

BROAD MONEY SUPPLY AND ECONOMIC GROWTH OF NIGERIA

AKUJUOBI CHIBUZO ANTHONY

¹Lecturer, Department of Social Science, Federal Polytechnic Nekede Owerri, Imo State Email:
chibuzaokujuobi@gmail.com

&

CHIKEZIE ADANNA OLACHI (PhD)

²Lecturer, Department of Social Science, Federal Polytechnic Nekede Owerri, Imo State Email:
adannaolachi1989@gmail.com

Abstract

The study investigated effect of broad money supply on the growth of the Nigerian economy for the period 1981 to 2021 with the help of the ARDL model of estimation. The objective of the study was to determine effect of money supply on the economic growth of Nigeria. While E-views 11 statistical software was employed for computation of results, time series data was obtained from World Development Indicators (WDI). Results showed that money supply had a long run relationship with real GDP while a combination of the broad money supply indices (monetary policy rate, inflation and interest rates) had no long run relationship with real GDP. The findings also revealed that money supply had a positive and significant short run relationship with economic growth in Nigeria while only interest rate had a positive but insignificant short run relationship with real gross domestic product in Nigeria. Based on the findings, the study recommended among others that the monetary authorities should increase the efficacy of money supply in Nigeria and that the interest rate policies of the Central bank of Nigeria should be relaxed and made investment friendly as it has a significant bearing on the rate of investment, which in turn is a prime mover of economic growth in Nigeria.

Keywords: Broad Money Supply; Economic Growth, Monetary Policy; Inflation

Background to the Study and Statement of the Problem

Money supply is a highly sensitive variable whose size determines the rate at which any economic activity takes place (Bakare, 2011). Aside from being a powerful monetary policy tool, its expansion or contraction determines the rate of increase in investment and output in any economy (Aslam, 2016). As a result, the monetarist school of thought's slogan is that money matters in an economy. Other economic changes, they claimed, are caused by changes in the amount of money in circulation. They also claimed that increasing a country's money supply causes an increase in the general price level of commodities, resulting in inflationary trends (Uzogu, 2015). As a result, they concluded that controlling the growth of the money supply is necessary to reduce inflation.

Monetarists, on the other hand, have differing perspectives on expectations. While extreme monetarists believe that people's expectations adjust so quickly that any policy change is immediately taken into account, resulting in no short-term adjustment, more moderate monetarists accept that there may be an adjustment period and that policy changes may have a temporary or short-term effect on output (Uzogu, 2015).

The total amount of money available for purchasing goods and services in a given economy is known as the money supply. It is the amount of money in circulation at any given time. Money supply, according to Uduakobong (2014), is an asset that represents immediate purchasing power in the economy and thus serves as a medium of exchange.

Narrow money supply (M1) in Nigeria is defined as currency outside the banking system plus commercial bank demand deposits plus domestic bank deposits less federal government deposits at commercial banks, whereas broad money supply is defined as narrow money supply plus quasi money supply (savings and time

deposits with commercial banks). The Central Bank is the authority in modern economies with the mandate of manipulating monetary policy through monetary policy tools in order to achieve desired macroeconomic objectives, such as price stability for both domestic and external prices.

According to Ernest (2013), the CBN controls the base money, which is made up of currency and coins outside the banking system, as well as bank deposits with the Central Bank in the form of reserves, when it changes the level of money supply.

For instance, if the central bank believes there is too much money in circulation and prices are rising (or are under threat of rising), it may reduce money supply by lowering the base money rate. The Central Bank sells financial securities to banks and the general public in order to reduce deposit money banks' ability to create new money and thus reduce the base money (Aslam, 2016). The Central Bank can also reduce money supply by increasing the amount of cash reserve deposits that banks must hold. The ability of banks to create new money by lending to their customers is harmed when the money supply is reduced. The Central Bank could be said to be following a contractionary monetary policy in this way. When investors are unable to obtain new loans to expand their investments, the economy's total output falls. Because there is less money available for purchasing goods, a decrease in output has an impact on employment and prices. Prices will either remain stable or fall as a result of this strategy. The Central Bank can also use open market operations to pursue an expansionary monetary policy by lowering the cash reserve ratio and purchasing securities on the open market (OMO).

In this case, the analysis above holds true in reverse.

Economists have developed theories to explain how the money supply interacts with the amount of output produced in the economy. According to classical economists, an increase in money supply can stimulate both price level and output in the short run, while output returns to its natural level in the long run, so that the effect of increased output is an increase in prices (Uduakobong, 2014).

The effect of increasing the money supply, on the other hand, is dependent on whether the economy is operating below full employment or not, according to Keynesians. An increase in money supply can increase output if the economy is operating below its equilibrium output, but once full employment is achieved, an increase in money supply will lead to an increase in the general price level (Anyanwu and Kalu, 2014).

In recent years, the relationship between money supply and economic growth has gotten more attention than any other topic in the field of monetary economics (Anyanwu and Kalu, 2014). While some argue that variations in the quantity of money are the most important determinant of economic growth and that countries that spend more time studying the behavior of the aggregate money supply experience significant variations in their economic activities, others doubt the role of money in gross national income (Nwaobi, 2013).

Nigeria has been able to control her economy over the years by manipulating her money supply. Various methods of stabilization, ranging from fiscal to monetary policy, were used as a result of the effect of the collapse of oil prices in 2015/2016 and the balance of payment (BOP) deficit experienced during this period. Ikhide and Alwoda (2013) concluded that increasing interest rates would lower the gross national product by reducing the money stock of money (GNP). As a result, the Nigerian economy bears out the notion that money stock varies with economic activity. As previously stated, the money supply has a significant impact on economic activity in both developed and developing economies. The fundamental failure of many African countries to achieve growth and development was due to a lack of supply of monetary aggregates in general and money stock in particular. Various scholars have blamed the government and its agencies for the failure of monetary policies to translate into economic growth, citing poor implementation and sincerity on the part of policy executors.

The validity of the Nigerian economy's output development and other economic growth processes via money supply regulation must be thoroughly tested. The stability of the relationship between money supply and economic growth will demonstrate the effectiveness of monetary policy in the Nigerian context. Because economic growth is such an important part of a country's macroeconomic goals, several authors were inspired to conduct research aimed at determining the precise relationship between monetary aggregate and economic growth. Uduakobong (2014), Aslam (2016), and Anyanwu and Kalu are among the authors in this group (2014).

