EMPIRICAL INVESTIGATION BETWEEN BUDGET DEFICIT, INFLATION AND MONEY SUPPLY IN NIGERIA

Ibrahim A.O. BAKARE
(Corresponding Author)
Department of Economics,
Faculty of Social Sciences, Lagos State University,
Ojo Campus, PMB 0001,
E-mail: bakgiit@yahoo.com

O.A. ADESANYA
Faculty of Social Sciences,
Lagos State University, Ojo Campus, PMB 0001,
LASU Post Office, Lagos. Nigeria.
Email:adesanya_oyindamola@yahoo.com

S.A. Bolarinwa
Department of Accounting and Finance,
Faculty of Management Sciences,
Lagos State University,
Ojo Campus, PMB 0001,
LASU Post Office, Lagos. Nigeria.
E-mail:sehilatabike@gmail.com

ABSTRACT

The paper critically investigates the long term relationship between budget deficit, money supply and inflation in Nigeria between 1975 and 2012. The paper employs quantitative methodological framework and specifically draws on econometric technique to find the relationship between inflation rate, growth rate of money supply, growth of budget deficit/GDP and growth of external debt/GDP. Stationarity test conducted using Augmented Dickey-Fuller (ADF) reveals that the variables used are stationary at levels. The Johansen co-integration test suggests that there are at least three co-integrating vectors among these variables. The estimated coefficient of the ECM reveals that about 132% of the errors in the short run are corrected in the long run. The overall result between inflation rate and growth of money supply, growth of BD/GDP and growth of ED/GDP indicates that the specified model is statistically significant at 5% level. By implication, the model is of goodness of fit i.e. reliable for policy making.

However, the paper recommends that the Nigerian government should demonstrate a high sense of transparency in its monetary and fiscal operations in order to curb high prevalence of money supply and external debt, money supply in order to reduce the incidence of inflation in Nigeria.

The main contribution of this work to knowledge lies in illuminating the theoretical and empirical linkages between budget deficit, money supply and inflation; which was inadequately investigated in previous studies. The linkages enhance our understanding about various interpretations which have shaped budget deficit, inflation and other macroeconomic variables both in theory and practice.

KEYWORDS: *Budget Deficit, Money Growth, Inflation, External Debt, Growth.*

I. INTRODUCTION

Most economic scholars are of the view that inflation[5] is strictly a monetary phenomenon. These scholars argue that inflation occurs when the rate of growth of the money supply[6] is higher than the growth rate of the economy (Akcay, Alper and Ozmucur, 1996, Chimobi and Igwe, 2010). This is the conventional monetarist linkage from the creation of base money to inflation when Central Banks issue money at a rate that exceeds the demand for cash balances at the existing price level and the increased demand in the goods market pushes up the price level as the public tries to get rid of its excess cash holdings. It is the contention of these economists that the Central Banks can eliminate the link between budget deficits and inflation by refusing to monetize the deficit, i.e., by not buying the bonds issued by governments. Higher deficit policies may, however, lead to higher inflation even in the absence of monetization by Central banks. The government's borrowing requirement will increase the net credit demands in the economy, drive up the interest rates and crowd out private investment. The resulting reduction in the growth rate of the economy will lead to a decrease in the amount of goods available for a given level of cash balances and hence the increase in the price level (ibid).

Various studies have examined the possibility of a relationship between deficit financing and the general price level. Deficit financing is a major cause of inflation. Budget deficit[7], money supply and inflation have been regarded as some of the important factors on issues relating to economic growth and development in Nigeria. One of the fundamental issues in Nigeria's policy formulation is how to put inflation, money supply and budget deficit under effective control (Omoke and Oruta, 2010).

According to Anyanwu (1997) budget deficit refers to government expenditure exceeding government revenue over a period of time. When a deficit is involved, it is important to find remedy for financing such deficits so as to eradicate its negative effects. The growth and persistence of developing countries in recent times has brought the issues of budget deficits into sharp focus. In the developing countries like Nigeria, fiscal deficits have been blamed for much of the economic crisis that beset them about two decades ago resulting in over indebtedness and the debt crisis, high inflation, poor investment performance, and growth (Ezeabasili, *et al* , 2012). The development of a budget deficit is often traced to the Keynesian inspired expenditure-led growth theory of the 1970s. Most countries of the world adopted this theory that government has to motivate the aggregate demand side of the economy in order to stimulate economic growth. However, the consequences of budget deficit on macroeconomic variables cannot be underestimated in most countries of the world, including Nigeria (Olomola and Olagunju, 2004).

