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# Impact of Money Supply on the Growth of the Nigerian Economy, 1976 – 2015

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***Abstract:*** *Economic growth is one of the important macro-economic objectives of Nigeria and this study examines the impact of money supply on the growth of the Nigerian economy. The research was anchored on theclassical quantity theory, Keynesian theory and the Monetarist theory that provided justifications for the conceptual and empirical discussion. This research employed ex-post facto design. It adopted the neo-classical production model and applied econometrics techniques to time series data. All estimations were performed with econometrical software called EVIEWS version 9.0. Empirically, the result showed that money supply is not significant in the short-run. In the long-run money supply is significant but has a negative impact on economic growth. The causality test showed that money and economic growth are independent of each other, meaning that there is no predictive power of money supply in explaining the economic growth and vice versa. Thus, increment in money supply is incapable of generating growth in the Nigerian economy. The implication is that government should not pay so much attention on money supply as a major tool of monetary policy towards the achievement of economic growth.Also in the estimated results investment (GFCF) is significant in long-run and not in the short-run, this is expected because capital accumulation takes time to yield returns. However, labour is significant in the long-run and in short-run thus government should encourage capital investments in productive sectors of the economy such as agriculture, education (which will help to enhance the quality of labour), transport, power, health etc.*

***Keywords:*** *Money Supply, Economic Growth, Gross Fixed Capital Formation.*

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## I. Introduction

Money supply in relation to economic growth has received more attention than any other subject matter in the field of monetary economics in recent years. Because of the importance of economic growth among the macro-economic objectives of developed and developing nations, persistent concern has always been given among monetary economists such as Asinya (2009) to the relationship between money supply and output.

Money supply is synonymous with terms such as money stock, quantity of money and stock of money. It is the total amount of money in the economy. There are three alternative views regarding measurement of money supply: the most common view is associated with the traditional Keynesian thinking which stresses the medium of exchange function of money and is usually designated by ($M_1$). $M_1$ is defined as currency with the public and demand deposit with commercial banks. It can also be called high powered money or narrow money. The second view is designated as ($M_2$) and is known as broad money. It is associated with modern quantity theorist headed by Friedman and $M_2$ consist of $M_1$ plus time and saving deposits. The third view is the broadest and is associated with Shaw (1973). It includes $M_2$ plus deposits of savings bank, building societies, loan associations and deposits of other credit and financial institutions (Jhingan, 2004).

The Central Bank of Nigeria defines money supply in two ways: narrow and broad money that is $M_1$ and $M_2$ as explained in the above paragraph. Since the establishment of the Central Bank of Nigeria in 1959, it has continued to play the traditional role expected of a central bank which is the regulation of the stock of money in such a way as to promote the social welfare (Ajayi, 1999). The economic environment that guided monetary policy before 1988 was characterized by the dominance of the oil sector, the expanding role of the public sector in the economy and over-dependence on imports. In order to maintain price stability and a healthy balance of payment position, monetary management depended on the use of direct monetary instruments such as credit ceilings, selective credit control, administered interest and exchange rates, as well as the prescription of cash reserve requirements and special deposits.

The most popular instrument of monetary policy was the issuance of credit guideline which brought about sectoral allocation of bank credit to stimulate the productive sectors and thereby stem inflationary pressures. The fixing of interest rates at relatively low levels was done mainly to promote investment and growth. Occasionally, special deposits were imposed to reduce the amounts of free reserves and credit creating

capacity of the banks. Minimum cash ratios were stipulated for the banks in the mid-1970s on the basis of their total deposit liabilities, but since such cash ratios were usually lower than those voluntarily maintained by the banks, they proved less effective as a resistant on their credit operations.

Evidence in the Nigerian economy has shown that since the 1970s, some relationship exist between the stock of money and economic growth. Over the years, Nigeria has been controlling her economy through variations in her stock of money. Consequent upon the effect of the collapse of oil price in 1981 and the Balance of payment deficit experienced during the period, various methods of stabilization ranging from fiscal to monetary policies were used and interest rates were fixed. Also, the Structural Adjustment Programme (SAP) showed that reducing money stock through increased rate would lower gross national product. Thus, the notion that stock of money varies with economic activities applies to the Nigerian economy (Laidler, 1993).

The implication of the stability of the relationship between money supply and economic growth will show the effectiveness of monetary policy following the conventional Hicksian IS-LM analysis.

### 1.1 Research hypotheses

The researcher has formulated two hypotheses for testing:

**Hypothesis I**

Ho: Money supply has no significant impact on the economic growth of Nigeria.

**Hypothesis II**

Ho: Gross fixed capital formation has no significant impact on the growth of the Nigerian economy.

## II. Literature Review

### 2.1 Theoretical framework

The concept of money and changes in the money stock are important aggregates that have far reaching implications for economic policy formulation. The changes in money stock have significant effects on the pattern of economic relations and form the basis for the articulation of measures necessary for ensuring aggregate economic performance in any economy. Thus, the concept of money is crucial in the study of monetary theory. What then is monetary theory?

Monetary theory examines the relationship existing between money and economic activities. It seeks to explain how changes in the stock of money affects overall economic activities. It also explains how the demand and supply of money influence prices, interest rates, output, incomes and employment. Simply put, monetary theory is the foundation for monetary policy formulations (Nzotta, 2004).

Basically this theory adopts an eclectic approach, which means that this research is not pinned to a particular theory but it adopts various theories which include:

i. Classical quantity theory
ii. Keynesian theory
iii. Monetarist theory

**Classical monetary theory**

The classical theory of money in its original and crude form asserts that there is a direct and proportionate relationship between changes in the quantity of money and the general price level. The formulation of this crude theory posits that if money supply increases by 10%, then general prices would also increase by 10%. This formulation is also attributed to the writings of the French economist - Jean Bodin published about 1968. Later in 1952, David Hume made a better exposition of this quantity theory of money as cited in (Nzotta, 2004). The crude theory could be stated as follows:

$P = KM$

Where P = General price index

K = Constant Proportionality, M = Money supply

Where K = v/y

V = Velocity of money;

Y = real output

Anyanwu and Oaikhenan (1995) asserted that the classical economist did not introduce the role of money in their model in terms of its demand and supply.Instead, they introduced money by using quantity theory. In short, they related the level of an economy commodity prices to the quantity of money in the economy and the level of its commodity production. Two very similar, "quantity theory" formulations were used to explain the level of prices, viz: the transactions formulations or the equation of exchange, and cash balances formulation or the Cambridge equation.

**Keynesian monetary theory**

Keynes based his theory on the following assumptions.

1) As long as there is unemployment, all factors of production are in a perfectly elastic supply state.
2) The unemployed factors are homogenous, perfectly divisible and interchangeable.
3) As long as prices do not rise or fall as output changes, there will be constant returns to scales
4) Finally, as long as there are unemployed resources, effective demand and the quantity of money change in the same direction (Jhingan, 1990).