There have been some variations in the growth movements of the money supply and the gross domestic product in Nigeria over the years, which necessitates additional attention and research. Between 1985 and 1989, the money supply grew at a rate of 15.62 percent on average, while GDP grew at a rate of 5.5 percent. Between 1990 and 1999, the money supply grew at a rate of 29.09 percent, while GDP grew at a rate of 3.99 percent. However, between 2000 and 2009, the average growth rate of the money supply fell to 23.59 percent, after reaching an all-time high of 53.76 percent in 2008, while the growth rate of GDP rose to 5.33 percent. Between 2010 and 2012, the rate of growth in money supply fell to 12.91 percent, while the rate of growth in gross domestic product increased to 7.33 percent on average. Between 2013 and 2018, the money supply averaged N20.39 trillion, growing at a 14 percent annualized rate. According to CBN (2017), real output contracted in 2016, causing the economy to enter a recession in the second quarter of 2016. As a result, the inflation rate increased in 2018, averaging 11.4 percent. The major flaw in this assertion is the CBN's inconsistent monetary policy decisions, which kept the policy rate at 14 percent in 2018, making it unclear whether this decision had a positive or negative impact on the economy since the resurgence of the economic recession in 2016.

Two main competing theories emerged in an attempt to link money supply to economic growth. Money supply, according to Keynesian economists, stimulates economic growth by increasing aggregate demand, favoring a positive relationship between money supply and economic growth. In their analysis of the impact of structural adjustment programs in Nigeria, Ikhida and Alwoda (1993) concluded that reducing money stock through increased interest rates would lower Nigeria's gross national product. Monetarists, on the other hand, believe that increasing the money stock will lead to an increase in the general price level, resulting in inflation in the economy.

As a result, money supply has a negative relationship with economic growth, according to them, because inflation, except when moderate, is detrimental to growth. However, the above analysis of the money supply and GDP growth trend revealed that in the Nigerian economy, declining money stock was accompanied by rising gross domestic product (GDP) growth. As a result of this scenario, despite the country's consistent GDP growth over the years, the country's economy continues to be plagued by general price instability and high unemployment.

Conceptual Clarifications

Depending on the level of development of their financial system, different countries define money supply differently. Savings and time deposits, according to Ajakaiye (2002), must first be converted into cash or demand deposits before they can be used as a medium of exchange. As a result, the official definition of Nigeria's money supply is M1, which includes in circulation notes and coins as well as demand deposits in commercial and central banks (CBN, 2016).

Money supply, according to Anyanwu (1993), is the total amount of money in circulation in a country. According to monetarists, it can affect prices but not GDP. However, Keynesians argue that changes in the money supply can affect prices and real output. The supply of money is the amount of money in circulation at any given time.

The total amount of money in the economy at any given time is the supply of money (Jhingan, 2006). Money supply, according to Anyanwu and Oaikhenan (1995), is the assets in the economy that represent immediate purchasing power and thus serve as a medium of exchange.

Narrow money supply (M₁) in Nigeria is defined by the Central Bank of Nigeria (CBN) as currency outside banks plus demand deposits of commercial banks, including domestic deposits with the Central Banks, less Federal Government deposits at commercial banks.

M₁ is defined by the CBN as follows: $M_1 = C + D$

Where:

M₁ = Narrow money supply

C = Currency outside banks

D = Demand deposits.

Shaw (1973) noted that in the UK, narrow money includes M₀, M₁ and M₂. M₀ includes only notes and coins in circulation and in bank tills, M₁ includes notes and coins in circulation and deposits with banks, M₂ includes not only notes and coin and bank current accounts, but also 7-days bank deposits and some building society deposits. In the Nigerian context, CBN (2013) defined broad money (M₂) as M₁ plus quasi-money. Quasi-money as used here is defined as the sum of savings and time deposits with commercial banks.

Symbolically shown as;

$M_2 = C + D + T + S$

Where:

M₂ = Broad money

T = Time deposit

S = Savings deposits

C = Currency outside banks

D = Demand deposits.

Instruments of Money Supply Control in Nigeria

The Central Bank issues fiduciary or paper money based on a calculation of expected cash demand. The Central Bank's money supply is guided by monetary policy in order to achieve the goals of price stability (low inflation), full employment, and aggregate income growth. Money is a medium of exchange, and changes in its demand relative to supply necessitate spending adjustments. Some monetary variables that the Central Bank controls, such as the monetary aggregate, interest rate, and exchange rate, are adjusted to affect goals that it does not control in order to conduct monetary policy (Jhingan, 2006). The Central Bank's monetary policy instruments are determined by the economy's level of development, particularly its financial sector.

The following are the most commonly used instruments, according to CBN (2013):

- **Reserve Requirement:** The Central Bank may require Deposit Money Banks to keep a portion (or all) of their deposit liabilities (reserves) in vault cash and or deposits with it. Fractional reserve banking restricts the amount of loans that banks can make to the domestic economy, thereby limiting money supply. Deposit Money Banks are assumed to maintain a stable relationship between their reserve holdings and the amount of credit they extend to the general public (CBN, 2013).
- **Open Market Operations (OMO):** According to the CBN (2013) monetary policy series, the Central Bank buys or sells securities to the banking and non-banking public on behalf of the Fiscal Authorities (the Treasury) (that is in the open market). Treasury Bills are an example of such a security. When the Central Bank sells securities, it reduces the supply of reserves; on the other hand, when it buys (back) securities by redeeming them, it increases the supply of reserves to the Deposit Money Banks, affecting the supply of money. It thus refers to the purchase and sale of government securities (Nigeria Treasury Bill, NTB) by the CBN in order to increase or decrease the money supply. The Open Market Operation (OMO) increases the monetary base, increasing the money supply and lowering shorter-term interest rates.

- Central Bank lending: The Central Bank lends to Deposit Money Banks on occasion, increasing the level of reserves and thus the monetary base (Mansor, 2005).
- Interest Rate: The Central Bank lends to financially sound Deposit Money Banks at the minimum rediscount rate, which is the best rate available (MRR). The MRR affects the supply of credit, savings (which affects the supply of reserves and monetary aggregate), and investment by setting the floor for the interest rate regime in the money market (the nominal anchor rate) (which affects full employment and GDP).
- Direct Credit Control: The Central Bank has the authority to direct Deposit Money Banks on the maximum percentage or amount of loans (credit ceilings) to different economic sectors or activities, interest rate caps, liquid asset ratios, and credit guarantees for preferred loans. This method allocates available savings and directs investment in specific directions.
- Moral Persuasion: The Central Bank issues licenses or operating permits to Deposit Money Banks and oversees the banking system's operation. According to Nwaobi (2013), the CBN can use this advantage to persuade banks to take certain actions, such as credit restraint or expansion, increased savings mobilization, and export promotion through financial support, that they would not do otherwise based on their risk/return assessments.
- Prudential Guidelines: The Central Bank may require Deposit Money Banks to exercise extra caution in their operations in order to achieve certain outcomes. Prudential guidelines include key elements that take away some discretion from bank management and replace it with rules in decision-making (Mansor, 2005).
- Currency Exchange Rate: The balance of payments can be in deficit or surplus, and each of these factors has an impact on the monetary base and, as a result, the money supply in one direction or the other (Mansor, 2005). The Central Bank ensures that the exchange rate is at a level that does not adversely affect domestic money supply through the balance of payments and the real exchange rate by selling or buying foreign exchange. Because of its impact on external competitiveness, a misaligned real exchange rate has an impact on the current account balance (Ojo, 1993). Direct supervision or qualitative instruments include moral suasion and prudential guidelines. Because they have numerical benchmarks, the others are quantitative instruments (CBN, 2013).