The supply of money is a stock at a particular point in time, though it conveys the idea of a flow over time. The term Money supply refers to the amount of money in the hands of the non-bank public at a point in time and the some balances in commercial banks (Okeowo, 2008). The Central Bank of Nigeria (CBN) as well as public and private analysts shows interest in the growth of money supply because of the impact it is believed to have on real economic activities and the general price level. The growth in money supply will lead to inflation if demand for money is stable if increase in money supply is not met by equal increase in demand (Umeora, 2010).

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[5] Simply put, inflation depicts an economic situation where there is a general and persistent rise in prices of goods and services. It could be said to be a continuous rise in prices as measured by the Consumer Price Index (CPI). People describe inflation as a situation where too much money is chasing too few goods. During inflation in an economy, the currency loses purchasing power (see: Umeora, 2010).

[6] Money supply is the amount of money within a specific economy available for purchasing goods or services. The broad definition of money supply (M2+) is adopted which includes currency in circulation, demand deposits, quasi-money and foreign currency deposits (WAMA, 2009)

[7] Budget deficit is a situation where total expenditure exceeds the revenue for a given financial period (see, Omoke and Oruta 2010).

The problem of inflation in Nigeria dates back to the 1970's when the Nigerian – Biafra war ended and was succeeded by the Udoji awards of 1974. With the increase in public expenditure, enhanced by increases in oil revenues, there was vast expansion in aggregate demand. With the inelastic supply of domestic output, inflation inevitably resulted (Imobighe 2012). The effects of inflation on the economy are generally considered as predominantly harmful and this explains why price stability is often regarded as one of the fundamental objectives of government's macroeconomic policy.

Therefore, the objective of this paper is to investigate the empirical linkages between budget deficit, money supply and inflation in Nigeria. The rest of the study is structured as follows: section 2 presents a review of literature. In section 3, the trends of budget deficit in Nigeria was discussed. Section 4 presents the methodology that governs the paper, while section 5 analyzed the empirical result. Finally, section 6 concludes the paper.

II. LITERATURE REVIEW

The literature review is discussed along two main areas: theoretical and empirical review. The theoretical review dichotomizes the factors that shape the relationship between inflation, budget deficit and money supply into monetary hypothesis and New Keynesian theory while the empirical review questions both the short run and long run relationship between the variables under consideration.

Theoretical Foundation

Following Lozano (2008), the grounded theoretical approaches to the relationship between budget deficit, money supply and inflation is separated into the traditional and new approach. The traditional approach mirrors the Monetary Hypothesis (MH) which is in line with the quantity theory of money. The fiscal theory of price level (FTPL.) which links the fiscal and monetary policies is known as the quantity theory of public debt while the New Keynesian Theory (NK) builds on dynamic general macroeconomic models in which the relationship between money supply, inflation and budget deficit is derived from aggregate demand and aggregate supply. The theoretical foundation underlying these approaches is comprehensively presented below:

The Monetarist Hypotheses (MH)

While reflecting on the quantitative theory of money, it is argued in this hypothesis that the pattern of real economic activity requires a certain desired level of real money balances, and the price level is controlled by the nominal money supply. The logic behind this position is that given the nominal money supply-exogenously determined by the monetary authority-price level is determined as the unique level of prices that will make the purchasing power of the money supply equal to the desired level of real balances. In practical terms, it means the central bank seeks to ensure that the quantity of money agents want for their transactions. If the nominal money supply differs from the desired real balances at a given price level, it will translate into changes in that price level. Hence, the price level has to be fully flexible and determined exclusively by the exogenous nominal money supply.

In relation to fiscal policy, the nominal money supply could change due to the use of seigniorage[8] as a main source of financing for public expenditure, or as the result of an open market operation in which the central bank purchases interest-bearing government debt. Since these two money expansion mechanisms may have different repercussions for taxes and the stock of government debt, they may lead to different effects on prices or interest rates. The budget deficit and its subsequent financing through money creation

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[8] Following Black (2002), Seigniorage implies profit made by a government from issuing currency (it is the difference between cost of production and face value of currency).

