

Impact of Money Supply on Some Macroeconomic Variables on the Nigerian Economy

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DOI: 10.29322/IJSRP.8.8.2018.p8079

<http://dx.doi.org/10.29322/IJSRP.8.8.2018.p8079>

Abstract

The link between aggregate money supply, inflation and economic growth has raised a lot of scholarly debate in the field of economics and finance. The study sets to investigate the impact of money supply on macroeconomic variables in Nigeria from 1985 to 2016. The specific objectives of the paper were to ascertain the impact of narrow money supply, broad money supply, inflation rate, and exchange rate on real gross domestic product on one hand, and narrow money supply, broad money supply and exchange rate on consumer price index in Nigeria. The ex post facto research design and descriptive statistics were used to observe the variables in retrospect. To achieve the objectives of the study, two models were built to mimic the trend. To avoid spurious results, the Augmented Dickey Fuller test was used to solidify the data, which integrated at first difference I(1). The ordinary least square technique was employed to determine the magnitude and direction of the variables in the models. It emerged that narrow money supply has a positive and significant impact on inflation and real gross domestic product; conversely, broad money supply does not have any significant impact on inflation and real gross domestic product. Empirical evidence further showed that exchange rate has an insignificant impact on inflation and real gross domestic product. Inflation rate on the other hand, has an inverse and statistically insignificant impact on real gross domestic product in Nigeria. The results suggest that economic growth and inflation is a function of money supply (narrow money supply) and exchange rate in Nigeria. The paper recommends that efforts should be put in place to better the exchange rate between the naira and other currencies. This will help avoid the imported inflationary pressure on goods and services in the country.

Key word: Money supply, inflation, real gross domestic product, narrow money supply, exchange rate

1. Introduction

The nexus between aggregate money supply, inflation and economic growth has raised a lot of scholarly debate in the field of economics and finance. Money supply is a very sensitive variable - the size and velocity of money supply determines the pace of any economic activity. Apart from being a powerful instrument of monetary policy, its expansion or contraction dictates the growth in investment and output of any economy. It is therefore the usual slogan of the Monetarist school of thought that money matters. They argued that changes in the amount of money in circulation is a major determinant other economic indices. In other words, the changes in the size of money supply have a number of implications on the macroeconomics variables like inflation and economic growth.

Ceteris Paribus, inflation has a linear relationship with money supply and a negative relation with growth in real income or output (Nyong, 2001). In support of this argument, Ogun & Adenikinju (1995) found that the period of oil boom in Nigeria was characterized by rapid monetary growth which coincided with the periods when the country experienced double-digit inflation. The growth in money supply and its economic implications is therefore an issue to be thoroughly investigated. This subject has bordered the minds of Nigerian policy makers for decades. Despite the lacks of consensus among different schools of thought on its effectiveness as an instrument of monetary policy, the Central Bank of Nigeria (CBN) relies on it as its major barometer for shaping economic activities. The design and shift of the monetary measures taken by the central bank in recent times have been either expansionary or contractionary. Expansionary policy tools have been used to increase money supply with the intent of increasing output. Contractionary policy tools have been used on the other hand to decrease money supply in the economy in order to discourage consumption thereby curtailing inflation.

Obviously, Nigeria is a third world country that is predominately dependent on crude oil for economic survival. Nigeria's economic aspirations have remained that of changing the structure of production and consumption patterns, diversifying the economic base and reducing dependence on oil, with the aim of putting the economy on the part of sustainable, all-inclusive and non-inflationary growth. The implication of this is that while rapid growth in output, as measured by the real gross domestic product is important, the revolution of the various sectors of the economy is even more critical. This is consistent with the growth targets of most developing countries.

Irrespective of this glowing objective, over the years, the economy of Nigeria has been beleaguered with several challenges. There has been rise in general price levels leading to major economic distortions in the late 1970s, consequent to the civil war, salary increment, and excess government spending (Olorunfemi & Adeleke, 2013). The gradual, but increasing, inflation rate became serious during the 1980s with the adoption of the structural adjustment program aimed inculcating liberal policies in all spheres of the national economy, plus several military interventions in governance - the various military leaders who came into power pursued expansionary policies in economic management. Inflationary pressures during the SAP era of 1986-1990 was due largely to sundry factors, especially the depreciation of the Naira on the foreign exchange market, which increased the Naira prices of imported goods including raw materials and capital goods as well as an unprecedented growth in money supply during the period (Onoh, 1990). The outcome was a huge balance of payment deficit.