Keynesians have done a great job in promoting their set of ideas. Rather than treat monetary theory in two separate compartments as the classical do, they integrate monetary theory with value theory. Apostles of Keynes do not buy the classical notion that the relationship between money and prices is direct and proportional. They share the view that it is indirect through the rate of interest. As for the role of money in economic activity, the Keynesian position is that money is not a veil rather it affects real variable in the economy. The transmission mechanism is that when there is an increase in money supply, the first impact of this change is to reduce the rate of interest. A lower interest rate has the tendency to increase investment since the latter is a decreasing function of the rate of interest. An increase in investment raises aggregate demand and brings about a rise in income, output and employment. Implicit in the above view is the idea that an increase in money supply affects prices only when the level of full employment has been reached on or before. Keynesians seek to stabilize the economy through activities of monetary and fiscal policy even though they prefer the latter (Rebmann and Levacic, 1982).

Fiscalists consider variables other than money supply in their explanation of depressions and inflations. They share the view that depressions are caused by deficiencies in aggregate demand and that the deficiencies could be taken care of by an increase in government expenditure. This expenditure can be financed through issuing bonds, printing more money and borrowing. Borrowing from the domestic financial market has the tendency to increase the cost of credit while printing more money could result in inflation.

**Monetarist theory**

In 1956, Professor Milton Friedman presented a "restatement of the quantity theory" in modern terms. This resulted in a new and more sophisticated version of the quantity theory and in a manner amenable to empirical testing.

Friedman's concern was to show that velocity (or demand for money) was a stable function of a limited number of other important variables, i.e. that velocity bears a stable, predictable relationship to limited number of other important variables. His approach was to concentrate on the determinants of how much money people will hold rather than the motives for holding more.

Monetarism consists of the school of thought that the demand for money is a stable function of many variables and that money supply is the most important determinant of interest rate, incomes (output), employment and prices (Woods,1980). The monetarists contend that all changes in money income can be traced to changes in the supply or demand for money. The central theme in all the views of the monetarists headed by Milton Friedman is that money matters in economic activities and as such monetary policy is a more viable economic stabilization measure than fiscal policy. This contention contrast sharply with the views of the Keynesians of fiscalists, who believe that fiscal policy is a more potent instrument for economic stabilization and aggregate income performance. However the Keynesians and the monetarists agree that both fiscal and monetary policies have significant effects on aggregate demand and general price levels.

The major tenets of monetarism could be stated as follows:

a) Money supply has a direct and significant impact on national income and expenditure.
b) Interest rates have no effect on the supply and demand for money. The demand for money is the transactions demand for money, which is determined by the level of income.
c) Change in the general price level is essentially a monetary phenomenon and exogenously determine by the monetary authorities.

Monetarist accepts the growth rule, which implies that growth in monetary aggregates affects aggregate economic performance. Thus, the need to focus on money stock as the proper target of monetary policy. Under monetarism, money supply is the target of monetary policy. Variations in the aggregate money supply affect the achievement of other macro-economic objectives (Nzotta, 2004).

The conventional Hicksian IS-LM model synthesizes the real and monetary component of the economy and enables us to properly understand the effect of money, government expenditure and other macro-economic policies on the level of aggregate output. The IS represent the investment - saving identity, while the LM represent the liquidity demand -money supply equality. The equilibrium in the goods market yields a negative relationship between the level of aggregate output and the interest rate. To derive this, assume a closed three

sector economy; with aggregate demand represented by consumption expenditure by households; investment demand by firms and government expenditure on good symbolically.

$$AD = C + I + G$$

Where AD = Aggregate demand,
C = household consumption spending
I =Investment
G = Government expenditure

From our general knowledge of macroeconomics, aggregate demand equal to aggregate income and equal to aggregate supply (AD=AS). Consumption, according to the Keynesian theory, is a function of disposable income, that is, C(Y), and I is a function of interest rate r, and income (y), that is: $I = I(r)$ $(I_y>0)$ $I_r< 0$

In other words, investment is decreasing in interest rate but increasing in income. The IS relationship can therefore be rewritten as:

$Y = C(Y) + I(Y_o r) + G$

Solving this relationship yields a downward sloping IS curve represented in the diagram in Fig. 2.1.

The LM curve, on the other hand, represents the koney market equilibrium condition:

$Ms = Md$

Where:

$M^s$ = Money supply

$M^d$ = Demand for real money balances

But $M^d = f(y,r)$

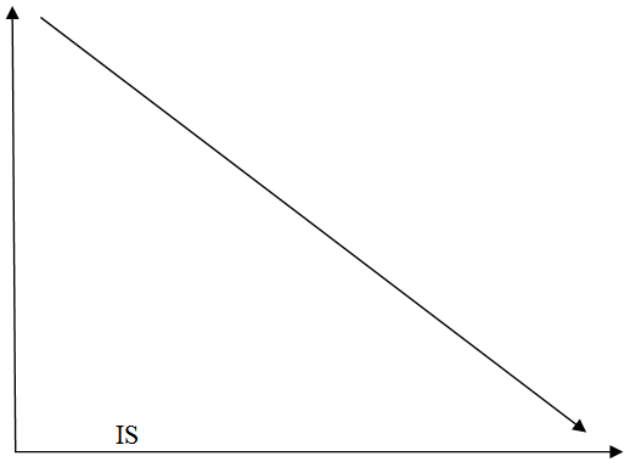


**FIG 2.1:** The IS model

Source: Nzotta (2004)

$y> 0, r < 0$

That is, money demand is an increasing function of the income level but a decreasing function of interest rate. Interest rate serves as the opportunity cost of holding money while the level of income determines the volume of transaction and serves as a scale factor. The higher the level of income the greater the volume of money held for transaction and other purposes.

Solving the money market equilibrium condition gives rise to an upward sloping LM curve depicted in Fig. 2.2a. To arrive at a macroeconomic wide equilibrium, all the markets must be in equilibrium. This, equilibrium in the market implies the intersection of the IS and LM curves (Fig. 2.2b).

At this juncture, the effect of money supply on output level can be examined.. Increase in money supply holding prices constant, would shift the LM curve outward to the right. As a result, interest rate will drop, leading to increase investment and higher output level, $y^1$ (Fig. 2.3). The reverse would be the case if money supply is decreased. Interest rate would rise and investment would decline in response to the high cost of funds leading to lower output level.

