used to predict the value of the dependent variables is called the independent variable or sometimes, explanatory variable (in this case, DEF). This method of analysis is a compact way of simultaneously writing several multiple linear regression models. In that sense it is not a separate statistical linear model (Mardia, *et al.*, 1979; Nworuh, 2004). Prior to the general linear model, preliminary tests were conducted using: Augmented Dicky-Fuller unit root to test the stationarity of the variables; ARDF cointegration to test long-term autocorrelation; and causality test to check the determinants of the variables.

3.4.1 Model Specification

The various multiple regression models in the general linear model may be compactly written as;

$$Y = XB + U$$

Where:

Y = a matrix with series of multivariate measurements.

X= a matrix of observations on independent variable that might be a design matrix.

B = a matrix containing parameters that are usually to be estimated.
U = a matrix containing errors.

3.4.2 Decision Rule

If the P-value is less than 0.05 alpha level, the null hypothesis of no significant relationship will be rejected. But if the P-value is greater than 0.05 alpha level, the null hypothesis will be accepted.

3.4.3 The *a priori* expectations

INF, INT, M2, and GDP < 0.

4. RESULTS AND DISCUSSIONS

4.1 Data Presentation

Table 1: Dataset for Budget Deficit, Inflation, Interest Rate, Money Supply, and Gross Domestic Product

YEAR	DEF [B'N]	INF [%]	INT [%]	M2 [B'N]	GDP [B'N]
1990	-22.12	7.36	27.70	47.42	499.68
1991	-35.76	13.01	20.80	75.40	596.04
1992	-39.53	44.59	31.20	111.11	909.80
1993	-65.16	57.17	36.09	165.34	1,259.07
1994	-70.27	57.03	21.00	230.29	1,762.81
1995	1.00	72.84	20.79	289.09	2,895.20
1996	32.05	29.27	20.86	345.85	3,779.13
1997	-5.00	8.53	23.32	413.28	4,111.64
1998	-133.39	10.00	21.34	488.15	4,588.99
1999	-285.10	6.62	27.19	628.95	5,307.36
2000	-103.78	6.93	21.55	878.46	6,897.48
2001	-221.05	18.87	21.34	1,269.32	8,134.14
2002	-301.40	12.88	30.19	1,505.96	11,332.25
2003	-202.72	14.03	22.88	1,952.92	13,301.56
2004	-172.60	15.00	20.82	2,131.82	17,321.30
2005	-161.40	17.86	19.49	2,637.91	22,269.98
2006	-101.40	8.23	18.70	3,797.91	28,662.47
2007	-117.24	5.39	18.36	5,127.40	32,995.38
2008	-47.38	11.58	18.70	8,643.43	39,157.88
2009	-810.01	12.56	22.62	9,687.51	44,285.56
2010	-1,105.40	13.72	22.51	11,101.46	54,612.26
2011	-1,158.52	10.84	22.42	12,628.32	62,980.40
2012	-975.78	12.22	23.79	15,503.41	71,713.94
2013	-1,153.49	8.48	24.69	18,743.07	80,092.56
2014	-835.71	8.06	25.74	20,415.61	89,043.62
2015	-1,557.83	9.01	26.71	20,885.52	94,144.96
2016	-2,673.84	15.68	27.29	24,259.00	101,489.49
2017	-3,609.37	16.52	30.68	28,604.47	113,711.63
2018	-3,628.10	12.09	31.00	29,774.43	127,736.83
2019	-4,913.82	11.40	31.01	34,251.70	144,210.49

Source: CBN Statistical Bulletin, 2019

4.2 Results

4.2.1 Unit Root Test

Table 4.2 presented the summary of unit root tests results gotten at levels, first difference and second difference.