In spite of many, and frequently changing policies, Nigeria has not been able to harness her economic potentials for rapid economic growth and development (Ogbole, 2010). Today, monetary and fiscal policies are both commonly accorded prominent roles in the pursuit of macroeconomic stabilization in developing countries, but the relative importance of these policies has been a serious debate between the Keynesians and the monetarists. The monetarists believe that monetary policy exert greater impact on economic activity while the Keynesian believe that fiscal policy rather than the monetary policy exert greater influence on economic activity. Despite their demonstrated efficacy in other economies as policies that exert influence on economic activities, both policies have not been adequately used in Nigeria (Ajisafe & Folorunsho, 2002).

This notwithstanding, the Central Bank of Nigeria (CBN) has continued to play the traditional role of regulating the stock of money in such a way as to promote the social welfare of Nigerians (Cochrane, 1998). Over the past two or more decades, the primary objective of many developed and developing countries (including Nigeria) have been the maintenance of price stability that supports sustainable economic growth and employment growth. As in most countries worldwide, the Central Bank of Nigeria (CBN) relies on a money demand function in the design and implementation of its monetary policy. The money demand function is used both as a means of identifying medium term growth targets for money supply and as a way of manipulating not only the interest rate and reserve money for the purpose of controlling the total liquidity in the economy but also for managing prices of commodities in the economy (Owoye & Onafowora, 2004).

Unquestionably, one of the macroeconomic goals which the government strives to achieve is the maintenance of stable domestic price level. To achieve this, monetary policy is used to regulate the value, supply and cost of money in an economy, in consonance with the expected level of economic activity (Baghedo & Ebibai, 2014). This goal is pursued in order to avoid the cost of inflation or deflation and the uncertainty that follows when there is price instability (Salam, Salam, & Feridun, 2006). Thus, this macroeconomic goal is aimed at ensuring price stability basically to avoid excess increase and excess decrease in prices of commodities. (Imoughele, 2014), this invariably leads to the attainment of internal and external balance, and the promotion of long run economic growth. This study therefore seeks to ascertain the impact of money supply on inflation and economic growth in Nigeria.

1.2 Objectives of the Paper

The broad objective of this paper is to scrutinize the impact of money supply on inflation and economic growth in Nigeria. The specific objectives of this paper are;

- (1) To investigate the impact of narrow money supply on inflation and real gross domestic product in Nigeria.
- (2) To determine the impact of broad money supply on inflation and real gross domestic product in Nigeria.
- (3) To determine the impact of exchange rate on inflation and real gross domestic product in Nigeria.
- (4) To ascertain the impact of inflation on real gross domestic product in Nigeria.

2. Empirical Literature Review

Several studies have been carried out to ascertain the impact of money supply on economic growth and inflation in developing and developed countries with varying results and conclusions. For instance, Mamo (2012) in a cross country study employed fixed effect panel model and Panel Granger causality to test the effect and causal relationship between inflation and economic growth. The study used strongly balanced panel data which contained 13 SSA countries covering 1969-2009. The estimation results showed that inflation was negatively and significantly related to economic growth. It means that inflation has an adverse effect on economic growth. The Panel Granger causality test showed that inflation Granger causes economic growth for all countries in the sample, while economic growth Granger causes inflation for two countries. Similarly, Chaturvedi, Kumar, & Dholakia (2009) equally used a simultaneous equation model for a panel of 140 countries over the 1970-2005 periods to show that there exists a bilateral causal relationship between the growth and inflation as predicted by recent theories. Most importantly, the results indicated that inflation is harmful to growth whereas the effect from growth to inflation is beneficial. Doroshenko (2001) also considered the relationship between money supply and inflation. The findings confirmed a long-run relationship between money growth and inflation.