Theoretical Literature Review

The Quantity Theory of Money

In its most basic form, the classical theory of money asserts that changes in the quantity of money have a direct and proportionate relationship with changes in the general price level. The basic premise of this crude theory is that if the money supply increases by 10%, general prices will also increase by 10%. The domestic version of the quantity theory, according to Uduakobong (2014), states that a one-time increase in the money supply is quickly reflected as a proportionate increase in the domestic price level.

According to the international version, an increase in the money supply is accompanied by a proportionate increase in the exchange rate. This formulation is also attributed to the French economist Jean Bodin's writings, which were published around 1668. Later, in 1952, David Hume improved on this quantity theory of money, as cited in (Nzotta, 2004).

The following is a simplified version of the theory: $P = KM$

Where P = General price index

K = Constant Proportionality,

M = Money supply

Where $K = v/y$

V = Velocity of money;

Y = real output

According to Anyanwu and Oaikhenan (1995), classical economists did not include money in their models in terms of demand and supply. Instead, they used quantity theory to introduce money. In other words, they

linked the quantity of money in the economy and the level of commodity production to the level of commodity prices.

To explain the level of prices, two very similar "quantity theory" formulations were used: transactions formulations or the equation of exchange, and cash balances formulations or the Cambridge equation.

The Transaction Version of the Theory of Money

Some assumptions were made in the transaction version - associated with Fisher and Newcomb - such as the quantity of money (m) being determined independently of other variables, the velocity of circulation (V) being assumed to be constant, and the volume of transactions (T) being assumed to be constant. Given a price (p) and the assumption that the economy is fully employed, the exchange equation is $MV = PT$. This easily establishes the production that price levels are a function of money supply. $p=F$, in other words (m) This means that any change in price affects the money supply, i.e., as the amount of money in circulation rises, the price level rises in direct proportion, and the value of money falls, and vice versa. Fisher concludes that the level of price varies directly with the quantity of money in circulation, assuming that the money's velocity of circulation and the volume of trade it is required to perform remain constant. As a result, according to the classical quantity theory of money, if " V " and " T " remain constant, changes in money cause direct and proportional changes in price level.

Cash Balance Theory of Money

In cash balances version – associated with Walras, Marshall, Wicksell and Pigou as cited in Adesoya (2012). The neo-classical school (Cambridge school), changed the focus of the quantity theory of without changing its underlying assumptions. This version focuses on the fraction (K) of income, held as money balances. The Cambridge version can be expressed as:

$M = kpy$

Where

K = Fraction of income

M = Quantity of money

P = price level

Y = value of goods and services

The K in the Cambridge equation is merely inversion of V , the income Velocity of money balances, in the original formulation of quantity theory. This version directs attention to the determinants of demand for money, rather than the effects of changes in the supply money (Anyanwu, 1993).

Empirical Literature Review

The impact of money supply on economic growth has spawned a slew of empirical studies using cross-sectional, time-series, and panel data, with mixed results. Some of these research projects are country-specific, while others are cross-national in nature.

The following studies have been chosen for review:

Gisaor (2021) empirically assessed the impact of monetary policy on economic growth in Nigeria. The ADF unit root test, Johansen co-integration, Vector error correction model, and pairwise granger causality test and variance decomposition were all used in the research. With a model strength of 75%, the Vector Error Correction Mechanism results show a positive short and long run relationship between both narrow and broad money supply and economic growth in Nigeria. The Pairwise granger causality test in Nigeria revealed a bi-directional causality between broad money supply and economic growth, which was statistically significant at the 5% confidence level.

In Nepal, Mahara (2021) investigated the empirical relationship between money supply, inflation, capital expenditure, and economic growth. To check the relationship between selected variables, the ARDL approach to co-integration was used. To determine the relationship between variables, the bound test was

used. The study's empirical findings show that money supply, capital expenditure, and growth have a significant long-run positive relationship. In Nepal, there is a one-way causal relationship between money supply and capital expenditure and real economic growth.

Obi (2021) looked at the impact of monetary policy instruments on Nigeria's manufacturing sector output from 1987 to 2020. Because the data for the study were secondary data obtained from the Central Bank of Nigeria Statistical Bulletin, 2020, the study used an ex-post facto research design. The findings showed that manufacturing subsector output is an endogenous variable in the explanation of the effect of monetary policy on manufacturing sector output in Nigeria in the short run, and that monetary policy rate, money supply, and treasury bill rate have positive and significant effects on manufacturing sector output in the short run.

From 1990 to 2018, Omobolanle (2021) investigated the effects of money supply and inflation on Nigerian economic growth. The technique of Ordinary Least Square (OLS) was used. At a significant level of 0.0011, the estimated regression model shows a negative and significant relationship between the coefficient of inflation and Real Gross Domestic Product (RGDP). Money supply and RGDP are found to have a negative relationship. The R square value was discovered to be 78 percent. This ensures that the model is well-fitting. The level regression passed the overall significant test (F-test) at a 5% significant level, indicating that none of the estimated coefficients are equal to zero and that the dependent variable (RGDP) and other independent variables have a linear relationship (MS, INF, INT and CPI). The absence of auto-correlation is indicated by the DW statistics of 1.96.

Opata and Obasikene (2021) investigated the impact of money supply on economic growth in Nigeria. The goals were to determine the impact of broad money supply on Nigerian economic growth and the impact of the private sector credit-to-GDP ratio on Nigerian economic growth. The unit root test, descriptive statistics, and ordinary least square were used as analytical tools. According to the findings, Nigeria's broad money supply and the ratio of private sector credit to GDP have a positive and significant impact on economic growth. The study concluded that the CBN should improve its monetary management by organizing all financial markets to amplify the effects of monetary policy variables such as the broad money supply.

Adediyani (2020) looked at the factors that influence money supply in Nigeria between 1980 and 2019. The Autoregressive Distributed Lag (ARDL) method was used in this study. In addition to currency ratio, required reserve ratio, and high-powered money, the study discovered that financial liberalization is an important factor in determining money supply in Nigeria. As a result, the degree of financial sector liberalization influences decisions about the regulation of money supply in the economy.