Table 2: Unit Root Test

Variable	T-Stat	Critical Values			Lagged Diff.	Probability
		1%	5%	10%		
At Level						
INT	-3.092007	-3.679322	-2.967767	-2.622989	0	0.0383
At 1st Diff.						
INF	-4.358654	-3.689194	-2.971853	-2.625121	0	0.0019
At 2nd Diff.						
M2	-7.27641	-3.711457	-2.981038	-2.629906	1	0.0000
GDP	-6.273282	-3.699871	-2.976263	-2.62742	0	0.0000
DEF	-4.673732	-3.752946	-2.998064	-2.638752	4	0.0012

Source: Computer output

The Augmented Dickey Fuller test were conducted on all the variables and the result (Table 4.2) gotten, showed that interest rate (INT) was stationary at level as its t-statistic value at zero lag was greater than the critical value at 5%. Inflation rate (INF) was stationary at first (1st) difference as its t-statistic at zero lag was greater than the critical value at 5%. On the other hand, Money supply (M2), Gross Domestic Product (GDP), and Budget deficit (DEF), were stationary at second (2nd) difference as their t-statistic values were greater than the critical values at 5%. This result implies that regression on these variables will not yield spurious result.

4.2.2 Cointegration Test

The result in Table 4.3 represented the cointegration test result.

Table 3: Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.835615	50.55518	33.87687	0.0002
At most 1 *	0.752280	39.07273	27.58434	0.0011
At most 2	0.524715	20.82754	21.13162	0.0551
At most 3	0.309918	10.38647	14.26460	0.1878
At most 4	0.097255	2.864822	3.841466	0.0905

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

Source: Computer output

The result (Table 4.3) showed 2 co-integrating variables at 5% critical value as the likelihood ratio values (Max-Eigen Stat.) of the variables (50.55518 and 39.07273) were greater than their respective 5 percent critical values (33.87687 and 27.58434). Again, from the decision rule, the probability values are less than the 0.05 (critical value), we therefore, reject the null

hypothesis and conclude that there exist long run equilibrium relationship between the dependent variables (INF, INT, M2, and GDP) and the independent variable (DEF).

4.2.4 Granger Causality Test

The result in Table 4.4 represented the output of concern for the Granger causality test.

Table 4: Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
INF does not Granger Cause DEF	28	0.20495	0.8162
DEF does not Granger Cause INF		0.27944	0.7587
INT does not Granger Cause DEF	28	0.02278	0.9775
DEF does not Granger Cause INT		1.86101	0.1782
M2 does not Granger Cause DEF	28	5.43027	0.0117
DEF does not Granger Cause M2		0.05811	0.9437
GDP does not Granger Cause DEF	28	5.16029	0.0141
DEF does not Granger Cause GDP		7.27503	0.0036

Source: Computer output

The results (Table 4.4) suggested that among the variables tested, DEF does not Granger Cause INF, INT and M2; but on the contrary, DEF determinant of the GDP as they showed significant relationship ($p < 0.05$).

4.2.5 General Linear Model Result

The output of the General linear model analysis was represented in Tables 4.5. The result shows that Beta coefficient that present the contributions of each variable to the model. The t and p-values show the impact of the independent variable on the dependent variables.

Table 5: Parameter Estimates

Parameter Estimates

Dependent Variable	Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
						Lower Bound	Upper Bound	
INF	Intercept	20.601	3.665	5.622	.000	13.094	28.108	.530
	DEF	.003	.002	1.166	.253	-.002	.008	.046
INT	Intercept	22.866	.876	26.099	.000	21.071	24.661	.961
	DEF	-.002	.001	-3.111	.004	-.003	-.001	.257
M2	Intercept	2243.895	871.239	2.576	.016	459.243	4028.547	.192
	DEF	-7.734	.585	-13.216	.000	-8.932	-6.535	.862

GDP	Intercept	14029.450	3964.192	3.539	.001	5909.17 0	22149.730	.309
	DEF	-31.418	2.663	- 11.800	.000	-36.872	-25.964	.833

Source: Computer output

From the result in Table 4.5, there were significant relationships between DEF and INT ($p=0.004$), DEF and M2 ($p=0.000$), DEF and GDP ($p=0.000$), However, there was no significant relationship between DEF and INT. The direction of these relationships was further ascertained by the Beta values which revealed that DEF had a negative effect on INT ($t= -3.111$), M2 ($t= -13.216$) and GDP ($t= -11.800$), whereas it influenced INF positively.