(seigniorage) are regarded as exogenous to the monetary authority. Hence, money growth would be dominated by the government's financing requirements, and the price level increases as result of that monetary expansion. From an empirical point of view, in terms of tile deficit-money growth-inflation system, it means the first two variables in the system have to satisfy the weak exogeneity property, while the later has to be determined endogenously. Consequently, with a monetarist approach, there is expected to be a positive correlation between monetary growth and inflation. A regime of that nature is known as fiscal dominance, pursuant to the spirit of Sargent and Wallace's seminal paper (1981).

The Fiscal Theory of the Price Level (FTPL)
The FTPL integrates fiscal and monetary policies through the government inter-temporal budget constraint (GBC), which also is understood as a long-term solvency condition for public sector finances. The GBC is satisfied when the discounted value of the government's future primary surplus is larger than for equal to) the current nominal value of the public debt.

The GBC is assumed to be an equilibrium condition, and the future path of revenues and primary expenditures is decided exogenously by the fiscal authority. Therefore, given a discount rate, if the discounted value of the primary surplus is lower than a predetermined level of nominal debt (both as a percentage of nominal GDP), the price level has to "jump" to equalize the GBC condition: i.e. the price level becomes the exclusive adjustment variable to maintain that condition. In order to be more explicit about how the price level is affected by fiscal actions. Woodford (1995) suggests first considering a positive and exogenous price shock that reduces the real value of the government's liabilities and leads to a parallel a reduction in the real value of private portfolios invested in government securities. The lower real value of these private assets generates a negative wealth-effect, which will be reflected ultimately in less demand for goods. According to the FTPL, the agent's expectations concerning the sustainability of fiscal policy would produce a similar wealth effect.

The New Keynesian Approach (NK)

This approach resolves the relationship between money growth, inflation and budget deficit from a system of two equations: aggregate supply (or an inflation equation) and aggregate demand. The system which is well substantiated for a closed economy is obtained with a dynamic stochastic general equilibrium framework based on maximization of the agent's behavior, with imperfect competition.

The demand equation is a "special" IS-function. It is achieved on a micro-fundamental basis and is affected by both the output gap and real interest rate expectations (i.e. it is an expectation forward looking IS curve). The supply equation corresponds to a NK version of the Phillips curve, based on maximization of the firm's profits, which adjust its prices temporarily, in a staggered way. This two-equation system represents the equilibrium conditions for a well specified general equilibrium model, which is usually completed with an interest rate rule used by the central bank to control inflation (when monetary policy is rule based instead of discretion based).

Review of Empirical Studies

Several efforts have been made by scholars to question both the short run and long run relationship between budget deficit, money supply and inflation. In investigating these studies, a number of scholars focused on the impact of these variables on developed countries while other scholars focused their attention on the economies of developing countries. However, evidence from empirical literature on the nature of these relationships remains inconclusive. The empirical evidence below captures pluralistic investigations carried out by various scholars traversing developed and developing countries on the relationship between budget deficit, inflation and money supply.

Using postwar data for the US and twelve other developed and developing countries, King and Plosser (1985) examined the connection between government deficit and factors that influence inflation in neoclassical macroeconomic models; i.e. factors affecting the supply of, or demand for money, using both single equation OLS regressions and VARs. The scholars found little evidence that deficit played an important role in postwar inflation by exerting pressure on the central bank to print money.

In the United States of America, Joines (1985) empirically analyzed the relationship between government budget deficits and the growth of high-powered money during an extended period (1866-1983). Through reduced-form equations, the scholar provides no evidence that growth in high-powered money is related to the non-war government deficit, after controlling the level of overall economic activity. The results from the study are consistent with the view that the government has set its real targets for the deficit and for high-powered money growth independently of one another.

De Haan and Zelhorst (1990), analyze the relationship between government budget deficit and money growth in developing countries. The overall conclusion of this study does not provide much support for the hypothesis that government budget deficit causes monetary expansion and, therefore, leads to inflation. Similarly, Vieira (2000) investigates the relationship between fiscal deficit and inflation in the case of six major European economies. The results provide little support for the proposition that budget deficit has been an important contributing factor to inflation in these economies over the last 45 years.