Omodore (2019) looked into the role of money supply in boosting economic growth in Nigeria and Ghana. The technique of Ordinary Least Squares regression was used. The findings revealed that while the broad money supply (M2) has a negligible negative impact on RGDP in Nigeria, it has a significant and positive impact in Ghana. In Nigeria, broad money supply (M3) has a negligible positive impact on RGDP, but has a significant negative impact in Ghana, whereas credit to private sectors (CPS) has a negligible positive impact on RGDP in both Nigeria and Ghana.

Methodology

Research Methodology

Ex post facto research design is used in this study. This is due to the study's attempt to investigate cause-and-effect relationships in situations where causes already exist and cannot be changed. Ex-post facto research is a systematic empirical investigation in which the scientist does not have direct control over independent variables because they have already manifested themselves or because they are inherently difficult to manipulate.

Theoretical Framework

The theoretical framework used in this study is based on Tobin's (1965) monetary version of growth and attempts to establish a link between money supply, inflation, and economic growth. The portfolio proposition is placed in a growth context in this model.

The applicability and significance of its assumptions to the nature and structure of the Nigerian economy led to the selection of this framework. The assumption that changes in money stock are concocted (cook up) via lump sum transfers, as well as the assumptions underlying the Solow growth model, stand out among the model's assumptions. Tobin's work has influenced modern thinking on the subject of money and growth (1965). Tobin considers how a fixed flow of savings is divided between two assets: money and physical capital. When the rate of inflation rises, the real return on money falls, causing agents to switch from cash to capital. That is, higher inflation rates are linked to a larger capital stock and higher per capita output. The choice in our model is between money and real output, as measured by real GDP.

Model Specification

The research used the models of Uduak-Obong (2014) and Ebikila, Agada, Tema, and Boloekeye (2018), who specified real gross domestic product (real GDP) as a function of broad money supply, real exchange rate, real interest rate, and bank loans and advances in their respective models. The regressed variable in their models is real gross domestic product (real GDP), while the regressors are broad money supply, bank loans, real exchange rate, and interest rate. We specified two models after modifying their models: the first establishes a linear relationship between money supply and economic growth, and the second establishes a nonlinear relationship between money supply and economic growth.

Exogenous variables in the second model are money supply indices.

The following are the details: $RGDP = F(MSS)$(3.1)

$RGDP = F(MPR, INF, INT)$(3.2)

In model (1) above, Real Gross Domestic Product (RGDP) is function of broad money supply (MSS).

In model (2) above, the Real Gross Domestic Product (RGDP) is a function of monetary policy rate, broad money supply (MSS), inflation rate (INF), and interest rate (INT).

However, to be able to estimate the two models, we establish a linear relationship between the variables by stating the models in a linear form as follows:

$RGDP = \beta_0 + \beta_1MSS + U_t$(3.3)

$RGDP = \beta_0 + \beta_1MPR + \beta_2INF + \beta_4INT+ U_t$(3.4)

Where;

RGDP = Real Gross Domestic Product

MPR = Monetary Policy Rate

MSS = Broad money supply

INF = Inflation Rate

INT = Interest rate

b_0 = Parameter constant or intercept

b_1, b_2, b_3 and b_4 are unknown parameters of the model to be estimated

U_t = Error Term of the model

A-priori Expectations

Table 1: A-priori Expectation of the Variables

Variable	A priori sign
MPR	$b_1 > 0$
MSS	$b_2 > 0$
INF	$b_3 < 0$
INT	$b_4 < 0$

Source: Author's Statement

Short Run and Long Run Estimation of the Models

The short run equation of the model one is restated thus:

$$D(RGDP)_{t-1} = b_0 + b_1D(MSS)_{t-1} + ECM(-1) + U_t \quad \dots(3.7)$$

Where “D” represents the first difference operation of the variables, ECM(-1) is the one period lag of the model residual. The parameters b_0 to b_1 are the short run coefficients of the equation (3.7). The coefficient of ECM(-1) is the long run speed of adjustment of the model; the sign of the coefficient of ECM(-1) should be negative and significant as well for holding the long run equilibrium (Dhungle, 2014).

For model two, the lagged order equation of the ARDL is given as:

$$RGDP_t = \beta_0 + \sum_{i=1}^n \beta_{1i}RGDP_{t-1} + \sum_{i=1}^n \beta_{2i}MPR_{t-1} + \sum_{i=1}^n \beta_{3i}INF_{t-1} + \sum_{i=1}^n \beta_{4i}INT_{t-1} + \varepsilon_{1t} \dots 3.8$$

Where the lagged value of the dependent variable is taken as exogenous and the other exogenous variables have one period lags i.e. “t-1”.

The parameters $\beta_0 - \beta_4$ are the short and long run parameters of equation (3.8).

The hypotheses are tested using the t-test of individual significance derived from the short run estimates of the ARDL model while the Joint test is carried out using the F-statistic from the short run estimates.

RESULTS AND DISCUSSION

Pre-Estimation Test Results

Unit Root Test

Table 4.1: Summary of Unit Root Test Result

Variable(s)	ADF Test Statistics		Decision	Order Of Integration
	At Level	At 1 st Difference		
LOGRGDP	0.169220	-3.9772	Stationary at 1 st difference	I(1)
LOGMSS	-1.4891	-5.7719	Stationary at 1 st difference	I(1)
MPR	-3.1935	-8.4233	Stationary at Level	I(0)
INF	-3.0885	-5.8445	Stationary at Level	I(0)
INT	-2.3944	-5.7668	Stationary at 1 st difference	I(1)

Source: Authors computation from E-view 11

A unit root test (ADF) was conducted to ascertain whether the variables in the model are stationary. This is necessary as it helps to avoid spurious regression results. From Table 4.1 above, the variables Real GDP (RGDP), Money supply (MSS) and Interest Rate (INT) became stationary after first differencing which implies that the variables (RGDP, MSS, and INT) are integrated of order one I(1). The other variables Monetary Policy Rate ((MPR) and Inflation rate (INF) were integrated of order zero I(0) as they were stationary at level form.

Johansen Cointegration Test For Model 1

Given that the variables of model one (RGDP and MSS), which seeks to analyze the relationship between Money supply, economic growth in Nigeria are integrated of order one I(1), we will make use of the Johansen co-integration test as summarized below:

Table 4.2: Johansen Cointegration Test For Model One

Model 1: Trace Statistic					Max-Eigen Statistic		
Hypothesized No of CE (S)	Eigen-Value	Trace statistics	5% Critical Value	Prob	Max-Eigen statistics	5% Critical value	Prob
None**	0.4827	30.1882	15.4947	0.002	23.7276	14.2646	0.012
At Most 1**	0.1643	6.4606	3.8415	0.010	6.4606	3.8415	0.011

Source: Researchers’ Computation using E-view 11

The Trace test and the Likelihood Eigenvalue test are two statistics tests used in the Johansen co-integration test. Each table's first row tests hypotheses of no co-integrating relation, the second row tests hypotheses of one co-integrating relation, and so on, against the alternative of full rank of co-integration. Using the Trace test for detecting co-integration, Table 4.2 shows that there are two co-integrating equations in the model, indicating that there is a long-run relationship between money supply and economic growth in Nigeria.