A recurring debate in the country specific literature on the effectiveness of monetary policy to stabilize the Nigerian economy in terms of price stability and subsequently stimulating economic growth and stability of money demand function that need not to be ignored in a study of this nature about Nigeria is the "TATTOO DEBATE" put forward by Tomori (1972) which found income,

interest rate and real income to be the major determinants of demand for money in Nigeria. Owing to perceived shortcomings of Tomori's work, Ajayi (1974), Teriba (1974), Ojo (1974) and Odama (1974) questioned that postulation and came up with their own positions. Consequently the debate centred around the significance of income in money demand function for Nigeria, the stability of the function, and the choice of appropriate definition of money in Nigeria.

On the issue of income, in line with Tomori (1972) assertion, Teriba (1974) and almost all the other scholars agreed that income is the most significant determinant of money demand in Nigeria. On interest rate, Teriba (1974) contrasted Tomori (1972) view by arguing that long term interest rate is significant (unstable demand for money) but short term rates are insignificant (stable demand for money function). Those who however, argued that the rate of interest is not significant have two reasons for their argument (Mai-Lafia, 1995). Firstly, the interest rates have remained relatively stable in developing countries so that there is too little variation to allow conventional estimators to capture the effect of interest rates in the demand for money function. Secondly, that owing to the underdeveloped nature of the financial structure of less developed countries, the substitution between money and real assets may be quantitatively more important than that between money and financial assets. Owoye & Onafowora (2007) found income elasticity of 2.067 for Nigeria and interest elasticity of 0.306. On the appropriate definition of money demand in Nigeria, Tomori concludes that M_1 performs better than M_2 . In contrast, Ajayi (1974) asserts that M_2 performs better than M_1 . In an attempt to mediate between Tomori (1972) & Ajayi (1974), Gwosh (1981) contends that both M_1 and M_2 can be used as the definition of money in Nigeria. As lively as the debate was, the issue still remains inconclusive. Several studies have been conducted around the globe on the subject matter.

Following this debate, Nwaobi (2002) made efforts to examine the stability of the Nigeria's money demand function and found it to be stable. Nwaobi (2002) then suggests that monetary policy could be effective and that income is an appropriate determinant in the estimation of money demand in Nigeria. Anoruo (2002) explores the stability of M_2 money demand function in Nigeria during the Structural Adjustment Programme (SAP) period. He observed that M_2 money demand function in Nigeria is stable for the study period. Again, like Nwaobi (2002), he asserts – using M_2 money demand function, that it is a viable monetary policy tool that could be used to stimulate economic activity in Nigeria.

Recently, Gatawa, Akinola, Muftau, & Olarinde (2017) empirically examined the impact of money supply, inflation, and interest rate on economic growth in Nigeria using time series data from 1973-2013. VAR model and Granger Causality test within error correction framework were used. The results of the VEC model provided evidence in support of a positive impact of broad money supply while inflation and interest rate exhibits a negative impact on growth most especially in the long run. The short run parsimonious results revealed that with the exception of inflation, broad money supply and interest rate were negatively related to economic growth. For the test of causality, it was revealed that none of the explanatory variables granger causes economic growth, implying that money supply, inflation and interest rate have not influenced growth.

Chinuba, Akhor, & Akwaden (2015) used time series data to study the impact of money supply on economic growth covering 1981-2008 with simple OLS on the Nigeria economy, the results showed that money supply exerted a considerable positive impact on economic growth. An investigation into the long-run and short-run impact of money supply on economic growth of Nigeria for the period 1986-2006 was carried out by Omotor, (2010) using VAR Model, the results provide evidence in support of the long run positive impact of money supply on growth in income but has no impact in the short-run.

Similarly, Aziakpono (2003) presented and tested a model on money supply and economic growth to determine either or both anticipated and unanticipated money affects real output and growth in Nigeria. The evidence revealed that while anticipated money supply affects real output and growth in Nigeria, the unanticipated money supply did not. Omoke & Ugwuanyi (2010) tested the relationship between money, inflation and output by employing co-integration and Granger-causality test analysis. The findings revealed no existence of a co-integrating vector in the series used. Money supply was seen to Granger cause both output and inflation. The result suggest that monetary stability can contribute towards price stability in Nigerian economy since the variation in price level is mainly caused by money supply and also conclude that inflation in Nigeria is to a large extent a monetary phenomenon. M_2 appeared to have a strong causal effect on the real output as well as prices.