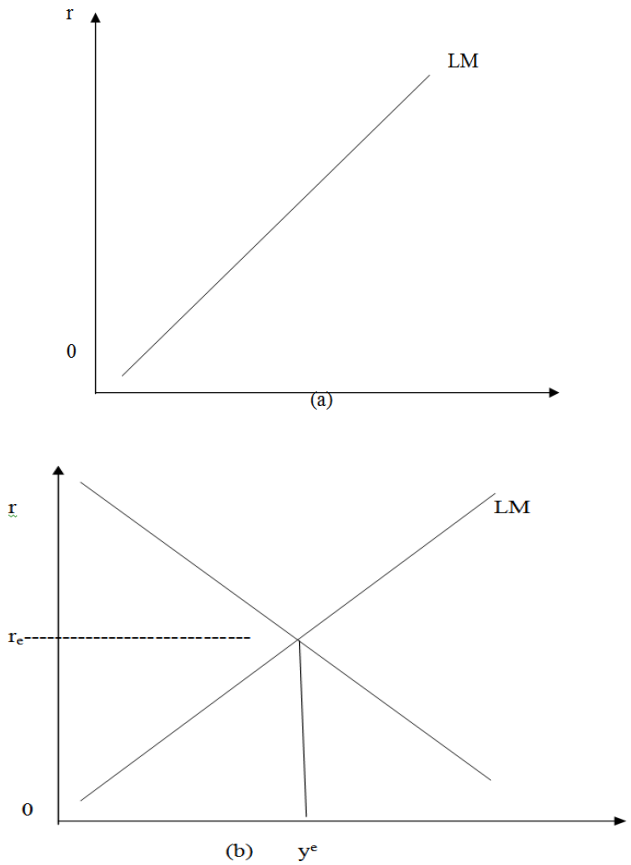


**FIG 2:2** The IS-LM curve
Source: Nzotta (2004)

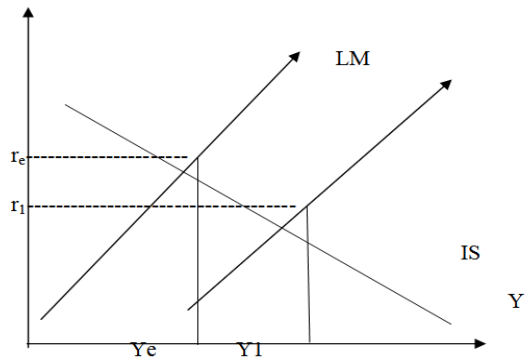


**Fig 2.3:** Equilibrium in IS-LM curve at different levels of output
Source: Nzotta (2004)

The basic conclusion from the above framework is that higher money supply is associated with higher level of aggregate output. Put another way; growth in money supply is positively related to growth in aggregate output (Anyanwu and Oaikhenan, 1995).

This framework was extended in the 1960s to the external sector, by Mundell (1968) and Fleming (1962). The Mundell-Fleming model also known as the Keynesian Open Economy Model, provides a simple framework for analyzing the role of monetary and fiscal policies in the context of an open economy. With regards to money supply, the Mundell-Fleming model, posits that under condition of perfect capital mobility and flexible exchange rate regime, monetary policy would be ineffective (Jhingan, 2004).

The basic growth theory considered in this work is the neoclassical growth model. The neo-classical growth theory, attributable to the works of Robert Solow will be used to formulate the model needed to carry out the test of the impact money supply on the economic growth. This theory postulates a continuous production

function linking output to the inputs of capital and labour. The assumptions of the model include: constant return to scale and no technical progress.
It can be stated as : Y = f(Kap, Lab)
Where:
Y = output
Kap = capital
Lab = labour
The simplified production function can be augmented with other factors, such as money supply, returns to scale variable, etc.

**Concept of money supply**

Generally, money supply is taken as the total amount of money (e.g. currency and demand deposits) in circulation in a country at any given time. Currency in circulation is made up of coins and notes, while demand deposits or checking current accounts are those obligations which are not associated with any interest payments (in Nigeria before January, 1990) and accepted by public as a means of exchange, drawn without notice by means of cheques.

Money supply can be defined as those assets which represent immediate purchasing power in the economy, and hence function as a medium of exchange. In Nigeria, the narrow money supply ($M_1$) is defined as currency outside the banks plus demand deposits of commercial banks plus domestic deposits with the central bank, less federal government deposits at commercial banks. In simple terms, $M_1$ is defined as $M_1 = C + D$
Where $M_1$ = narrow money supply
C = Currency outside banks
D = Demand deposits

Ajayi (1978) contends that $M_1$ is the appropriate definition of money in Nigeria. In UK narrow money includes $M_o$, $M_1$, and $M_2$. $M_o$ includes only notes and coins in circulation and in bank bills, $M_1$ include notes and coins circulation and sight deposits with bank; and $M_2$ includes not only notes and coins and bank current accounts, but also seven day bank deposits and some building society deposits. Broad money, on the other hand, includes narrow money assets but in addition; include those assets which have the quality of liquidity. They can be quickly and readily converted to cash and the conversion is achieved with little or no loss in terms of either interest penalty or capital loss through force sale. In the Nigerian context, broad money ($M_2$) is defined as $M_1$ plus quasi-money.
Quasi- money as used here is defined as the sum of savings and time deposits with the commercial banks. Thus, $M_2$ is symbolically shown as
$M_2 = C+D+T+S$
Where;
$M_2$ = broad money
C = Currency in circulation
D = Demand Deposits
T = Time Deposits
S = Savings deposits

Time deposits as used here are those obligations of the banks on which interest is paid and which at least potentially or formally, can be made available to the depositors after some delays and notice. In the U.K, broad money is primarily represented by $M_2$ plus $M_4$ and $M_5$ - $M_3$ consists of $M_1$ plus private sector holdings of sterling certificates of deposits; $M_4$ includes bank deposit accounts which are a very close substitute for bank deposit accounts, and include national savings (other than National Savings Certificates, SAYE, and long-term deposits) (Anyanwu, 1993).

It is important to note that narrow money could be preferred because they exclude investment balances which distort the usefulness of broad definitions, and they can usually be calculated more quickly. But broad money has two main advantages over narrow money. It includes funds which, while not themselves a medium of exchange, can be rapidly converted to transactional money, and it is more stable since increase in interest rates tend to cause people to manage their cash and current balances more carefully, causing a fall in the narrow money which in no way may reflect a change in transactional balances. In other words, higher interest rates mean a greater opportunity cost in holding non-interest bearing cash and current account balances (Anyanwu and Oiakhenan, 1995).

**Monetary policy**

Monetary policy refers to the combination of discretionary measures designed to regulate and control the money supply in an economy by the monetary authorities to change or regulate the availability quantity, cost or direction of credit in any economy, in order to attain stated economic objectives. In effect, the monetary

policy in force at any point in time, affects the level of money supply either by expanding it through contraction of same. It also influences the level and structure of interest rates and thus the cost of funds in the market depending on the prevailing economic conditions (Nzotta, 2004). On the other hand, fiscal policy is defined as that part of government policy concerning the raising of revenue through taxation and other means and deciding on the level and pattern of expenditure for the purpose of influencing economic activities or attaining some desirable macroeconomic goals. Such fiscal policy can be used for allocation, stabilization and distribution. In essence, a primary objective of fiscal policy is to balance the use of resources of the public and private sectors and by so doing, to avoid inflation, unemployment, balance of payments pressures, and income inequity. The Keynesians take preference in fiscal policy over monetary policy.

Macroeconomic policies are the actions of policy makers (government) directed at influencing the levels of employments, price, output, income and income distribution, the exchange rate and the balance of payments, etc. These variables of which policy makers (government) seeks to influence are known as policy "targets". Also, policy target variables are usually affected through the use of policy instruments also called instrumental variables.