ARDL Bounds Test For Co-integration Test (Model Two)

Since the variables of Model 2 (RGDP, MPR, INF and INT) are integrated of order one and zero (i.e. mixed order) and none of the variables is integrated of order two. We therefore, apply the ARDL bounds cointegration test. However, before we apply the ARDL bounds cointegration test, we first determine the optimum lag length using Akaike information criteria. The result is shown in the figure 4.1 below:

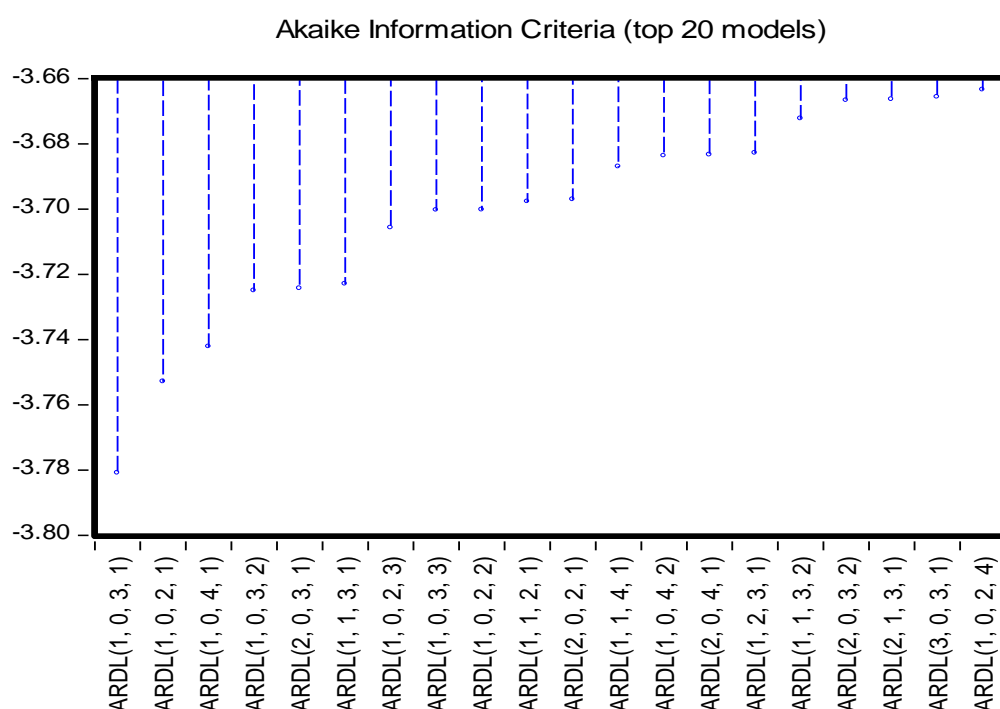


Fig. 4.1: Akaike Information Criteria (AIC) Lag Selection

The ARDL model automatically generated twenty (20) models and their lag lengths based on the figure above. The "ARDL (1,0,3,1)" model is chosen as the la structure with the highest AIC values.As a result, the model has an ARDL lag structure based on Akaike information criteria (1,0,3,1). The ARDL bounds test's null hypothesis is that the variables are not cointegrated, as opposed to the alternative that they are. If the F-statistics are greater than the upper bound critical values at a 5% level of significance, the null hypothesis is rejected. The ARDL cointegration test result is shown in table 2 below.

Table 4.3: ARDL Bounds Cointegration Test for model Two

Model	F-Statistics	K	Significance level	Critical Bound Value	
				10 (Lower Bound)	11 (Upper Bound)
1	1.0885	3	5%	3.23	4.35

Source: Author's Computation using E-views

The F-statistics for model 2 are 1.0885, which is less than the upper (I1) bound of 4.35 at a 5% level of significance (see Table 4.3). As a result, we accept the null hypothesis and conclude that the second model has no cointegration. This means that in Nigeria, there is no long-term link between monetary policy,

inflation, interest rates, and economic growth. Because there is no long-run relationship between the variables, the short-run coefficients for model 2 are estimated.

Model Estimation

Short Run Model Estimates for Models One and Two

Because the first model is an Error Correction Model (ECM), and the second model showed no long run relationship based on the Bounds test, the short run model was estimated for both models. As a result, our estimation is a short-run estimate, with the following results for both models:

Table 4.4: Short Run Estimates For Model One

Dependent Variable: LRGDP				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.914843	0.112829	79.01203	0.0000
LMSS	0.200095	0.015664	12.77384	0.0000
ECM(-1)	-0.159352	0.053107	-3.000550	0.0050
R-squared	0.925134	Mean dependent var		10.26606
Adjusted R-squared	0.819330	S.D. dependent var		0.561445
S.E. of regression	0.241989	Akaike info criterion		0.051343
Sum squared resid	2.108104	Schwarz criterion		0.137532
Log likelihood	1.024478	Hannan-Quinn criter.		0.082009
F-statistic	163.1710	Durbin-Watson stat		1.899164
Prob(F-statistic)	0.000000			

Source: Researcher’s Computation using E-View 11

Table 4.5: Short Run Estimates For Model Two

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LRGDP(-1)	0.958101	0.014467	66.22539	0.0000
MPR	-0.008049	0.002224	-3.619366	0.0013
INF	-0.001183	0.000433	-2.730829	0.0112
INF(-1)	-0.000914	0.000571	-1.602413	0.1211
INF(-2)	-0.001127	0.000619	-1.821311	0.0801
INF(-3)	-0.000659	0.000419	-1.571628	0.1281
INT	0.000182	0.001837	0.099039	0.9219
INT(-1)	0.008579	0.002230	3.846621	0.0007
ECM(-1)	-0.041899	0.014467	-2.896148	0.0076
C	0.477472	0.157022	3.040787	0.0053
R-squared	0.897208	Mean dependent var		10.32361
Adjusted R-squared	0.826349	S.D. dependent var		0.547432
S.E. of regression	0.033077	Akaike info criterion		-3.762911
F-statistic	11.60855	Durbin-Watson stat		2.003777
Prob(F-statistic)	0.000000			

The ECM estimates are as follows, based on the results in Table 4.4:

When the broad money supply (MSS) is held constant at zero, the intercept C has a positive coefficient of 8.9148, implying that Real GDP will be 8.9148 units. The positive coefficient value of 0.20009 for broad money supply (MSS) indicates that there is a positive relationship between money supply and economic growth in Nigeria.

Thus, a unit change in money supply increases Nigeria's real gross domestic product by 0.20009 units.