Abbas & Husian (2006) examines the casual relationship between money and income and money and prices in Pakistan. The co-integration analysis indicates, in general, the long run relationship among money, income and prices. The error correction and Granger causality framework suggest a one-way causation from income to money in the long run implying that probably real factors rather than money supply have played a major role in increasing Pakistan's national income, regarding the causal relationship between money and prices, the causality frame work provides the evidence of bi-variate causality indicating that monetary expansion increases and is also increased by inflation in Pakistan. However, money supply seems to be the leader in this case.

Akujuobi (2010) studied monetary policy and Nigeria's economic development using multiple regression analysis, namely; gross domestic product (dependent variable) and independent variables: Cash Reserve Ratio (CRR), Liquidity Ratio (LQR), interest rate, Minimum Rediscount Rate (MRR) and the treasury bill rate and found out that apart from cash reserve ratio, others impacted much on the economic development of the nation.

Similarly, Chimobi & Uche (2010) examined the relationship between money, inflation and output in Nigeria. The study adopted co-integration and granger causality test analysis. The co-integrating result of the study showed that the variables used in the model exhibited no long run relationship among each other. Nevertheless, money supply was seen to granger cause both output and inflation. The result of the study suggested that monetary stability can contribute towards price stability in the Nigerian economy since the variation in price level is mainly caused by money supply and concluded that inflation in Nigeria is to an extent a monetary phenomenon.

Usman & Adejare (2014) empirically examined the effect of money supply, foreign exchange on Nigeria economy with secondary data covering the period of 1988 to 2010. Multiple regressions were employed to analyze the variables; gross domestic product (GDP), Narrow Money, Broad money, exchange rate and interest rate. The results found that all the variables have significant effects on the economic growth with the adjusted R^2 showing that about 97.3% variation in the GDP from 1988 to 2010 is due to NARM.

Similarly, Aminu & Amono, (2012) conducted an empirical investigation into the effect of inflation on the growth and development of Nigeria economy. The work employed Cobb Douglas Production function with ordinary least square method and concluded that inflation possess a positive impact on economic growth. Osuala, Osuala, & Onyeike (2013) carried out an empirical study on the impact of inflation on economic growth over a period of thirty-one years. The VAR results revealed a statistically significant positive impact of inflation on economic growth in Nigeria while the causality test showed that there is no causality in between the two variables. In the same vein, Taiwo (2011) investigated the impact of inflation and investment on economic growth in Nigeria with the use of ordinary least square (OLS) method and annual secondary data from 1981 to 2006, the investigation based on inflation-GDP revealed that inflation has negative and insignificant impact on economic growth, meaning that as inflation increases economic growth falls.

Ifionu & Akinpelumi (2015) examined the effect and implication of selected macroeconomic variables on money supply (M_2), using derived secondary data gotten from the Central Bank Statistical Bulletin (2013). Coupled with the application of econometric technique such as; O.L.S., causality test and Co-integration of time series data to estimate the long and short run relationship and causality of employed variables. The results revealed that all variables were stationary at various lags and there exists a long run relationship between variables employed and it was discovered that apart from inflation had an inverse significance with money supply (M_2) and exchange Rate (EXR), all other variables such as gross domestic Product (GDP) were found to have a positive impact on money supply.

Malik (2006) studied the effects of monetary policy actions on inflation using Near-VAR approach. His results showed that effect of monetary policy transmits into inflation with a lag of half year and then take another year to reach the peak. This study suggested the identification of variables that are most important in explaining inflation in Pakistan by considering monetary policy actions, supply side factors and foreign inflation.

Kenneth, Yuni, & Ihugba (2016) investigated the relationship between inflation and economic growth in Nigeria using a two stage least square estimation to examine the simultaneous models of the study. The study showed that inflation is beneficial to growth though not significantly while growth is significantly beneficial to inflation; given the positive relationship between inflation and growth and the negative relationship between growth and inflation. The results further showed that money supply and trade openness are significant determinants of real GDP for all three estimation techniques under consideration. While, real GDP, money supply and interest rate are significant determinants of inflation.