In Turkey, Karras (1994) investigated the impact of budget deficit on money growth, inflation investment and real output for a wider sample of 32 countries, including developed and developing economies. He used annual data between 1950 and 1989, to estimate reduced-form equations and found among other things that (i) deficits are generally not monetized and therefore do not produce inflation via monetary expansion; and (ii) deficits are not inflationary, even by virtue *of* their aggregate demand deficits. For the same country, Metin (1998) evaluated annual fiscal and monetary data for Turkey (from 1950 to 1987) and found the budget deficit and government debt monetization affected the price level significantly. For the same country, Ozatay (2000) found the price level has been adjusted to the monetary imbalances caused by the Turkish government's fiscal imbalances.

Kelly (1997) examined the effects of public expenditure on economic growth among 73 nations (including developing and developed nations) over the period 1970-1989. This study used ordinary least square to estimate economic growth as a function of various public expenditures (such as social expenditure, educational expenditure and other expenditures) and certain variables, which have been prominent in the empirical growth literature such as private investment, and the trade openness variable. This study realized that public investment, and particularly housing expenditure, registers a uniformly positive and frequently significant relationship with growth. Although the results do not support a robust relationship between public investment and growth, they nevertheless conflict with the crowding out thesis that dominates the theoretical literature. Social security expenditures are positively related to growth in each specification of the model and significantly so in several versions. The results are important because they suggest that nations may pursue social welfare and growth simultaneously. The results indicate that health expenditures are negatively and sometimes significantly related to growth, while those for education vary in sign and significance.

For the Democratic Republic of the Congo, Nachega (2005) assessed the fiscal dominance (FD) hypothesis dining the period 1981-2003, using a co-integration analysis. The empirical findings reveal a strong and statistically significant long- term relationship between fiscal deficit and money growth, and between money creation and inflation. This supports the assumption that the FD hypothesis applies throughout the period studied.

With reference to Nigeria, Ebiringa (1998) examined the macroeconomic impact of public sector deficit on macroeconomic performance for the period between 1988 and 1997. On finding an insignificant negative relationship between growth in public sector deficit (% of GDP) and inflation, the study concluded that large accelerations of monetary financing cannot consistently result in higher inflation. The study adopted stepwise regression method. Onwioduokit, (1999) studied the causal relationship between inflation and fiscal deficits in Nigeria using annual data from 1970 to 1994. The scholar employed Granger Causality Test. The variables used in this study were ratio of fiscal deficit to gross domestic product, level of fiscal deficit and inflation rate. The scholar found evidence that fiscal deficit caused inflation without a feedback effect but however feedback existed between inflation and the ratio of fiscal deficit to gross domestic product.

Ogunmuyiwa (2008) argued that, there is unidirectional causality between budget deficit and inflation in Nigeria. The result of the study shows that, the causality runs from inflation to budget deficit in Nigeria. This implies that, inflation causes budget deficit in Nigeria. Omoke and Oruta (2010) studied the causal long term effect relationship between budget deficit, money supply and inflation. They employed Vector Error Correction Model (VECM). Findings from the study revealed that there is a long run relationship between the variables and that money supply Granger causes budget deficit.

Oladipo and Akinbobola (2011) used Granger causality pair-wise test in determining the causal relationship between budget deficit and inflation. The results showed that there was no causal relationship from inflation to budget deficit, while the causal relationship from budget deficit to inflation exists in Nigeria. Furthermore, the result showed that budget deficit affects inflation directly and indirectly through fluctuations in exchange rate in the Nigerian economy. Also, Chimobi and Igwe (2010) investigated the causality between budget deficit, money supply growth and inflation, using Vector Error Correction (VEC) model and Pair wise Granger causality test. The result revealed that inflation and budget deficit have bilateral/feedback causality. This proved that the change that occurred in inflation could be explained by its lag and also lagged value of budget deficit. In the same vein, changes that occur in budget deficit are explained by its lagged values and the lagged values of inflation.