Table 6: Model Summary

DEF	INF	a. R Squared = .046 (Adjusted R Squared = .012)
	INT	b. R Squared = .257 (Adjusted R Squared = .230)
	M2	c. R Squared = .862 (Adjusted R Squared = .857)
	GDP	d. R Squared = .833 (Adjusted R Squared = .827)

Source: Computer output

Table 4.6 presented the model summary of the general linear model. It shows the coefficient of determination (R^2) and the Adjusted coefficient of determination (Adj. R^2). These coefficients show the goodness of fit between the variables. From the result, DEF showed better goodness of fit with M2 and GDP only, while it did not perform better in INF and INT. In order words, at 86.2%, DEF explains variations in M2 ($R^2=0.862$), at 83.3%, DEF explains changes in GDP ($R^2=0.833$), at 4.6%, DEF explains changes in INF, and at 25.7%, DEF explains variations in INT ($R^2=0.257$).

Table 7: Multivariate Analysis of Variance (MANOVA)
Multivariate Tests^a

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Squared	Eta
Intercept	Pillai's Trace	.975	242.32 8 ^b	4.000	25.000	.000	.975	
	Wilks' Lambda	.025	242.32 8 ^b	4.000	25.000	.000	.975	
	Hotelling's Trace	38.772	242.32 8 ^b	4.000	25.000	.000	.975	
	Roy's Largest Root	38.772	242.32 8 ^b	4.000	25.000	.000	.975	
DEF	Pillai's Trace	.887	48.910 ^b	4.000	25.000	.000	.887	
	Wilks' Lambda	.113	48.910 ^b	4.000	25.000	.000	.887	
	Hotelling's Trace	7.826	48.910 ^b	4.000	25.000	.000	.887	
	Roy's Largest Root	7.826	48.910 ^b	4.000	25.000	.000	.887	

a. Design: Intercept + DEF

b. Exact statistic

Source: Computer output

Table 4.7 presents multivariate tests that show the contributions of the independent variable to the model. The p-values (Sig.) from the various standards explained the effect of the DEF in the model. It showed that INF, INT, M2 and GDP as a group were significantly influenced by DEF ($p < 0.05$).

4.3 Hypotheses Testing

4.3.1 Hypothesis One

H₀₁; Budget deficit has no significant effect on inflation rate in Nigeria.

H_{a1}; Budget deficit has a significant effect on inflation rate in Nigeria.

Since p-value for INF from Table 4.5 (0.253) is greater than 0.05 (risk level), we reject the alternative hypothesis and accept the null, to conclude that budget deficit had no significant effect on inflation rate in Nigeria.

4.3.2 Hypothesis Two

H₀₂; Budget deficit has no significant effect on interest rate in Nigeria.

H_{a2}; Budget deficit has a significant effect on interest rate in Nigeria.

The result from Table 4.5 also shows that the p-value (0.004) for INT is less than 0.05 (risk level), therefore, we reject the null hypothesis and accept the alternative to conclude that budget deficit had a significant effect on interest rate in Nigeria.

4.3.3 Hypothesis Three

H₀₃; Budget deficit has no significant effect on money supply in Nigeria.

H₀₃; Budget deficit has a significant effect on money supply in Nigeria.

The result in Table 4.5 equally revealed that the p-value for M2 (0.000) is less than 0.05 (risk level), therefore, we reject the null hypothesis and accept the alternative to conclude that budget deficits have no significant effect on broad money supply in Nigeria.

4.3.4 Hypothesis Four

H₀₄; Budget deficit has no significant effect on economic growth in Nigeria.

H₀₄; Budget deficit has a significant effect on economic growth in Nigeria.

The result from Table 4.5 again shows that the probability value for GDP (0.000) is greater than 0.05 (risk level), therefore, we reject the null hypothesis and accept the alternative to conclude that budget deficit had a significant effect on economic growth in Nigeria.

4.4 Discussion of Results

The Augmented Dickey Fuller test result showed that interest rate (INT) was stationary at level, Inflation rate (INF) was stationary at first 1st difference, whereas Money supply (M2), Gross Domestic Product (GDP), and Budget deficit (DEF) were stationary at second 2nd difference. This result implies that regression on these variables will not yield spurious result. This result is closely related to several studies which include Nkaku (2015), Nkrumah *et al.* (2016), Okoro & Oksakei (2020), Sunday *et al.* (2020). In their separate studies, the macroeconomic variables (Inflation rate, lending interest rate, and gross domestic product) were stationary at their first order of differentiation.