Furthermore, Femi (2014) the study examined the effect of economic variables such as inflation, income; interest rates, price level and exchange rate have on demand for money, by applying regression analysis with an Error Correction Model (ECM) on various economic variables, covering a period of thirty-three years (1970-2003). The study revealed that inflation was not affected by trend but by Nigerian government policies and that inflation does not exert any significant influence on demand for money. Olorunfemi & Adeleke (2013) studied the impact of money supply and inflation rate in Nigeria using secondary data that ranged between 1970-2008. The study used Vector Auto Regressive (VAR) model. The results revealed that money supply and exchange rate were stationary at the level while oil revenue and interest rate were stationary at the first difference. Results from the causality test indicate that there exists a unidirectional causality between money supply and inflation rate as well as interest rate and inflation rate. The causality test runs from money supply to inflation, from the interest rate to inflation and from interest rate to money supply.

Adeyeye & Fakiyesi (1980) estimated and tested the hypothesis that the main factor responsible for instability of prices and inflationary tendencies in Nigeria was government expenditure. Working with annual time series data spanning 1960–1977, they tested the hypothesis that the rate of inflation in Nigeria is linearly related to the rate of growth of money stock, government expenditure, especially deficit, and growth of government revenue, especially monetization of foreign exchange from oil export. The result established some significant positive relationships between inflation rate and growth in bank credit, growth of money supply and growth in government expenditure, while the relationship with growth of government revenue was uncertain.

Using quarterly data, Osakwe (1983) attempted to verify the amount of government expenditure that affected money supply in the ten-year period 1970–1980. Significant statistical evidence obtained from the analysis showed strong relationships between

increases in net current expenditure and growth in money supply, on the one hand, and growth in money supply and inflation, on the other hand. Further increases in money wage rate and money supply (with a lag in effect) were identified as the two most important factors that influenced the movement of prices during the period.

Baghelo & Ebibai (2014) empirically examined the impact of monetary policy on selected macroeconomics variables such as gross domestic product, inflation, and balance of payment in Nigeria from (1980-2011) using ordinary least square (OLS) regression analysis. The error correction method is used to ascertain if there is a static long run equilibrium relationship among the explanatory variables and subsequently derive an adequate dynamic model of the short run relationship. The study showed that the provision of investment friendly environment in the Nigerian economy will increase the growth rate of GDP.

Nwaobi (2002) used data from 1960 through 1995 and the Johansen co-integration framework found that money demand, real GDP, inflation and interest rate are co integrated in Nigeria. He also found stable money demand in the period under study. Fatukasi (2004) investigated the determinants of inflation in Nigeria between 1981 and 2003. The study made use of non-linear multiple regression models. He posited that the causes of inflation in Nigeria are multi-dimensional and dynamic, requiring full knowledge at any point in time to be able to proffer solutions to the inflationary trends in the country. Also, Omoke (2010) tested the causal long-term relationship between budget deficit, money growth and inflation in Nigeria. Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) test were carried out to test the stationarity of the variables used. The result of the study pointed to a close long-term relationship between inflation and money supply.

In another country specific study, Olusanya (2009) analyzed the main sources of fluctuations in inflation in Nigeria. Using the framework of error correction mechanism (ECM) it was found that the lagged CPI, expected inflation, petroleum prices and real exchange rate significantly propagate the dynamics of inflationary process in Nigeria. Bakare (2011) conducted a study on the determinants of money supply growth and its implications on inflation in Nigeria. The study employed quasi-experimental research design approach. The results showed that credit expansion to the private sector determines money supply growth and inflation in Nigeria. He therefore concluded that changes in money supply are concomitant to inflation in Nigeria.

Anyanwu & Kalu (2015) examined the correlation that exists between money supply and economic growth using time series data for 18 years (1994-2012) on money supply, CLBA and output. The findings showed that change in money supply (M2) has significant effect on variables such as CBLA and output in Nigerian economy within the period under review. It also showed that there is a significant strong multiple correlation among Real GDP, money supply and commercial banks' loans and advances ($R=95.1\%$). The coefficient of Determination (R^2) reveals that 90.5% of variations in RGDP were explained by the selected explanatory variables.