The probability value of the t-statistics for money supply (MSS) is less than 0.05, implying that broad money supply has had a significant impact on Nigerian economic growth from 1981 to 2018. The coefficient of the error correction model ECM(-1) is -0.04189, according to estimates for model 2 summarized in Table 4.5.

This implies that a short-run relationship exists, resulting in the variables converging in the short term.

According to the rate of adjustment, monetary policy, inflation, and interest rates correct about 4.18 percent of the previous period's disequilibrium in Real GDP every year.

The results also show that the monetary policy rate (MPR) and the inflation rate (INF) both have negative and significant short run relationships with real GDP, whereas the interest rate has a positive and significant short run relationship.

Discussion of Results

The unit root test revealed that the variables in model 1, which are real GDP and money supply, are integrated of order 1 (I(1)), implying that they can co-integrate.

The model was tested for cointegration, and the results revealed that the variables have two cointegrating relationships at the 5% level. The variables in model two have a mixed order of integration, i.e., they were integrated at I(0) and I(1), so the long run relationship was tested using the ARDL Bounds test. The findings revealed that the monetary policy rate (MPR), inflation rate (INF), and interest rate have no long-term relationship (INT).

In Nigeria, the first model's short run estimates revealed a positive and significant relationship between money supply and economic growth.

With a 16 percent annual adjustment rate, money supply increased real GDP by 0.200095 units. The short run coefficient for model 2 revealed that the monetary policy rate (MPR) has a negative value of -0.008, implying that the monetary policy rate and per RGDP have an inverse relationship in the short run. This also means that if MPR rises by one unit, RGDP falls by 0.008 units. The relationship between the monetary policy rate and economic growth (RGDP) is significant, according to the significance test.

In the short run, the coefficient of inflation rate (INF) is also negative, estimated at -0.00118, implying that a unit change in inflation rate reduces Nigerian economic growth (RGDP) by 0.00118 units. Inflation rate was found to be significant based on the probability value of the t-statistic, implying that inflation rate has significantly slowed Nigeria's economic growth. However, the coefficient of interest rate (INT) is positive, indicating that interest rate and RGDP in Nigeria have a positive relationship.

As a result, a one-unit increase in the interest rate will result in a 0.000182 unit increase in Real GDP. In the short run, the relationship between interest rate and economic growth (Real GDP) in Nigeria was not significant, according to the significance test. When all exogenous variables (MPR, INF, and INT) are held constant, the cumulative impact on RGDP (economic growth) is 0.4775 units. This means that if these variables remain at zero, Nigeria's Real GDP will increase by 0.4775 units.

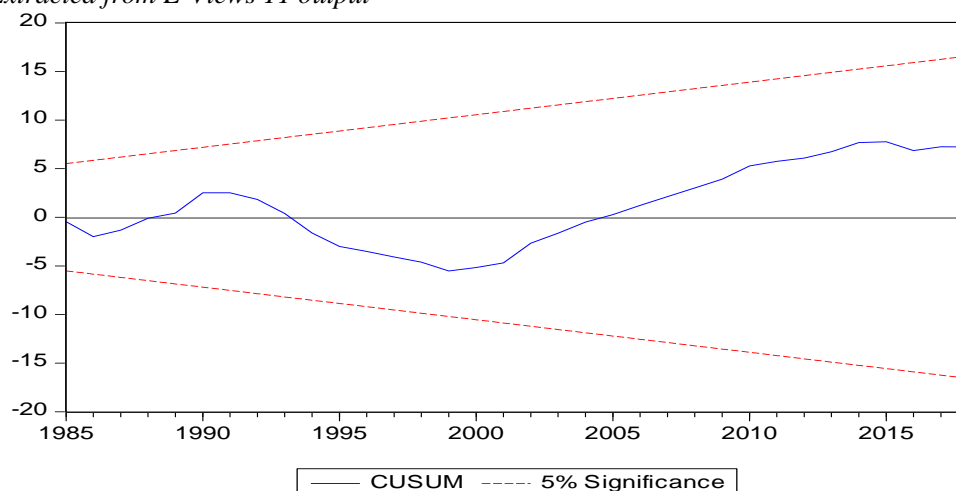
Post-Estimation Test Results

The results of the post-estimation tests are summarized in Table 4.6. The Breusch-Godfrey serial correlation test, the Durbin Watson autocorrelation test, the Cumulative Sum test, the Normality test, and the Coefficient of determination (R-squared and Adjusted R-squared) were among the tests used. These tests are required to determine the model's statistical robustness and predictive ability. The following is a summary of what they are:

Table 4.6: Diagnostic Tests

S/N	Test	Probability		Decision
		Model 1	Model 2	
1.				
2.	Durbin Watson Statistic	1.8991	2.004	No Autocorrelation
3.	Whites Heteroskedasticity Test	0.3331	0.4351	No Heteroscedasticity
4.	CUSUM Test	Within bands of 5% significance level	Outside bands of 5% significance level	Model one is Stable Model 2 is not Stable
5.	Normality (Residual) Test	Skewness: -3.3828 Kurtosis: 17.7676 Jarque-Bera: 417.769 ($p=0.000$)	Skewness: --3.7117 Kurtosis: 6.7249 Jarque-Bera: 9.4511 ($p=0.0197$)	Series are not normally distributed.
6.	Adjusted R-squared	0.8193 (82%)	0.8263 (83%)	High explanatory coefficients

Source: Extracted from E-Views 11 output



The following are the results of the post-estimation tests, as shown in table 4.6: For models 1 and 2, the F-statistic probability value for the Whites test for heteroskedasticity is 0.3331 and 0.4351, respectively. Because the p-values are greater than the 0.05 critical value, we accept the null hypothesis and conclude that the model is homoskedastic, implying that the error term is not heteroskedastic. In both models, there is no autocorrelation in the residuals. The normality test, however, revealed that neither model follows a normal distribution.

As a result, the estimates are skewed. Model 1's Cumulative Sum line is within the 5% critical bounds line, indicating that it is stable. Model 2 is not stable, however, because the CUSUM line exceeds the 5% critical value upper and lower bounds (see appendix).

Money supply explains about 82 percent of the total variation in real GDP, leaving 18 percent to the error term, according to the adjusted R^2 . In addition, the model's monetary policy rate, inflation rate, and interest rate explain about 83 percent of the total variations in Real GDP. This leaves 17% unexplained, but the error term takes care of it and these show a high degree of fit goodness.