These are principally exogenous variables whose values are determined independently of other variables in the system and which the government can manipulate to achieve desirable objective. Examples of instrumental variables are bank rate policy, open market operations, changes in reserve ratios, selection credit controls, etc. (Iyoha*etal*., 2003).

**Empirical review of the impact of money supply on the growth of the Nigeria economy**

Empirical researches have largely focused on addressing two issues first, to examine if money could forecast output given predictive power of past values of output. If so, the second issue is to examine whether such relationship is stable over time or not. Some researchers have found evidence of the predictive ability of monetary aggregates (Krol&Chanian, 1993). Though, some of these studies argued that such relationship seems to have changed overtime (Becketti&Moris, 1992). Similar studies that have found a strong support for a positive relationship between money supply and growth include (Mansor, 2005 and Owoye&Onafowara, 2007).

In Nigeria however, the influence of money supply on economic growth can only be taken with mixed reactions. Albeit, several studies have confirmed the significant of money supply and economic growth.Omoke and Ugwuanyi's (2010) findings revealed that there is a positive relationship between money supply and output, granger causality test showed that money supply doesn't granger cause output but on the other hand causality runs from output to money supply, showing a unidirectional relationship. Ogunmuyiwa and Ekone (2010) in the study of money supply and economy growth in Nigeria from 1980-2006 revealed that there is a negative relationship between money supply and gross domestic product. Causality test showed that money supply did not have the predictive power in explaining the growth of the real gross domestic product. Asogu (1998) examine the influence of money supply and government expenditure on gross Domestic product. He adopted the St. Louis model on annual and quarterly time series data from 1960 -1995.

He finds money supply export as significant. This finding according to Asogu corroborates the earlier work of Nwaobi (1999) while examining the interaction between money and output in Nigeria between periods 1960-1995. The model assumed the irrelevance of anticipated monetary policy for short-run deviations of domestic output from its natural level. The result indicated that unanticipated growth in money supply would have positive effect on output. A clear examination of the above shows that there is agreement on the determinant of economic growth in Nigerian economy. Findings of Odedokun (1996), Ojo (1993), Owoye and Onafowora (1996), Okedokun (2007) have confirmed a strong relationship between money supply and economic growth.

**The general performance of Nigerian economy**

According to Ekpo and Umoh (2012) the Nigerian economy has had a truncated history. In the period 1960-1970, the gross domestic product (GDP) recorded 3.1 percent growth annually. During the oil boom era, roughly 1970-1978, GDP grew positively by 6.2 percent annually - a remarkable growth. However, in the 1980s GDP had negative growth rates. In the period 1988-1997 which constitutes the period of structural adjustment and economic liberalization, the GDP responded to economic adjustment policies and grew at a positive rate of 4.0. In the years after independence, industry and manufacturing sectors had positive growth rates except for the period 1980-1988 where industry and manufacturing grew negatively by -3.2 percent and -2.9 percent respectively. The growth of agriculture for the periods 1960-1970 and 1970-1978 was unsatisfactory. In the early 1960s, the agriculture sector suffered from low commodity prices while the oil boom contributed to the negative growth of agriculture in the 1970s. The boom in the oil sector lured labour away from the rural sector to urban centers.

The contribution of agriculture to GDP, which was 63 percent in 1960, decline to 34 percent in 1988, not because the industrial sector increased its share but due to neglect of the agricultural sector. It was therefore

not surprising that by 1975, the economy had become a net importer of basic food items. The apparent increase in industry and manufacturing from 1978 to 1988, was due to activities in the mining sub-sector, especially petroleum. Capital formation in the economy has not been satisfactory. Gross domestic investment as a percentage of GDP, which was 16.3 percent and 22.8 percent in the periods 1965-73 and 1973-80 respectively, decreased to almost 14 percent in 1980-88 and increased to 18.2 percent in 1991-98. Gross National saving has been low and consists mostly of public savings especially during the period 1965-80. The current account balances before official transfers are negative for 1965-73, 1980-88 and 1991-98.

The economy never experience double - digit inflation during the 1960s. By 1976, however, the inflation rate stood at 23 percent. It decreased to 11.8 percent in 1979 and jumped to 41 percent and 72.8 percent in 1989 1995, respectively. By 1998, the inflation rate had, however, reduced to 9.5 percent from 29.0 percent in 1996.

Unemployment rates averaged almost 5 percent for the period 1976-1998. However, the statistics especially on unemployment must be interpreted with caution. Most job seekers do not use the labour exchanges, apart from the inherent distortions in the country's labour market. Based on some basic indicators, it appears that the economy performed well during the years immediately after independence and into the oil boom years. However, in the 1980's the economy was in a recession and up to the 21st century the country has experienced significant growth in her economy. The economy has been characterized with inflation, high unemployment rates, and recession. All data and analysis on the general performance of the Nigerian economy is from the work of (Ekpo&Umoh, 2012).

## III. Methodology

### 3.1 Research design

An ex-post facto design shall be employed. The study is designed to incorporate econometric research into the impact of money supply on the growth of the Nigeria economy. The study design will warrant exploring the co-integration theory and error correction mechanism to investigate if there is a static long-run equilibrium relationship between money supply (other selected variables) and economic growth.

### 3.2 Model specification

The study incorporates an aggregate Neo-classical Production Function into the IS-LM Synthesis to analyze the relationship between economic growth and money supply. Earlier in the theoretical framework Section, it was clearly shown within the Mundell-Fleming framework that increase in money supply will increase output under a flexible exchange regime. The Neoclassical economist postulate a continuous production function linking output to the inputs of capital and labour. The other assumptions of the model include:

i) Constant return to scale

ii) No technical progress

Mathematical, this can be stated as:

$Y = f(kap, lap)$ - - - (eq 1)

While Y = Output = gdp

kap= Capital

lap= Labour

For the purpose of this study, the explanatory variables are augmented with money supply (ms).

Hence:

$Y = f(kap, lab, ms)$ - - - - (eq 2)

Based on Neoclassical production function discussed in the theoretical framework, our model is specified thus;

$gdp = f(kap, lab, ms)$ - - - - (eq 3)

where,

gdp = logarithm of real gross domestic product

kap = logarithm of gross fixed capital formation

lab = logarithm of labour force

ms = logarithm of broad money supply

Equation (I) above is transformed econometrically as;

$gdp_t = \beta_o + \beta_1 kap_t + \beta_2 lab_t + \beta_3 ms_t + \mu_t$ - - - (eq 4)