Inam (2014) studied the role of money supply on economic growth in Nigeria between 1985-2012 using augmented Cobb-Douglas production function and relying on co-integration/Error - Correction methodology. The results showed that money supply have a linear and statistically significant impact on economic growth. Babatunde & Shuaibu (2011) examined the existence of a significant long run relationship between money supply, capital stock, inflation and economic growth between 1975 and 2008 using error correction mechanism. The empirical estimates revealed a positive and significant relationship between money supply and capital stock while a negative relationship was found between inflation and growth.

Abdulazeez (2016) using time-series data covering 1990 to 2010, investigated the impact of monetary policy on economic growth in Nigeria. With the aid of multiple regressions analysis technique on money supply, interest rate, and financial deepening on gross domestic product, the study found that all the variables have marginal impact on the economic growth of Nigeria.

3. Methodology

3.1 Research Design

The Ex-Post Facto research design was adopted to examine the impact of money supply on some macroeconomic variables in Nigeria. This design was adopted to enable the researcher to use time series data to explain the impact of narrow and broad money supply, inflation rate, and exchange rate on real gross domestic product on one hand, and narrow and broad money supply and exchange rate on consumer price index in Nigeria in retrospect.

In addition to this design, the author used descriptive statistics and empirical analytical methods like Augmented Dickey-Fuller (ADF) test to solidify the data, Johansen co-integration test to determine the long run relationship in the variables, and multiple regressions to determine the impact of the variables on the explanatory variables in the study.

3.2 Nature and Source of Data

The nature of the data used in this paper is called time series data. The time series data gave us the needed information about the numerical values of the individual variables of the study from period to period for the estimation of the models.

The data for the paper was obtained from secondary sources, the Central of Nigeria Statistical Bulletin of 2016 and journals. Specifically, the researcher obtained data for real gross domestic product, inflation rate, narrow and broad money supply, and exchange rates from 1985 – 2016.

3.3 Model Specification

The study imitated finance literature and adopted the Multiple Regression using the Ordinary Least Squares like Usman & Adejare (2014), Baghelo & Ebibai (2014), Ifionu & Akinpelumi (2015) to examine the impact of narrow and broad money supply, inflation rate, and exchange rate on real gross domestic product on one hand, and narrow and broad money supply and exchange rate on consumer price index in Nigeria in retrospect in the other hand. The Ordinary Least Squares (OLS) technique is used because it is the most unbiased estimator, consistency, minimum variance and efficiency.

Consequently, the study assumed that real gross domestic product is a function of narrow and broad money supply, inflation rate, and exchange rate, and that consumer price index is a function of narrow and broad money supply and exchange rate in Nigeria. Thus, the mathematical and econometric model follows the augmented technique used by McCallum (1991) and Kohn (1999).

The functional models are stated as follows;

$$RGDP = f(M_1, M_2, INFR, EXR) \quad 1$$

$$INFR = f(M_1, M_2, INFR, EXR) \quad 2$$

This is expressed econometrically as follows;

$$RGDPGR = \beta_0 + \beta_1 M_1 + \beta_2 M_2 + \beta_3 INFR + \beta_4 EXR + u \quad 3$$

$$INFR = \beta_0 + \beta_1 M_1 + \beta_2 M_2 + \beta_3 EXR + u \quad 4$$

Where;

RGDP = Growth rate of real Gross Domestic Product

INFR = Inflation rate

M₁ = Narrow money supply

M₂ = Broad money supply

EXR = Exchange Rate

u = Stochastic term

β₁ to β₄ = Parameter estimates

A priori Expectations

β₁ > 0, β₂ > 0, β₃ > 0, β₄ > 0.

The implication of this is that all the coefficients of the explanatory variables are expected to have a linear impact on the dependent variables.

Operational Description of the Variables

1. **Narrow Money Supply (M₁)** - Currency outside bank plus demand deposits of commercial banks.
2. **Broad Money Supply (M₂)** - M₁ plus quasi money. Quasi-money is defined as the sum of savings and time deposits with commercial banks.
3. **Inflation** – general increase in prices of goods and services over a period of time in Nigeria.
4. **Gross Domestic Product** - the total market value of all final goods and services produced in Nigeria annually.
5. **Exchange Rate** - the value of the naira against other currencies.