The cointegration result showed that there exist long run equilibrium relationship between the dependent variables (INF, INT, M2, and GDP) and the independent variable (DEF). This result is in agreement with the studies Nkrumah *et al.* (2016) and Akamobi & Unachukwu (2021). In their separate studies, there was a long run relationship between budget deficit and macroeconomic variables. Contrariwise, in other studies such as Okoro & Ukagba (2020),

Chukwu *et al.* (2020), there was no long-run equilibrium relationship between budget deficit and macroeconomic variables.

The results from the Granger causality test suggested that among the variables tested, DEF does not Granger Cause INF, INT and M2. However, DEF had a causal relationship with GDP as it showed ($p < 0.05$). This result is in agreement with the finding of Nkrumah *et al.* (2016), Akamobi & Unachukwu (2021). In their separate studies there was unidirectional causality running from budget deficit to economic growth, private investment and public investment. Similarly, in the study of Sunday *et al.* (2020), budget deficit does not Granger Cause inflation rate and interest rate. Also, in the study of Okoro & Oksakei (2020), there is significant causal relationship existing between federal government deficits and lending rate.

The results from the general linear model revealed that relationship between DEF and INT was negative and significant ($p < 0.05$). Contrariwise, in the study of Odionye & Uma (2013), there was a long run relationship between budget deficit and interest rate. Also, in the study of M-Amin (2015), there was a significantly positive relationship between INR and budget deficit. The relationship between DEF and M2 was negative and significant ($p < 0.05$). The relationship between DEF and GDP was negative and significant ($p < 0.05$). Similarly, in the study of Nkrumah *et al.* (2016), the econometric results show a significantly negative effect of budget deficits on economic growth in Ghana. The relationship between DEF and INF was positive and insignificant ($p > 0.05$). Generally, in the findings of Osuka & Achinihu (2014), budget deficits exert significant impact on the macro-economic performance of the Nigerian economy. Also, the study of Epaphra (2017) found that there is a significant negative relationship between real GDP, exchange rate, and budget deficit in Tanzania.

The coefficient of determination (R^2) and the Adjusted coefficient of determination (Adj. R^2) show the goodness of fit between the variables. From the result, DEF showed better goodness of fit with M2 and GDP, but did not perform better in INF and INT. In order words, at 86.2%, DEF explains variations in M2 ($R^2 = 0.862$), at 83.3%, DEF explains changes in GDP ($R^2 = 0.833$), at 4.6%, DEF explains changes in INF, and at 25.7%, DEF explains variations in INT ($R^2 = 0.257$). In the study of Osuka & Achinihu (2014), the Coefficient of Determination (R^2) of 0.73 showed that the budget deficit variables included in the model explained 73% of the variations in the macroeconomic variables which implied that the model is a good fit to the relationship.

In a nutshell, the MANOVA result showed that the effect of DEF on INF, INT, M2 and GDP as a group was statistically significantly at 5% alpha level ($p < 0.05$). Contrariwise, in the multivariate analysis of Musa & Mawejje (2014) using VAR Residual Normality Tests, budget deficit had no significant joint macroeconomic effect.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

On the basis of our findings, the study therefore, concludes as follows;

- a) There was a negative and significant relationship between budget deficit and interest rate in Nigeria.
- b) There was a negative and significant impact of budget deficit on broad money supply in Nigeria.
- c) There was a negative and significant effect of budget deficit on Gross Domestic Product in Nigeria.
- d) The relationship between budget deficit and inflation rate in Nigeria was positive and insignificant.

Concisely, there was a statistically significant ($p < 0.05$) impact of budget on macroeconomic variables. The coefficients of determination showed that budget explains changes in the macroeconomic variables at 73%.

5.2 Recommendations

In the light of the researcher's findings, the following recommendations are presented;

- i. As budget deficit influences interest rates and broad money supply negatively, government should minimize the amount of deficits injected in the economy so as not to crowd - out private investment.
- ii. Since budget deficits have not enhanced the level of economic growth expected in Nigeria, the government should endeavour to have a balanced budget. This will enable her manage available resources.
- iii. For the nation to achieve and maintain sustainable long-run economic growth, monetary policy should be used to complement fiscal policy so as to curtail inflation when budget deficit is used as policy instrument.
- iv. The government should monitor how these budget deficits are being utilized the impact on growth have minimal impact on the economy.

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