III: STRUCTURE OF BUDGET DEFICIT AND MACROECONOMIC PERFORMANCE IN NIGERIA

Available statistics shows that government expenditure in Nigeria has consistently exceeded its revenue from 1980 to 2012 while the reverse occurred in both 1995 and 1996 when the government recorded surplus budget (see table 1 in the appendix). Scholars have attributed the persistent fiscal deficit to a number of factors including declining tax revenue resulting from the recession and increase in debt service payments on public debt (Olomola and Olagunju, 2004). Fiscal deficit affects macroeconomic variables such as interest rate, exchange rate, inflation, consumption, investment, and so on which serve as medium through which budget deficit affects economic growth. Scholars argued that deficit reduction is crucial to the future growth of an economy, although, economists are divided over its impacts. It is expected that lower budget deficits will lower real interest rates, increase investment, and thereby increase productivity growth and real income (Cebula, 2000).

However, the protangonists of fiscal deficits argue that it can sometimes stimulate economic performance because real structural deficits drive robust growth in output, consumption, encourages savings and investment as well as enhanced productivity and purchasing power in an economy, thereby stimulating economic activities. Deficit reduction' financing is done via borrowing mainly and taxation sometimes, which are both inflationary. Inflation is one of the numerous problems of developing nations which needs to be regulated. The rate of inflation has been on increase with its damaging effect on the economy through the movement of price of consumers' goods and services.

Table 1 (see Appendix) shows the budget deficit/surplus, the percentage changes in budget deficit/surplus and the corresponding rate of inflation from 1980 to 2012 in Nigeria. Budget deficit stood at ₦1, 975.20 million in 1980 while the rate of inflation during the same period was 9.9%. Inflation rose from 9.9% to 20.9% in 1981 when budget deficit increased from ₦1, 975.20 million in 1980 to ₦3, 902.10 million in 1981. But there was a decline in the rate of inflation from 20.9% in 1981 to 7.7% in 1982 when budget deficit further increased from ₦ 3,902.10 million in 1981 to ₦ 6,104.10 in 1982, representing 56.6% increase during the period. However, budget deficit declined from ₦ 6,104.10 in 1982 to ₦ 3,364.50 in1983 which represented 44.9% reduction in budget deficit and it further declined by 20.9% when the deficit reduced to ₦2,660.40 in1984. But inflation increased from 7.7% in 1982 to 23.2% in 1983 and increased further to 39.6% in 1984. Again, Budget deficit started increasing from 1985 up till 1994, while rate of inflation was fluctuating with the highest inflationary rate of 57.2% was recorded in 1993 and the lowest rate of inflation of 5.4% occurred in 1986. However, Nigeria recorded budget surplus in 1995 and 1996. It was in 1995 when budget surplus in Nigeria stood at ₦ 1billion that the highest rate of inflation of 72.8% was recorded in Nigeria. But inflationary rate falls from 72.8% in 1995 to 8.5% in 1997 when Nigeria recorded budget deficit of ₦5billion in 1997. Budget deficit remained uncontrolled between 1997 and 2009 amidst fluctuating inflation during the same period. Budget deficit rose from ₦810,020.70 from 2009 to ₦1105309.78billion in 2010 while inflation rate fell from 27.8% from 2009 to 13.72% in 2010. Budget deficit attained its highest value of 1710267.20 in 2012 coupled with a single digit inflation of 8.2%.This budget deficit figure represent a slight proportional increase of 25.4% relative to 23.4% change in budget deficit between 2010 and 2011.

IV. METHODOLOGY

This paper adopts quantitative methodological framework in order to capture the aggregates of macroeconomic variables used. Macroeconomic variables such as gross domestic products, budget deficit, money supply, external debt, inflation can be robustly analyzed only with the aid of quantification. The use of quantification will facilitate accuracy, reliability and effective time management relative to qualitative methodological framework where data collection generates more time, more risk and financial resources.

The data for this study was obtained mainly from secondary sources; particularly from World Bank world development indicator, Central Bank of Nigeria (CBN) publications such as the CBN Statistical Bulletin, CBN Annual Reports and Statements of Accounts, the Debt Management Office [DMO], CBN Economic and Financial Review Bullion and Bureau of Statistics publications. The data used cover thirty eight (38) years from 1975-2012. The rest of issues covered in the methodological section include: model specification and method of data analysis.

Model Specification

This paper modifies the empirical work of Akcay *et al* (1996)[9] and Ezeabasili *et   al* (2012)[10] in order to formulate its structural equation. The modified structural equation is justified in order to strengthen the work of the aforementioned scholars in relation to the economic realities of macroeconomic variables adopted in this paper. Secondly, to understand the behavior of the variables (inflation rate, growth rate of money supply, growth rate of budget deficit ratio gross domestic product and growth rate of external debt ratio gross domestic product) used between 1975 and 2012 taking cognizance of pre-adjustment era, adjustment periods and post adjustment political economic era in Nigeria.