Summary of Findings, Conclusion and Recommendation

Summary of Findings

The following findings made in the study are summarized as follows:

1. At the first difference, real gross domestic product, money supply, and interest rate all had unit roots, whereas inflation and monetary policy rates did not.
2. It was discovered that the money supply has a long-run relationship with real GDP, whereas the monetary policy rate, inflation rate, and interest rate only have a short-run relationship with real GDP.
3. The regression result revealed that in Nigeria, money supply has a positive and significant short-term relationship with economic growth.
4. The ARDL result of Model 2 revealed that in Nigeria, only the interest rate has a positive but insignificant short run relationship with real GDP.
5. In the short run, the monetary policy rate and inflation rate were inversely related to real gross domestic product. There is a significant relationship between money supply and economic growth in Nigeria; monetary policy, inflation rate, and interest rate as well have a significant relationship with economic growth in Nigeria.

Conclusion

The study used time series data from World Development Indicators and CBN Statistical Bulletin 2021 to examine the relationship between money supply and economic growth in Nigeria from 1980 to 2021. The Error Correction Model and Auto Regressive Distributed Lag (ARDL) model were used to estimate the two models formulated for the study. The study concluded that money supply, inflation rate, monetary policy rate, and interest rate all have significant relationships with economic growth in Nigeria, though only money supply and interest rate were positively related to economic growth after a thorough analysis of the models. For the period under consideration, the co-integration test revealed that there was no long run relationship between the monetary policy rate, inflation rate, interest rate, and real GDP in Nigeria, whereas money supply has a long run significant relationship with economic growth in Nigeria.

Recommendations

The following recommendations are made from the findings of this study;

1. Because monetary policy has a significant impact on a country's economic growth, the monetary authorities in Nigeria should increase the efficacy of money supply.
2. The Central Bank of Nigeria's interest rate policies should be relaxed, as they have a significant impact on the rate of investment, which is a key driver of economic growth. In the short run, keeping interest rates moderate and stable will stimulate economic activity and eventually lead to economic growth.
3. Attention should be paid to Nigeria's rising rate of inflation, as the findings revealed that inflation has had a negative impact on the country's economic growth, which can be mitigated through effective monetary policy control.

References

- Adediyin, R. A. (2020) Determinants of Money Supply in Nigeria. *CBN Journal of Applied Statistics* Vol. 11 No. 2
- Adesoya, A.B. (2012). Price, Money and Output in Nigeria: A Cointegration-Casualty Analysis. *African Journal of Scientific Research*, 8(1)
- Ajakaiye, O. (2002). Economic development in Nigeria: A review of experience. *CBN Bullion*,26(1):47- 64.
- Ajayi, S.I. (1978). *Money in a developing economy: A portfolio approach to money supply determination in Nigeria*. Ibadan: Ibadan University Press.
- Akinbola, T.O. (2012). Dynamics of money supply, exchange rate and inflation in Nigeria. *Journal of Applied Finance and Banking*, 8(4)

- Anyanwu, J.C &Oaikhenan, H.E. (1995). *Modern macroeconomic: Theory and application in Nigeria*. Onitsha: JoaneeEducational Publishers Ltd.
- Anyanwu, J.C. (1993). *Monetary economics: Theory, policy and institutions*. Onitsha: Hybrid publishers.
- Anyanwu, U. &Kalu, A.O.U. (2014). The effect of Central Bank of Nigeria's money supply management on commercial bank loans and advances and output. *Singaporean Journal of Business Economics and Management Studies*, 2(12)
- Aslam, A.L.M (2016). Impact of money supply on Sri Lankan economy: An econometric analysis. *International Journal of Social and Humanistic Sciences*, 67(1): 11-17
- Asogu, J.O. (1998). An econometric analysis of relative potency of monetary policy in Nigeria. *Economic and Financial Review*, 30 (3)
- Bakare, A.S. (2011). An empirical study of the determinants of money supply growth and its effects on inflation rate in Nigeria. *Journal of Research in International Business and Management*, 1(5)
- Blanchard, O. (2011). *Macroeconomics*. Boston: Pearson Publishing
- Cagan, P. (1956). The monetary dynamics of hyperinflation. In M Friedman (Ed.): *Studies in the quantity theory of money*, Chicago: University of Chicago press
- Central Bank of Nigeria, CBN, (2013) Monetary Policy Series No.32
- Central Bank of Nigeria, CBN, Statistical Bulletin (2016 and 2018) Edition vol. 28
- Chude, N. P. and Chude, D. I. (2016) Impact of Broad Money Supply on Nigerian Economic Growth, *IIARD International Journal of Banking and Finance Research* Vol. 2 No.1 2016 www.iiardpub.org
- Chuku, A.C. (2009). Measuring the effect of monetary policy innovations in Nigeria. A structural vector autoregressive approach. *Africa Jack economic finance bank review*, 15(15)
- Dhungel, K. R. (2014) Estimation of Short and Long Run Equilibrium Coefficients in Error Correction Model: Empirical Evidence from Nepal, *International Journal of Econometrics and Financial Management* 2(6) pp214-219
- Dingela, S.. and Khobai, H. (2017) Dynamic Impact of Money Supply on Economic Growth in South Africa. An ARDL Approach, Nelson Mandela University (NMU) Archives, <https://mpr.ub.uni-muenchen.de/82539/>
- Ebikila, S., Agada, F. A., Tema, L. and Bolokeye, M. (2018) Impact of Money Supply on Some Macroeconomic Variables on the Nigerian Economy, *International Journal of Scientific and Research Publications*, Volume 8, Issue 8, August 2018 607
- Egbulonu, K.G (2005) *Basic Econometric Methods*, Owerri, Peace Publishers
- Engle, R.F. (1987). Granger, co-integration and error-correction: Representation, estimation and testing. *Econometrica*, 55, 251-276
- Ernest, S.O. (2013). Pure portfolio approach to money supply determination in Nigeria: A generalized method of moments approach. *Journal of economics & finance*, 1(3)
- Fasanya, I.O, Adegbeni, B.O &Agboluaje M.A. (2013). Does monetary policy influence economic growth in Nigeria? *Asian Economic and Financial Review*, 3(5):635-646.
- Fishers, S. (1979). *Rules versus discretion in money supply*. Onitsha: Hybrid publishers limited.
- Gatawa, N. M., Akinola, A. and Muftau, O. O. (2017) Impact of Money Supply and Inflation on Economic Growth in Nigeria (1973-2013), *IOSR Journal of Economics and Finance (IOSR-JEF)*. Volume 8, Issue 3, pp26-37
- Ghatak, S. (1995) *Monetary economics in developing countries (2nd edition)*. New York: St. Martins publishers.
- Gisaor, V. I., (2021). Monetary Policy and Long Run Economic Growth in Nigeria: An Application of the Vector Error Correction Mechanism. *International Journal of Finance Research*. 2(2). 71-83. DOI. <https://doi.org/10.47747/ijfr.v2i2.319>
- Granger, C. (1969). Investigating Causal Relations By Econometric Model And Cross-spectral Method. *Econometrica*, 37: 424-438
- Gujarati, D.N. (2002). *Basic econometrics*. New York: Tafa mc grew hill companies.
- Hossain. A. (2005). The sources and dynamics of inflation in Indonesia: An ECM Approach. *African Journal of Accounting, Economics, Finance and Banking Research*, 5(5).