$\beta_0$ = Constant

$\beta_{1-3}$ =Coefficient of the variables

$\mu_t$ = Stochastic error term

**4.1 Data presentation**

**TABLE 4.1**

Trends in money supply and Real GDP in Nigeria, 1976 - 2015

| Year | MS | RGDP |
|---|---|---|
| 1976 | 978.2 | 4219 |
| 1981 | 4241.2 | 27172 |
| 1986 | 15100 | 31546.8 |
| 1991 | 26277.6 | 201036.3 |
| 1996 | 68662.5 | 267550 |
| 2001 | 318763.5 | 281407.4 |
| 2006 | 1036080 | 329178.7 |
| 2007 | 1315869 | 356994.3 |
| 2008 | 1599495 | 433203.5 |
| 2009 | 1985192 | 477533 |
| 2010 | 2263588 | 527576 |
| 2011 | 1814846 | 561931.4 |
| 2012 | 4027902 | 596821.6 |
| 2013 | 5809827 | 634251.1 |
| 2014 | 9166835 | 672202.6 |
| 2015 | 10767378 | 716949.7 |

Source: CBN statistical bulletin 2015

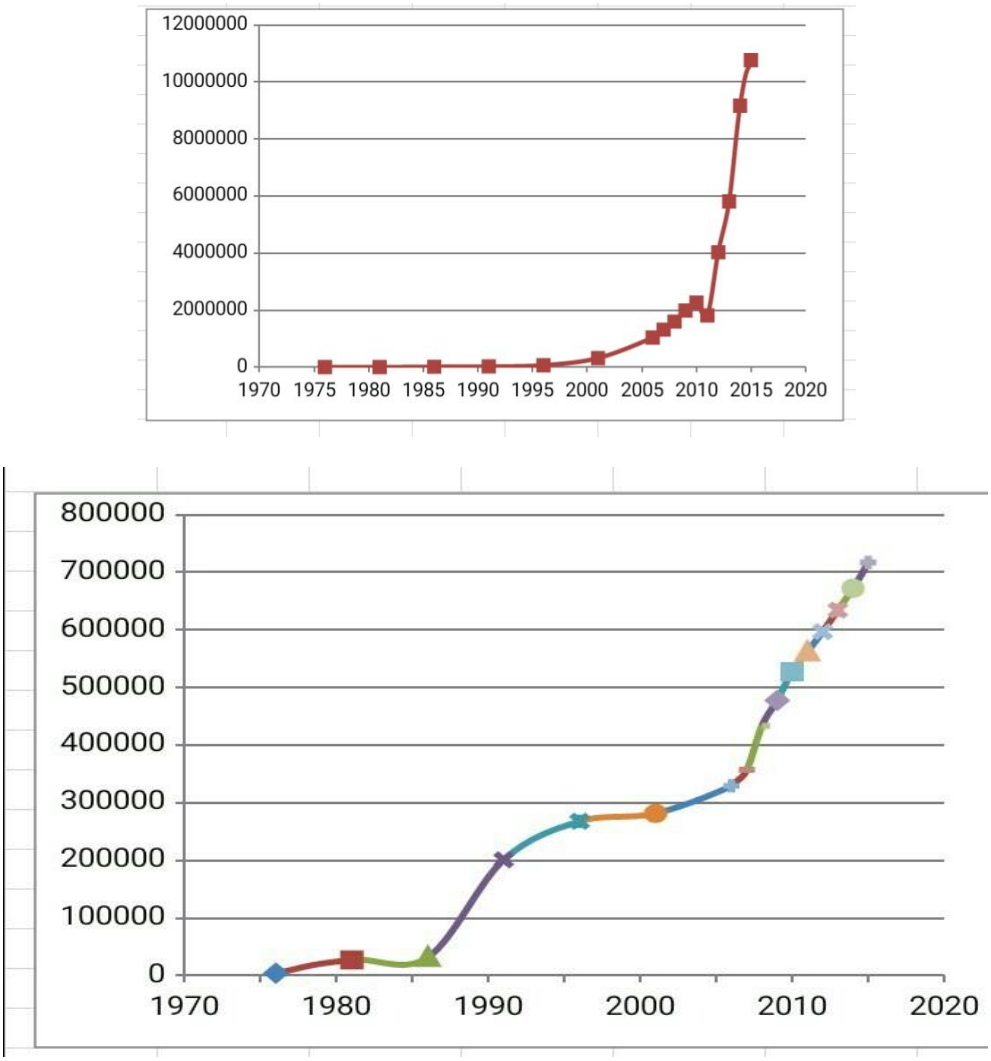


**FIG 4:** Trend of money supply and real GDP in Nigeria, 1976 – 2015. (Source: CBN 2015).

In 1996 money supply was N68662.5 but in 2001 over a five year period money rose to N318763.3 also looking at RDGP in 1990 it was N267550 by 1195 RDGP was still around N281407.4 showing very slow rate over five years period.

Inflation became so high that it moved from single digit to double digit. In 2001 we notice from table 4.2 that money supply and RDGP have swapped positions. This means the money supply became higher than RDGP and the margin of difference became even wider in the 21st century. From the year 2006 down to 2015 some monetary policies were enacted that led to RGDP and money supply growing apart. The monetary aggregates witnessed tremendous growths principally because of large injections into the system by the government in the form of public expenditure and also the large fiscal deficits ran by public sector. This in addition to the large fiscal deficits ran by the public sector. This in addition to the large expansion in the currency circulation over the period.

Finally, from the trend of events in Fig 4 we can see that money supply has inflationary tendencies. The effect of money supply on RGDP over three decades has been overwhelmed and eaten up by inflation.

**4.2 Test of hypotheses**

The researcher will adopt statistical significance using the T-statistic and unit root test a product of the Augmented Dickey-Fuller (ADF) test, for accepting or rejecting the null hypotheses. The following hypotheses will be restated here and tested.

**Hypothesis one**

$H_{01}$ Money supply has no significant impact on the economic growth in Nigeria
$H_{A1}$ Money supply has significant impact on the economic growth in Nigeria
Were the variables in the hypothesis are:
The dependent variable (GDP) = Gross domestic product
The independent variable = Money Supply
The figures bellow will assist the researcher to accept or reject the aforementioned hypothesis
R2 = 0.897462
Adjusted R2 = 0.95352
F-statistics = 1.478141
T-statistics = -3.4605350
Table value
T 0.01 =1.697
Refer to table 4.3 below

In view of the above the researcher will employ the use of t-statistics for the dependent variable in the model comparing it against the table value.

**Decision:** The outcome of the analysis indicates that the variables in the model are good predictors of the dependent variable GDP. It is evident that there is significant effect between money supply and economic growth as measure by GDP in the long run, therefore the null hypothesis is rejected while the alternate is accepted by comparing the calculated t-value (-3.4605350) against the table value (1.697). This will be further analyst using the unit root test.