On the basis of the foregoing analysis, the modified structural model relevant to this paper is specified as follows:

INF = αo + α1GMS + α2GBD/GDP + α3GED/GDP+ Ut. ……………… (1)

Where:
INF = Inflation rate
GMS=Growth rate of Money Supply
GGDP = Growth rate of Gross Domestic Product
GBD/GDP =Growth Rate of Budget Deficit ratio Gross Domestic Product
GED/GDP= Growth Rate of External Debt ratio Gross Domestic Product
Ut = Stochastic variable (error term).

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[9] Akcay *et al* (1996) empirically studied the relationship between budget deficit, money growth and inflation, using Turkish annual data and co-integrating vectors. The study noticed the existence of a stable long-run relationship between budget deficit, money growth and inflation.

[10]Ezeabasili *et al* (2012) adopted the relationship between fiscal deficits and inflation in Nigeria using data over 1970-2006, a period of persistent inflationary trends. The writer adopted co-integration techniques and structural analysis. The results reveal a positive but insignificant relationship between inflation and fiscal deficits in Nigeria. A positive long run relationship between money supply and inflation in the Nigerian economy, suggesting that money supply is procyclical and tends to grow at a faster rate than inflation rate.

V. ANALYSIS AND RESULTS

Analyses of result as are discussed in three sub-sections: (1) Unit root test analysis (2) Co-integration test analysis, and (3) Error Correction Model (ECM) analysis.

Table (1)

Result of unit Root Test

Variables	Augmented-Dickey Fuller (ADF) Test				
	Probability Value (level)	Probability. Value (1st. Diff.)	Probability. Value (2nd. Diff.)	5% Critical Value	Order of Integration
INF	0.0489*	--------	-----------	-1.950394	$I_{(0)}$
GMS	0.000*	--------	-----------	-1.950394	$I_{(0)}$
GBD_GDP	0.0001*	--------	-----------	-1.950394	$I_{(0)}$
GED_GDP	0.0002*	----------	------------	-1.950394	$I_{(0)}$

Source: Data Analysis (2014)

*Rejection of null hypothesis of unit root at 5%.

Prior to the estimation of equation 2, the characteristics of the data were examined to determine whether the data are stationary or not at levels, first difference or second difference. In order to achieve this objective, the Augmented Dickey-Fuller (ADF) test was used. The result of the stationarity test with intercept is presented in table 1. It is clear from the table that all the variables are stationary at levels because the probability values of all the variables were less than 5% level of significance. This is an indication that the data are not nonsensical i.e. they do not have spurious relationship.

Cointegration Test

To test for co-integration, this paper utilized the Johansen (1990) procedure. Co-integration implies the existence of a long-run or equilibrium relationship between a set of variables. Inflation and other macroeconomic variables are co-integrated to check if the existence of the variables demonstrates no inherent tendency to drift apart. The results of the co-integration test are reported in Table 2 and Table 3 below.

TABLE 2: Unrestricted Cointegration Trace Results

Eigenvalue	Trace	5 % Critical Value	Hypothesized No. of CEs
0.617449	103.6451	83.93712	None *
0.485936	69.05295	60.06141	At most 1 *
0.316594	24.77524	24.27596	At most 2 *
0.034574	1.266689	4.129906	At most 3*

Source: Data Analysis (2014)

*Trace value test indicates 3 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 3: Unrestricted Cointegration Rank Results (Maximun Eigen Value)

Eigenvalue	Maximum Eigen Value Statistics	5 % Critical Value	Hypothesized No. of CEs
0.617449	34.63019	36.63019	None *
0.485936	23.95465	30.43961	At most 1 *
0.316594	13.70399	17.79730	At most 2 *
0.034574	1.266689	4.129906	At most 3*

Source: Data Analysis (2014)

*Max-eigen value test indicates no cointegrating eqn(s) at the 0.05 level

*denotes rejection of the hypothesis at the 0.05 level.