- Ikhide, S.I and Alawode, A.A. (1993). Financial sector reforms, macroeconomic instability and the order of economic liberalization: Evidence from Nigeria. *AERC workshop paper*, Nairobi. May 28-June 4.
- Iyoha, M.A. (1998). *Macroeconomics for developing world*. Benin: Miyo Educational Publisher
- Jhingan, M, L. (2004). *Money, Banking, International Trade And Public Finance*. Delhi; Vrinda Publications.
- Jhingan, M. L. (2005). *Macroeconomics*. Delhi: Vrinda
- Jhingan, M. L. (2006). *Macroeconomic theory*. New Delhi: Vrinda publishers
- Johansen, S. & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—with applications to the demand for money. *Oxford Bulletin of Economics and Statistics*, 52, 169– 210.
- Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control*, 12, 231–254.
- Laidler, DEW. (1993). *The demand for money: Theories, evidence and problems (4th edition)*. New York: Harper Collins
- Lucas, R., (2016). Nobel lecture: Monetary neutrality. *Journal of Political Economy*, 104: 661- 82.
- Mahara, T.S. (2021). An empirical investigation between money supply, inflation, capital expenditure and economic growth in Nepal. *Quest Journal of Management and Social Sciences*, 3(1), 23-39.
- Mansor, A. (2005). Monetary policy and sectoral effect: A case study of Malaysia. *Applied Econometrics and International Development*, 5(4)
- Masha, I. (2000). New perspectives on inflation in Nigeria. *CBN economic and financial review*, 38(2).
- Montiel, P.J. (1995). Financial policies and economic growth: Theory, evidence and country specific experience, from Sub-Saharan Africa. *AERC special paper*, 18.
- Muktar, D. G. and Muhammad, H. N. (2017) Impact of Money Supply on Economic Growth in Nigeria (1981 – 2015), *Dutse Journal of Economics & Development Studies, ISSN 2356-6130 (Paper) Vol. 3. No. 1. July, 2017. Pp.133-144*
- Musibau, A. B. and Muhammed, I. S. (2011) Money Supply, Inflation And Economic Growth In Nigeria, *Asian-African Journal of Economics and Econometrics, Vol. 11, No. 1, 2011: 147-163*
- Neusser, L & Kinger, M. (1996). *Manufacturing growth and financial development: Evidence from OECD countries*. Mimeo university of Berne.
- Nwankwoeze, I. (2011). *The impact of money supply on economic growth in Nigeria*. A project work submitted to the department of economics Faculty of management and social sciences, Caritas University, Amorji – Nike, Enugu.
- Nwaobi, A.O. (2013). M2 targeting, money demand and real GDP brought in Nigeria. *Journal of Business and Public Affairs*, 1(12): 25- 34.
- Nzotta, S. N. (2004). *Money, Banking and Finance*. Owerri; Hudson- Jude.
- Obi, C. O. (2021) Monetary Policy Instruments and Manufacturing Sector Output in Nigeria. *International Journal of Innovative Finance and Economics Research* 9(2):85-100.
- Odedokun, K. (1996). Alternative economic approaches for analysing the role of the financial sector in economic growth. Time series evidence from LDC's. *Journal of Development Economics*, 50(1):119-146.
- Odiba, E.O, Apeh, A.S & Daniel, E.O. (2013). Money supply and inflation in Nigeria. *Journal of Business and Organisation Development*, 5(1)
- Ogunmuyiwa, M. S. and Ekone, F. A. (2010) Money Supply - Economic Growth Nexus in Nigeria, *Journal of Social Sciences*, 22(3): pp199-204
- Ojo, M.O. (1993). *A review and appraisal of Nigeria experience with financial sector reform*. Lagos: Spectrum books
- Omobolanle, Y. R. (2021) Money Supply and Inflation Effects on Economic Growth in Nigeria, *The International Journal of Humanities & Social Studies*. Issn 2321 – 9203
- Omodero, C. O. (2019) Effect of Money Supply on Economic Growth: A Comparative Study of Nigeria and Ghana. *International Journal of Social Science Studies*, Vol. 7, No. 3; ISSN 2324-8033 E-ISSN 2324-8041

- Opata, N. M. B., and Obasikene, A. C. (2021). The impact of money supply on economic growth in Nigeria. International Digital Organization for Scientific Research, issn: 2579-0765 idosr *Journal of Current Issues In Social Sciences* 7(1): 46-59, 2021.
- Owoye, O & Onafowora, A.O. (2007). M2 targeting ,moneydemand and real GDP growth in Nigeria: Do rulesApply? *Journal of Business and Public Affair*, 1(2):25-34
- Pesaran, M. H., Shin, Y and Smith, R. J. (2001) Bounds Testing Approaches to the Analysis of Level Relationships, *Journal of Applied Econometrics*, 16, 289-326
- Robinson, M.O. (1952). *The generalization of the general theory in the rate of interests and other essays*. Obosi: Pacific Publications.
- Romer, P. (1987). Growth based on increasing returns due to specialization. *American Economic Review*, 77, 56-62.
- Romer, P. (1990). *Endogenous technical change*. *Journal of Political Economy*, 98, 71-102
- Shaw, E.S. (1973). *Financial deepening in economic development*. New York: Oxford University press.
- Sims, C.A. (1972). Money, income and causality. *The American Economic Review*, 62 (1)
- Soyibo, I and Olayiwola, K. (1996). Interest rate policy and the promotion of savings, investment and resourcemobilization in *Nigeria. Research report*, 24. Ibadan: develop policy centre
- Taylor, J.B. (1979). *Improvement in monetary policy and implications for Nigeria*. Awka: Joanne educational publishers Ltd
- Uduakobong, I. (2014). Money supply and economic growth in Nigeria: An Econometric Analysis. *Journal of Economics and Sustainable Development*, 5(12)
- Usman, R.D & Lazarus Z.W (N.D.). *Interaction among money supply, inflation and output in Nigeria: A necessity for sustainable economic growth*. *Journal of Development Economics*, 80(1): 478-500
- Uzugu, J.J. (2015). Monetary dimension of the Nigeria economic crisis. Empirical evidence from a co-integrated paradigm. *Nigeria Journal of Economics and Social Studies*, 39(2): 145 – 167.
- Yahya, K.A. (2000). *Structural disequilibrium and inflation in Nigeria: A theoretical and empirical analysis*. Centre for economic research on Africa, school business, Montclair state university, upper Montclair, New Jersey, 07043,
- Yugang-He (2017) A Study on the Relationship between Money Supply and Macroeconomic Variables in China, *Mediterranean Journal of Social Sciences*, Vol 8 No 6 November 2017