4. Results and Discussions

4.1 Descriptive Statistics

The following report the mean, median, and standard deviation of the variables of the study

Table 4.1: Descriptive Statistics for RGDP, M₁, M₂, INFR, and EXR

	RGDP	M ₁	M ₂	INFR	EXR
Mean	4.943667	24.73533	25.89433	20.49333	76.61592
Median	5.100000	20.22000	22.62000	12.10000	94.07500
Maximum	11.36000	62.24000	57.78000	76.80000	158.6200
Minimum	-0.690000	-5.230000	1.320000	0.200000	0.999600
Std. Dev.	3.060835	18.51544	15.34671	20.00498	62.04927
Skewness	0.196472	0.406838	0.426843	1.502732	0.010971
Kurtosis	2.624988	2.251950	2.275053	4.026276	1.220870
Jarque-Bera	0.368799	1.527061	1.567908	12.60757	3.957230
Probability	0.831604	0.466018	0.456597	0.001829	0.138261

Source: Author's Computation using E-view 9.1

Note: RGDP = real gross domestic product, M₁ = narrow money supply, M₂ = broad money supply, INFR = inflation rate, EXR = exchange rate

From the descriptive statistics results, the mean real gross domestic product growth rate over the period of the study is 4.94, while M₁ (narrow money), M₂ (broad money), INFR (inflation rate) and EXR (exchange rate) are: 24.73, 25.89, 20.49, and 76.61592 respectively. The standard deviation of real gross domestic product growth rate, M₁, M₂, inflation rate and exchange rate reveals that the values in the data set are close to the mean. Thus reflects a small amount of variation of the data of the variables. All the variables positively skewed as indicated by the positive skewness coefficients.

4.2 Augmented Dickey Fuller (ADF) Unit Root Test

The ADF unit root test in this study was employed to solidify the numeric values of the variables. This helped us ensure that the regression outputs were not spurious. The results of the unit root test at level and first difference are presented in table 4.2.

Table 4.2: Unit Root Test for RGDP, M₁, M₂, INFR, and EXR

Variable	Level	1 st Difference	Order of integration
RGDP	1.3774	1.9889	I(1)
M ₁	-1.5581	-2.9116	I(1)
M ₂	-1.0345	-2.2293	I(1)
INFR	-0.2942	-2.6030	I(1)
EXR	-1.9395	-2.8639	I(1)
Critical Value @ 5%	-1.9583	-1.9592	

Source: Author's Computation using E-views

Table 4.2 show the summary of the unit root test of the variables used for the study. The results shows that all the variables used in the model are all integrated at first difference, symbolized by I(1), all at 5 percent significance level.

4.3 OLS Results for Models I & II

The Ordinary Least Square (OLS) is used in this study to estimate and determine the impact of the explanatory variables on the dependent variables of the study. The results are presented in tables 4.3 and 4.4 respectively.

Table 4.3: Regression Outputs for Model I

Dependent Variable: RGDP
Method: Least Squares
Sample: 1985 2016
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.378644	1.485134	3.621656	0.0013

M ₁	0.158868	0.074099	2.143991	0.0419
M ₂	-0.162466	0.082949	-1.958629	0.0614
EXR	0.023757	0.099586	2.385576	0.1637
INFR	-0.059128	0.033224	-1.779659	0.0873
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R-squared	0.509574	Mean dependent var	4.943667	
Adjusted R-squared	0.491106	S.D. dependent var	3.060835	
S.E. of regression	0.836677	Akaike info criterion	5.074155	
Sum squared resid	201.1684	Schwarz criterion	5.307688	
Log likelihood	-71.11233	Hannan-Quinn criter.	5.148864	
F-statistic	5.191085	Durbin-Watson stat	1.648027	
Prob(F-statistic)	0.009167			

Source: Author's Computation using E-view

The results showed that narrow money supply (M₁) possess a positive and significant impact on RGDP. Broad money supply (M₂) possesses a negative and insignificant impact on RGDP growth rate. Exchange rate has a linear and insignificant impact on RGDP growth rate; while for inflation rate (INFR), the results predict a nonlinear and insignificant impact on RGDP growth rate in Nigeria.