**Hypothesis two**

$H_{01}$ Gross fixed capital formation has no significant impact on the growth of the Nigerian economy
$H_{A1}$ Gross fixed capital formation has significant impact on the growth of the Nigerian economy
Were the variables in the hypothesis are:
The dependent variable (GDP) = Gross domestic product
The independent variable = Capital Investment
Where labour supply was held constant
The figures bellow will assist the researcher to accept or reject the aforementioned hypotheses
R2 = 0.897462
Adjusted R2 = 0.95352
F-statistics = 1.478141
T-statistics = 0.631317
Table value bellow
T 0.01 =1.697
Refer to table 4.3 above

**Decision:** In view of hypothesis two considering the figure stated above where the t-statistics is used as a basis for rejecting or accepting the null hypothesis, the calculated t-value (0.631317) is > the table value (1.697). Therefore the null hypothesis is rejected while the alternate is accepted; it indicates that capital investment is significantly related with economic growth as measured by GDP both in the long and short run. It will further be analyze using the unit root test as stated bellow

(i) Unit root test

In literature, most time series variables are non-stationary and using non-stationary variables in the model might lead to spurious regressions. The first or second differenced terms of most variables will usually be stationary (Ramathan, 1992). The units roots test results in levels and first differences using the augmented Dickey-Fuller (ADF) are presented in table 4.2 below. The result shows that the null hypothesis is accepted at level for most variables.

This implies that most of the series are not stationary or integrated of order zero. Economic growth measured by logarithm of gross domestic product is not stationary at level for both the model with trend and without trend. The null hypothesis is rejected after differencing once. Thus economic growth is integrated of order one. Capital stock measured as the gross fixed capital formation is stationary at level in the model with trend but not in the model without trend. After differencing once, both models yield results that clearly show that the series is stationary. Therefore we conclude that capital stock is unmistakably integrated of order one.

**TABLE 4.2**

Unit root - Augmented Dickey Fuller test

| variables | level | | difference | | lag length | stationary status |
|---|---|---|---|---|---|---|
| | No trend | Trend | No trend | No trend | | |
| gdp | -2.3092 | -2.0202 | -5.7536 | -6.0580 | 0 | I(1) |
| kap | -2.0613 | -3.8358 | -4.9196 | -5.0472 | 3 | I(1) |
| Lab | -1.6900 | -3.5713 | -5.7582 | -5.9332 | 1 | I(1) |
| Ms | 0.3722 | -1.8950 | -5.7463 | -5.6628 | 0 | I(1) |
| **Critical Values:** | | | | | | |
| 1% | -3.6104 | -4.2118 | -3.6155 | -4.2191 | | |
| 5% | -2.9389 | -3.5297 | -2.9411 | -3.5330 | | |

Finally, the ADF test was conducted on money supply and the results presented in table 4.2 show that null hypothesis of unit roots was rejected after differencing once. Hence, the variable is clearly integrated of order one.

**(ii) Co-integration test**

Given that all the variables are integrated of order one, co-integration test was carried out to establish whether the variable though individually non-stationary could be co-integrated as a group and also to establish the existence of a long-run relationship among them. The Johansen procedure is used to achieve this. The results of this test are presented in Appendix 1

Both trace statistic and maximum eigenvalue test are used to determine the number of co-integrating vectors. The test statistic rejects the null hypothesis in favour of three co-integrating relationship at 5% significant level. But the maximum eigenvalue test indicates one co-integrating relation at the 5% level.

The long run coefficients emanating from the co-integration relationship normalization on economic growth is presented in Table 4.3. The coefficient money supply was equally statistical significant at one percent level but negative. In other words, increase in money supply will have an adverse effect on economic growth in the long run. This coefficient indicates that a percentage increase in money supply will in the long run result in about 0.6 percent reduction in the growth rate of the economy, measured as gross domestic product growth.

Short run dynamic model:

With the existence of a co-integrating relationship among the variables established, the over-parameterized and parsimonious error correction models for the relationship are estimated. The results of which are reported in Appendix 4 and 5. The parameters estimate along with the standard errors, t-values and the corresponding critical values are given in the tables. To decide on the lag length structure of the over

parameterized model, a battery of lag structure tests were conducted and the results uniformly selected one lag for the over parameterized model. Summary of the test result is presented in Appendix 2

**TABLE 4.3**

Long run relationship

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 5.908081 | 1.047874 | 5.638158 | 0.0000 |
| Ms | -0.599756 | 0.173322 | -3.460350 | 0.0014 |
| Lab | 4.293549 | 0.644554 | 6.661270 | 0.0000 |
| Kap | 0.089632 | 0.141976 | 0.631317 | 0.5318 |
| R-squared Adjustment | 0.905350 | Akaike info criterion | 11.81286 | |
| R-aquared S.E. of regression | 0.897462 | Schwarz criterion | 1.509193 | |
| Durbin-Waston Stat | 0.483266 | F-statistic | 1.478141 | |
| | 0.652384 | Prob(F-statistic) | 0.000000 | |

Dependent Variable: gdp

The result presented in Appendix 3 could not yield any interesting insight into the relationship between money supply and economic growth in Nigeria. Most of the variables turned up with statistically insignificant coefficients at 5 percent significant level. In addition, the $R^2$-adjusted is quite low at 21.1 per cent. However, the coefficient of labour stock is positive and significant. The coefficient of the error correction mechanism (ECM) is also statistically significant and has a priori expected negative sign.

In order to derive a more policy oriented model, the insignificant variables and their lag were eliminated in a stepwise manner one after the other, paying special attention to the Schwarz criterion and the Akaike information criterion as well as the standard error regression in the elimination process. The result of the preferred model is presented in Appndix 4.

**4.3 Discussion of findings**

There are considerable improvements in the performance model. The coefficient of determination or the adjusted $R^2$ has increased to 26.1 percent. The F-statistic is now 4.3 and is statistically significant at one percent. Thus the model as a whole is significant. The Durbin Watson statistics (1.83) shows that there is no autocorrelation.

Even in the short run dynamic model, the impact of labour stock on economic growth in Nigeria is substantial. The coefficient of labour is statistically significant at 5% level and positive. Although the coefficient of capital stock is positive, it is not significant in the short run dynamic model. This should not be surprising; capital accumulation takes time to yield fruits. The coefficient of money supply is not also statistically significant in the short run model although it has a positive sign. The favourable effect of money supply increase works through the effect of money supply on interest rate and investment.

An increase in money supply will cause a fall in interest rate and demand for investment will increase. However, the fall in interest rate also implies cheap credit for consumption. Hence the net effect of money supply increase depends on which effect is overwhelming; the investment effect or the consumption effect. In a situation where the two effects are in equilibrium, money supply may be neutral in the short run as the case for Nigeria in this study.

The $ECM_{t-1}$ coefficient show how slowly or quickly variables return to the equilibrium. It is expecting that sign of $ECM_{t-1}$ should be negative with high level of significance. The $ECM_{t-1}$ estimates the speed of adjustment to re-establish the stable equilibrium in the dynamic short run model. The appearance of $ECM_{t-1}$ with a negative sign and significance ensures that an established long run relationship can be attained. The coefficient of $ECM_{t-1}$is (-0.3193) and significant at 1 percent level of significance for the short run model. This implies that long run derivation in gross domestic production is corrected by 31.93 percent over each year:

Granger causality test results:

It has been stressed earlier in the introductory part of this study that association or correction does not imply causality. The fact that two events are observed or occurred at the same time does not necessarily mean that there is causality between the two. Granger (1969) developed a method for testing causality between two or more variables. In this study, we adopted the Granger causality test to determine the direction of causation between money supply and economic growth, measured by Real Gross Domestic Product (RGDP). There are three possible outcomes from a Granger causality test: first, given two variables, X and Y, X may Granger cause Y and Y does not Granger cause X. In this case we say there is a unidirectional causality flowing from X to Y. The reverse may also occur, in which case Y would Granger cause X, but X does not Granger cause Y.