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

Given that all the variables are stationary at levels, we then decided to find out whether these variables are co-integrated. The result of the co-integration test shows that there are three co-integrating equations. From the above result, 103.6451, 69.05295, 24.77524 are greater than the critical values 83.93712, 60.06141 and 24.27596 at 5% level of significance. This implies that we are rejecting the H_0 which says that at most 3 of the co-integrating equation are co-integrated for the alternative hypothesis. The maximum Eigen value statistics indicate no cointegrating equation. The existence of cointegration is indicative of a long run relationship between inflation rate and other explanatory variables and is consistent with the monetary-fiscal led theories.

Error Correction Model (ECM)

When there is an existence of co-integration, then the construction of error correction model becomes imperative in order to model dynamic relationships. The importance of an error correction model indicates the speed of adjustment from the short run equilibrium to the long run equilibrium state. Therefore, the greater the co-efficient of the parameter, the higher the speed of the model from short run to the long run and vice-versa. The result of the ECM is specified in an over parameterized form. However, the parsimonious encompassing model depicts the best fitted result for the dynamic specifications.

TABLE 4: ESTIMATE OF THE ERROR CORRECTION MODEL RESULT

Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	20.06053	2.500771	8.021741	0.0000
D(GMS(-1))	0.010733	0.010286	1.043518	0.3067
D(GBD_GDP(-1))	-0.000556	0.000381	-1.459390	0.1569
D(GED_GDP(-1))	0.021023	0.013028	1.613641	0.1192
D(INF(-1))	0.548412	0.161974	3.385813	0.0023
ECM(-1)	-132.4710	53.30594	-2.485108	0.0200

 R-squared   0.468629   Mean dependent var   19.70882

Adjusted R-squared	0.298590	S.D. dependent var	17.17903
S.E. of regression	14.38747	Akaike info criterion	8.392520
Sum squared resid	5174.985	Schwarz criterion	8.796557
Log likelihood	-133.6728	Hannan-Quinn criter.	8.530308
F-statistic	2.756012	Durbin-Watson stat	1.671615
Prob(F-statistic)	0.024881		

The equation of Error Correction Model (ECM) is specified below:

$$DINF=20.1+ 0.01D(GMS(-1))-0.0005D(GBD\_GDP(1))+0.02D(GED\_GDP)+0.55D(INF(-1))-132.5ECM(-1)$$

    (2.50)   (0.01)   (0.0004)   (0.013)   (0.16)   (53.3)

From the result above, the error correction term is statistically significant with appropriate negative sign as required for dynamic stability. This agrees with the validity of an equilibrium relationship among the variables in the cointegrating equation. This term shows that the for every one unit increase in the growth rate of money supply (GMS) lagged in year 1, inflation rate (INF) in the current year increases by 0.01 units. By implication, there is a positive relationship between the growth rate of money supply (GMS) lagged in year 1 and inflation rates. Conversely, for every a unit change in the growth rate of GBD/GDP and the growth rate of GED/GDP lagged by one year, inflation rate in the current year falls by 0.0005units and increases by 0.02units respectively. The speed of adjustment of ECM from the short-run equilibrium to the long-run equilibrium dynamics is 132%. The estimated coefficient of the ECM reveals that about 132% of the errors in the short run are corrected in the long run.

The coefficient of determination of the model, that is, R^2 is 0.468. This indicates that there is a positive linear relationship between the dependent variable (INF) and the explanatory variables (GMS, GBD/GDP, and GED/GDP). By implication, the explanatory variables account for 46.8% of the variations in the inflation rate (INF) from 1975-2012 while the remaining 54.2% variation in inflation rate (INF) is explained by other exogenous variables that are not included in the model (error term). The Durbin-Watson statistic is a test used to detect the presence of autocorrelation (a relationship between values separated from each other by a given time lag). As a rule of thumb, if D-W is less than 2.0, there is an indication that the successive error terms are on average, close in value to one another and positively correlated. It therefore means there is presence of auto correlation. If greater than 2.0, there is no autocorrelation. The Durbin- Watson statistics for the models is 1.67 which shows that there is presence of auto correlation because it is less than 2. From the ECM result, the probability value of F test which is used in detecting the overall significant of the model reveals probability F statistic value of 0.02. This result indicates that our model is statistically significant at 5% level. By implication, the model is of goodness of fit i.e. reliable for policy making.