Further results show that the coefficient of determination (R²) explained approximately 51% of the variation/changes in the dependent variable (RGDP growth rate). The test of the aggregate significance of the model also unveils that that the model is statistically significant because the F-statistics (5.191085) is greater than the F-prob(0.009167) which is statistically zero. The Durbin Watson statistic of 1.648027 is greater than the R² output of 0.509574. This shows the absence of first order autocorrelation. The Akaike info criterion of 5.07 indicates that the model is correctly specified. The standard error of regression reveals that in about two-third of the time the independent variables explained the dependent variable by exactly 84 percent.

Table 4.4: Regression Outputs for Model II

Dependent Variable: INFR
Method: Least Squares
Sample: 1985 2016
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.988841	0.399780	12.47895	0.0000
M ₁	0.158364	0.056476	2.804075	0.0187
M ₂	0.106232	0.109901	0.966615	0.1024
EXR	0.650081	0.140658	4.061743	0.9520
<hr/>				
R-squared	0.689006	Mean dependent var	6.380007	
Adjusted R-squared	0.681310	S.D. dependent var	0.336225	
S.E. of regression	0.045966	Akaike info criterion	-3.020716	
Sum squared resid	0.021129	Schwarz criterion	-2.624995	
Log likelihood	35.18644	Hannam-Quinn criter.	8.508300	
F-statistic	2.103845	Durbin-Watson stat	1.648007	
Prob(F-statistic)	0.009167			

Source: Author's Computation using E-view

The results showed that narrow money supply (M₁) has a linear and significant impact on inflation rate (INFR). This means that every 1 percent increase in narrow money supply led to about 0.16 percent increase in the rate of inflation. Similarly, broad money supply (M₂) also has a positive and statistically insignificant impact on inflation rate. Also, exchange rate has a linear and statistically insignificant impact on inflation in Nigeria.

The results further revealed that 68 percent of the variation/change in the dependent variable, inflation rate was explained by the explanatory variables in the model. The results also predict that the overall model is statistically significant because the F-statistic is greater than the F-prob (i.e. 2.103845 > 0.009167). Finally, the Durbin-Watson statistic value of 1.648007 is greater than the R² value of 0.689006; this suggests the absence of first order autocorrelation.

5. Summary of Findings, Conclusion, and Recommendations

5.1 Summary of Findings

This paper examined the impact of money supply on economic growth and inflation in the Nigerian economy from 1985 to 2016. Consequently, the study uncovered the following;

1. Narrow money supply (M_1) has a positive significant impact on inflation and real gross domestic product in Nigeria.
2. Broad money supply (M_2) does not have any significant impact on inflation and real gross domestic product in Nigeria.
3. Exchange rate has a significant impact on inflation and real gross domestic product in Nigeria.
4. Inflation rate does not have any linear significant impact on real gross domestic product in Nigeria.

5.2 Conclusion

The paper evaluated the impact of money supply on varied macroeconomic variables in the Nigerian economy from 1985 to 2016. To achieve the objectives of the study, the ex post facto research design and descriptive statistics was used to observe the variables in retrospect. The Augmented Dickey Fuller test was used to solidify the data and the ordinary least square technique was employed to determine the magnitude and direction of the variables in the models. The empirical results showed that narrow money supply and exchange rate has a significant impact on economic growth and inflation whereas, this is not the case for broad money supply and the rate of inflation on economic growth in Nigeria. Ceteris Paribus, the results suggest that economic growth and inflation is a function of money supply (narrow money supply) and exchange rate in Nigeria.

5.3 Recommendations

The following recommendations were made;

1. Accelerate efforts should be put in place to better the exchange rate between the naira and other currencies. This will help avoid the imported inflationary pressure on goods and services in the country.
2. Concerted effort should be made to ensure that efforts aimed at ensuring price stability do not stifle aggregate demand and hence economic growth.
3. Measure should be put in place to improve domestic production. This will reduce demand pull inflation and enhance economic growth.

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