Secondly, X may Granger cause Y and Y also Granger cause X. This is the case for bi-directional causality. It might require a simultaneous equation or a Vector Autoregressive (VAR) model to estimate the

relationship. Thirdly, the two variables may be independent to each other, in which case there is no Granger causal relationship between them.

In this, Pairwise Granger causality was carried out using Nigerian data from 1976 to 2015. The key variables of interest, money supply and economic growth was not refuted, neither was the null hypothesis that economic growth Granger cause money supply. The results are presented in Appendix 5.

Due to the sensitivity of Granger causality test to the lag structure, several lag lengths were chosen for the Granger causality test. However, due to limited space, only three of the results are reported in Appendix 6. The null hypothesis that economic growth does not Granger cause money supply was not refuted at lag length 2, 4 or 6. Similar results were obtained for the null hypothesis that money supply does not Granger cause economic growth.

## V. Summary of findings

The result from empirical analysis shows that a significant but negative relationship exists between money supply and economic growth in the long-run. This means that sustained increase in money supply in the long-run will lead to inflation which will be counterproductive to economic growth. This result reiterates the classical believe or thinking which says that money is inflationary in nature and will affect a nation's economy adversely in the long run. Also findings reveal that in the short-run there is no significant relationship between money supply and economic growth. This falls in line with the Keynesian thinking because they believe that in the short-run increase in money supply will decrease interest rate and this will increase investment which will eventually lead to economic growth. The result is negative as in the case of Nigeria, because for a long period of time the country practiced the fixed interest rate regime. The MundellFlemming model, also known as Keynesian open economy provides a simple framework for analyzing the result. It posits that under flexible exchange rate regime, increase in money supply would be very effective in increasing output. However, under fixed exchange rate regime which Nigeria has operated from 1970s to 1990s money supply will be ineffective on output, hence economic growth. This is why there is no significance of money supply on economic growth in the short-run. This corroborates the findings of Ogumuyiwa and Ekone(2010).

Also in the estimated results investment (GFCF) is significant in long-run and not in the short-run, this is expected because capital accumulation takes time to yield returns. However, labour is significant in the long-un and in short-run. Granger causality test showed no evidence of granger causality between money supply and economic growth.

## VI. Conclusion

This study evaluates the impact of money supply on the growth of the Nigerian economy using annual data from 1976-2015. The findings albeit shows that money supply has no significance on economic growth in the short-run, while in the long-run money supply is negatively related to economic growth. However, money supply does have a negative impact on the growth of Real Gross Domestic Product (RGDP), this findings negates some earlier findings in the literature that posits a positive relationship between money supply an economic growth which includes the works of Mansor (2005) and Owoye and Onafowara (2007). The study further reveals that investment will impact on economic growth in the long-run, while labour impact on the economic growth of Nigeria both in the short and long-run.

Research works by some authors had established unilateral causal relationship between money supply and economy growth in literature review. But this study shows that there is no causal relationship between money supply and economic growth. This finding reiterates the works of Ogunmuyiwa and Ekone (2010).

Therefore, government should take its focus off money supply as a major tool of monetary policy in causing growth in the Nigerian economy since results show that money supply is counterproductive due to inflationary tendencies of money supply.

## VII. Recommendations

i. Increment in the money supply in the long-run will tend to worsen inflationary trend and also is incapable of causing economic growth. It is therefore recommended that the government and monetary authorities focus on other instruments of monetary policy that is supportive of the growth objective of the government.
ii. Government should encourage capital investments in productive sectors of the economy such as agriculture, education (which will help to enhance the quality of labour), transport, power, health etc. Capital investment will yield return in the long run that will eventually contribute to economic growth and development. Investment in human capital and skilled manpower will cause a growth in the Nigerian economy because labour impacts on economic growth in the short and long run.

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## APPENDICES

### APPENDIX 1

Johansen Co-integration test results

Series: gdp lab kapms
Lags interval (in first differences): 1 to 3

Unrestricted Co-integration Rank Test (Trace)

| Hypothesized No. of CE(s) | Eigenvalue | Trace Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None * | 0.585770 | 67.70807 | 47.85613 | 0.0003 |
| At most 1 * | 0.412918 | 35.98006 | 29.79707 | 0.0085 |
| At most 2 * | 0.345300 | 16.80679 | 15.49471 | 0.0316 |
| At most 3 | 0.042354 | 1.557970 | 3.841466 | 0.2120 |

Trace test indicate 3 co-integrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
** Mackinnon-Haug-Michelis (1999) p-values

Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

| Hypothesized No. of CE(s) | Eigenvalue | Trace Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None * | 0.585770 | 31.72801 | 27.58434 | 0.0138 |
| At most 1 * | 0.412918 | 19.17326 | 21.13162 | 0.0919 |
| At most 2 * | 0.345300 | 15.24882 | 14.26460 | 0.0348 |
| At most 3 | 0.042354 | 1.557970 | 3.841466 | 0.2120 |

Max-eigenvalue test indicates 1 co-integrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
** Mackinnon-Haug-Michelis (1999) p-values

### APPENDIX2

Lag order selection criteria

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | -99.32677 | NA | 0.003657 | 5.740376 | 5916323 | 5.801786 |
| 1 | 43.71626 | 246.3519* | 3.17e-06* | 1.317470* | 0.437837* | 1.010520* |
| 2 | 56.21542 | 18.74873 | 3.99e-06 | -1.123079 | 0.460440 | -0.570388 |
| 3 | 65.75908 | 12.19468 | 6.27e-06 | -0.764393 | 1.522912 | 0.033937 |
| 4 | 83.39352 | 18.61413 | 6.92e.06 | -0.855196 | 2.135896 | 0.188775 |

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information critetion

**APPENDIX3**

Over-parameterized error correction model results

| Dependent Variable: D(gdp) | | | | |
|---|---|---|---|---|
| Variable | Coefficient | standard error | t-statistic | t-probability |
| C | 0.059886 | 0.120823 | 0.495651 | 0.6239 |
| D(gdp(1)) | 0.160415 | 0.169386 | 0.947037 | 0.3514 |
| D(kap) | 0.080172 | 0.127662 | 0.628001 | 0.5349 |
| D(kap(-1)) | 0.005870 | 0.112535 | 0.052158 | 0.9588 |
| D(lab) | 1.949593 | 0.760096 | 2.564931 | 0.0158 |
| D(lab(-1) | -1.140800 | 0.967737 | 1.178833 | 0.2480 |
| D(ms) | -0.109177 | 0.293697 | 0.371734 | 0.7128 |
| D(ms(-1)) | 0.129581 | 0.312145 | 0.415132 | 0.6811 |
| ECM(-1) | -0.384631 | 0.125061 | 3.075545 | 0.0046 |

| | | | |
|---|---|---|---|
| R-squared Adjustment | 0.381663 | Mean dependent | 0.132214 |
| R-aquared S.E. of regression | 0.211087 | S.D. dependent | 0.348446 |
| Sum squared resid | 0.309493 | Akaike info criterion | 0.695629 |
| Log likelihood | 2.777785 | Schwarz criterion | 1.083478 |
| Durbin-Waston | -4.216950 | F-statistic | 2.237495 |
| Stat | 2.051722 | Prob(F-statistic) | 0.053785 |