VI. CONCLUSION AND POLICY IMPLICATIONS

The paper questioned long term relationship between budget deficit, money supply and inflation in Nigeria. The paper also reviewed relevant theories and empirical studies that illuminated the relationship between the variables under consideration. Besides, the paper highlighted the structure of budget deficit in relation to various macroeconomic variables in Nigeria. The test for stationarity using Augmented Dickey-Fuller (ADF) proved that the variables used in this study are stationary at levels. The Johansen co-integration test suggested only three co-integrating vectors among the variables tested were cointegrated. The estimated coefficient of the ECM reveals that about 132% of the errors in the short run are corrected in the long run.

Based on the findings of the study, the Nigerian government should display a high sense of transparency in the fiscal operations to bring about realistic fiscal surplus. Fiscal surplus, where recorded should be channeled to productive investments like road construction, electricity provision and so on, that would serve as incentives to productivity through the attraction of foreign direct investment, in other to reduce the incidence of inflation in Nigeria. Also, the implication of these findings was that growth of BD/GDP, growth in money supply and growth of ED/GDP could be inflationary if not properly managed, meaning that they are monetary phenomenon. Inflation was also found to be highly dependent on performance of growth of money supply and the budget (deficit). Hence, adequate monetary policy should be geared towards balancing the growth of money supply, growth of BD/GDP, growth of ED/GDP to inflation in Nigeria.

Considering the causal relationship that exist between budget deficit and inflation, relevant measures has to be put in-place in order to enhance policy coordination among various arms of government, especially monetary policy should be made to complement fiscal policy. For Nigeria to achieve high and sustained long-run economic growth, monetary policy has to be strengthened to act as checks and balances, that is, monetary policy should be used to complement fiscal policy, in order to curtail inflation when budget deficit is used as fiscal policy instrument.

The scope of the paper covered the relationship between inflation and other macroeconomic variables in Nigeria. It is therefore suggested for further studies that researchers should investigate such relationship beyond Nigeria in order to know how inflation, growth rate of money supply, growth rate of BD/GDP and growth rate of BD/GDP will behave for example whenever comparative analysis is conducted between two countries, perhaps Nigeria and Ghana.

The main contribution of this paper to knowledge lies in illuminating the theoretical and empirical linkages between budget deficit, money supply and inflation; which was inadequately investigated in previous studies. The linkages enhance our understanding about various interpretations which have shaped the relationship between inflation and other macroeconomic variables both in theory and practice.

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APPENDIX

TABLE 1: NIGERIAN BUDGETARY PROFILE FROM 1980-2012

Year	Budget Deficit/Budget Surplus (#Million)	Percentage of Changes in Budget Deficit/Budget Surplus (%)	Inflation rate (%)
1980	-1,975.20	35.1	9.9
1981	-3,902.10	97.6	20.9
1982	-6,104.10	56.6	7.7
1983	-3,364.50	44.9	23.2
1984	-2,660.40	20.9	39.6
1985	-3,039.70	14.3	5.5
1986	-8,254.30	171.6	5.4
1987	-5,889.70	28.7	10.2
1988	-12,160.90	106.5	38.3
1989	-15,134.70	24.5	40.9
1990	-22,134.70	46.3	7.5
1991	-35,755.20	61.5	13.0
1992	-39,532.50	10.6	44.5
1993	-65,157.70	64.8	57.2
1994	-70,270.60	7.8	57.0
1995	1,000.0	98.6	72.8
1996	32,049.40	310.5	29.3
1997	-5,000.00	84.4	8.5
1998	-133,389.30	2569.8	10.0
1999	-285,104.70	113.7	6.6
2000	-103,777.30	63.6	6.9
2001	-221,048.90	113.0	18.9
2002	-301,401.60	36.4	12.9
2003	-202,724.70	32.7	14.0
2004	-172,601.30	14.8	15.0
2005	-161,406.30	6.4	17.9
2006	-101,397.50	37.2	8.2
2007	-117,237.10	15.6	5.4
2008	-47,378.50	59.6	11.6
2009	-810,020.70	1609.7	27.8
2010	-1105309.78	36.5	13.72
2011	-1363926.60	23.4	5.4
2012	-1710267.20	25.4	8.2

Source: CBN statistical Bulletin 2013.

(-): Budget Deficit.

(+): Budget surplus