**APPENDIX 4**

Parsimonious short-run error correction results

| Dependent Variable: D(gdp) | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -0.012873 | 0.086112 | 0.149494 | 0.8821 |
| D(lab) | 1.603480 | 0.688906 | 2.327577 | 0.0262 |
| ECM(-1) | -0.319322 | 0.107161 | 2.979845 | 0.0054 |
| D(kap) | 0.003420 | 0.107973 | 0.031677 | 0.9749 |
| D(ms(-1)) | 0.180078 | 0.295970 | 0.608463 | 0.5470 |

| | | | |
|---|---|---|---|
| R-squared Adjustment | 0.340773 | Mean dependent | 0.132214 |
| R-aquared S.E. of regression | 0.260867 | S.D. dependent | 0.348446 |
| Sum squared resid | 0.299569 | Akaike info criterion | 0.549136 |
| Log likelihood | 2.961474 | Schwarz criterion | 0.764608 |
| Durbin-Waston | -5.433581 | F-statistic | 4.264664 |
| Stat | 1.832072 | Prob(F-statistic) | 0.006841 |

Source: Computed1

Note * Significant at 1%

** Significant at 5%

*** Significant at 10%

**APPENDIX 5**

Granger causality test

Pairwise Granger Causality Test
Date: 09/09/2016 Time: 16:00
Sample: 1976 - 2015
Lags: 2

| Null Hypothesis | Obs | F-Statistic | Probability |
|---|---|---|---|
| LNGDP does Granger Cause LNGDP | 38 | 0.57112 | 0.57038 |
| LNMS does not Granger Cause LNGDP | | 1.18394 | 0.31874 |

Pairwise Granger Causality Test
Date: 09/09/2016 Time: 16:00
Sample: 1976 - 2015
Lags: 4

| Null Hypothesis | Obs | F-Statistic | Probability |
|---|---|---|---|
| LNGDP does Granger Cause LNGDP | 36 | 0.60531 | 0.66218 |
| LNMS does not Granger Cause LNGDP | | 1.90512 | 0.13848 |

Pairwise Granger Causality Test
Date: 09/09/2016 Time: 16:00
Sample: 1976 2015
Lags: 6

| Null Hypothesis | Obs | F-Statistic | Probability |
|---|---|---|---|
| LNGDP does Granger Cause LNGDP | 34 | 0.36104 | 0.89526 |
| LNMS does not Granger Cause LNGDP | | 0.86187 | 0.53840 |

**APPENDIX 6**

Data of RGDP, $M_2$, GFCF and labour force

| Year | GDP(Real) | Broad Money $M_2$ | GFCF Investment | Labour For (Millions) |
|---|---|---|---|---|
| 1976 | 4,219.00 | 978.2 | 1353 | 4.2423 |
| 1977 | 4,715.50 | 1,041.80 | 1753 | 4.5386 |
| 1978 | 4,892.80 | 1,214.90 | 1871 | 4.9308 |
| 1979 | 5,310.00 | 1,522.50 | 3085 | 5.5312 |
| 1980 | 15,919.70 | 2,352.30 | 3637 | 6.2305 |
| 1981 | 27,172.00 | 4,241.20 | 5019.8 | 7.0824 |
| 1982 | 29,146.50 | 5,905.10 | 8107.3 | 7.8378 |
| 1983 | 31,520.30 | 7,998.80 | 9420.6 | 9.1456 |
| 1984 | 29,212.40 | 7,985.40 | 9386.3 | 10.4907 |
| 1985 | 29,948.00 | 10,224.60 | 9094.5 | 10.8629 |
| 1986 | 31,546.80 | 15,100.00 | 10841.2 | 11.8582 |
| 1987 | 205,222.10 | 16,161.70 | 18,220.60 | 14.7234 |
| 1988 | 199,685.30 | 18,093.60 | 17,145.80 | 14.7346 |
| 1989 | 185,598.10 | 20,879.10 | 13,335.30 | 14.2733 |
| 1990 | 183,563.00 | 23,370.00 | 9,149.80 | 13.9286 |
| 1991 | 201,036.30 | 26,277.60 | 8,799.50 | 14.6756 |
| 1992 | 205,971.40 | 27,389.80 | 11,351.50 | 13.7671 |
| 1993 | 204,806.50 | 33,667.40 | 15,228.60 | 13.9030 |
| 1994 | 219,875.60 | 45,446.90 | 17,562.20 | 14.5961 |
| 1995 | 236,729.60 | 47,055.00 | 26,825.50 | 16.9992 |
| 1996 | 267,550.00 | 68,662.50 | 40,121.30 | 18.0182 |
| 1997 | 265,379.10 | 87,499.80 | 45,190.20 | 19.4826 |
| 1998 | 271,365.50 | 129,085.50 | 70,809.20 | 21.9336 |
| 1999 | 274,833.30 | 198,479.20 | 96,915.50 | 21.4217 |
| 2000 | 275,450.60 | 266,499.90 | 105,575.50 | 20.4901 |
| 2001 | 281,407.40 | 318,763.50 | 141,920.20 | 23.3991 |
| 2002 | 293,745.40 | 370,333.50 | 204,047.60 | 26.4368 |
| 2003 | 302,022.50 | 429,731.30 | 242.899.80 | 25.1601 |
| 2004 | 310,890.10 | 525,637.80 | 242,256.30 | 22.9878 |
| 2005 | 312,183.50 | 699,733.70 | 231,661.70 | 27.6662 |
| 2006 | 329,178.70 | 1,036,079.50 | 331,056.70 | 35.0958 |
| 2007 | 356,994.30 | 1,315,869.10 | 372,135.70 | 34.2817 |
| 2008 | 433,203.50 | 1,599,494.60 | 499,681.50 | 35.3867 |
| 2009 | 477,533.00 | 1,985,191.80 | 865,876.50 | 36.9967 |
| 2010 | 527,576.00 | 2,263,587.90 | 863,072.60 | 40.2794 |
| 2011 | 561,931.40 | 1,814,846.10 | 804,400.80 | 43.8222 |
| 2012 | 596,821.60 | 4,027,901.70 | 1,546,525.70 | 44.9965 |
| 2013 | 634,251.10 | 5,809,826.50 | 1,915,348.80 | 49.4697 |
| 2014 | 672,202.60 | 9,166,835.30 | 2,030,510.00 | 50.7999 |
| 2015 | 716,949.70 | 10,767,377.80 | 2,442,703.50 | 54.2255 |

Source: CBN Statistical Bulletin, 2015

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